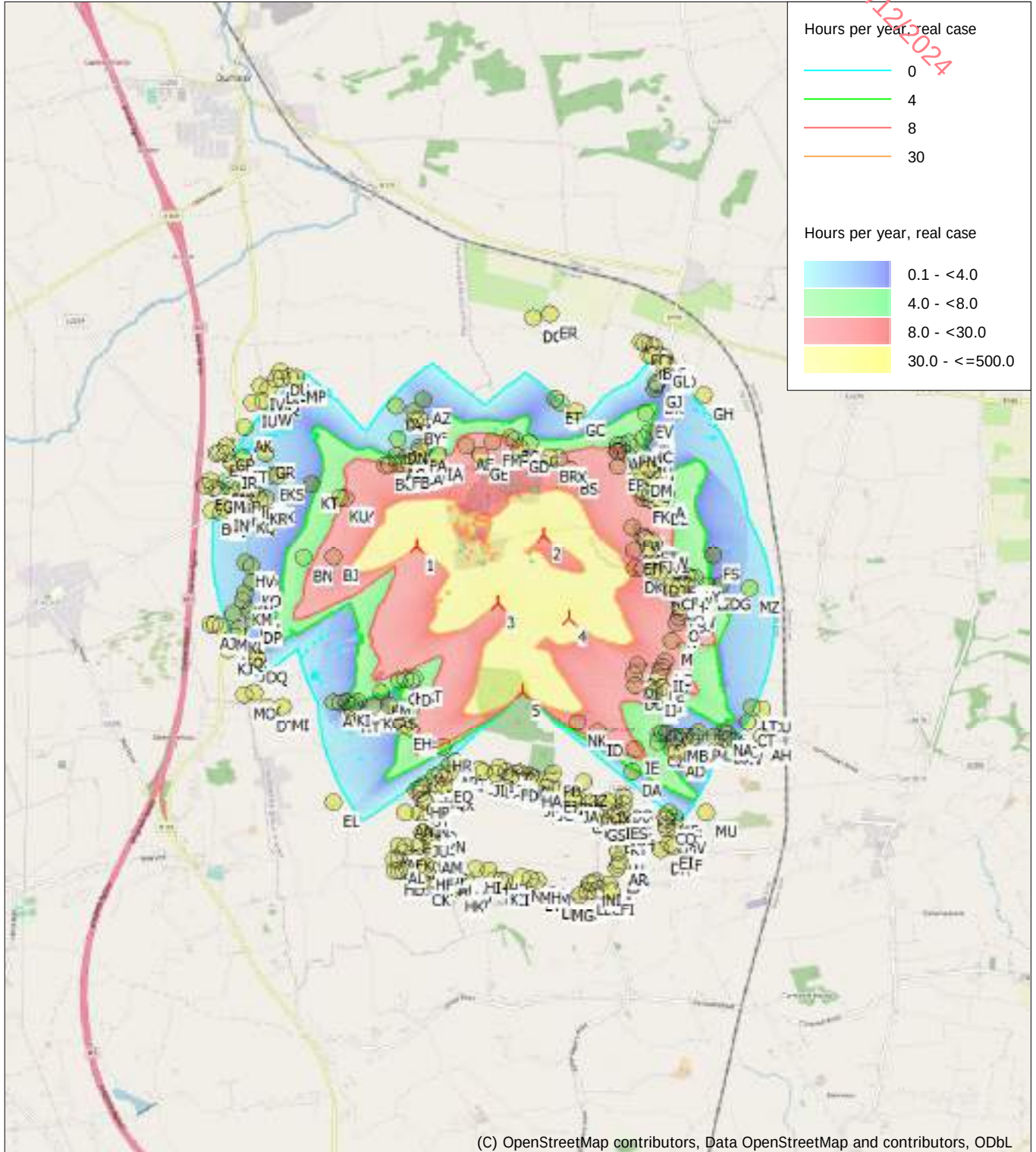


SHADOW - Map

Calculation: Kellystown N163 Real Case



0 500 1000 1500 2000 m

Map: EMD OpenStreetMap , Print scale 1:50,000, Map center Irish ITM-IRENET95 (IE), geocentric, GRS80 East: 708,030 North: 783,620
New WTG Shadow receptor
Flicker map level: Height Contours: CONTOURLINE_6918 Kellystown_3.wpo (3)
Time step: 2 minutes, Day step: 3 days, Map resolution: 10 m, Visibility resolution: 5 m, Eye height: 1.5 m

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time
N NNE NE ENE E ESE SE SSE S SSW SW WSW
160 97 158 383 373 261 461 767 532 825 1,031 1,215

W WNW NW NNW Sum
766 673 581 477 8,760

Monthly aggregation of real case reduction
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_6918 Kellystown_3.w
Receptor grid resolution: 1.0 m

All coordinates are in
Irish ITM-IRENET95 (IE), geocentric, GRS80

WTGs

	Easting	Northing	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
1	707,338	784,036	115.1	T01	Yes	NORDEX	N163/6.X-7,000	7,000	163.0	98.0	1,789	10.7
2	708,442	784,163	104.9	T02	Yes	NORDEX	N163/6.X-7,000	7,000	163.0	98.0	1,789	10.7
3	708,057	783,557	98.1	T03	Yes	NORDEX	N163/6.X-7,000	7,000	163.0	98.0	1,789	10.7
4	708,686	783,447	90.3	T04	Yes	NORDEX	N163/6.X-7,000	7,000	163.0	98.0	1,789	10.7
5	708,289	782,794	112.2	T05	Yes	NORDEX	N163/6.X-7,000	7,000	163.0	98.0	1,789	10.7

Shadow receptor-Input

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	H1	709,505	784,550	91.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
B	H2	709,367	784,550	93.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
C	H3	707,206	782,871	130.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
D	H4	707,318	782,870	131.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
E	H5	707,444	781,961	140.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
F	H6	707,513	781,507	158.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
G	H7	707,383	781,906	145.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
H	H8	705,584	783,319	107.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
I	H9	705,744	783,414	104.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
J	H10	705,902	783,048	123.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
K	H11	708,134	781,146	127.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
L	H12	706,829	782,648	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
M	H13	709,591	783,271	84.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
N	H14	709,625	783,428	81.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
O	H15	709,647	783,479	84.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
P	H16	709,657	783,517	86.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Q	H17	709,551	783,895	97.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
R	H18	709,459	783,967	94.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
S	H19	709,386	784,693	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
T	H20	709,354	784,771	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
U	H21	709,398	784,820	73.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
V	H22	709,114	784,973	73.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...



SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
W H23		709,077	784,968	73.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
X H24		708,564	785,327	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Y H25		709,371	785,841	63.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Z H26		709,336	785,853	64.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AA H27		709,496	782,453	88.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AB H28		709,526	782,458	88.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AC H29		709,557	782,461	87.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AD H30		709,649	782,293	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AE H31		707,754	784,932	85.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AF H32		707,338	785,150	88.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AG H33		707,139	784,828	105.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AH H34		710,397	782,450	63.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AI H35		705,824	784,510	80.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AJ H36		705,550	783,314	106.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AK H37		705,812	785,050	78.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AL H38		707,240	781,305	179.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AM H39		707,528	781,402	160.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AN H40		707,291	781,712	158.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AO H41		707,540	782,027	136.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AP H42		707,674	782,146	133.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AQ H43		708,690	781,931	116.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AR H44		709,175	781,337	87.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AS H45		707,126	782,653	129.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AT H46		707,344	782,894	131.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AU H47		706,698	782,663	128.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AV H48		706,639	782,666	128.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AW H49		709,674	783,593	86.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AX H50		708,565	784,842	79.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AY H51		707,289	785,222	92.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AZ H52		707,364	785,326	87.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BA H53		706,194	785,494	90.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BB H54		706,039	784,628	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BC H55		707,042	784,741	105.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BD H56		707,077	784,751	104.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BE H57		705,927	784,462	79.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BF H58		705,705	784,510	85.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BG H59		705,521	784,573	88.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BH H60		705,656	784,393	92.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BI H61		705,616	784,300	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BJ H62		706,612	783,934	103.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BK H63		705,816	783,140	110.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BL H64		706,071	785,473	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BM H65		706,123	785,479	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BN H66		706,349	783,922	93.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BO H67		705,540	784,312	102.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BP H68		705,596	784,822	78.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BQ H69		708,136	785,009	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BR H70		708,483	784,848	80.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BS H71		708,669	784,739	80.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BT H72		709,294	784,805	78.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BU H73		709,311	784,893	73.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BV H74		709,363	785,756	61.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BW H75		709,335	785,767	61.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BX H76		709,291	785,868	64.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BY H77		707,293	785,144	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BZ H78		707,340	784,844	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CA H79		707,301	784,792	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CB H80		707,252	784,779	97.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CC H81		709,390	784,492	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CD H82		709,503	783,935	96.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CE H83		709,610	783,743	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CF H84		709,573	783,753	94.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CG H85		709,535	783,765	95.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CH H86		709,484	783,778	96.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
CI H87		708,177	781,136	125.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CJ H88		707,792	781,047	132.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CK H89		707,456	781,117	152.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CL H90		707,203	781,303	180.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CM H91		707,245	781,206	170.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CN H92		707,415	781,706	152.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CO H93		709,577	781,624	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CP H94		709,574	781,659	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CQ H95		709,571	781,704	81.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CR H96		709,565	781,730	82.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CS H97		709,652	781,734	79.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CT H98		710,271	782,572	67.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CU H99		710,392	782,695	67.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CV H100		710,154	782,410	71.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CW H101		710,096	782,415	72.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CX H102		709,782	782,400	81.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CY H103		709,653	782,327	85.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CZ H104		709,486	782,375	89.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DA H105		709,265	782,119	91.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DB H106		709,201	781,889	100.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DC H107		709,196	781,773	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DD H108		709,275	782,875	91.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DE H109		709,266	782,972	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DF H110		709,289	783,047	90.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DG H111		710,003	783,760	89.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DH H112		709,324	783,893	105.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DI H113		709,411	783,875	103.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DJ H114		709,463	783,861	102.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DK H115		709,255	783,893	105.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DL H116		709,467	784,495	94.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DM H117		709,282	784,741	84.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DN H118		707,145	784,976	107.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DO H119		708,308	786,067	65.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DP H120		705,922	783,376	107.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DQ H121		705,963	783,037	123.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DR H122		709,536	781,439	81.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DS H123		706,804	782,632	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DT H124		706,066	782,611	127.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DU H125		706,111	785,544	88.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DV H126		707,126	785,263	97.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DW H127		709,426	784,111	91.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DX H128		709,392	785,462	69.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DY H129		708,305	782,018	122.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DZ H130		708,330	782,064	124.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EA H131		708,379	782,060	124.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EB H132		708,418	782,035	123.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EC H133		708,356	782,014	122.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ED H134		708,578	782,087	121.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EE H135		709,648	781,687	77.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EF H136		709,004	781,720	103.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EG H137		709,126	781,613	94.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EH H138		707,259	782,476	128.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EI H139		709,611	781,494	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EJ H140		707,668	782,062	132.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EK H141		707,304	781,411	179.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EL H142		706,657	781,789	159.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EM H143		707,054	782,762	127.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EN H144		709,238	784,049	99.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EO H145		709,146	784,894	74.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EP H146		709,081	784,786	78.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EQ H147		707,624	782,023	133.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ER H148		708,458	786,104	60.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ES H149		709,179	781,738	99.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ET H150		708,515	785,357	78.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
EU H151		709,357	784,502	92.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EV H152		709,311	785,254	65.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EW H153		708,444	781,087	111.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EX H154		705,947	782,729	126.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EY H155		705,470	784,531	91.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EZ H156		707,342	784,881	98.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FA H157		707,342	784,908	100.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FB H158		707,196	784,755	100.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FC H159		709,256	785,879	64.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FD H160		708,205	782,041	121.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FE H161		708,510	781,960	119.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FF H162		707,719	782,168	133.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FG H163		707,234	784,825	101.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FH H164		709,237	781,637	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FI H165		709,111	781,063	90.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FJ H166		709,367	784,069	93.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FK H167		709,307	784,515	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FL H168		709,352	785,081	70.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FM H169		707,979	784,969	85.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FN H170		709,169	784,987	73.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FO H171		709,496	785,693	59.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FP H172		709,460	785,707	60.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FQ H173		709,467	785,745	60.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FR H174		709,433	785,761	62.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FS H175		709,934	784,019	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FT H176		709,387	784,150	92.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FU H177		709,340	784,163	94.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FV H178		709,318	784,178	94.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FW H179		709,215	784,252	97.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FX H180		709,312	784,556	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FY H181		709,279	784,682	86.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FZ H182		709,116	784,922	74.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GA H183		709,082	784,914	74.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GB H184		709,070	784,913	74.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GC H185		708,707	785,255	80.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GD H186		708,216	784,924	80.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GE H187		707,874	784,854	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GF H188		708,178	784,996	82.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GG H189		708,305	784,969	81.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GH H190		709,818	785,414	62.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GI H191		709,402	785,500	69.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GJ H192		709,405	785,517	69.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GK H193		709,453	785,665	59.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GL H194		709,456	785,693	59.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GM H195		705,544	784,509	90.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GN H196		705,680	784,453	88.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GO H197		705,657	784,572	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GP H198		705,651	784,873	80.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GQ H199		706,010	785,393	90.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GR H200		705,999	784,823	97.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GS H201		708,974	781,721	104.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GT H202		708,947	781,729	104.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GU H203		708,977	781,847	107.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GV H204		708,935	781,765	106.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GW H205		708,905	781,831	109.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GX H206		708,838	781,781	109.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GY H207		708,796	781,872	111.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GZ H208		708,636	781,939	116.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HA H209		708,397	782,002	121.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HB H210		708,267	782,013	120.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HC H211		708,078	782,066	123.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HD H212		707,212	781,200	170.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HE H213		707,323	781,217	168.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HF H214		707,484	781,251	162.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

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SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
HG	H215	708,081	781,151	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HH	H216	708,031	781,228	128.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HI	H217	707,920	781,237	134.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HJ	H218	707,831	781,155	137.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HK	H219	707,748	781,065	135.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HL	H220	707,681	781,206	148.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HM	H221	707,513	781,338	162.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HN	H222	707,561	781,590	149.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HO	H223	707,469	781,664	152.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HP	H224	707,425	781,885	142.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HQ	H225	707,542	781,969	136.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HR	H226	707,609	782,297	132.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HS	H227	707,268	782,879	130.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HT	H228	706,805	782,611	128.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HU	H229	705,896	783,448	103.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HV	H230	705,841	783,863	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HW	H231	705,887	784,475	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HX	H232	706,014	784,437	79.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HY	H233	706,701	784,453	96.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HZ	H234	707,338	784,807	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IA	H235	707,506	784,843	97.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IB	H236	707,514	784,845	97.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IC	H237	708,102	782,128	123.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ID	H238	708,956	782,454	108.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IE	H239	709,290	782,312	91.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IF	H240	709,136	781,735	101.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IG	H241	709,182	781,682	97.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IH	H242	709,642	783,733	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
II	H243	709,515	783,040	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IJ	H244	709,454	782,822	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IK	H245	709,444	782,792	92.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IL	H246	705,567	784,809	77.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IM	H247	705,638	783,305	105.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IN	H248	705,640	784,350	95.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IO	H249	705,650	784,374	93.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IP	H250	705,583	784,500	89.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IQ	H251	705,613	784,489	89.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IR	H252	705,712	784,727	77.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IS	H253	705,654	784,815	78.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IT	H254	705,800	784,781	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IU	H255	705,868	785,262	73.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IV	H256	705,937	785,412	86.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IW	H257	705,962	785,280	81.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IX	H258	709,053	781,852	105.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IY	H259	709,046	781,725	102.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IZ	H260	708,843	782,018	113.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JA	H261	708,760	781,877	112.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JB	H262	708,726	781,912	114.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JC	H263	708,535	781,883	115.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JD	H264	708,421	781,927	118.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JE	H265	708,252	782,077	123.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JF	H266	708,233	782,021	120.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JG	H267	708,187	782,044	121.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JH	H268	708,163	782,093	122.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JI	H269	707,974	782,092	127.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JJ	H270	707,933	782,103	128.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JK	H271	707,283	781,361	179.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JL	H272	707,284	781,205	168.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JM	H273	707,360	781,320	173.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JN	H274	707,423	781,321	169.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JO	H275	707,786	781,092	135.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JP	H276	707,640	781,305	151.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JQ	H277	707,609	781,309	153.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JR	H278	707,530	781,439	159.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
JS	H279	707,518	781,467	159.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JT	H280	707,417	781,420	170.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JU	H281	707,445	781,545	160.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JV	H282	707,503	781,557	155.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JW	H283	707,479	781,570	157.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JX	H284	707,471	781,630	157.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JY	H285	707,466	781,810	141.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JZ	H286	707,440	781,835	140.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KA	H287	707,401	781,915	144.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KB	H288	707,430	781,935	142.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KC	H289	707,570	781,956	135.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KD	H290	707,588	782,057	134.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KE	H291	707,733	782,121	133.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KF	H292	707,320	782,445	128.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KG	H293	706,989	782,647	130.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KH	H294	706,850	782,679	126.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KI	H295	706,756	782,676	128.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KJ	H296	705,706	783,101	120.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KK	H297	705,767	783,216	110.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KL	H298	705,798	783,285	108.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KM	H299	705,822	783,531	100.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KN	H300	705,842	783,600	106.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KO	H301	705,902	783,694	102.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KP	H302	705,896	783,830	98.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KQ	H303	705,844	784,342	88.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KR	H304	705,959	784,420	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KS	H305	706,102	784,637	91.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KT	H306	706,407	784,566	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KU	H307	706,661	784,461	96.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KV	H308	707,151	784,761	103.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KW	H309	707,353	784,818	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KX	H310	709,200	781,828	99.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KY	H311	709,179	781,595	93.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KZ	H312	709,659	783,758	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LA	H313	709,633	783,663	85.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LB	H314	709,653	783,554	87.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LC	H315	709,531	783,091	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LD	H316	709,503	783,005	87.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LE	H317	709,478	782,944	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LF	H318	709,508	782,861	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LG	H319	709,450	782,849	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LH	H320	708,598	781,027	105.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LI	H321	709,088	781,130	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LJ	H322	709,157	781,278	85.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LK	H323	708,833	781,031	96.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LL	H324	708,900	781,062	94.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LM	H325	709,704	783,834	98.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LN	H326	709,694	782,393	84.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LO	H327	709,723	782,432	83.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LP	H328	709,807	782,438	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LQ	H329	709,837	782,477	78.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LR	H330	709,987	782,433	75.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LS	H331	710,055	782,422	73.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LT	H332	710,299	782,705	69.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LU	H333	709,157	781,422	89.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LV	H334	709,700	783,772	96.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LW	H335	709,700	783,800	98.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LX	H336	709,734	783,831	97.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LY	H337	709,777	783,823	96.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LZ	H338	709,888	783,758	91.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MA	H339	709,626	782,417	86.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MB	H340	709,655	782,420	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MC	H341	710,093	782,469	72.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MD	H342	709,164	781,301	86.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
ME H343		709,597	781,764	80.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MF H344		709,643	781,469	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MG H345		708,679	781,011	102.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MH H346		708,399	781,162	113.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MI H347		706,194	782,621	124.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MJ H348		707,491	781,202	157.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MK H349		709,000	781,085	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ML H350		709,665	783,563	87.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MM H351		708,461	781,151	111.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MN H352		708,290	782,083	124.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MO H353		705,858	782,712	125.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MP H354		706,252	785,486	90.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MQ H355		705,733	783,152	113.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MR H356		709,492	783,870	102.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MS H357		710,128	782,412	71.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MT H358		709,404	783,965	96.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MU H359		709,923	781,772	70.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MV H360		709,659	781,632	75.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MW H361		709,031	781,787	106.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MX H362		707,629	781,952	131.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MY H363		709,130	781,697	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MZ H364		710,258	783,747	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NA H365		710,059	782,479	72.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NB H366		707,240	781,420	179.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NC H367		709,301	785,032	71.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ND H368		708,915	781,135	92.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NE H369		709,539	783,850	102.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NF H370		708,323	781,177	117.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NG H371		708,949	781,069	93.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NH H372		708,942	781,142	92.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NI H373		708,972	781,153	91.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NJ SAINT PATRICK'S NATIONAL SCHOOL		708,565	781,951	118.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NK H374		708,783	782,534	110.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5

Calculation Results

Shadow receptor

No. Name		Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year	per year	hours per day	per year
		[h/year]	[days/year]	[h/day]	[h/year]
A	H1	44:04	123	0:34	7:11
B	H2	40:44	117	0:38	6:51
C	H3	26:58	111	0:33	5:37
D	H4	22:43	78	0:37	4:44
E	H5	0:00	0	0:00	0:00
F	H6	0:00	0	0:00	0:00
G	H7	0:00	0	0:00	0:00
H	H8	0:00	0	0:00	0:00
I	H9	7:03	32	0:21	1:41
J	H10	14:57	64	0:20	3:12
K	H11	0:00	0	0:00	0:00
L	H12	17:42	83	0:21	3:50
M	H13	42:23	115	0:42	9:12
N	H14	61:37	152	0:48	12:49
O	H15	65:01	160	0:49	13:28
P	H16	65:04	166	0:49	13:28
Q	H17	55:18	165	0:39	10:47
R	H18	69:16	187	0:42	13:12
S	H19	28:09	86	0:36	4:52
T	H20	30:51	92	0:36	5:13
U	H21	20:13	50	0:34	3:25
V	H22	48:50	92	0:39	7:35
W	H23	50:34	90	0:40	7:48

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]	Shadow hours per year [h/year]
	X H24	12:48	54	0:23	2:05	
	Y H25	0:00	0	0:00	0:00	
	Z H26	0:00	0	0:00	0:00	
	AA H27	17:45	48	0:31	4:04	
	AB H28	16:38	46	0:31	3:48	
	AC H29	15:32	45	0:30	3:32	
	AD H30	14:29	46	0:28	3:20	
	AE H31	78:47	88	1:13	11:15	
	AF H32	15:16	54	0:27	2:20	
	AG H33	26:33	69	0:45	3:41	
	AH H34	0:00	0	0:00	0:00	
	AI H35	8:20	30	0:24	1:29	
	AJ H36	0:00	0	0:00	0:00	
	AK H37	0:00	0	0:00	0:00	
	AL H38	0:00	0	0:00	0:00	
	AM H39	0:00	0	0:00	0:00	
	AN H40	0:00	0	0:00	0:00	
	AO H41	0:00	0	0:00	0:00	
	AP H42	0:00	0	0:00	0:00	
	AQ H43	0:00	0	0:00	0:00	
	AR H44	0:00	0	0:00	0:00	
	AS H45	14:50	61	0:29	3:25	
	AT H46	24:25	86	0:38	5:02	
	AU H47	14:08	75	0:18	3:07	
	AV H48	10:58	63	0:17	2:28	
	AW H49	55:43	146	0:49	11:29	
	AX H50	66:49	109	0:57	9:52	
	AY H51	13:38	54	0:26	2:04	
	AZ H52	20:54	64	0:26	2:53	
	BA H53	0:00	0	0:00	0:00	
	BB H54	10:54	36	0:27	1:49	
	BC H55	66:43	91	1:14	9:08	
	BD H56	60:55	89	1:14	8:19	
	BE H57	9:59	33	0:26	1:48	
	BF H58	6:32	27	0:22	1:10	
	BG H59	0:00	0	0:00	0:00	
	BH H60	5:49	25	0:21	1:04	
	BI H61	5:08	24	0:20	0:59	
	BJ H62	55:28	103	0:52	12:37	
	BK H63	9:28	44	0:20	2:11	
	BL H64	0:00	0	0:00	0:00	
	BM H65	0:00	0	0:00	0:00	
	BN H66	29:18	75	0:38	6:32	
	BO H67	0:00	0	0:00	0:00	
	BP H68	0:00	0	0:00	0:00	
	BQ H69	56:12	80	1:00	8:08	
	BR H70	61:52	105	0:55	9:07	
	BS H71	104:18	129	1:11	16:05	
	BT H72	35:26	96	0:37	5:57	
	BU H73	24:11	58	0:35	4:03	
	BV H74	0:00	0	0:00	0:00	
	BW H75	0:00	0	0:00	0:00	
	BX H76	0:00	0	0:00	0:00	
	BY H77	13:21	48	0:26	2:03	
	BZ H78	27:26	75	0:31	3:59	
	CA H79	37:38	84	0:42	5:24	
	CB H80	39:40	83	0:51	5:36	
	CC H81	48:45	127	0:38	8:07	
	CD H82	61:58	176	0:41	11:55	
	CE H83	54:28	151	0:39	11:01	
	CF H84	58:42	157	0:41	11:50	
	CG H85	63:25	167	0:42	12:45	
	CH H86	71:16	179	0:44	14:17	

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SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
	CI H87	0:00	0	0:00	0:00
	CJ H88	0:00	0	0:00	0:00
	CK H89	0:00	0	0:00	0:00
	CL H90	0:00	0	0:00	0:00
	CM H91	0:00	0	0:00	0:00
	CN H92	0:00	0	0:00	0:00
	CO H93	0:00	0	0:00	0:00
	CP H94	0:00	0	0:00	0:00
	CQ H95	0:00	0	0:00	0:00
	CR H96	0:00	0	0:00	0:00
	CS H97	0:07	7	0:01	0:01
	CT H98	0:00	0	0:00	0:00
	CU H99	0:00	0	0:00	0:00
	CV H100	0:00	0	0:00	0:00
	CW H101	4:07	35	0:11	0:48
	CX H102	10:27	36	0:25	2:22
	CY H103	13:52	45	0:28	3:12
	CZ H104	19:27	53	0:31	4:28
	DA H105	14:43	50	0:25	2:52
	DB H106	0:00	0	0:00	0:00
	DC H107	0:00	0	0:00	0:00
	DD H108	50:23	127	0:39	10:34
	DE H109	45:50	139	0:38	9:33
	DF H110	71:33	153	0:44	14:42
	DG H111	16:53	64	0:26	3:32
	DH H112	97:21	237	0:50	18:40
	DI H113	76:15	199	0:46	14:51
	DJ H114	67:07	184	0:43	13:10
	DK H115	124:59	255	0:54	23:49
	DL H116	48:34	129	0:35	8:00
	DM H117	35:19	98	0:38	5:57
	DN H118	8:00	32	0:23	1:14
	DO H119	0:00	0	0:00	0:00
	DP H120	10:25	41	0:24	2:30
	DQ H121	12:55	56	0:19	2:45
	DR H122	0:00	0	0:00	0:00
	DS H123	17:03	81	0:21	3:42
	DT H124	0:00	0	0:00	0:00
	DU H125	0:00	0	0:00	0:00
	DV H126	8:39	40	0:22	1:20
	DW H127	77:31	190	0:40	14:15
	DX H128	19:34	54	0:26	2:48
	DY H129	0:00	0	0:00	0:00
	DZ H130	0:00	0	0:00	0:00
	EA H131	0:00	0	0:00	0:00
	EB H132	0:00	0	0:00	0:00
	EC H133	0:00	0	0:00	0:00
	ED H134	0:00	0	0:00	0:00
	EE H135	0:00	0	0:00	0:00
	EF H136	0:00	0	0:00	0:00
	EG H137	0:00	0	0:00	0:00
	EH H138	24:18	94	0:34	5:39
	EI H139	0:00	0	0:00	0:00
	EJ H140	0:00	0	0:00	0:00
	EK H141	0:00	0	0:00	0:00
	EL H142	0:00	0	0:00	0:00
	EM H143	21:14	102	0:27	4:35
	EN H144	113:50	209	0:50	21:06
	EO H145	51:40	106	0:39	8:14
	EP H146	61:41	118	0:44	9:59
	EQ H147	0:00	0	0:00	0:00
	ER H148	0:00	0	0:00	0:00
	ES H149	0:00	0	0:00	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]	
ET	H150	16:42	68	0:23	2:36	
EU	H151	47:06	125	0:39	7:54	
EV	H152	30:51	72	0:30	4:39	
EW	H153	0:00	0	0:00	0:00	
EX	H154	0:00	0	0:00	0:00	
EY	H155	0:00	0	0:00	0:00	
EZ	H156	17:34	61	0:30	2:37	
FA	H157	13:16	43	0:29	2:02	
FB	H158	49:51	87	1:06	6:51	
FC	H159	0:00	0	0:00	0:00	
FD	H160	0:00	0	0:00	0:00	
FE	H161	0:00	0	0:00	0:00	
FF	H162	0:00	0	0:00	0:00	
FG	H163	24:45	71	0:31	3:33	
FH	H164	0:00	0	0:00	0:00	
FI	H165	0:00	0	0:00	0:00	
FJ	H166	89:48	200	0:43	16:35	
FK	H167	46:23	124	0:41	7:55	
FL	H168	23:19	64	0:31	3:52	
FM	H169	77:17	72	1:20	10:49	
FN	H170	40:54	94	0:37	6:30	
FO	H171	0:00	0	0:00	0:00	
FP	H172	0:00	0	0:00	0:00	
FQ	H173	0:00	0	0:00	0:00	
FR	H174	0:00	0	0:00	0:00	
FS	H175	18:19	66	0:27	3:41	
FT	H176	81:34	184	0:41	14:47	
FU	H177	86:05	181	0:42	15:33	
FV	H178	87:32	179	0:43	15:45	
FW	H179	86:38	165	0:49	15:18	
FX	H180	40:22	112	0:40	6:56	
FY	H181	35:27	94	0:40	6:03	
FZ	H182	51:57	100	0:40	8:10	
GA	H183	54:00	98	0:41	8:27	
GB	H184	54:47	98	0:41	8:33	
GC	H185	0:00	0	0:00	0:00	
GD	H186	59:25	96	0:48	8:44	
GE	H187	108:18	90	1:27	15:37	
GF	H188	53:05	84	0:51	7:47	
GG	H189	39:11	96	0:36	5:48	
GH	H190	0:00	0	0:00	0:00	
GI	H191	17:12	50	0:25	2:26	
GJ	H192	16:10	48	0:24	2:16	
GK	H193	0:00	0	0:00	0:00	
GL	H194	0:00	0	0:00	0:00	
GM	H195	0:00	0	0:00	0:00	
GN	H196	6:17	26	0:22	1:08	
GO	H197	6:00	26	0:21	1:04	
GP	H198	0:00	0	0:00	0:00	
GQ	H199	0:00	0	0:00	0:00	
GR	H200	9:06	34	0:25	1:27	
GS	H201	0:00	0	0:00	0:00	
GT	H202	0:00	0	0:00	0:00	
GU	H203	0:00	0	0:00	0:00	
GV	H204	0:00	0	0:00	0:00	
GW	H205	0:00	0	0:00	0:00	
GX	H206	0:00	0	0:00	0:00	
GY	H207	0:00	0	0:00	0:00	
GZ	H208	0:00	0	0:00	0:00	
HA	H209	0:00	0	0:00	0:00	
HB	H210	0:00	0	0:00	0:00	
HC	H211	0:00	0	0:00	0:00	
HD	H212	0:00	0	0:00	0:00	

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day	Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]	
HE	H213	0:00	0	0:00	0:00	
HF	H214	0:00	0	0:00	0:00	
HG	H215	0:00	0	0:00	0:00	
HH	H216	0:00	0	0:00	0:00	
HI	H217	0:00	0	0:00	0:00	
HJ	H218	0:00	0	0:00	0:00	
HK	H219	0:00	0	0:00	0:00	
HL	H220	0:00	0	0:00	0:00	
HM	H221	0:00	0	0:00	0:00	
HN	H222	0:00	0	0:00	0:00	
HO	H223	0:00	0	0:00	0:00	
HP	H224	0:00	0	0:00	0:00	
HQ	H225	0:00	0	0:00	0:00	
HR	H226	29:38	68	0:38	6:23	
HS	H227	24:43	104	0:35	5:08	
HT	H228	14:57	78	0:21	3:15	
HU	H229	9:50	38	0:24	2:22	
HV	H230	8:13	30	0:24	1:52	
HW	H231	9:17	31	0:25	1:40	
HX	H232	11:40	35	0:27	2:06	
HY	H233	51:22	99	0:51	8:19	
HZ	H234	35:19	83	0:39	5:06	
IA	H235	40:01	94	0:37	5:46	
IB	H236	40:59	96	0:37	5:55	
IC	H237	0:00	0	0:00	0:00	
ID	H238	69:07	93	0:55	14:38	
IE	H239	44:51	93	0:37	9:37	
IF	H240	0:00	0	0:00	0:00	
IG	H241	0:00	0	0:00	0:00	
IH	H242	51:03	146	0:38	10:21	
II	H243	77:57	154	0:44	16:34	
IJ	H244	30:56	117	0:32	6:42	
IK	H245	33:40	113	0:33	7:17	
IL	H246	0:00	0	0:00	0:00	
IM	H247	0:00	0	0:00	0:00	
IN	H248	5:36	25	0:21	1:03	
IO	H249	5:45	25	0:21	1:04	
IP	H250	0:00	0	0:00	0:00	
IQ	H251	5:33	25	0:21	1:00	
IR	H252	6:41	28	0:22	1:07	
IS	H253	0:00	0	0:00	0:00	
IT	H254	7:09	29	0:22	1:11	
IU	H255	0:00	0	0:00	0:00	
IV	H256	0:00	0	0:00	0:00	
IW	H257	0:00	0	0:00	0:00	
IX	H258	0:00	0	0:00	0:00	
IY	H259	0:00	0	0:00	0:00	
IZ	H260	0:00	0	0:00	0:00	
JA	H261	0:00	0	0:00	0:00	
JB	H262	0:00	0	0:00	0:00	
JC	H263	0:00	0	0:00	0:00	
JD	H264	0:00	0	0:00	0:00	
JE	H265	0:00	0	0:00	0:00	
JF	H266	0:00	0	0:00	0:00	
JG	H267	0:00	0	0:00	0:00	
JH	H268	0:00	0	0:00	0:00	
JI	H269	0:00	0	0:00	0:00	
JJ	H270	0:00	0	0:00	0:00	
JK	H271	0:00	0	0:00	0:00	
JL	H272	0:00	0	0:00	0:00	
JM	H273	0:00	0	0:00	0:00	
JN	H274	0:00	0	0:00	0:00	
JO	H275	0:00	0	0:00	0:00	

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]
JP	H276	0:00	0	0:00	0:00
JQ	H277	0:00	0	0:00	0:00
JR	H278	0:00	0	0:00	0:00
JS	H279	0:00	0	0:00	0:00
JT	H280	0:00	0	0:00	0:00
JU	H281	0:00	0	0:00	0:00
JV	H282	0:00	0	0:00	0:00
JW	H283	0:00	0	0:00	0:00
JX	H284	0:00	0	0:00	0:00
JY	H285	0:00	0	0:00	0:00
JZ	H286	0:00	0	0:00	0:00
KA	H287	0:00	0	0:00	0:00
KB	H288	0:00	0	0:00	0:00
KC	H289	0:00	0	0:00	0:00
KD	H290	0:00	0	0:00	0:00
KE	H291	0:00	0	0:00	0:00
KF	H292	30:56	109	0:36	7:11
KG	H293	10:19	60	0:25	2:18
KH	H294	20:14	86	0:22	4:22
KI	H295	19:55	93	0:20	4:19
KJ	H296	0:00	0	0:00	0:00
KK	H297	7:30	36	0:20	1:46
KL	H298	8:01	36	0:21	1:54
KM	H299	8:27	33	0:24	2:00
KN	H300	8:03	32	0:23	1:53
KO	H301	9:16	34	0:25	2:10
KP	H302	9:28	34	0:25	2:10
KQ	H303	8:29	30	0:25	1:35
KR	H304	10:35	34	0:26	1:55
KS	H305	12:02	37	0:28	2:00
KT	H306	22:19	52	0:36	3:37
KU	H307	41:46	71	0:48	6:42
KV	H308	50:08	85	1:07	6:52
KW	H309	33:39	83	0:37	4:52
KX	H310	0:00	0	0:00	0:00
KY	H311	0:00	0	0:00	0:00
KZ	H312	46:51	140	0:37	9:27
LA	H313	58:13	151	0:45	11:53
LB	H314	64:01	172	0:51	13:13
LC	H315	76:56	160	0:44	16:37
LD	H316	74:16	149	0:44	15:36
LE	H317	57:56	142	0:40	11:57
LF	H318	39:14	130	0:31	8:11
LG	H319	33:29	125	0:33	7:09
LH	H320	0:00	0	0:00	0:00
LI	H321	0:00	0	0:00	0:00
LJ	H322	0:00	0	0:00	0:00
LK	H323	0:00	0	0:00	0:00
LL	H324	0:00	0	0:00	0:00
LM	H325	39:37	133	0:34	7:50
LN	H326	12:22	41	0:27	2:49
LO	H327	11:26	39	0:27	2:35
LP	H328	9:57	36	0:25	2:14
LQ	H329	9:21	35	0:24	2:06
LR	H330	7:54	46	0:22	1:45
LS	H331	2:36	28	0:08	0:30
LT	H332	8:58	39	0:21	2:01
LU	H333	0:00	0	0:00	0:00
LV	H334	41:58	133	0:35	8:27
LW	H335	40:32	131	0:34	8:06
LX	H336	37:43	129	0:33	7:28
LY	H337	28:58	94	0:32	5:57
LZ	H338	20:53	73	0:29	4:23

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SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]
MA	H339	13:51	42	0:28	3:10
MB	H340	13:00	42	0:28	2:58
MC	H341	8:51	45	0:17	1:43
MD	H342	0:00	0	0:00	0:00
ME	H343	0:00	0	0:00	0:00
MF	H344	0:00	0	0:00	0:00
MG	H345	0:00	0	0:00	0:00
MH	H346	0:00	0	0:00	0:00
MI	H347	0:00	0	0:00	0:00
MJ	H348	0:00	0	0:00	0:00
MK	H349	0:00	0	0:00	0:00
ML	H350	59:21	160	0:50	12:16
MM	H351	0:00	0	0:00	0:00
MN	H352	0:00	0	0:00	0:00
MO	H353	0:00	0	0:00	0:00
MP	H354	0:00	0	0:00	0:00
MQ	H355	0:00	0	0:00	0:00
MR	H356	62:08	175	0:42	12:10
MS	H357	5:37	38	0:13	1:05
MT	H358	79:21	203	0:44	15:04
MU	H359	0:00	0	0:00	0:00
MV	H360	0:00	0	0:00	0:00
MW	H361	0:00	0	0:00	0:00
MX	H362	0:00	0	0:00	0:00
MY	H363	0:00	0	0:00	0:00
MZ	H364	5:54	26	0:22	1:09
NA	H365	7:50	43	0:16	1:31
NB	H366	0:00	0	0:00	0:00
NC	H367	26:01	67	0:33	4:19
ND	H368	0:00	0	0:00	0:00
NE	H369	55:29	162	0:40	10:56
NF	H370	0:00	0	0:00	0:00
NG	H371	0:00	0	0:00	0:00
NH	H372	0:00	0	0:00	0:00
NI	H373	0:00	0	0:00	0:00
NJ	SAINT PATRICK'S NATIONAL SCHOOL	0:00	0	0:00	0:00
NK	H374	87:12	92	1:13	18:22

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	T01	475:52	80:23
2	T02	733:22	124:09
3	T03	243:12	44:46
4	T04	373:42	71:34
5	T05	357:10	72:25

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

The calculation of the total expected values for a given receptor assumes a weighted average directional reduction for all WTGs contributing to shadow flicker within the same day. In the case where shadow flicker from different WTGs is not concurrent within the day, the total expected time at a given receptor may deviate marginally from the individual flicker time caused by each turbine separately.

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: A - H1

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		15:02 (4)	08:14		16:30 (3)	07:16		17:08 (2)	07:01		05:52			05:03		
	16:15	29	15:31 (4)	17:06	4	16:34 (3)	18:02	26	17:34 (2)	20:00		20:55			21:45		
2	08:44		15:03 (4)	08:12		16:30 (3)	07:14		17:07 (2)	06:59		05:50			05:02		
	16:16	28	15:31 (4)	17:08	7	16:37 (3)	18:04	29	17:36 (2)	20:02		20:57			21:46		
3	08:44		15:03 (4)	08:10		16:29 (3)	07:12		17:07 (2)	06:56		05:48			05:01		
	16:17	28	15:31 (4)	17:10	10	16:39 (3)	18:06	31	17:38 (2)	20:04		20:59			21:48		
4	08:43		15:04 (4)	08:08		16:29 (3)	07:09		17:07 (2)	06:54		05:46			05:00		
	16:18	28	15:32 (4)	17:12	12	16:41 (3)	18:07	34	17:41 (2)	20:06		21:01			21:49		
5	08:43		15:05 (4)	08:07		16:29 (3)	07:07		17:06 (2)	06:51		05:44			04:59		
	16:19	27	15:32 (4)	17:14	14	16:43 (3)	18:09	34	17:40 (2)	20:07		21:03			21:50		
6	08:43		15:06 (4)	08:05		16:29 (3)	07:04		17:07 (2)	06:49		05:42			04:58		
	16:21	26	15:32 (4)	17:16	16	16:45 (3)	18:11	33	17:40 (2)	20:09		21:04			21:51		
7	08:42		15:06 (4)	08:03		16:30 (3)	07:02		17:06 (2)	06:47		05:40			04:58		
	16:22	26	15:32 (4)	17:18	17	16:47 (3)	18:13	33	17:39 (2)	20:11		21:06			21:52		
8	08:42		15:07 (4)	08:01		16:30 (3)	07:00		17:07 (2)	06:44		05:38			04:57		
	16:24	25	15:32 (4)	17:20	20	16:50 (3)	18:15	32	17:39 (2)	20:13		21:08			21:53		
9	08:41		15:09 (4)	07:59		16:31 (3)	06:57		17:07 (2)	06:42		05:36			04:57		
	16:25	24	15:33 (4)	17:22	20	16:51 (3)	18:17	30	17:37 (2)	20:15		21:10			21:54		
10	08:40		15:09 (4)	07:57		16:32 (3)	06:55		17:08 (2)	06:39		05:34			04:56		
	16:26	23	15:32 (4)	17:24	18	16:50 (3)	18:19	28	17:36 (2)	20:17		21:11			21:55		
11	08:40		15:10 (4)	07:55		16:33 (3)	06:52		17:10 (2)	06:37		05:33			04:56		
	16:28	22	15:32 (4)	17:26	16	16:49 (3)	18:21	25	17:35 (2)	20:19		21:13			21:55		
12	08:39		15:11 (4)	07:53		16:35 (3)	06:50		17:10 (2)	06:35		05:31			04:55		
	16:30	21	15:32 (4)	17:28	12	16:47 (3)	18:23	23	17:33 (2)	20:20		21:15			21:56		
13	08:38		15:12 (4)	07:51		16:37 (3)	06:48		17:12 (2)	06:32		05:29			04:55		
	16:31	19	15:31 (4)	17:30	7	16:44 (3)	18:25	20	17:32 (2)	20:22		21:17			21:57		
14	08:37		15:14 (4)	07:49			06:45		17:14 (2)	06:30		05:27			04:55		
	16:33	17	15:31 (4)	17:32			18:27	14	17:28 (2)	20:24		21:18			21:58		
15	08:36		15:16 (4)	07:47			06:43			06:28		05:25			04:54		
	16:34	14	15:30 (4)	17:34			18:28			20:26		21:20			21:58		
16	08:35		15:17 (4)	07:45			06:40			06:25		05:24			04:54		
	16:36	11	15:28 (4)	17:36			18:30			20:28		21:22			21:59		
17	08:34		15:21 (4)	07:43			06:38			06:23		05:22			04:54		
	16:38	4	15:25 (4)	17:38			18:32			20:30		21:23			21:59		
18	08:33			07:41			06:35			06:21		05:21			04:54		
	16:40			17:40			18:34			20:31		21:25			22:00		
19	08:32			07:39			06:33			06:18		05:19			04:54		
	16:41			17:42			18:36			20:33		21:27			22:00		
20	08:31			07:36			06:31			06:16		05:18			04:54		
	16:43			17:44			18:38			20:35		21:28			22:00		
21	08:30			07:34			06:28			06:14		05:16			04:54		
	16:45			17:46			18:40			20:37		21:30			22:01		
22	08:29			07:32			06:26			06:12		05:15			04:55		
	16:47			17:48			18:42			20:39		21:31			22:01		
23	08:27			07:30		17:16 (2)	06:23			06:09		05:13			04:55		
	16:49			17:50	6	17:22 (2)	18:43			20:41		21:33			22:01		
24	08:26			07:28		17:14 (2)	06:21			06:07		05:12			04:55		
	16:50			17:52	10	17:24 (2)	18:45			20:43		21:34			22:01		
25	08:24			07:25		17:12 (2)	06:18			06:05		05:11			04:55		
	16:52			17:54	14	17:26 (2)	18:47			20:44		21:36			22:01		
26	08:23			07:23		17:11 (2)	06:16			06:03		05:09			04:56		
	16:54			17:56	17	17:28 (2)	18:49			20:46		21:37			22:01		
27	08:22			07:21		17:10 (2)	06:13			06:00		05:08			04:56		
	16:56			17:58	21	17:31 (2)	18:51			20:48		21:39			22:01		
28	08:20			07:18		17:09 (2)	06:11			05:58		05:07			04:57		
	16:58			18:00	23	17:32 (2)	18:53			20:50		21:40			22:01		
29	08:19						07:08			05:56		05:06			04:57		
	17:00						19:54			20:52		21:41			22:01		
30	08:17						07:06			05:54		05:05			04:58		
	17:02						19:56			20:54		21:43			22:00		
31	08:15		16:30 (3)				07:04					05:04					
	17:04	1	16:31 (3)				19:58					21:44					
Potential sun hours		250			273		367			420		494			510		
Total, worst case		373			264		392										
Sun reduction		0.24			0.23		0.27										
Oper. time red.		1.00			1.00		1.00										
Wind dir. red.		0.65			0.66		0.68										
Total reduction		0.16			0.15		0.18										
Total, real		59			41		72										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: A - H1

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:50 (2) 18:11 (2)	07:24 16:54	16:01 (3) 16:20 (3)	08:19 16:10	14:52 (4) 15:14 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:48 (2) 18:13 (2)	07:26 16:52	16:01 (3) 16:20 (3)	08:21 16:09	14:51 (4) 15:14 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:47 (2) 18:14 (2)	07:28 16:50	16:00 (3) 16:19 (3)	08:22 16:08	14:52 (4) 15:16 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:45 (2) 18:15 (2)	07:30 16:48	15:59 (3) 16:17 (3)	08:24 16:08	14:52 (4) 15:17 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:44 (2) 18:15 (2)	07:32 16:46	15:59 (3) 16:15 (3)	08:25 16:07	14:52 (4) 15:17 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:44 (2) 18:16 (2)	07:34 16:44	15:59 (3) 16:12 (3)	08:26 16:07	14:52 (4) 15:18 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:42 (2) 18:15 (2)	07:36 16:43	15:59 (3) 16:10 (3)	08:28 16:06	14:52 (4) 15:19 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:42 (2) 18:15 (2)	07:38 16:41	15:59 (3) 16:08 (3)	08:29 16:06	14:52 (4) 15:19 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:41 (2) 18:15 (2)	07:40 16:39	16:00 (3) 16:07 (3)	08:30 16:05	14:53 (4) 15:20 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:41 (2) 18:14 (2)	07:42 16:37	16:01 (3) 16:05 (3)	08:31 16:05	14:52 (4) 15:21 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:41 (2) 18:11 (2)	07:44 16:35	16:02 (3) 16:03 (3)	08:33 16:05	14:53 (4) 15:21 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:41 (2) 18:09 (2)	07:45 16:34	08:34 16:05	14:53 (4) 15:21 (4)	
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:42 (2) 18:07 (2)	07:47 16:32	08:35 16:04	14:53 (4) 15:22 (4)	
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:42 (2) 18:04 (2)	07:49 16:31	08:36 16:04	14:53 (4) 15:22 (4)	
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:43 (2) 18:02 (2)	07:51 16:29	08:37 16:04	14:54 (4) 15:23 (4)	
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:44 (2) 17:59 (2)	07:53 16:27	08:38 16:05	14:54 (4) 15:23 (4)	
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:45 (2) 17:57 (2)	07:55 16:26	08:38 16:05	14:55 (4) 15:24 (4)	
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:46 (2) 17:55 (2)	07:57 16:24	08:39 16:05	14:56 (4) 15:25 (4)	
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:48 (2) 17:52 (2)	07:59 16:23	08:40 16:05	14:56 (4) 15:26 (4)	
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:00 16:06	08:41 16:06	14:56 (4) 15:26 (4)	
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:02 16:06	08:41 16:06	14:57 (4) 15:26 (4)	
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:04 16:06	08:42 16:06	14:57 (4) 15:26 (4)	
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:06 16:07	08:42 16:07	14:58 (4) 15:28 (4)	
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:08 16:08	08:43 16:08	14:58 (4) 15:28 (4)	
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	14:59 (4) 15:03 (4)	08:43 16:08	14:58 (4) 15:28 (4)	
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	14:56 (4) 15:07 (4)	08:43 16:09	14:59 (4) 15:28 (4)	
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	14:55 (4) 15:09 (4)	08:44 16:10	15:00 (4) 15:29 (4)	
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	14:54 (4) 15:11 (4)	08:44 16:10	15:01 (4) 15:30 (4)	
29	05:34 21:30	06:27 20:25	07:22 19:09	17:57 (2) 18:07 (2)	07:18 17:00	16:06 (3) 16:14 (3)	08:16 16:11	14:53 (4) 15:11 (4)	
30	05:35 21:28	06:29 20:23	07:24 19:07	17:52 (2) 18:09 (2)	07:20 16:58	16:03 (3) 16:16 (3)	08:18 16:11	14:52 (4) 15:13 (4)	
31	05:37 21:27	06:31 20:21		07:22 16:56	16:02 (3) 16:18 (3)	08:19 16:13	08:44 16:13	15:01 (4) 15:30 (4)	
Potential sun hours	512	460	382	328	259	233			
Total, worst case			27	500	221	867			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.68	0.68	0.65	0.65			
Total reduction			0.22	0.20	0.17	0.13			
Total, real			6	99	38	117			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: B - H2

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April		May	June
1	08:44		14:46 (4)	08:14		16:18 (3)	07:16		16:55 (2)	07:01	05:52	05:03	
	16:15	21	15:07 (4)	17:06	16	16:34 (3)	18:02	38	17:33 (2)	20:00	20:55	21:45	
2	08:44		14:48 (4)	08:12		16:18 (3)	07:14		16:54 (2)	06:59	05:50	05:02	
	16:16	19	15:07 (4)	17:08	19	16:37 (3)	18:04	38	17:32 (2)	20:02	20:57	21:46	
3	08:44		14:48 (4)	08:10		16:18 (3)	07:12		16:55 (2)	06:56	05:48	05:01	
	16:17	18	15:06 (4)	17:10	21	16:39 (3)	18:06	37	17:32 (2)	20:04	20:59	21:48	
4	08:43		14:50 (4)	08:08		16:19 (3)	07:09		16:55 (2)	06:54	05:46	05:00	
	16:18	16	15:06 (4)	17:12	22	16:41 (3)	18:07	37	17:32 (2)	20:06	21:01	21:49	
5	08:43		14:51 (4)	08:07		16:19 (3)	07:07		16:55 (2)	06:51	05:44	04:59	
	16:19	14	15:05 (4)	17:14	22	16:41 (3)	18:09	36	17:31 (2)	20:07	21:03	21:50	
6	08:43		14:53 (4)	08:05		16:20 (3)	07:04		16:55 (2)	06:49	05:42	04:58	
	16:21	12	15:05 (4)	17:16	20	16:40 (3)	18:11	36	17:31 (2)	20:09	21:04	21:51	
7	08:42		14:54 (4)	08:03		16:21 (3)	07:02		16:55 (2)	06:47	05:40	04:58	
	16:22	10	15:04 (4)	17:18	19	16:40 (3)	18:13	34	17:29 (2)	20:11	21:06	21:52	
8	08:42		14:57 (4)	08:01		16:23 (3)	07:00		16:56 (2)	06:44	05:38	04:57	
	16:24	5	15:02 (4)	17:20	15	16:38 (3)	18:15	33	17:29 (2)	20:13	21:08	21:53	
9	08:41			07:59		16:25 (3)	06:57		16:57 (2)	06:42	05:36	04:57	
	16:25			17:22	12	16:37 (3)	18:17	30	17:27 (2)	20:15	21:10	21:54	
10	08:40			07:57		16:29 (3)	06:55		16:58 (2)	06:39	05:34	04:56	
	16:26			17:24	4	16:33 (3)	18:19	28	17:26 (2)	20:17	21:11	21:55	
11	08:40			07:55			06:53		17:00 (2)	06:37	05:33	04:56	
	16:28			17:26			18:21	24	17:24 (2)	20:19	21:13	21:55	
12	08:39			07:53			06:50		17:02 (2)	06:35	05:31	04:55	
	16:30			17:28			18:23	19	17:21 (2)	20:20	21:15	21:56	
13	08:38			07:51			06:48		17:05 (2)	06:32	05:29	04:55	
	16:31			17:30			18:25	13	17:18 (2)	20:22	21:17	21:57	
14	08:37			07:49			06:45		06:30	05:27	04:55		
	16:33			17:32			18:27		20:24	21:18	21:58		
15	08:36			07:47			06:43		06:28	05:26	04:54		
	16:34			17:34			18:28		20:26	21:20	21:58		
16	08:35			07:45			06:40		06:25	05:24	04:54		
	16:36			17:36			18:30		20:28	21:22	21:59		
17	08:34			07:43			06:38		06:23	05:22	04:54		
	16:38			17:38			18:32		20:30	21:23	21:59		
18	08:33			07:41		17:07 (2)	06:35		06:21	05:21	04:54		
	16:40			17:40	4	17:11 (2)	18:34		20:31	21:25	22:00		
19	08:32			07:39		17:05 (2)	06:33		06:18	05:19	04:54		
	16:41			17:42	8	17:13 (2)	18:36		20:33	21:27	22:00		
20	08:31			07:36		17:03 (2)	06:31		06:16	05:18	04:54		
	16:43			17:44	13	17:16 (2)	18:38		20:35	21:28	22:00		
21	08:30			07:34		17:01 (2)	06:28		06:14	05:16	04:54		
	16:45			17:46	17	17:18 (2)	18:40		20:37	21:30	22:01		
22	08:29			07:32		16:59 (2)	06:26		06:12	05:15	04:55		
	16:47			17:48	20	17:19 (2)	18:42		20:39	21:31	22:01		
23	08:27			07:30		16:59 (2)	06:23		06:09	05:13	04:55		
	16:49			17:50	23	17:22 (2)	18:43		20:41	21:33	22:01		
24	08:26			07:28		16:58 (2)	06:21		06:07	05:12	04:55		
	16:50			17:52	26	17:24 (2)	18:45		20:43	21:34	22:01		
25	08:24			07:25		16:56 (2)	06:18		06:05	05:11	04:55		
	16:52			17:54	30	17:26 (2)	18:47		20:44	21:36	22:01		
26	08:23		16:18 (3)	07:23		16:56 (2)	06:16		06:03	05:09	04:56		
	16:54	3	16:21 (3)	17:56	32	17:28 (2)	18:49		20:46	21:37	22:01		
27	08:22		16:17 (3)	07:21		16:56 (2)	06:13		06:00	05:08	04:56		
	16:56	6	16:23 (3)	17:58	35	17:31 (2)	18:51		20:48	21:39	22:01		
28	08:20		16:18 (3)	07:18		16:55 (2)	06:11		05:58	05:07	04:57		
	16:58	8	16:26 (3)	18:00	37	17:32 (2)	18:53		20:50	21:40	22:01		
29	08:19		16:17 (3)				07:08		05:56	05:06	04:57		
	17:00	11	16:28 (3)				19:54		20:52	21:41	22:01		
30	08:17		16:17 (3)				07:06		05:54	05:05	04:58		
	17:02	12	16:29 (3)				19:56		20:54	21:43	22:00		
31	08:15		16:17 (3)				07:04			05:04			
	17:04	14	16:31 (3)				19:58			21:44			
Potential sun hours	250			273			367			420		494	510
Total, worst case	169			415			403						
Sun reduction	0.24			0.23			0.27						
Oper. time red.	1.00			1.00			1.00						
Wind dir. red.	0.65			0.67			0.67						
Total reduction	0.16			0.16			0.18						
Total, real	27			65			74						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: B - H2

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:42 (2) 17:59 (2)	07:24 16:54	15:57 (3) 16:04 (3)	08:19 16:10	
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:39 (2) 18:01 (2)	07:26 16:52	15:54 (3) 16:07 (3)	08:21 16:09	
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:37 (2) 18:03 (2)	07:28 16:50	15:52 (3) 16:08 (3)	08:22 16:08	
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:35 (2) 18:04 (2)	07:30 16:48	15:51 (3) 16:09 (3)	08:24 16:08	14:43 (4) 14:46 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:34 (2) 18:05 (2)	07:32 16:46	15:50 (3) 16:10 (3)	08:25 16:07	14:40 (4) 14:49 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:33 (2) 18:06 (2)	07:34 16:44	15:49 (3) 16:11 (3)	08:26 16:07	14:39 (4) 14:51 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:31 (2) 18:05 (2)	07:36 16:43	15:49 (3) 16:10 (3)	08:28 16:06	14:38 (4) 14:52 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:30 (2) 18:06 (2)	07:38 16:41	15:48 (3) 16:08 (3)	08:29 16:06	14:37 (4) 14:53 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:29 (2) 18:06 (2)	07:40 16:39	15:49 (3) 16:07 (3)	08:30 16:05	14:37 (4) 14:55 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:29 (2) 18:06 (2)	07:42 16:37	15:49 (3) 16:05 (3)	08:31 16:05	14:37 (4) 14:56 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:28 (2) 18:06 (2)	07:44 16:35	15:49 (3) 16:03 (3)	08:33 16:05	14:37 (4) 14:57 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:28 (2) 18:06 (2)	07:45 16:34	15:49 (3) 16:01 (3)	08:34 16:05	14:36 (4) 14:57 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:28 (2) 18:06 (2)	07:47 16:32	15:49 (3) 15:59 (3)	08:35 16:05	14:36 (4) 14:58 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:28 (2) 18:04 (2)	07:49 16:31	15:50 (3) 15:57 (3)	08:36 16:04	14:36 (4) 14:59 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:28 (2) 18:02 (2)	07:51 16:29	15:50 (3) 15:56 (3)	08:37 16:04	14:37 (4) 14:59 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:28 (2) 17:59 (2)	07:53 16:27	15:51 (3) 15:54 (3)	08:38 16:05	14:37 (4) 15:00 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:29 (2) 17:57 (2)	07:55 16:26	15:54 (3) 16:05	08:38 16:05	14:38 (4) 15:01 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:29 (2) 17:55 (2)	07:57 16:24	16:05 16:05	08:39 16:05	14:38 (4) 15:02 (4)
19	05:18 21:45	06:10 20:48	07:05 19:35	07:59 18:22	17:30 (2) 17:52 (2)	07:59 16:23	16:05 16:05	08:40 16:05	14:39 (4) 15:03 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:31 (2) 17:50 (2)	08:00 16:22	16:05 16:05	08:41 16:05	14:39 (4) 15:03 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:32 (2) 17:48 (2)	08:02 16:20	16:05 16:05	08:41 16:05	14:39 (4) 15:04 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:34 (2) 17:45 (2)	08:04 16:19	16:05 16:05	08:42 16:05	14:39 (4) 15:04 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:36 (2) 17:43 (2)	08:06 16:18	16:05 16:05	08:42 16:05	14:40 (4) 15:05 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:38 (2) 17:41 (2)	08:08 16:17	16:05 16:05	08:43 16:05	14:41 (4) 15:05 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	17:41 (2) 17:48 (2)	08:09 16:16	16:05 16:05	08:43 16:05	14:41 (4) 15:05 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	17:48 (2) 17:45 (2)	08:11 16:14	16:05 16:05	08:43 16:05	14:41 (4) 15:05 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	17:45 (2) 17:42 (2)	08:13 16:13	16:05 16:05	08:44 16:05	14:43 (4) 15:06 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	17:42 (2) 17:39 (2)	08:14 16:12	16:05 16:05	08:44 16:05	14:43 (4) 15:06 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	17:39 (2) 17:36 (2)	08:16 16:11	16:05 16:05	08:44 16:05	14:44 (4) 15:07 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:46 (2) 17:55 (2)	07:20 16:58	08:18 16:11	16:05 16:05	08:44 16:05	14:44 (4) 15:06 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56			16:05 16:13	08:44 16:13	14:45 (4) 15:06 (4)
Potential sun hours	512	460	382	328	259		233		
Total, worst case			9	649	223		576		
Sun reduction			0.32	0.29	0.27		0.21		
Oper. time red.			1.00	1.00	1.00		1.00		
Wind dir. red.			0.67	0.67	0.66		0.65		
Total reduction			0.22	0.20	0.17		0.13		
Total, real			2	128	39		77		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: C - H3

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	06:18 (4) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	06:16 (4) 20:57	05:02 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	06:14 (4) 20:59	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	06:15 (4) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	06:19 (4) 21:03	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	06:22 (4) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	07:12 (5) 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	07:09 (5) 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	07:07 (5) 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	07:04 (5) 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	07:02 (5) 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:59 (5) 20:32	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:57 (5) 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:54 (5) 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:52 (5) 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:50 (5) 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:47 (5) 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:45 (5) 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:42 (5) 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:43 (5) 20:46	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:43 (5) 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	06:45 (5) 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	07:45 (5) 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	07:47 (5) 20:54	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	07:49 (5) 20:54	05:04 21:44	05:34 (3) 05:39 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case			399	55	65	443
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.68	0.67	0.66
Total reduction			0.18	0.24	0.26	0.21
Total, real			72	13	17	94

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: C - H3

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 15	05:32 (3) 05:47 (3) 21:25	05:39 21:25	06:33 20:18	07:26 19:05 1	07:52 (5) 07:53 (5) 16:54 16:10
2	05:00 22:00 15	05:33 (3) 05:48 (3) 21:23	05:40 21:23	06:35 20:16	07:28 19:02	08:21 16:52 16:09
3	05:00 21:59 14	05:33 (3) 05:47 (3) 21:21	05:42 21:21	06:36 20:14	07:30 19:00	08:22 16:50 16:09
4	05:01 21:59 13	05:34 (3) 05:47 (3) 21:19	05:44 21:19	06:38 20:11	07:32 18:57	08:24 16:48 16:08
5	05:02 21:58 12	05:35 (3) 05:47 (3) 21:17	05:46 21:17	06:40 20:09	07:33 18:55	08:25 16:46 16:07
6	05:03 21:58 12	05:36 (3) 05:48 (3) 21:16	05:47 21:16	06:42 20:06	07:35 18:53	08:26 16:45 16:07
7	05:04 21:57 11	05:37 (3) 05:48 (3) 21:14	05:49 21:14	06:44 20:04	07:37 18:50	08:28 16:43 16:06
8	05:05 21:56 10	05:38 (3) 05:48 (3) 21:12	05:51 21:12	06:45 20:01	07:39 18:48	08:29 16:41 16:06
9	05:06 21:55 9	05:39 (3) 05:48 (3) 21:10	05:52 21:10	06:47 19:59	07:41 18:45	08:30 16:39 16:06
10	05:07 21:55 8	05:40 (3) 05:48 (3) 21:08	05:54 21:08	06:49 19:57	07:43 18:43	08:32 16:37 16:05
11	05:08 21:54 6	05:41 (3) 05:47 (3) 21:06	05:56 21:06	06:51 19:54	07:44 18:41	08:33 16:36 16:05
12	05:09 21:53 5	05:42 (3) 05:47 (3) 21:03	05:58 21:03	06:52 19:52	07:46 18:38	08:34 16:34 16:05
13	05:11 21:52 4	05:43 (3) 05:47 (3) 21:01	05:59 21:01	06:54 19:49	07:48 18:36	08:35 16:32 16:05
14	05:12 21:51 2	05:44 (3) 05:46 (3) 20:59	06:01 20:59	06:56 19:47	07:50 18:34	08:36 16:31 16:05
15	05:13 21:50 1	05:45 (3) 05:46 (3) 20:57	06:03 20:57	06:58 19:44	07:52 18:31	08:37 16:29 16:05
16	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	08:38 16:28	16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	08:39 16:26	16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	08:39 16:25	16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	08:40 16:23	16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:41 16:22	16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:42 16:21	16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:44 16:19	16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:46 16:18	16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:48 16:17	16:08
25	05:27 21:36	06:21 20:35	07:15 19:19	08:11 18:09	08:49 16:16	16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	08:13 18:07	08:51 16:15	16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	08:15 18:05	08:53 16:14	16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	08:17 18:03	08:55 16:13	16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	08:19 18:01	08:57 16:12	16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	08:21 18:00	08:59 16:11	16:13
31	05:37 21:27	06:31 20:21	07:26 19:05	08:23 18:00	09:01 16:10	16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	137	113	405	1		
Sun reduction	0.32	0.34	0.32	0.29		
Oper. time red.	1.00	1.00	1.00	1.00		
Wind dir. red.	0.66	0.68	0.67	0.67		
Total reduction	0.21	0.23	0.21	0.20		
Total, real	29	26	87	0		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: D - H4

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:49 (5) 08:07 (5)	05:52 20:55
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	11 06:29 (4) 05:02
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	13 06:29 (4) 05:01
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	14 06:28 (4) 21:48
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	15 06:27 (4) 21:49
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	16 06:26 (4) 21:50
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	17 06:26 (4) 21:51
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	16 06:24 (4) 21:52
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	13 06:22 (4) 21:53
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	8 06:19 (4) 21:54
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	07:14 (5) 07:18 (5)	06:35 20:20	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	07:12 (5) 07:19 (5)	06:32 20:22	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	07:09 (5) 07:20 (5)	06:30 20:24	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	07:07 (5) 07:21 (5)	06:28 20:26	04:55 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	07:04 (5) 07:21 (5)	06:25 20:28	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	07:02 (5) 07:22 (5)	06:23 20:30	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:59 (5) 07:22 (5)	06:21 20:32	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:57 (5) 07:22 (5)	06:18 20:33	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:54 (5) 07:21 (5)	06:16 20:35	1 05:28 (3) 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:52 (5) 07:22 (5)	06:14 20:37	1 05:28 (3) 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:50 (5) 07:22 (5)	06:12 20:39	1 05:28 (3) 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:47 (5) 07:21 (5)	06:09 20:41	1 05:29 (3) 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:45 (5) 07:21 (5)	06:07 20:43	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:42 (5) 07:19 (5)	06:05 20:44	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:43 (5) 07:19 (5)	06:03 20:46	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:43 (5) 07:17 (5)	06:01 20:48	2 06:30 (4) 21:37
28	08:20 16:58	07:19 18:00	06:11 18:53	06:44 (5) 07:16 (5)	05:59 20:50	4 06:30 (4) 21:39
29	08:19 17:00		07:09 19:55	07:45 (5) 08:14 (5)	05:56 20:52	6 06:30 (4) 21:41
30	08:17 17:02		07:06 19:56	07:46 (5) 08:13 (5)	05:54 20:54	8 06:30 (4) 21:43
31	08:15 17:04		07:04 19:58	07:47 (5) 08:10 (5)		10 06:30 (4) 21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case			498	59	123	5
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.67	0.67	0.66
Total reduction			0.18	0.24	0.26	0.21
Total, real			90	14	32	1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: D - H4

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (5) 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (5) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:55 (5) 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:21 (4) 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:46 21:17	06:19 (4) 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:17 (4) 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57	05:49 21:14	06:19 (4) 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:20 (4) 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:22 (4) 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55	05:54 21:08	06:24 (4) 19:57	07:47 (5) 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:25 (4) 19:54	07:42 (5) 18:41	07:44 16:36	08:33 16:05
12	05:09 21:53	05:58 21:03	06:27 (4) 19:52	07:40 (5) 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	06:28 (4) 19:49	07:38 (5) 18:36	07:48 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:30 (4) 19:47	07:35 (5) 18:34	07:50 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	06:32 (4) 19:44	07:34 (5) 18:31	07:52 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	06:33 (4) 19:42	07:33 (5) 18:29	07:54 16:28	08:38 16:05
17	05:16 21:47	06:06 20:53	06:35 (4) 19:39	07:32 (5) 18:27	07:56 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:30 (5) 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:31 (5) 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	07:33 (5) 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	07:35 (5) 18:18	08:03 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	07:36 (5) 18:15	08:05 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	07:38 (5) 18:13	08:07 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	07:40 (5) 18:11	08:09 16:17	08:43 16:08
25	05:27 21:36	06:21 20:35	07:15 19:19	07:42 (5) 18:09	07:11 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:43 (5) 18:07	17:13 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:45 (5) 18:05	07:15 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:47 (5) 18:02	07:17 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:49 (5) 18:01	07:18 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:51 (5) 18:00	07:20 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case		149	523	6		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.67	0.67	0.67		
Total reduction		0.23	0.21	0.20		
Total, real		34	112	1		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: E - H5

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: F - H6

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: G - H7

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: H - H8

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:07 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: I - H9

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:56	18	06:36 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:41	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	20	06:36 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	06:57	05:48	06:14 (1)	05:01	05:01	05:42	06:37	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	21	06:35 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09		
4	08:43	08:09	07:09	06:54	05:46	06:14 (1)	05:00	05:01	05:44	6	06:31 (1)	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01	20	06:34 (1)	21:49	21:59	21:19	6	06:37 (1)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	06:15 (1)	04:59	05:02	05:46	06:29 (1)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:10	20:08	21:03	18	06:33 (1)	21:50	21:58	21:18	11	06:40 (1)	20:09	18:55	16:47	16:07
6	08:43	08:05	07:05	06:49	05:42	06:17 (1)	04:59	05:03	05:47	06:27 (1)	06:42	07:35	07:34	08:27		
	16:21	17:16	18:12	20:10	21:05	16	06:33 (1)	21:51	21:58	21:16	14	06:41 (1)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	06:18 (1)	04:58	05:04	05:49	06:26 (1)	06:44	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	13	06:31 (1)	21:52	21:57	21:14	17	06:43 (1)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	06:19 (1)	04:57	05:05	05:51	06:24 (1)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	10	06:29 (1)	21:53	21:56	21:12	19	06:43 (1)	20:02	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36	06:23 (1)	04:57	05:06	05:52	06:24 (1)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	2	06:25 (1)	21:54	21:56	21:10	20	06:44 (1)	19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35		04:56	05:07	05:54	06:24 (1)	06:49	07:43	07:42	08:32		
	16:27	17:24	18:19	20:17	21:12		21:55	21:55	21:08	21	06:45 (1)	19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33		04:56	05:08	05:56	06:25 (1)	06:51	07:44	07:44	08:33		
	16:28	17:26	18:21	20:19	21:13		21:56	21:54	21:06	19	06:44 (1)	19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	06:27 (1)	06:52	07:46	07:46	08:34		
	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	18	06:45 (1)	19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	06:29 (1)	06:54	07:48	07:48	08:35		
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	16	06:45 (1)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:30 (1)	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	14	06:44 (1)	19:47	18:34	16:31	16:05	
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:32 (1)	06:58	07:52	07:51	08:37		
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	12	06:44 (1)	19:44	18:31	16:29	16:05	
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	06:34 (1)	07:00	07:54	07:53	08:38		
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	10	06:44 (1)	19:42	18:29	16:28	16:05	
17	08:35	07:43	06:38	06:23	05:22		04:54	05:16	06:06	06:35 (1)	07:01	07:56	07:55	08:39		
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	8	06:43 (1)	19:39	18:27	16:26	16:05	
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08	06:37 (1)	07:03	07:58	07:57	08:39		
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51	5	06:42 (1)	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:19	05:19		04:54	05:19	06:10	06:39 (1)	07:05	07:59	07:59	08:40		
	16:42	17:42	18:36	20:34	21:27		22:00	21:45	20:49	2	06:41 (1)	19:34	18:22	16:23	16:05	
20	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12		07:07	08:01	08:01	08:41		
	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46		19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16		04:55	05:22	06:14		07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	21:30		22:01	21:42	20:44		19:29	18:18	16:21	16:06		
22	08:29	07:32	06:26	06:12	05:15		04:55	05:23	06:15		07:10	08:05	08:04	08:42		
	16:47	17:48	18:42	20:39	21:32		22:01	21:41	20:42		19:27	18:15	16:19	16:07		
23	08:27	07:30	06:23	06:10	05:13		04:55	05:24	06:17		07:12	08:07	08:06	08:42		
	16:49	17:50	18:44	20:41	21:33		22:01	21:40	20:39		19:24	18:13	16:18	16:07		
24	08:26	07:28	06:21	06:07	05:12	3	06:32 (1)	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43	
	16:51	17:52	18:45	20:43	21:35		22:01	21:38	20:37		19:22	18:11	16:17	16:08		
25	08:25	07:26	06:19	06:05	05:11		04:56	05:28	06:21		07:15	07:11	08:09	08:43		
	16:53	17:54	18:47	20:45	21:36	6	06:36 (1)	05:10	22:01	21:37	20:35	19:20	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:10		04:56	05:29	06:22		07:17	07:13	08:11	08:44		
	16:55	17:56	18:49	20:46	21:37	8	06:36 (1)	05:08	22:01	21:35	20:33	19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08		04:57	05:31	06:24		07:19	07:15	08:13	08:44		
	16:56	17:58	18:51	20:48	21:39	11	06:37 (1)	05:07	22:01	21:33	20:30	19:15	17:05	16:14	16:10	
28	08:20	07:19	06:11	05:59	05:07		04:57	05:32	06:26		07:21	07:17	08:15	08:44		
	16:58	18:00	18:53	20:50	21:40	13	06:37 (1)	05:06	22:01	21:32	20:28	19:12	17:02	16:13	16:11	
29	08:19		07:09	05:56	05:06		04:58	05:34	06:28		07:23	07:19	08:16	08:44		
	17:00		19:55	20:52	21:42	15	06:37 (1)	05:05	22:01	21:30	20:26	19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05		04:58	05:36	06:29		07:24	07:21	08:18	08:44		
	17:02		19:57	20:54	21:43	17	06:37 (1)	05:04	22:01	21:28	20:23	19:07	16:58	16:11	16:13	
31	08:15		07:04		05:04			05:37	06:31				07:22		08:44	
	17:04		19:58		21:44			21:27	20:21				16:56		16:14	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233		
Total, worst case						138				212						
Sun reduction				0.35		0.38				0.34						
Oper. time red.				1.00		1.00				1.00						
Wind dir. red.				0.68		0.68				0.68						
Total reduction				0.24		0.26				0.23						
Total, real				17		36				49						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: J - H10

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	05:03	05:34 (1)	04:59	05:34 (1)	05:39	06:33	07:26	07:24	08:19		
2	16:15	17:06	18:02	20:00	20:56	21:45	05:49 (1)	22:00	18	05:52 (1)	21:25	20:18	19:05	16:54	16:10	
	08:44	08:12	07:14	06:59	05:50	05:02	05:33 (1)	05:00		05:35 (1)	05:41	06:35	07:28	07:26	08:21	
3	16:16	17:08	18:04	20:02	20:57	21:47	05:49 (1)	22:00	18	05:53 (1)	21:23	20:16	19:02	16:52	16:09	
	08:44	08:10	07:12	06:57	05:48	05:01	05:32 (1)	05:01		05:35 (1)	05:42	06:37	07:30	07:28	08:22	
4	16:17	17:10	18:06	20:04	20:59	21:48	05:49 (1)	21:59	19	05:54 (1)	21:21	20:14	19:00	16:50	16:09	
	08:43	08:09	07:09	06:54	05:46	05:00	05:31 (1)	05:01		05:34 (1)	05:44	06:38	07:32	07:30	08:24	
5	16:18	17:12	18:08	20:06	21:01	21:49	05:48 (1)	21:59	20	05:54 (1)	21:19	20:11	18:57	16:48	16:08	
	08:43	08:07	07:07	06:52	05:44	04:59	05:31 (1)	05:02		05:35 (1)	05:46	06:40	07:33	07:32	08:25	
6	16:20	17:14	18:10	20:08	21:03	21:50	05:49 (1)	21:58	19	05:54 (1)	21:18	20:09	18:55	16:47	16:07	
	08:43	08:05	07:05	06:49	05:42	04:59	05:30 (1)	05:03		05:36 (1)	05:47	06:42	07:35	07:34	08:27	
7	16:21	17:16	18:12	20:09	21:05	21:51	05:48 (1)	21:58	18	05:55 (1)	21:16	20:06	18:53	16:45	16:07	
	08:42	08:03	07:02	06:47	05:40	04:58	05:30 (1)	05:04		05:37 (1)	05:49	06:44	07:37	07:36	08:28	
8	16:22	17:18	18:13	20:11	21:06	21:52	05:49 (1)	21:57	18	05:55 (1)	21:14	20:04	18:50	16:43	16:06	
	08:42	08:01	07:00	06:44	05:38	04:57	05:29 (1)	05:05		05:38 (1)	05:51	06:45	07:39	07:38	08:29	
9	16:24	17:20	18:15	20:13	21:08	21:53	05:48 (1)	21:56	18	05:56 (1)	21:12	20:01	18:48	16:41	16:06	
	08:41	07:59	06:58	06:42	05:36	04:57	05:30 (1)	05:06		05:39 (1)	05:52	06:47	07:41	07:40	08:30	
10	16:25	17:22	18:17	20:15	21:10	21:54	05:49 (1)	21:56	17	05:56 (1)	21:10	19:59	18:45	16:39	16:06	
	08:41	07:57	06:55	06:40	05:35	04:56	05:29 (1)	05:07		05:40 (1)	05:54	06:49	07:43	07:42	08:32	
11	16:27	17:24	18:19	20:17	21:12	21:55	05:48 (1)	21:55	16	05:56 (1)	21:08	19:57	18:43	16:37	16:05	
	08:40	07:55	06:53	06:37	05:33	04:56	05:30 (1)	05:08		05:41 (1)	05:56	06:51	07:44	07:44	08:33	
12	16:28	17:26	18:21	20:19	21:13	21:56	05:48 (1)	21:54	16	05:57 (1)	21:06	19:54	18:41	16:36	16:05	
	08:39	07:53	06:50	06:35	05:31	04:56	05:31 (1)	05:10		05:42 (1)	05:58	06:52	07:46	07:46	08:34	
13	16:30	17:28	18:23	20:21	21:15	21:56	05:49 (1)	21:53	15	05:57 (1)	21:04	19:52	18:38	16:34	16:05	
	08:38	07:51	06:48	06:33	05:29	04:55	05:31 (1)	05:11		05:43 (1)	05:59	06:54	07:48	07:48	08:35	
14	16:31	17:30	18:25	20:22	21:17	21:57	05:48 (1)	21:52	14	05:57 (1)	21:01	19:49	18:36	16:32	16:05	
	08:37	07:49	06:45	06:30	05:27	04:55	05:31 (1)	05:12		05:44 (1)	06:01	06:56	07:50	07:49	08:36	
15	16:33	17:32	18:27	20:24	21:19	21:58	05:48 (1)	21:51	13	05:57 (1)	20:59	19:47	18:34	16:31	16:06	
	08:36	07:47	06:43	06:28	05:26	04:55	05:32 (1)	05:13		05:46 (1)	06:03	06:58	07:52	07:51	08:37	
16	16:35	17:34	18:29	20:26	21:20	21:58	05:48 (1)	21:50	12	05:58 (1)	20:57	19:44	18:31	16:29	16:05	
	08:36	07:45	06:41	06:25	05:24	04:55	05:32 (1)	05:15		05:47 (1)	06:05	07:00	07:54	07:53	08:38	
17	16:36	17:36	18:31	20:28	21:22	21:59	05:48 (1)	21:49	11	05:58 (1)	20:55	19:42	18:29	16:28	16:05	
	08:35	07:43	06:38	06:23	05:22	04:54	05:33 (1)	05:16		05:48 (1)	06:06	07:01	07:56	07:55	08:39	
18	16:38	17:38	18:32	20:30	21:24	21:59	05:48 (1)	21:48	10	05:58 (1)	20:53	19:39	18:27	16:26	16:05	
	08:33	07:41	06:36	06:21	05:21	04:54	05:33 (1)	05:17		05:49 (1)	06:08	07:03	07:58	07:57	08:39	
19	16:40	17:40	18:34	20:32	21:25	22:00	05:48 (1)	21:46	9	05:58 (1)	20:51	19:37	18:24	16:25	16:05	
	08:32	07:39	06:33	06:19	05:19	04:54	05:33 (1)	05:19		05:51 (1)	06:10	07:05	07:59	07:59	08:40	
20	16:42	17:42	18:36	20:33	21:27	22:00	05:48 (1)	21:45	7	05:58 (1)	20:48	19:34	18:22	16:23	16:05	
	08:31	07:37	06:31	06:16	05:18	04:55	05:33 (1)	05:20		05:52 (1)	06:12	07:07	08:01	08:01	08:41	
21	16:43	17:44	18:38	20:35	21:28	22:00	05:48 (1)	21:44	6	05:58 (1)	20:46	19:32	18:20	16:22	16:06	
	08:30	07:34	06:28	06:14	05:16	04:55	05:34 (1)	05:22		05:53 (1)	06:14	07:08	08:03	08:02	08:41	
22	16:45	17:46	18:40	20:37	21:30	2	05:47 (1)	22:01	15	05:49 (1)	21:42	4	05:57 (1)	20:44	16:06	
	08:29	07:32	06:26	06:12	05:15	05:44 (1)	05:55	05:34 (1)		05:55 (1)	06:15	07:10	08:05	08:04	08:42	
23	16:47	17:48	18:42	20:39	21:31	3	05:47 (1)	22:01	15	05:49 (1)	21:41	3	05:58 (1)	20:42	16:07	
	08:27	07:30	06:23	06:10	05:13	05:43 (1)	04:55	05:34 (1)		05:56 (1)	06:17	07:12	08:07	08:06	08:42	
24	16:49	17:50	18:44	20:41	21:33	5	05:48 (1)	22:01	15	05:49 (1)	21:40	1	05:57 (1)	20:39	16:07	
	08:26	07:28	06:21	06:07	05:12	05:41 (1)	04:55	05:34 (1)		05:56 (1)	06:26	07:21	08:16	08:15	08:41	
25	16:51	17:52	18:45	20:43	21:35	6	05:47 (1)	22:01	15	05:49 (1)	21:38	20:37	19:22	18:11	16:17	16:08
	08:25	07:26	06:19	06:05	05:11	05:40 (1)	04:56	05:35 (1)		05:57 (1)	06:28	07:23	08:18	08:17	08:41	
26	16:53	17:54	18:47	20:45	21:36	8	05:48 (1)	22:01	15	05:50 (1)	21:37	20:35	19:20	17:09	16:16	16:08
	08:23	07:23	06:16	06:03	05:10	05:39 (1)	04:56	05:34 (1)		05:58 (1)	06:29	07:24	08:19	08:18	08:41	
27	16:55	17:56	18:49	20:46	21:37	9	05:48 (1)	22:01	16	05:50 (1)	21:35	20:33	19:17	17:07	16:15	16:09
	08:22	07:21	06:14	06:01	05:08	05:38 (1)	04:57	05:35 (1)		05:59 (1)	06:31	07:26	08:21	08:20	08:41	
28	16:56	17:58	18:51	20:48	21:39	10	05:48 (1)	22:01	16	05:51 (1)	21:33	20:30	19:15	17:05	16:14	16:10
	08:20	07:19	06:11	05:59	05:07	05:37 (1)	04:57	05:34 (1)		05:60 (1)	06:32	07:27	08:22	08:21	08:41	
29	16:58	18:00		06:53	21:40	12	05:49 (1)	22:01	17	05:51 (1)	21:32	20:28	19:12	17:02	16:13	16:11
	08:19		07:09	05:56	05:06	05:36 (1)	04:58	05:35 (1)		05:61 (1)	06:34	07:29	08:24	08:23	08:41	
30	17:00		07:55	20:52	21:42	13	05:49 (1)	22:01	17	05:52 (1)	21:30	20:26	19:10	17:00	16:12	16:12
	08:17		07:06	05:54	05:05	05:35 (1)	04:58	05:34 (1)		05:62 (1)	06:36	07:31	08:26	08:25	08:41	
31	17:02		19:57	20:54	21:43	14	05:49 (1)	22:00	18	05:52 (1)	21:28	20:23	19:07	16:58	16:11	16:13
	08:15		07:04		05:04	05:34 (1)				05:37		06:31	07:22	07:22	08:44	
	17:04		19:58		21:44	14	05:48 (1)			21:27		20:21	16:56	16:10	16:14	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233				
Total, worst case					96	498	303									
Sun reduction					0.38	0.32	0.32									
Oper. time red.					1.00	1.00	1.00									
Wind dir. red.					0.66	0.66	0.66									
Total reduction					0.25	0.21	0.21									
Total, real					24	104	64									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: K - H11

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: L - H12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		07:25 (5)	05:52			05:03		05:34 (3)
	16:15	17:06	18:02						20:00	10	07:35 (5)	20:55			21:45	9	05:43 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50			05:02		05:33 (3)
	16:16	17:08	18:04						20:02	13	07:36 (5)	20:57			21:47	10	05:43 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48			05:01		05:32 (3)
	16:17	17:10	18:06						20:04	15	07:35 (5)	20:59			21:48	11	05:43 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46			05:00		05:31 (3)
	16:18	17:12	18:08						20:06	17	07:35 (5)	21:01			21:49	12	05:43 (3)
5	08:43	08:07	07:07						06:52		07:15 (5)	05:44			04:59		05:31 (3)
	16:20	17:14	18:10						20:08	18	07:33 (5)	21:03			21:50	13	05:44 (3)
6	08:43	08:05	07:05						06:49		07:13 (5)	05:42			04:59		05:30 (3)
	16:21	17:16	18:11						20:09	20	07:33 (5)	21:04			21:51	13	05:43 (3)
7	08:42	08:03	07:02						06:47		07:11 (5)	05:40			04:58		05:30 (3)
	16:22	17:18	18:13						20:11	21	07:32 (5)	21:06			21:52	14	05:44 (3)
8	08:42	08:01	07:00						06:44		07:10 (5)	05:38			04:57		05:29 (3)
	16:24	17:20	18:15						20:13	20	07:30 (5)	21:08			21:53	14	05:43 (3)
9	08:41	07:59	06:57						06:42		07:12 (5)	05:36			04:57		05:29 (3)
	16:25	17:22	18:17						20:15	17	07:29 (5)	21:10			21:54	15	05:44 (3)
10	08:40	07:57	06:55						06:40		07:13 (5)	05:35			04:56		05:28 (3)
	16:27	17:24	18:19						20:17	13	07:26 (5)	21:12			21:55	15	05:43 (3)
11	08:40	07:55	06:53						06:37		07:17 (5)	05:33			04:56		05:28 (3)
	16:28	17:26	18:21						20:19	5	07:22 (5)	21:13			21:55	16	05:44 (3)
12	08:39	07:53	06:50						06:35			05:31			04:56		05:28 (3)
	16:30	17:28	18:23						20:21			21:15			21:56	16	05:44 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:27 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	17	05:44 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:27 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	17	05:44 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:27 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	17	05:44 (3)
16	08:35	07:45	06:41						06:25			05:24			04:55		05:27 (3)
	16:36	17:36	18:30						20:28			21:22			21:59	17	05:44 (3)
17	08:34	07:43	06:38						06:23			05:22			04:54		05:27 (3)
	16:38	17:38	18:32						20:30			21:23			21:59	17	05:44 (3)
18	08:33	07:41	06:36						06:21			05:21			04:54		05:27 (3)
	16:40	17:40	18:34						20:32			21:25			22:00	18	05:45 (3)
19	08:32	07:39	06:33						06:19			05:19			04:54		05:27 (3)
	16:42	17:42	18:36						20:33			21:27			22:00	18	05:45 (3)
20	08:31	07:37	06:31						06:16			05:18			04:55		05:27 (3)
	16:43	17:44	18:38						20:35			21:28			22:00	18	05:45 (3)
21	08:30	07:34	06:28						06:14			05:16			04:55		05:28 (3)
	16:45	17:46	18:40						20:37			21:30			22:01	18	05:46 (3)
22	08:29	07:32	06:26						06:12			05:15			04:55		05:28 (3)
	16:47	17:48	18:42						20:39			21:31			22:01	18	05:46 (3)
23	08:27	07:30	06:23						06:09			05:13			04:55		05:28 (3)
	16:49	17:50	18:44						20:41			21:33			22:01	18	05:46 (3)
24	08:26	07:28	06:21						06:07			05:12			04:55		05:28 (3)
	16:51	17:52	18:45						20:43			21:34			22:01	18	05:46 (3)
25	08:25	07:25	06:18						06:05			05:11		05:40 (3)	04:56		05:29 (3)
	16:53	17:54	18:47						20:44			21:36	1	05:41 (3)	22:01	18	05:47 (3)
26	08:23	07:23	06:16						06:03			05:10		05:39 (3)	04:56		05:29 (3)
	16:54	17:56	18:49						20:46			21:37	2	05:41 (3)	22:01	17	05:46 (3)
27	08:22	07:21	06:14						06:01			05:08		05:38 (3)	04:57		05:30 (3)
	16:56	17:58	18:51						20:48			21:39	4	05:42 (3)	22:01	17	05:47 (3)
28	08:20	07:19	06:11						05:59			05:07		05:37 (3)	04:57		05:30 (3)
	16:58	18:00	18:53						20:50			21:40	5	05:42 (3)	22:01	17	05:47 (3)
29	08:19		07:09					07:32 (5)	05:56			05:06		05:36 (3)	04:58		05:31 (3)
	17:00		19:55	2		07:34 (5)	20:52					21:41	6	05:42 (3)	22:01	17	05:48 (3)
30	08:17		07:06			07:30 (5)	05:54					05:05		05:35 (3)	04:58		05:31 (3)
	17:02		19:56	5		07:35 (5)	20:54					21:43	7	05:42 (3)	22:00	16	05:47 (3)
31	08:15		07:04			07:27 (5)						05:04		05:34 (3)			
	17:04		19:58	8		07:35 (5)						21:44	8	05:42 (3)			
Potential sun hours	250	273	367				420					494			510		
Total, worst case				15			169					33			471		
Sun reduction				0.27			0.35					0.38			0.32		
Oper. time red.				1.00			1.00					1.00			1.00		
Wind dir. red.				0.68			0.68					0.66			0.66		
Total reduction				0.18			0.24					0.25			0.21		
Total, real				3			40					8			99		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: L - H12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33	07:16 (5)	07:26	07:24	08:19			
	22:00	16 05:48 (3)	21:25	20:18	5 07:21 (5)	19:05	16:54	16:10			
2	05:00	05:33 (3)	05:40	06:35	07:12 (5)	07:28	07:26	08:21			
	22:00	16 05:49 (3)	21:23	20:16	13 07:25 (5)	19:02	16:52	16:09			
3	05:00	05:33 (3)	05:42	06:37	07:10 (5)	07:30	07:28	08:22			
	21:59	15 05:48 (3)	21:21	20:14	17 07:27 (5)	19:00	16:50	16:09			
4	05:01	05:34 (3)	05:44	06:38	07:07 (5)	07:32	07:30	08:24			
	21:59	15 05:49 (3)	21:19	20:11	20 07:27 (5)	18:57	16:48	16:08			
5	05:02	05:35 (3)	05:46	06:40	07:07 (5)	07:33	07:32	08:25			
	21:58	14 05:49 (3)	21:17	20:09	21 07:28 (5)	18:55	16:46	16:07			
6	05:03	05:36 (3)	05:47	06:42	07:09 (5)	07:35	07:34	08:26			
	21:58	14 05:50 (3)	21:16	20:06	20 07:29 (5)	18:53	16:45	16:07			
7	05:04	05:37 (3)	05:49	06:44	07:10 (5)	07:37	07:36	08:28			
	21:57	13 05:50 (3)	21:14	20:04	19 07:29 (5)	18:50	16:43	16:06			
8	05:05	05:38 (3)	05:51	06:45	07:12 (5)	07:39	07:38	08:29			
	21:56	12 05:50 (3)	21:12	20:01	17 07:29 (5)	18:48	16:41	16:06			
9	05:06	05:39 (3)	05:52	06:47	07:14 (5)	07:41	07:40	08:30			
	21:55	11 05:50 (3)	21:10	19:59	15 07:29 (5)	18:45	16:39	16:06			
10	05:07	05:40 (3)	05:54	06:49	07:16 (5)	07:43	07:42	08:32			
	21:55	11 05:51 (3)	21:08	19:57	13 07:29 (5)	18:43	16:37	16:05			
11	05:08	05:41 (3)	05:56	06:51	07:17 (5)	07:44	07:44	08:33			
	21:54	10 05:51 (3)	21:06	19:54	11 07:28 (5)	18:41	16:36	16:05			
12	05:10	05:42 (3)	05:58	06:52	07:19 (5)	07:46	07:46	08:34			
	21:53	9 05:51 (3)	21:03	19:52	8 07:27 (5)	18:38	16:34	16:05			
13	05:11	05:43 (3)	05:59	06:54	07:21 (5)	07:48	07:47	08:35			
	21:52	8 05:51 (3)	21:01	19:49	6 07:27 (5)	18:36	16:32	16:05			
14	05:12	05:44 (3)	06:01	06:56	07:22 (5)	07:50	07:49	08:36			
	21:51	7 05:51 (3)	20:59	19:47	3 07:25 (5)	18:34	16:31	16:05			
15	05:13	05:45 (3)	06:03	06:58		07:52	07:51	08:37			
	21:50	6 05:51 (3)	20:57	19:44		18:31	16:29	16:05			
16	05:15	05:47 (3)	06:05	06:59		07:54	07:53	08:38			
	21:49	4 05:51 (3)	20:55	19:42		18:29	16:28	16:05			
17	05:16	05:48 (3)	06:06	07:01		07:56	07:55	08:39			
	21:47	3 05:51 (3)	20:53	19:39		18:27	16:26	16:05			
18	05:17	05:49 (3)	06:08	07:03		07:57	07:57	08:39			
	21:46	2 05:51 (3)	20:51	19:37		18:24	16:25	16:05			
19	05:19		06:10	07:05		07:59	07:59	08:40			
	21:45		20:48	19:34		18:22	16:23	16:05			
20	05:20		06:12	07:07		08:01	08:01	08:41			
	21:44		20:46	19:32		18:20	16:22	16:06			
21	05:21		06:14	07:08		08:03	08:02	08:41			
	21:42		20:44	19:29		18:18	16:21	16:06			
22	05:23		06:15	07:10		08:05	08:04	08:42			
	21:41		20:42	19:27		18:15	16:19	16:07			
23	05:24		06:17	07:12		08:07	08:06	08:42			
	21:39		20:39	19:24		18:13	16:18	16:07			
24	05:26		06:19	07:14		08:09	08:08	08:43			
	21:38		20:37	19:22		18:11	16:17	16:08			
25	05:28		06:21	07:15		07:11	08:09	08:43			
	21:36		20:35	19:19		17:09	16:16	16:08			
26	05:29		06:22	07:17		07:13	08:11	08:43			
	21:35		20:33	19:17		17:07	16:15	16:09			
27	05:31		06:24	07:19		07:15	08:13	08:44			
	21:33		20:30	19:15		17:05	16:14	16:10			
28	05:32		06:26	07:21		07:17	08:14	08:44			
	21:32		20:28	19:12		17:02	16:13	16:11			
29	05:34		06:28	07:23		07:19	08:16	08:44			
	21:30		20:25	19:10		17:00	16:12	16:12			
30	05:35		06:29	07:24		07:20	08:18	08:44			
	21:28		20:23	19:07		16:58	16:11	16:13			
31	05:37		06:31			07:22		08:44			
	21:27		20:21			16:56		16:14			
Potential sun hours	512		460	382		328	259	233			
Total, worst case	186			188							
Sun reduction	0.32			0.32							
Oper. time red.	1.00			1.00							
Wind dir. red.	0.66			0.68							
Total reduction	0.21			0.22							
Total, real	40			41							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: M - H13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	17:11 (5) 20:00	07:01 20:55	19:29 (4) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	17:10 (5) 20:02	06:59 20:57	19:30 (4) 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	17:11 (5) 20:04	06:56 20:59	19:31 (4) 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	17:11 (5) 20:06	06:54 21:01	19:32 (4) 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	17:10 (5) 20:07	06:51 21:03	19:33 (4) 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	17:11 (5) 20:09	06:49 21:04	19:34 (4) 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	17:11 (5) 20:11	06:47 21:06	19:37 (4) 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	17:12 (5) 20:13	06:44 21:08	19:39 (4) 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	17:12 (5) 20:15	06:42 21:10	19:42 (4) 21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	17:14 (5) 20:17	06:39 21:11	19:41 (4) 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	17:17 (5) 20:19	06:37 21:13	19:39 (4) 21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	17:29 (5) 20:20	06:35 21:15	19:51 (3) 21:57
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:53 (3) 21:17	21:19 (2) 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:54 (3) 21:18	21:21 (2) 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:56 (3) 21:20	21:22 (2) 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:58 (3) 21:22	21:23 (2) 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	20:00 (3) 21:23	21:24 (2) 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:29 (4) 21:25	21:25 (2) 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	20:03 (3) 21:27	21:26 (2) 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:29 (4) 21:28	21:27 (2) 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	20:07 (4) 21:30	21:28 (2) 22:00
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	20:08 (4) 21:31	21:29 (2) 22:01
23	08:27 16:49	07:30 17:50	17:20 (5) 18:43	06:09 20:41	20:09 (4) 21:33	21:30 (2) 22:01
24	08:26 16:50	07:28 17:52	17:17 (5) 18:45	06:07 20:42	19:27 (4) 21:34	21:31 (2) 22:01
25	08:24 16:52	07:25 17:54	17:15 (5) 18:47	06:05 20:44	20:09 (4) 21:36	21:32 (2) 22:01
26	08:23 16:54	07:23 17:56	17:14 (5) 18:49	06:03 20:46	19:27 (4) 21:37	21:33 (2) 22:01
27	08:22 16:56	07:21 17:58	17:13 (5) 18:51	06:01 20:48	20:08 (4) 21:39	21:34 (2) 22:01
28	08:20 16:58	07:18 18:00	17:12 (5) 18:53	05:58 20:50	19:28 (4) 21:40	21:35 (2) 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	19:28 (4) 21:41	21:36 (2) 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	19:29 (4) 21:43	21:37 (2) 22:00
31	08:15 17:04		07:04 19:58		05:04 21:44	21:38 (2) 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case		72	253	677	228	64
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.68	0.68	0.65	0.65	0.61
Total reduction		0.16	0.18	0.23	0.25	0.19
Total, real		11	46	156	57	12

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: M - H13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	12 19:38 (4) 19:50 (3)	07:26 19:05	07:24 16:54
2	05:00 22:00	05:40 21:23	06:35 20:16	8 19:40 (4) 19:48 (3)	07:28 19:02	17:56 (5) 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	3 19:42 (4) 19:45 (4)	07:30 19:00	17:53 (5) 16:50
4	05:01 21:59	05:44 21:19	19:51 (4) 20:03 (4)	06:38 20:11	07:31 18:57	17:51 (5) 16:48
5	05:02 21:58	05:45 21:17	19:47 (4) 20:05 (4)	06:40 20:09	07:33 18:55	17:49 (5) 16:46
6	05:03 21:57	05:47 21:15	19:45 (4) 20:07 (4)	06:42 20:06	07:35 18:52	17:48 (5) 16:44
7	05:04 21:57	05:49 21:13	19:44 (4) 20:09 (4)	06:43 20:04	07:37 18:50	17:46 (5) 16:43
8	05:05 21:56	05:51 21:11	19:42 (4) 20:10 (4)	06:45 20:01	07:39 18:48	17:46 (5) 16:41
9	05:06 21:55	05:52 21:09	19:41 (4) 20:11 (4)	06:47 19:59	07:41 18:45	17:45 (5) 16:39
10	05:07 21:55	05:54 21:07	19:39 (4) 20:12 (4)	06:49 19:56	07:42 18:43	17:45 (5) 16:37
11	05:08 21:54	05:56 21:05	19:38 (4) 20:13 (4)	06:50 19:54	07:44 18:40	17:45 (5) 16:35
12	05:09 21:53	05:57 21:03	19:38 (4) 20:14 (4)	06:52 19:51	07:46 18:38	17:45 (5) 16:34
13	05:11 21:52	05:59 21:01	19:36 (4) 20:14 (4)	06:54 19:49	07:48 18:36	17:45 (5) 16:32
14	05:12 21:51	06:01 20:59	19:36 (4) 20:14 (4)	06:56 19:47	07:50 18:33	17:45 (5) 16:31
15	05:13 21:50	06:03 20:57	19:35 (4) 20:15 (4)	06:58 19:44	07:52 18:31	17:46 (5) 16:29
16	05:14 21:49	06:05 20:55	19:34 (4) 20:15 (4)	06:59 19:42	07:54 18:29	17:47 (5) 16:27
17	05:16 21:47	06:06 20:53	19:34 (4) 20:15 (4)	07:01 19:39	07:55 18:26	17:48 (5) 16:26
18	05:17 21:46	06:08 20:50	19:34 (4) 20:15 (4)	07:03 19:37	07:57 18:24	17:49 (5) 16:25
19	05:18 21:45	06:10 20:48	19:33 (4) 20:15 (4)	07:05 19:34	07:59 18:22	17:59 16:23
20	05:20 21:44	06:12 20:46	19:33 (4) 20:15 (4)	07:06 19:32	08:01 18:20	18:00 16:22
21	05:21 21:42	06:13 20:44	19:33 (4) 20:15 (4)	07:08 19:29	08:03 18:17	18:02 16:20
22	05:23 21:41	06:15 20:42	19:32 (4) 20:12 (4)	07:10 19:27	08:05 18:15	18:04 16:19
23	05:24 21:39	06:17 20:39	19:32 (4) 20:10 (4)	07:12 19:24	08:07 18:13	18:06 16:18
24	05:26 21:38	06:19 20:37	19:33 (4) 20:09 (3)	07:13 19:22	08:09 18:11	18:08 16:17
25	05:27 21:36	06:20 20:35	19:32 (4) 20:06 (3)	07:15 19:19	07:11 17:09	18:09 16:16
26	05:29 21:35	06:22 20:32	19:33 (4) 20:04 (3)	07:17 19:17	07:13 17:06	18:11 16:14
27	05:30 21:33	06:24 20:30	19:34 (4) 20:02 (3)	07:19 19:14	07:14 17:04	18:13 16:13
28	05:32 21:32	06:26 20:28	19:33 (4) 19:59 (3)	07:21 19:12	07:16 17:02	18:14 16:12
29	05:34 21:30	06:27 20:25	19:34 (4) 19:57 (3)	07:22 19:09	07:18 17:00	18:16 16:12
30	05:35 21:28	06:29 20:23	19:36 (4) 19:55 (3)	07:24 19:07	07:20 16:58	18:18 16:11
31	05:37 21:26	06:31 20:21	19:36 (4) 19:52 (3)	07:22 16:56	07:22 16:56	18:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		895	23	331		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.65	0.68		
Total reduction		0.22	0.21	0.20		
Total, real		199	5	66		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: N - H14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June			
1	08:44 16:15	08:14 17:06	07:16 18:02	16:59 (5) 17:17 (5)	07:01 20:00	19:04 (4) 19:33 (3)	05:52 20:55	05:03 21:45	20:48 (2) 21:10 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	17:00 (5) 17:14 (5)	06:59 20:02	19:02 (4) 19:35 (3)	05:50 20:57	05:02 21:46	20:49 (2) 21:12 (2)
3	08:43 16:17	08:10 17:10	07:11 18:06	17:03 (5) 17:12 (5)	06:56 20:04	19:02 (4) 19:37 (3)	05:48 20:59	05:01 21:48	20:48 (2) 21:13 (2)
4	08:43 16:18	08:08 17:12	07:09 18:07		06:54 20:06	19:02 (4) 19:39 (3)	05:46 21:01	05:00 21:49	20:48 (2) 21:14 (2)
5	08:43 16:19	08:07 17:14	07:07 18:09		06:51 20:07	19:01 (4) 19:40 (3)	05:44 21:03	04:59 21:50	20:48 (2) 21:14 (2)
6	08:42 16:21	08:05 17:16	07:04 18:11		06:49 20:09	19:01 (4) 19:42 (3)	05:42 21:04	04:59 21:51	20:49 (2) 21:16 (2)
7	08:42 16:22	08:03 17:18	07:02 18:13		06:47 20:11	19:00 (4) 19:43 (3)	05:40 21:06	04:58 21:52	20:48 (2) 21:16 (2)
8	08:41 16:24	08:01 17:20	07:00 18:15		06:44 20:13	19:00 (4) 19:46 (3)	05:38 21:08	04:57 21:53	20:49 (2) 21:18 (2)
9	08:41 16:25	07:59 17:22	06:57 18:17		06:42 20:15	19:00 (4) 19:48 (3)	05:36 21:10	04:57 21:54	20:49 (2) 21:18 (2)
10	08:40 16:26	07:57 17:24	06:55 18:19		06:39 20:17	19:00 (4) 19:47 (3)	05:34 21:11	04:56 21:55	20:49 (2) 21:19 (2)
11	08:40 16:28	07:55 17:26	06:52 18:21		06:37 20:19	19:00 (4) 19:47 (3)	05:33 21:13	04:56 21:55	20:50 (2) 21:19 (2)
12	08:39 16:30	07:53 17:28	06:50 18:23		06:35 20:20	19:01 (4) 19:46 (3)	05:31 21:15	04:55 21:56	20:49 (2) 21:19 (2)
13	08:38 16:31	07:51 17:30	06:48 18:25		06:32 20:22	19:01 (4) 19:43 (3)	05:29 21:17	04:55 21:57	20:50 (2) 21:19 (2)
14	08:37 16:33	07:49 17:32	06:45 18:27		06:30 20:24	19:02 (4) 19:42 (3)	05:27 21:18	04:55 21:57	20:50 (2) 21:19 (2)
15	08:36 16:34	07:47 17:34	17:03 (5) 18:28	06:43 20:26	06:28 20:26	19:03 (4) 19:39 (3)	05:26 21:20	04:55 21:58	20:50 (2) 21:20 (2)
16	08:35 16:36	07:45 17:36	17:01 (5) 18:30	06:40 20:28	06:25 20:28	19:04 (4) 19:33 (4)	05:24 21:22	04:54 21:59	20:51 (2) 21:20 (2)
17	08:34 16:38	07:43 17:38	17:00 (5) 18:32	06:38 20:30	06:23 20:30	19:05 (4) 19:30 (4)	05:22 21:23	04:54 21:59	20:51 (2) 21:20 (2)
18	08:33 16:40	07:41 17:40	16:58 (5) 18:34	06:35 20:31	06:21 20:31	19:07 (4) 19:29 (4)	05:21 21:25	04:54 22:00	20:51 (2) 21:20 (2)
19	08:32 16:41	07:39 17:42	16:57 (5) 18:36	06:33 20:33	06:18 20:33	19:09 (4) 19:26 (4)	05:19 21:27	04:54 22:00	20:51 (2) 21:20 (2)
20	08:31 16:43	07:36 17:44	16:57 (5) 18:38	06:31 20:35	06:16 20:35	19:13 (4) 19:22 (4)	05:18 21:28	04:54 22:00	20:51 (2) 21:21 (2)
21	08:30 16:45	07:34 17:46	16:56 (5) 18:40	06:28 20:37	06:14 20:37	19:22 (4) 21:30	21:28 21:30	22:00 22:01	30 30
22	08:28 16:47	07:32 17:48	16:55 (5) 18:41	06:26 20:39	06:12 20:39	20:53 (2) 21:31	22:01 21:31	22:01 22:01	30 30
23	08:27 16:49	07:30 17:50	16:55 (5) 18:43	06:23 20:41	06:09 20:41	20:51 (2) 21:33	22:01 20:59 (2)	22:01 22:01	30 30
24	08:26 16:50	07:28 17:52	16:56 (5) 18:45	06:21 20:42	06:07 20:42	20:50 (2) 21:34	22:01 21:01 (2)	22:01 22:01	29 29
25	08:24 16:52	07:25 17:54	16:55 (5) 18:47	18:19 (4) 20:44	06:05 20:44	20:50 (2) 21:36	22:01 21:02 (2)	22:01 22:01	29 29
26	08:23 16:54	07:23 17:56	16:56 (5) 18:49	18:14 (4) 20:46	06:03 20:46	20:50 (2) 21:37	22:01 21:04 (2)	22:01 22:01	29 29
27	08:22 16:56	07:21 17:58	16:57 (5) 18:51	18:12 (4) 20:48	06:01 20:48	20:49 (2) 21:39	22:01 21:05 (2)	22:01 22:01	29 30
28	08:20 16:58	07:18 18:00	16:57 (5) 18:53	18:10 (4) 20:50	05:58 20:50	20:49 (2) 21:40	22:01 21:06 (2)	22:01 22:01	30 30
29	08:18 17:00		07:08 19:54	19:08 (4) 20:52	05:56 20:52	20:49 (2) 21:41	22:01 21:07 (2)	22:01 22:01	29 29
30	08:17 17:02		07:06 19:56	19:07 (4) 20:53	05:54 20:53	20:48 (2) 21:43	22:01 21:08 (2)	22:01 22:00	29 30
31	08:15 17:04		07:04 19:58	19:05 (4) 20:54	05:53 20:54	20:48 (2) 21:44	22:01 21:09 (2)		
Potential sun hours	250	273	367	420	494	510			
Total, worst case		256	148	710	147	854			
Sun reduction		0.23	0.27	0.35	0.38	0.32			
Oper. time red.		1.00	1.00	1.00	1.00	1.00			
Wind dir. red.		0.67	0.67	0.67	0.62	0.62			
Total reduction		0.16	0.18	0.24	0.24	0.20			
Total, real		40	27	168	35	168			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: N - H14

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59	20:54 (2)	05:39	06:33	18:59 (4)	07:26		07:24	08:19		
	22:00	29	21:23 (2)	21:25	20:18	47	19:46 (3)	19:05	16:54	16:10	
2	05:00	20:54 (2)	05:40	06:35	18:59 (4)	07:28		07:26	08:21		
	22:00	30	21:24 (2)	21:23	20:16	47	19:46 (3)	19:02	16:52	16:09	
3	05:00	20:54 (2)	05:42	06:36	18:57 (4)	07:30		07:28	08:22		
	21:59	29	21:23 (2)	21:21	20:13	48	19:45 (3)	19:00	16:50	16:08	
4	05:01	20:54 (2)	05:44	06:38	18:57 (4)	07:31		07:30	08:24		
	21:59	29	21:23 (2)	21:19	20:11	46	19:43 (3)	18:57	16:48	16:08	
5	05:02	20:55 (2)	05:45	06:40	18:57 (4)	07:33		07:32	08:25		
	21:58	28	21:23 (2)	21:17	20:09	44	19:41 (3)	18:55	16:46	16:07	
6	05:03	20:55 (2)	05:47	06:42	18:57 (4)	07:35		07:34	08:26		
	21:57	27	21:22 (2)	21:15	20:06	42	19:39 (3)	18:52	16:44	16:07	
7	05:04	20:55 (2)	05:49	06:43	18:56 (4)	07:37		07:36	08:28		
	21:57	27	21:22 (2)	21:13	20:04	39	19:35 (3)	18:50	16:43	16:06	
8	05:05	20:56 (2)	05:51	06:45	18:56 (4)	07:39		07:38	08:29		
	21:56	25	21:21 (2)	21:11	20:01	37	19:33 (3)	18:48	16:41	16:06	
9	05:06	20:56 (2)	05:52	06:47	18:56 (4)	07:41		07:40	08:30		
	21:55	25	21:21 (2)	21:09	19:59	35	19:31 (3)	18:45	16:39	16:05	
10	05:07	20:56 (2)	05:54	06:49	18:56 (4)	07:42		07:42	08:31		
	21:55	24	21:20 (2)	21:07	19:56	32	19:28 (3)	18:43	16:37	16:05	
11	05:08	20:56 (2)	05:56	06:50	18:56 (4)	07:44		17:35 (5)	07:44	08:33	
	21:54	23	21:19 (2)	21:05	19:54	30	19:26 (3)	18:40	17:47 (5)	16:35	16:05
12	05:09	20:57 (2)	05:57	06:52	18:57 (4)	07:46		17:33 (5)	07:45	08:34	
	21:53	21	21:18 (2)	21:03	19:51	27	19:24 (4)	18:38	17:49 (5)	16:34	16:05
13	05:10	20:57 (2)	05:59	06:54	18:58 (4)	07:48		17:31 (5)	07:47	08:35	
	21:52	20	21:17 (2)	21:01	19:49	24	19:22 (4)	18:36	17:51 (5)	16:32	16:05
14	05:12	20:57 (2)	06:01	06:56	18:58 (4)	07:50		17:30 (5)	07:49	08:36	
	21:51	19	21:16 (2)	20:59	19:47	20	19:18 (4)	18:33	17:52 (5)	16:31	16:05
15	05:13	20:57 (2)	06:03	06:58	18:59 (4)	07:52		17:29 (5)	07:51	08:37	
	21:50	18	21:15 (2)	20:57	19:44	17	19:16 (4)	18:31	17:52 (5)	16:29	16:05
16	05:14	20:58 (2)	06:04	06:59	19:01 (4)	07:54		17:28 (5)	07:53	08:38	
	21:49	16	21:14 (2)	20:55	19:42	13	19:14 (4)	18:29	17:53 (5)	16:27	16:05
17	05:16	20:59 (2)	06:06	07:01	19:02 (4)	07:55		17:27 (5)	07:55	08:38	
	21:47	15	21:14 (2)	20:53	19:39	9	19:11 (4)	18:26	17:53 (5)	16:26	16:05
18	05:17	20:59 (2)	06:08	07:03	19:05 (4)	07:57		17:27 (5)	07:57	08:39	
	21:46	13	21:12 (2)	20:50	19:37	3	19:08 (4)	18:24	17:53 (5)	16:24	16:05
19	05:18	21:00 (2)	06:10	07:05		07:59		17:27 (5)	07:59	08:40	
	21:45	11	21:11 (2)	20:48	19:34			18:22	17:52 (5)	16:23	16:05
20	05:20	21:01 (2)	06:12	07:06		08:01		17:27 (5)	08:00	08:41	
	21:44	9	21:10 (2)	20:46	19:32			18:20	17:50 (5)	16:22	16:06
21	05:21	21:02 (2)	06:13	07:08		08:03		17:27 (5)	08:02	08:41	
	21:42	7	21:09 (2)	20:44	19:29			18:17	17:48 (5)	16:20	16:06
22	05:23	21:02 (2)	06:15	07:10		08:05		17:27 (5)	08:04	08:42	
	21:41	5	21:07 (2)	20:42	19:27			18:15	17:45 (5)	16:19	16:06
23	05:24	21:04 (2)	06:17	19:16 (4)	07:12			08:07	17:28 (5)	08:06	08:42
	21:39	3	21:07 (2)	20:39	19:26 (4)	19:24		18:13	17:43 (5)	16:18	16:07
24	05:26		06:19	19:13 (4)	07:13			08:09	17:28 (5)	08:08	08:43
	21:38		20:37	19:30 (4)	19:22			18:11	17:41 (5)	16:17	16:08
25	05:27		06:20	19:09 (4)	07:15			07:11	16:29 (5)	08:09	08:43
	21:36		20:35	19:32 (4)	19:19			17:09	16:38 (5)	16:16	16:08
26	05:29		06:22	19:07 (4)	07:17			07:13	16:31 (5)	08:11	08:43
	21:35		20:32	19:33 (4)	19:17			17:06	16:36 (5)	16:14	16:09
27	05:30		06:24	19:06 (4)	07:19			07:14	16:33 (5)	08:13	08:44
	21:33		20:30	19:35 (4)	19:14			17:04	16:34 (5)	16:13	16:10
28	05:32		06:26	19:04 (4)	07:21			07:16		08:14	08:44
	21:32		20:28	19:40 (3)	19:12			17:02		16:12	16:11
29	05:34		06:27	19:02 (4)	07:22			07:18		08:16	08:44
	21:30		20:25	19:43 (3)	19:09			17:00		16:12	16:11
30	05:35		06:29	19:02 (4)	07:24			07:20		08:18	08:44
	21:28		20:23	19:44 (3)	19:07			16:58		16:11	16:12
31	05:37		06:31	19:00 (4)				07:22			08:44
	21:26		20:21	19:45 (3)				16:56			16:13
Potential sun hours	512		460		382			328		259	233
Total, worst case		453		269		560			300		
Sun reduction		0.32		0.34		0.32		0.29			
Oper. time red.		1.00		1.00		1.00		1.00			
Wind dir. red.		0.62		0.67		0.67		0.67			
Total reduction		0.20		0.23		0.22		0.20			
Total, real		90		62		120		59			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: O - H15

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:54 (4) 19:33 (3)	05:52 20:55
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:53 (4) 19:35 (3)	05:50 20:57
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:53 (4) 19:37 (3)	05:48 20:59
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:53 (4) 19:39 (3)	05:46 21:01
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	18:53 (4) 19:40 (3)	05:44 21:03
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	18:54 (4) 19:42 (3)	05:42 21:04
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	18:54 (4) 19:42 (3)	05:40 21:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	18:54 (4) 19:41 (3)	05:38 21:08
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	18:56 (4) 19:40 (3)	05:36 21:10
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	18:56 (4) 19:38 (3)	05:34 21:11
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	18:58 (4) 19:36 (3)	05:33 21:13
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	19:00 (4) 19:21 (4)	05:31 21:15
13	08:38 16:31	07:51 17:30	16:57 (5) 17:00 (5)	06:32 20:22	19:01 (4) 19:18 (4)	05:29 21:17
14	08:37 16:33	07:49 17:32	16:56 (5) 17:02 (5)	06:30 20:24	19:06 (4) 19:13 (4)	05:27 21:18
15	08:36 16:34	07:47 17:34	16:55 (5) 17:05 (5)	06:28 20:26	05:26 21:20	20:45 (2) 21:58
16	08:35 16:36	07:45 17:36	16:54 (5) 17:07 (5)	06:25 20:28	05:24 21:22	20:44 (2) 21:59
17	08:34 16:38	07:43 17:38	16:53 (5) 17:09 (5)	06:23 20:30	05:22 21:23	20:42 (2) 21:59
18	08:33 16:40	07:41 17:40	16:52 (5) 17:11 (5)	06:21 20:31	05:21 21:25	20:42 (2) 22:00
19	08:32 16:41	07:39 17:42	16:52 (5) 17:13 (5)	06:18 20:33	05:19 21:27	20:42 (2) 22:00
20	08:31 16:43	07:36 17:44	16:52 (5) 17:16 (5)	06:16 20:35	05:18 21:28	20:42 (2) 22:00
21	08:30 16:45	07:34 17:46	16:52 (5) 17:18 (5)	06:14 20:37	05:16 21:30	20:40 (2) 22:01
22	08:28 16:47	07:32 17:48	16:52 (5) 17:17 (5)	06:12 20:39	05:15 21:31	20:40 (2) 22:01
23	08:27 16:49	07:30 17:50	16:52 (5) 17:16 (5)	06:09 20:41	05:13 21:33	20:39 (2) 22:01
24	08:26 16:50	07:28 17:52	16:53 (5) 17:16 (5)	06:07 20:42	05:12 21:34	20:39 (2) 22:01
25	08:24 16:52	07:25 17:54	16:53 (5) 17:14 (5)	06:05 20:44	05:11 21:36	20:39 (2) 22:01
26	08:23 16:54	07:23 17:56	16:55 (5) 17:13 (5)	06:03 20:46	05:09 21:37	20:39 (2) 22:01
27	08:22 16:56	07:21 17:58	16:56 (5) 17:12 (5)	06:01 20:48	05:08 21:39	20:39 (2) 22:01
28	08:20 16:58	07:18 18:00	16:58 (5) 17:09 (5)	05:58 20:50	05:07 21:40	20:39 (2) 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	20:39 (2) 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	20:39 (2) 22:00
31	08:15 17:04		07:04 19:58	05:54 20:53	05:04 21:44	20:39 (2) 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case		276		257	528	809
Sun reduction		0.23		0.27	0.35	0.32
Oper. time red.		1.00		1.00	1.00	1.00
Wind dir. red.		0.67		0.67	0.62	0.62
Total reduction		0.16		0.18	0.24	0.20
Total, real		43		47	76	161

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: O - H15

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59	20:47 (2)	05:39	06:33	18:57 (4)	07:26		07:24	08:19		
	22:00	27	21:14 (2)	21:25	20:18	36	19:35 (3)	19:05	16:54	16:10	
2	04:59	20:47 (2)	05:40	06:35	18:55 (4)	07:28		07:26	08:21		
	22:00	28	21:15 (2)	21:23	20:16	42	19:37 (3)	19:02	16:52	16:09	
3	05:00	20:47 (2)	05:42	06:36	18:53 (4)	07:30		07:28	08:22		
	21:59	27	21:14 (2)	21:21	20:13	44	19:37 (3)	19:00	16:50	16:08	
4	05:01	20:47 (2)	05:44	06:38	18:52 (4)	07:31		07:30	08:24		
	21:59	28	21:15 (2)	21:19	20:11	46	19:38 (3)	18:57	16:48	16:08	
5	05:02	20:47 (2)	05:45	06:40	18:51 (4)	07:33		07:32	08:25		
	21:58	28	21:15 (2)	21:17	20:09	48	19:39 (3)	18:55	16:46	16:07	
6	05:03	20:47 (2)	05:47	06:42	18:50 (4)	07:35		07:34	08:26		
	21:57	29	21:16 (2)	21:15	20:06	49	19:39 (3)	18:52	16:44	16:07	
7	05:04	20:48 (2)	05:49	06:43	18:48 (4)	07:37		07:36	08:28		
	21:57	28	21:16 (2)	21:13	20:04	47	19:35 (3)	18:50	16:43	16:06	
8	05:05	20:48 (2)	05:51	06:45	18:48 (4)	07:39		07:38	08:29		
	21:56	28	21:16 (2)	21:11	20:01	45	19:33 (3)	18:48	16:41	16:06	
9	05:06	20:48 (2)	05:52	06:47	18:47 (4)	07:41		07:40	08:30		
	21:55	29	21:17 (2)	21:09	19:59	44	19:31 (3)	18:45	16:39	16:05	
10	05:07	20:48 (2)	05:54	06:49	18:46 (4)	07:42		07:42	08:31		
	21:55	29	21:17 (2)	21:07	19:56	42	19:28 (3)	18:43	16:37	16:05	
11	05:08	20:48 (2)	05:56	06:50	18:46 (4)	07:44		07:44	08:33		
	21:54	29	21:17 (2)	21:05	19:54	40	19:26 (3)	18:40	16:35	16:05	
12	05:09	20:48 (2)	05:57	06:52	18:46 (4)	07:46		07:45	08:34		
	21:53	29	21:17 (2)	21:03	19:51	38	19:24 (3)	18:38	16:34	16:05	
13	05:10	20:48 (2)	05:59	06:54	18:46 (4)	07:48		17:34 (5)	07:47	08:35	
	21:52	29	21:17 (2)	21:01	19:49	36	19:22 (3)	18:36	16:32	16:05	
14	05:12	20:48 (2)	06:01	06:56	18:45 (4)	07:50	6	17:40 (5)	07:49	08:36	
	21:51	28	21:16 (2)	20:59	19:47	33	19:18 (3)	18:33	16:31	16:05	
15	05:13	20:48 (2)	06:03	06:58	18:46 (4)	07:52		17:28 (5)	07:51	08:37	
	21:50	27	21:15 (2)	20:57	19:44	30	19:16 (4)	18:31	16:29	16:05	
16	05:14	20:48 (2)	06:04	06:59	18:46 (4)	07:54		17:26 (5)	07:53	08:38	
	21:49	26	21:14 (2)	20:55	19:42	28	19:14 (4)	18:29	16:27	16:05	
17	05:16	20:49 (2)	06:06	07:01	18:46 (4)	07:55		17:25 (5)	07:55	08:38	
	21:47	25	21:14 (2)	20:53	19:39	25	19:11 (4)	18:26	16:26	16:05	
18	05:17	20:49 (2)	06:08	07:03	18:47 (4)	07:57		17:24 (5)	07:57	08:39	
	21:46	23	21:12 (2)	20:50	19:37	21	19:08 (4)	18:24	16:24	16:05	
19	05:18	20:49 (2)	06:10	07:05	18:48 (4)	07:59		17:23 (5)	07:59	08:40	
	21:45	22	21:11 (2)	20:48	19:34	18	19:06 (4)	18:22	16:23	16:05	
20	05:20	20:50 (2)	06:12	07:06	18:49 (4)	08:01		17:23 (5)	08:00	08:41	
	21:44	20	21:10 (2)	20:46	19:32	15	19:04 (4)	18:20	16:22	16:06	
21	05:21	20:50 (2)	06:13	07:08	18:49 (4)	08:03		17:23 (5)	08:02	08:41	
	21:42	19	21:09 (2)	20:44	19:29	12	19:01 (4)	18:17	16:20	16:06	
22	05:23	20:50 (2)	06:15	07:10	18:52 (4)	08:05		17:22 (5)	08:04	08:42	
	21:41	17	21:07 (2)	20:42	19:27	6	18:58 (4)	18:15	16:19	16:06	
23	05:24	20:51 (2)	06:17	07:12	18:55 (4)	08:07		17:22 (5)	08:06	08:42	
	21:39	16	21:07 (2)	20:39	19:24	1	18:56 (4)	18:13	16:18	16:07	
24	05:26	20:51 (2)	06:19	07:13	18:09			17:23 (5)	08:08	08:43	
	21:38	14	21:05 (2)	20:37	19:22			17:41 (5)	16:17	16:08	
25	05:27	20:52 (2)	06:20	07:15	17:11			16:23 (5)	08:09	08:43	
	21:36	12	21:04 (2)	20:35	19:19			16:38 (5)	16:16	16:08	
26	05:29	20:53 (2)	06:22	07:17	17:09			16:24 (5)	08:11	08:43	
	21:35	9	21:02 (2)	20:32	19:17			16:36 (5)	16:14	16:09	
27	05:30	20:53 (2)	06:24	07:19	17:14			16:25 (5)	08:13	08:44	
	21:33	7	21:00 (2)	20:30	19:14			16:34 (5)	16:13	16:10	
28	05:32	20:55 (2)	06:26	07:21	17:16			16:26 (5)	08:14	08:44	
	21:32	4	20:59 (2)	20:28	19:12			16:31 (5)	16:12	16:11	
29	05:34	20:56 (2)	06:27	19:07 (4)	07:22			16:27 (5)	08:16	08:44	
	21:30	1	20:57 (2)	20:25	19:14 (4)			17:00	16:12	16:11	
30	05:35		06:29	19:02 (4)	07:24			17:20	08:18	08:44	
	21:28		20:23	19:19 (4)	19:07			16:58	16:11	16:12	
31	05:37		06:31	18:59 (4)				07:22		08:44	
	21:26		20:21	19:20 (4)				16:56		16:13	
Potential sun hours	512		460	382			328	259	233		
Total, worst case	638		45	746		281					
Sun reduction	0.32		0.34	0.32		0.29					
Oper. time red.	1.00		1.00	1.00		1.00					
Wind dir. red.	0.62		0.68	0.67		0.67					
Total reduction	0.20		0.23	0.22		0.20					
Total, real	129		10	161		55					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: P - H16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:48 (4) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:48 (4) 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:49 (4) 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:50 (4) 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	18:50 (4) 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	18:51 (4) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	18:52 (4) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	18:54 (4) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	18:57 (4) 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	19:02 (4) 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	16:55 (5) 18:21	06:52 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	16:52 (5) 18:23	06:50 20:20	05:31 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	16:51 (5) 18:25	06:48 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	16:50 (5) 18:27	06:45 20:24	05:27 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	16:50 (5) 18:28	06:43 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	16:49 (5) 18:30	06:40 20:28	05:24 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	16:49 (5) 18:32	06:38 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	16:48 (5) 18:34	06:35 20:31	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	16:49 (5) 18:36	06:33 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	16:49 (5) 18:38	06:31 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	16:50 (5) 18:40	06:28 20:37	05:16 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	16:49 (5) 18:41	06:26 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	16:50 (5) 18:43	06:23 20:41	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	16:52 (5) 18:45	06:21 20:42	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	16:53 (5) 18:47	06:18 20:44	05:11 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	16:55 (5) 18:49	06:16 20:46	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	17:06 (5) 18:51	06:13 20:48	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	05:48 19:31 (3)	05:04 21:44	20:35 (2) 21:03 (2)
Potential sun hours	250	273	367	420	494	510
Total, worst case		264	390	387	434	658
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.68	0.67	0.63	0.63
Total reduction		0.16	0.18	0.24	0.24	0.20
Total, real		41	71	92	104	132

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: P - H16

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:44 (2)	05:39	20:50 (2)	06:33		07:26		07:24		08:19
	22:00	22	21:06 (2)	21:25	3	20:53 (2)	20:18		16:54		16:10
2	04:59	20:44 (2)	05:40		06:35		19:01 (4)		07:28		08:21
	22:00	23	21:07 (2)	21:23		20:16	4	19:05 (4)	19:02		16:52
3	05:00	20:44 (2)	05:42		06:36		18:54 (4)		07:30		08:22
	21:59	23	21:07 (2)	21:21		20:13	23	19:28 (3)	19:00		16:50
4	05:01	20:44 (2)	05:44		06:38		18:51 (4)		07:31		08:24
	21:59	23	21:07 (2)	21:19		20:11	35	19:31 (3)	18:57		16:48
5	05:02	20:44 (2)	05:45		06:40		18:49 (4)		07:33		08:25
	21:58	24	21:08 (2)	21:17		20:09	42	19:32 (3)	18:55		16:46
6	05:03	20:44 (2)	05:47		06:42		18:47 (4)		07:35		08:26
	21:58	25	21:09 (2)	21:15		20:06	46	19:33 (3)	18:52		16:44
7	05:04	20:44 (2)	05:49		06:43		18:45 (4)		07:37		08:28
	21:57	25	21:09 (2)	21:13		20:04	48	19:33 (3)	18:50		16:43
8	05:05	20:44 (2)	05:51		06:45		18:44 (4)		07:39		08:29
	21:56	26	21:10 (2)	21:11		20:01	49	19:33 (3)	18:48		16:41
9	05:06	20:44 (2)	05:52		06:47		18:43 (4)		07:41		08:30
	21:55	26	21:10 (2)	21:09		19:59	48	19:31 (3)	18:45		16:39
10	05:07	20:43 (2)	05:54		06:49		18:41 (4)		07:42		08:31
	21:55	27	21:10 (2)	21:07		19:56	47	19:28 (3)	18:43		16:37
11	05:08	20:43 (2)	05:56		06:50		18:40 (4)		07:44		08:33
	21:54	28	21:11 (2)	21:05		19:54	46	19:26 (3)	18:40		16:35
12	05:09	20:43 (2)	05:57		06:52		18:40 (4)		07:46		08:34
	21:53	28	21:11 (2)	21:03		19:51	44	19:24 (3)	18:38		16:34
13	05:10	20:43 (2)	05:59		06:54		18:40 (4)		07:48		08:35
	21:52	28	21:11 (2)	21:01		19:49	42	19:22 (3)	18:36		16:32
14	05:12	20:43 (2)	06:01		06:56		18:38 (4)		07:50		08:36
	21:51	28	21:11 (2)	20:59		19:47	40	19:18 (3)	18:33		16:31
15	05:13	20:43 (2)	06:03		06:58		18:38 (4)		07:52		08:37
	21:50	28	21:11 (2)	20:57		19:44	38	19:16 (3)	18:31	4	17:35 (5)
16	05:14	20:42 (2)	06:04		06:59		18:38 (4)		07:54		17:27 (5)
	21:49	29	21:11 (2)	20:55		19:42	36	19:14 (3)	18:29	12	17:39 (5)
17	05:16	20:43 (2)	06:06		07:01		18:37 (4)		07:55		17:24 (5)
	21:47	29	21:12 (2)	20:53		19:39	34	19:11 (4)	18:26	17	17:41 (5)
18	05:17	20:43 (2)	06:08		07:03		18:37 (4)		07:57		17:23 (5)
	21:46	29	21:12 (2)	20:50		19:37	31	19:08 (4)	18:24	19	17:42 (5)
19	05:18	20:43 (2)	06:10		07:05		18:38 (4)		07:59		17:21 (5)
	21:45	28	21:11 (2)	20:48		19:34	28	19:06 (4)	18:22	22	17:43 (5)
20	05:20	20:43 (2)	06:12		07:06		18:38 (4)		08:01		17:20 (5)
	21:44	27	21:10 (2)	20:46		19:32	26	19:04 (4)	18:20	23	17:43 (5)
21	05:21	20:43 (2)	06:13		07:08		18:38 (4)		08:03		17:20 (5)
	21:42	26	21:09 (2)	20:44		19:29	23	19:01 (4)	18:17	24	17:44 (5)
22	05:23	20:43 (2)	06:15		07:10		18:39 (4)		08:05		17:19 (5)
	21:41	24	21:07 (2)	20:42		19:27	19	18:58 (4)	18:15	25	17:44 (5)
23	05:24	20:44 (2)	06:17		07:12		18:40 (4)		08:07		17:19 (5)
	21:39	23	21:07 (2)	20:39		19:24	16	18:56 (4)	18:13	24	17:43 (5)
24	05:26	20:44 (2)	06:19		07:13		18:41 (4)		08:09		17:19 (5)
	21:38	21	21:05 (2)	20:37		19:22	13	18:54 (4)	18:11	22	17:41 (5)
25	05:27	20:45 (2)	06:20		07:15		18:42 (4)		07:11		16:19 (5)
	21:36	19	21:04 (2)	20:35		19:19	9	18:51 (4)	17:09	19	16:38 (5)
26	05:29	20:45 (2)	06:22		07:17		18:45 (4)		07:13		16:19 (5)
	21:35	17	21:02 (2)	20:32		19:17	3	18:48 (4)	17:06	17	16:36 (5)
27	05:30	20:45 (2)	06:24		07:19				07:14		16:19 (5)
	21:33	15	21:00 (2)	20:30		19:14			17:04	15	16:34 (5)
28	05:32	20:46 (2)	06:26		07:21				07:16		16:20 (5)
	21:32	13	20:59 (2)	20:28		19:12			17:02	11	16:31 (5)
29	05:34	20:46 (2)	06:27		07:22				07:18		16:21 (5)
	21:30	11	20:57 (2)	20:25		19:09			17:00	8	16:29 (5)
30	05:35	20:47 (2)	06:29		07:24				07:20		16:22 (5)
	21:28	9	20:56 (2)	20:23		19:07			16:58	5	16:27 (5)
31	05:37	20:49 (2)	06:31						07:22		16:24 (5)
	21:26	6	20:55 (2)	20:21					16:56	1	16:25 (5)
Potential sun hours	512		460		382		328		259		233
Total, worst case	710		3		790		268				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.63		0.63		0.67		0.67				
Total reduction	0.20		0.21		0.22		0.20				
Total, real	144		1		171		52				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: Q - H17

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44 16:15	08:14 17:06	18	16:06 (5) 16:24 (5)	07:16 18:02	31	16:45 (4) 17:16 (4)	07:01 20:00	05:52 20:55	19:44 (2) 20:13 (2)	05:03 21:45
2	08:44 16:16	08:12 17:08	16	16:07 (5) 16:23 (5)	07:14 18:04	27	16:46 (4) 17:13 (4)	06:59 20:02	05:50 20:57	19:44 (2) 20:12 (2)	05:02 21:46
3	08:44 16:17	08:10 17:10	13	16:09 (5) 16:22 (5)	07:12 18:06	24	16:48 (4) 17:12 (4)	06:56 20:04	05:48 20:59	19:45 (2) 20:11 (2)	05:01 21:48
4	08:43 16:18	08:08 17:12	8	16:11 (5) 16:19 (5)	07:09 18:07	19	16:51 (4) 17:10 (4)	06:54 20:06	05:46 21:01	19:46 (2) 20:10 (2)	05:00 21:49
5	08:43 16:19	08:07 17:14			07:07 18:09	13	16:53 (4) 17:06 (4)	06:51 20:07	05:44 21:03	19:47 (2) 20:08 (2)	04:59 21:50
6	08:42 16:21	08:05 17:16			07:04 18:11	3	17:42 (3) 17:45 (3)	06:49 20:09	05:42 21:04	19:49 (2) 20:06 (2)	04:59 21:51
7	08:42 16:22	08:03 17:18			07:02 18:13	6	17:40 (3) 17:46 (3)	06:47 20:11	05:40 21:06	19:52 (2) 20:04 (2)	04:58 21:52
8	08:42 16:24	08:01 17:20			07:00 18:15	9	17:39 (3) 17:48 (3)	06:44 20:13	05:38 21:08	19:56 (2) 19:59 (2)	04:57 21:53
9	08:41 16:25	07:59 17:22	2	16:50 (4) 16:52 (4)	06:57 18:17	12	17:38 (3) 17:50 (3)	06:42 20:15	05:36 21:10		04:57 21:54
10	08:40 16:26	07:57 17:24	5	16:49 (4) 16:54 (4)	06:55 18:19	14	17:38 (3) 17:52 (3)	06:39 20:17	05:34 21:11		04:56 21:55
11	08:40 16:28	07:55 17:26	8	16:48 (4) 16:56 (4)	06:52 18:21	17	17:38 (3) 17:55 (3)	06:37 20:19	05:33 21:13		04:56 21:55
12	08:39 16:30	07:53 17:28	12	16:46 (4) 16:58 (4)	06:50 18:23	18	17:38 (3) 17:56 (3)	06:35 20:20	05:31 21:15		04:55 21:56
13	08:38 16:31	07:51 17:30	15	16:45 (4) 17:00 (4)	06:48 18:25	20	17:38 (3) 17:58 (3)	06:32 20:22	05:29 21:17		04:55 21:57
14	08:37 16:33	07:49 17:32	18	16:44 (4) 17:02 (4)	06:45 18:27	22	17:38 (3) 18:00 (3)	06:30 20:24	19:53 (2) 19:56 (2)	05:27 21:18	04:55 21:58
15	08:36 16:34	07:47 17:34	21	16:44 (4) 17:05 (4)	06:43 18:28	21	17:39 (3) 18:00 (3)	06:28 20:26	19:51 (2) 19:58 (2)	05:26 21:20	04:54 21:58
16	08:35 16:36	07:45 17:36	24	16:43 (4) 17:07 (4)	06:40 18:30	19	17:39 (3) 17:58 (3)	06:25 20:28	19:49 (2) 20:00 (2)	05:24 21:22	04:54 21:59
17	08:34 16:38	16:02 (5) 16:03 (5)	07:43 17:38	26	16:43 (4) 17:09 (4)	06:38 18:32	15	17:41 (3) 17:56 (3)	19:47 (2) 20:01 (2)	05:22 21:23	04:54 21:59
18	08:33 16:40	16:02 (5) 16:05 (5)	07:41 17:40	29	16:42 (4) 17:11 (4)	06:35 18:34	10	17:43 (3) 17:53 (3)	19:46 (2) 20:03 (2)	05:21 21:25	04:54 22:00
19	08:32 16:41	16:02 (5) 16:07 (5)	07:39 17:42	31	16:42 (4) 17:13 (4)	06:33 18:36		06:18 20:33	19:45 (2) 20:05 (2)	05:19 21:27	04:54 22:00
20	08:31 16:43	16:01 (5) 16:08 (5)	07:36 17:44	34	16:42 (4) 17:16 (4)	06:31 18:38		06:16 20:35	19:45 (2) 20:07 (2)	05:18 21:28	04:54 22:00
21	08:30 16:45	16:01 (5) 16:11 (5)	07:34 17:46	36	16:42 (4) 17:18 (4)	06:28 18:40		06:14 20:37	19:43 (2) 20:08 (2)	05:16 21:30	04:54 22:01
22	08:29 16:47	16:01 (5) 16:12 (5)	07:32 17:48	38	16:41 (4) 17:19 (4)	06:26 18:41		06:12 20:39	19:43 (2) 20:10 (2)	05:15 21:31	04:55 22:01
23	08:27 16:49	16:01 (5) 16:15 (5)	07:30 17:50	38	16:42 (4) 17:20 (4)	06:23 18:43		06:09 20:41	19:42 (2) 20:12 (2)	05:13 21:33	04:55 22:01
24	08:26 16:50	16:01 (5) 16:17 (5)	07:28 17:52	38	16:42 (4) 17:20 (4)	06:21 18:45		06:07 20:42	19:42 (2) 20:14 (2)	05:12 21:34	04:55 22:01
25	08:24 16:52	16:02 (5) 16:19 (5)	07:25 17:54	37	16:42 (4) 17:19 (4)	06:18 18:47		06:05 20:44	19:42 (2) 20:15 (2)	05:11 21:36	04:55 22:01
26	08:23 16:54	16:02 (5) 16:21 (5)	07:23 17:56	36	16:43 (4) 17:19 (4)	06:16 18:49		06:03 20:46	19:42 (2) 20:16 (2)	05:09 21:37	04:56 22:01
27	08:22 16:56	16:02 (5) 16:23 (5)	07:21 17:58	34	16:44 (4) 17:18 (4)	06:13 18:51		06:01 20:48	19:42 (2) 20:16 (2)	05:08 21:39	04:56 22:01
28	08:20 16:58	16:03 (5) 16:26 (5)	07:18 18:00	32	16:44 (4) 17:16 (4)	06:11 18:53		05:58 20:50	19:43 (2) 20:15 (2)	05:07 21:40	04:57 22:01
29	08:18 17:00	16:03 (5) 16:25 (5)			07:08 19:54			05:56 20:52	19:43 (2) 20:15 (2)	05:06 21:41	04:57 22:01
30	08:17 17:02	16:03 (5) 16:25 (5)			07:06 19:56			05:54 20:53	19:43 (2) 20:14 (2)	05:05 21:43	04:58 22:00
31	08:15 17:04	16:04 (5) 16:24 (5)			07:04 19:58				05:04 21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case	211		569		300		404		160		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.67		0.67		0.65		0.65		
Total reduction	0.16		0.16		0.18		0.23		0.25		
Total, real	34		88		55		92		40		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyarne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: Q - H17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:17 (3) 16:54	16:19 (4) 16:23 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:16 (3) 16:52	16:20 (4) 16:21 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:16 (3) 16:50	16:08 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:16 (3) 16:48	16:08 16:08
5	05:02 21:58	05:45 21:17	20:03 (2) 20:11 (2)	06:40 20:09	07:33 18:55	16:07 16:07
6	05:03 21:58	05:47 21:15	20:00 (2) 20:15 (2)	06:42 20:06	07:35 18:52	16:07 16:07
7	05:04 21:57	05:49 21:13	19:59 (2) 20:17 (2)	06:43 20:04	07:37 18:50	15:41 (5) 16:06
8	05:05 21:56	05:50 21:12	19:56 (2) 20:18 (2)	06:45 20:01	07:39 18:48	15:38 (5) 16:06
9	05:06 21:55	05:52 21:10	19:55 (2) 20:19 (2)	06:47 19:59	07:41 18:45	15:37 (5) 16:05
10	05:07 21:55	05:54 21:07	19:53 (2) 20:20 (2)	06:49 19:56	07:42 18:43	15:37 (5) 16:05
11	05:08 21:54	05:56 21:05	19:53 (2) 20:21 (2)	06:50 19:54	07:44 18:40	15:36 (5) 16:05
12	05:09 21:53	05:57 21:03	19:52 (2) 20:22 (2)	06:52 19:51	07:46 18:38	15:35 (5) 16:05
13	05:10 21:52	05:59 21:01	19:51 (2) 20:22 (2)	06:54 19:49	07:48 18:36	15:35 (5) 16:05
14	05:12 21:51	06:01 20:59	19:50 (2) 20:22 (2)	06:56 19:47	07:50 18:33	15:35 (5) 16:04
15	05:13 21:50	06:03 20:57	19:50 (2) 20:23 (2)	06:58 19:44	07:52 18:31	15:34 (5) 16:05
16	05:14 21:49	06:04 20:55	19:49 (2) 20:22 (2)	06:59 19:42	07:54 18:29	15:34 (5) 16:05
17	05:16 21:47	06:06 20:53	19:49 (2) 20:23 (2)	07:01 19:39	07:55 18:26	15:35 (5) 16:05
18	05:17 21:46	06:08 20:51	19:49 (2) 20:22 (2)	07:03 19:37	07:57 18:24	15:35 (5) 16:05
19	05:18 21:45	06:10 20:48	19:48 (2) 20:19 (2)	07:05 19:34	07:59 18:22	15:35 (5) 16:05
20	05:20 21:44	06:12 20:46	19:48 (2) 20:17 (2)	07:06 19:32	08:01 18:20	15:36 (5) 16:06
21	05:21 21:42	06:13 20:44	19:48 (2) 20:15 (2)	07:08 19:29	08:03 18:17	15:36 (5) 16:06
22	05:23 21:41	06:15 20:42	19:48 (2) 20:12 (2)	07:10 19:27	08:05 18:15	15:37 (5) 16:06
23	05:24 21:39	06:17 20:39	19:48 (2) 20:10 (2)	07:12 19:24	08:07 18:13	15:38 (5) 16:07
24	05:26 21:38	06:19 20:37	19:49 (2) 20:09 (2)	07:13 19:22	08:09 18:11	15:39 (5) 16:08
25	05:27 21:36	06:20 20:35	19:49 (2) 20:06 (2)	07:15 19:19	18:11 18:27 (3)	15:40 (5) 16:08
26	05:29 21:35	06:22 20:32	19:50 (2) 20:04 (2)	07:17 19:17	18:24 (3) 18:37 (3)	16:08 16:09
27	05:30 21:33	06:24 20:30	19:51 (2) 20:02 (2)	07:19 19:14	18:22 (3) 18:39 (3)	16:13 (4) 16:13
28	05:32 21:32	06:26 20:28	19:52 (2) 19:59 (2)	07:21 19:12	18:20 (3) 18:40 (3)	16:14 (4) 16:12
29	05:34 21:30	06:27 20:25	19:54 (2) 19:57 (2)	07:22 19:09	18:19 (3) 18:41 (3)	16:14 (4) 16:12
30	05:35 21:28	06:29 20:23	19:09 19:07	07:24 18:38 (3)	17:00 16:58	16:12 16:11
31	05:37 21:26	06:31 20:21		07:22 16:56	16:16 (4) 16:25 (4)	16:12 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		573	100	726	275	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.18	
Total, real		127	22	142	48	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: R - H18

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44		08:14	16:21 (4)	07:16	17:30 (3)	07:01	05:52		19:35 (2)	05:03
	16:15		17:06	14	16:35 (4)	18:02	4	17:34 (3)	20:00	20:02 (2)	21:45
2	08:44		08:12		16:20 (4)	07:14		17:28 (3)	06:59	19:36 (2)	05:02
	16:16		17:08	17	16:37 (4)	18:04	8	17:36 (3)	20:02	20:00 (2)	21:46
3	08:44		08:10		16:20 (4)	07:12		17:28 (3)	06:56	19:37 (2)	05:01
	16:17		17:10	19	16:39 (4)	18:06	10	17:38 (3)	20:04	19:58 (2)	21:48
4	08:43		08:08		16:19 (4)	07:09		17:27 (3)	06:54	19:39 (2)	05:00
	16:18		17:12	22	16:41 (4)	18:07	14	17:41 (3)	20:06	19:56 (2)	21:49
5	08:43		08:07		16:18 (4)	07:07		17:26 (3)	06:51	19:41 (2)	04:59
	16:19		17:14	25	16:43 (4)	18:09	16	17:42 (3)	20:07	19:53 (2)	21:50
6	08:43	15:42 (5)	08:05		16:18 (4)	07:04		17:26 (3)	06:49	05:42	04:59
	16:21	2	15:44 (5)	17:16	27	16:45 (4)	18:11	19	17:45 (3)	20:09	21:51
7	08:42		15:42 (5)	08:03		16:18 (4)	07:02		17:25 (3)	06:47	04:58
	16:22	3	15:45 (5)	17:18	29	16:47 (4)	18:13	21	17:46 (3)	20:11	21:52
8	08:42		15:42 (5)	08:01		16:17 (4)	07:00		17:26 (3)	06:44	04:57
	16:24	4	15:46 (5)	17:20	33	16:50 (4)	18:15	22	17:48 (3)	20:13	21:53
9	08:41		15:43 (5)	07:59		16:17 (4)	06:57		17:26 (3)	06:42	04:57
	16:25	6	15:49 (5)	17:22	35	16:52 (4)	18:17	24	17:50 (3)	20:15	21:54
10	08:40		15:43 (5)	07:57		16:17 (4)	06:55		17:27 (3)	06:39	04:56
	16:26	7	15:50 (5)	17:24	37	16:54 (4)	18:19	23	17:50 (3)	20:17	21:55
11	08:40		15:43 (5)	07:55		16:17 (4)	06:52		17:28 (3)	06:37	04:56
	16:28	9	15:52 (5)	17:26	39	16:56 (4)	18:21	21	17:49 (3)	20:19	21:55
12	08:39		15:43 (5)	07:53		16:16 (4)	06:50		17:28 (3)	06:35	04:55
	16:30	11	15:54 (5)	17:28	42	16:58 (4)	18:23	19	17:47 (3)	20:20	21:56
13	08:38		15:43 (5)	07:51		16:17 (4)	06:48		17:30 (3)	06:32	04:55
	16:31	12	15:55 (5)	17:30	41	16:58 (4)	18:25	15	17:45 (3)	20:22	21:57
14	08:37		15:43 (5)	07:49		16:17 (4)	06:45		17:33 (3)	06:30	04:55
	16:33	14	15:57 (5)	17:32	41	16:58 (4)	18:27	8	17:41 (3)	20:24	21:58
15	08:36		15:43 (5)	07:47		16:17 (4)	06:43		06:28	19:35 (2)	04:54
	16:34	16	15:59 (5)	17:34	41	16:58 (4)	18:28	23	20:26	19:58 (2)	21:58
16	08:35		15:43 (5)	07:45		16:18 (4)	06:40		06:25	19:34 (2)	04:54
	16:36	17	16:00 (5)	17:36	40	16:58 (4)	18:30	26	20:28	20:00 (2)	21:59
17	08:34		15:43 (5)	07:43		16:19 (4)	06:38		06:23	19:33 (2)	04:54
	16:38	20	16:03 (5)	17:38	39	16:58 (4)	18:32	28	20:30	20:01 (2)	21:59
18	08:33		15:44 (5)	07:41		16:19 (4)	06:35		06:21	19:32 (2)	04:54
	16:40	21	16:05 (5)	17:40	37	16:56 (4)	18:34	31	20:31	20:03 (2)	22:00
19	08:32		15:45 (5)	07:39		16:20 (4)	06:33		06:18	19:32 (2)	04:54
	16:41	22	16:07 (5)	17:42	36	16:56 (4)	18:36	33	20:33	20:05 (2)	22:00
20	08:31		15:44 (5)	07:36		16:21 (4)	06:31		06:16	19:32 (2)	04:54
	16:43	24	16:08 (5)	17:44	34	16:55 (4)	18:38	35	20:35	20:07 (2)	22:00
21	08:30		15:45 (5)	07:34		16:22 (4)	06:28		06:14	19:30 (2)	04:54
	16:45	24	16:09 (5)	17:46	32	16:54 (4)	18:40	38	20:37	20:08 (2)	22:01
22	08:29		15:45 (5)	07:32		16:23 (4)	06:26		06:12	19:30 (2)	04:55
	16:47	23	16:08 (5)	17:48	29	16:52 (4)	18:42	38	20:39	20:08 (2)	22:01
23	08:27		15:47 (5)	07:30		16:25 (4)	06:23		06:09	19:30 (2)	04:55
	16:49	22	16:09 (5)	17:50	26	16:51 (4)	18:43	37	20:41	20:07 (2)	22:01
24	08:26		15:47 (5)	07:28		16:27 (4)	06:21		06:07	19:31 (2)	04:55
	16:50	21	16:08 (5)	17:52	22	16:49 (4)	18:45	36	20:43	20:07 (2)	22:01
25	08:24		15:48 (5)	07:25		16:29 (4)	06:18		06:05	19:31 (2)	04:55
	16:52	20	16:08 (5)	17:54	16	16:45 (4)	18:47	36	20:44	20:07 (2)	22:01
26	08:23		15:49 (5)	07:23		16:36 (4)	06:16		06:03	19:31 (2)	04:56
	16:54	18	16:07 (5)	17:56	3	16:39 (4)	18:49	35	20:46	20:06 (2)	22:01
27	08:22		15:50 (5)	07:21		06:13			06:01	19:32 (2)	04:56
	16:56	16	16:06 (5)	17:58		18:51			20:48	20:06 (2)	22:01
28	08:20		15:53 (5)	07:18		17:31 (3)	06:11		05:58	19:32 (2)	04:57
	16:58	12	16:05 (5)	18:00	1	17:32 (3)	18:53	33	20:50	20:05 (2)	22:01
29	08:18		15:55 (5)			07:08			05:56	19:33 (2)	04:57
	17:00	12	16:28 (4)			19:54			20:52	20:04 (2)	22:01
30	08:17		16:23 (4)			07:06			05:54	19:34 (2)	04:58
	17:02	7	16:30 (4)			19:56			20:54	20:03 (2)	22:00
31	08:15		16:21 (4)			07:04				05:04	
	17:04	10	16:31 (4)			19:58				21:44	
Potential sun hours	250		273		367		420		494		510
Total, worst case		373		777		224		590		101	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.66		0.68		0.65		0.65	
Total reduction		0.16		0.15		0.18		0.23		0.25	
Total, real		60		118		41		136		25	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: R - H18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December						
1	04:59 22:00	05:39 21:25	06:33 20:18	19:40 (2) 19:50 (2)	07:26 18:08 (3)	07:24 15:47 (4)	08:19 15:25 (5)					
2	04:59 22:00	05:40 21:23	06:35 20:16	19:42 (2) 19:48 (2)	07:28 18:26 (3)	07:26 16:52	08:21 15:33 (5)					
3	05:00 21:59	05:42 21:21	06:36 20:13	19:48 (2) 19:00	07:30 18:05 (3)	07:28 16:50	08:22 15:32 (5)					
4	05:01 21:59	05:44 21:19	06:38 20:11	19:00 18:57	22 24	18:27 (3) 18:28 (3)	16:08 16:48	6 5	16:07 15:32 (5)			
5	05:02 21:58	05:45 21:17	06:40 20:09	18:57 18:55	23	18:03 (3) 18:26 (3)	07:32 16:46	30 27	15:48 (4) 16:15 (4)	08:25 16:07	3 15:30 (5)	
6	05:03 21:58	05:47 21:15	06:42 20:06	18:55 18:52	23 21	18:26 (3) 18:03 (3)	16:46 07:34	27 24	16:15 (4) 16:12 (4)	16:07 16:07	3 1	15:30 (5) 15:29 (5)
7	05:04 21:57	05:49 21:13	19:55 (2) 20:00 (2)	06:43 20:04	20	07:37 18:21 (3)	07:36 16:43	21	15:49 (4) 16:10 (4)	08:28 16:06		
8	05:05 21:56	05:50 21:12	19:50 (2) 20:04 (2)	06:45 20:01	20	07:39 18:18 (3)	07:38 16:41	21	15:50 (4) 16:08 (4)	08:29 16:06		
9	05:06 21:55	05:52 21:10	19:48 (2) 20:06 (2)	06:47 19:59	17	07:41 18:01 (3)	07:40 16:39	18	15:50 (4) 16:06 (4)	08:30 16:05		
10	05:07 21:55	05:54 21:07	19:45 (2) 20:07 (2)	06:49 19:56	15	07:42 18:14 (3)	07:42 16:37	16	15:52 (4) 16:05 (4)	08:31 16:05		
11	05:08 21:54	05:56 21:05	19:44 (2) 20:09 (2)	06:50 19:54	13	07:44 18:02 (3)	07:44 16:35	13	15:53 (4) 16:03 (4)	08:33 16:05		
12	05:09 21:53	05:57 21:03	19:43 (2) 20:10 (2)	06:52 19:51	9	07:46 18:03 (3)	07:45 16:34	10	15:55 (4) 16:01 (4)	08:34 16:05		
13	05:10 21:52	05:59 21:01	19:41 (2) 20:11 (2)	06:54 19:49	6	07:48 18:04 (3)	07:47 16:32	6	15:27 (5) 15:59 (4)	08:35 16:05		
14	05:12 21:51	06:01 20:59	19:40 (2) 20:12 (2)	06:56 19:47	3	07:50 18:33	07:49 16:31	11	15:25 (5) 15:37 (5)	08:36 16:04		
15	05:13 21:50	06:03 20:57	19:40 (2) 20:12 (2)	06:58 19:44		07:52 18:31	07:51 16:29	12	15:23 (5) 15:39 (5)	08:37 16:05		
16	05:14 21:49	06:04 20:55	19:38 (2) 20:12 (2)	06:59 19:42	16	07:54 17:15 (4)	07:53 16:27	16	15:22 (5) 15:40 (5)	08:38 16:05		
17	05:16 21:47	06:06 20:53	19:38 (2) 20:13 (2)	07:01 19:39	11	07:55 17:00 (4)	07:55 16:26	18	15:21 (5) 15:41 (5)	08:38 16:05		
18	05:17 21:46	06:08 20:51	19:37 (2) 20:13 (2)	07:03 19:37	18	07:57 17:18 (4)	07:57 16:24	20	15:21 (5) 15:42 (5)	08:39 16:05		
19	05:18 21:45	06:10 20:48	19:36 (2) 20:13 (2)	07:05 19:34	24	07:59 17:21 (4)	07:59 16:24	21	15:21 (5) 15:43 (5)	08:40 16:05		
20	05:20 21:44	06:12 20:46	19:36 (2) 20:13 (2)	07:06 19:32	27	08:01 17:22 (4)	08:00 16:23	22	15:20 (5) 15:43 (5)	08:41 16:06		
21	05:21 21:42	06:13 20:44	19:36 (2) 20:13 (2)	07:08 19:29	31	08:03 17:25 (4)	08:02 16:20	23	15:20 (5) 15:44 (5)	08:41 16:06		
22	05:23 21:41	06:15 20:42	19:35 (2) 20:12 (2)	07:10 19:27	33	08:05 17:26 (4)	08:04 16:19	24	15:20 (5) 15:44 (5)	08:42 16:06		
23	05:24 21:39	06:17 20:39	19:35 (2) 20:10 (2)	07:12 19:24	35	08:07 17:27 (4)	08:06 16:18	24	15:21 (5) 15:43 (5)	08:42 16:07		
24	05:26 21:38	06:19 20:37	19:36 (2) 20:09 (2)	07:13 19:22	36	08:09 17:28 (4)	08:08 16:17	22	15:21 (5) 15:42 (5)	08:43 16:08		
25	05:27 21:36	06:20 20:35	19:35 (2) 20:06 (2)	07:15 19:19	38	07:11 17:09	08:09 16:16	21	15:21 (5) 15:41 (5)	08:43 16:08		
26	05:29 21:35	06:22 20:32	19:35 (2) 20:04 (2)	07:17 19:17	39	07:13 17:06	08:11 16:14	20	15:22 (5) 15:40 (5)	08:43 16:09		
27	05:30 21:33	06:24 20:30	19:36 (2) 20:02 (2)	07:19 19:14	40	07:15 17:04	08:13 16:13	18	15:22 (5) 15:38 (5)	08:44 16:10		
28	05:32 21:32	06:26 20:28	19:36 (2) 19:59 (2)	07:21 19:12	41	07:16 17:02	08:14 16:12	16	15:23 (5) 15:37 (5)	08:44 16:11		
29	05:34 21:30	06:27 20:25	19:37 (2) 19:57 (2)	07:22 19:09	42	07:18 18:20 (3)	08:16 16:12	14	15:23 (5) 15:36 (5)	08:44 16:11		
30	05:35 21:28	06:29 20:23	19:38 (2) 19:55 (2)	07:24 19:07	42	07:20 16:58	08:18 16:11	13	15:24 (5) 15:35 (5)	08:44 16:12		
31	05:37 21:27	06:31 20:21	19:38 (2) 19:52 (2)	18:23 (3) 16:56	41	07:22 16:56	08:19 16:25 (4)	11	15:24 (5) 16:13	08:44 16:13		
Potential sun hours	512	460	382	328	259	233						
Total, worst case		686	33	747	593	32						
Sun reduction		0.34	0.32	0.29	0.27	0.21						
Oper. time red.		1.00	1.00	1.00	1.00	1.00						
Wind dir. red.		0.65	0.66	0.66	0.66	0.66						
Total reduction		0.22	0.21	0.19	0.17	0.14						
Total, real		153	7	145	104	4						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: S - H19

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	16:09 (3)	07:16	16:41 (2)	07:01
	16:15	17:06	16:27 (3)	18:02	22	17:03 (2)
2	08:44	08:12	16:10 (3)	07:14	16:42 (2)	06:59
	16:16	17:08	16:25 (3)	18:04	18	17:00 (2)
3	08:44	08:10	16:12 (3)	07:12	16:46 (2)	06:56
	16:17	17:10	16:24 (3)	18:06	11	16:57 (2)
4	08:43	08:08	16:14 (3)	07:09		06:54
	16:18	17:12	7	16:21 (3)		20:06
5	08:43	08:07		07:07		06:51
	16:19	17:14		18:09		20:07
6	08:43	08:05		07:04		06:49
	16:21	17:16		18:11		20:09
7	08:42	08:03		07:02		06:47
	16:22	17:18		18:13		20:11
8	08:42	08:01	16:46 (2)	07:00		06:44
	16:24	17:20	4	16:50 (2)		20:13
9	08:41	07:59	16:44 (2)	06:57		06:42
	16:25	17:22	8	16:52 (2)		20:15
10	08:40	07:57	16:42 (2)	06:55		06:39
	16:26	17:24	12	16:54 (2)		20:17
11	08:40	07:55	16:41 (2)	06:53		06:37
	16:28	17:26	15	16:56 (2)		20:19
12	08:39	07:53	16:40 (2)	06:50		06:35
	16:30	17:28	19	16:59 (2)		20:20
13	08:38	07:51	16:38 (2)	06:48		06:32
	16:31	17:30	22	17:00 (2)		20:22
14	08:37	07:49	16:37 (2)	06:45		06:30
	16:33	17:32	25	17:02 (2)		20:24
15	08:36	07:47	16:36 (2)	06:43		06:28
	16:34	17:34	29	17:05 (2)		20:26
16	08:35	07:45	16:36 (2)	06:40		06:25
	16:36	17:36	31	17:07 (2)		20:28
17	08:34	07:43	16:36 (2)	06:38		06:23
	16:38	17:38	33	17:09 (2)		20:30
18	08:33	07:41	16:35 (2)	06:35		06:21
	16:40	17:40	35	17:10 (2)		20:31
19	08:32	16:05 (3)	07:39	16:35 (2)		06:18
	16:41	2	16:07 (3)	17:42		20:33
20	08:31	16:04 (3)	07:36	16:35 (2)		06:16
	16:43	4	16:08 (3)	17:44		20:35
21	08:30	16:04 (3)	07:34	16:35 (2)		06:14
	16:45	7	16:11 (3)	17:46		20:37
22	08:29	16:04 (3)	07:32	16:35 (2)		06:12
	16:47	8	16:12 (3)	17:48		20:39
23	08:27	16:04 (3)	07:30	16:35 (2)		06:09
	16:49	11	16:15 (3)	17:50		20:41
24	08:26	16:04 (3)	07:28	16:36 (2)		06:07
	16:50	13	16:17 (3)	17:52		20:43
25	08:24	16:05 (3)	07:25	16:36 (2)		06:05
	16:52	14	16:19 (3)	17:54		20:44
26	08:23	16:04 (3)	07:23	16:37 (2)		06:03
	16:54	17	16:21 (3)	17:56		20:46
27	08:22	16:04 (3)	07:21	16:38 (2)		06:00
	16:56	19	16:23 (3)	17:58		20:48
28	08:20	16:06 (3)	07:18	16:39 (2)		05:58
	16:58	20	16:26 (3)	18:00		20:50
29	08:19	16:06 (3)		07:08		05:56
	17:00	21	16:27 (3)			20:52
30	08:17	16:06 (3)		07:06		05:54
	17:02	21	16:27 (3)			20:54
31	08:15	16:07 (3)		07:04		05:04
	17:04	19	16:26 (3)			21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case	176	609	51			
Sun reduction	0.24	0.23	0.27			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.66	0.66			
Total reduction	0.16	0.15	0.18			
Total, real	28	94	9			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: S - H19

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	16:12 (2) 16:23 (2)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	16:14 (2) 16:21 (2)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	16:17 (2) 16:19 (2)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	15:44 (3) 15:52 (3)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	15:41 (3) 15:54 (3)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	15:41 (3) 15:56 (3)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:24 (2) 17:28 (2)	15:40 (3) 15:57 (3)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:18 (2) 17:33 (2)	15:39 (3) 15:58 (3)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:15 (2) 17:35 (2)	15:38 (3) 15:59 (3)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:13 (2) 17:37 (2)	15:38 (3) 15:59 (3)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:11 (2) 17:38 (2)	15:37 (3) 15:57 (3)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:10 (2) 17:39 (2)	15:37 (3) 15:56 (3)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:09 (2) 17:40 (2)	15:37 (3) 15:54 (3)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:08 (2) 17:40 (2)	15:38 (3) 15:52 (3)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:07 (2) 17:41 (2)	15:38 (3) 15:50 (3)
19	05:18 21:45	06:10 20:48	07:05 19:35	07:59 18:22	17:06 (2) 17:41 (2)	15:38 (3) 15:49 (3)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:06 (2) 17:41 (2)	15:39 (3) 15:47 (3)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:06 (2) 17:41 (2)	15:39 (3) 15:46 (3)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:05 (2) 17:41 (2)	15:40 (3) 15:44 (3)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:05 (2) 17:41 (2)	15:41 (3) 15:43 (3)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:05 (2) 17:40 (2)	16:07 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	16:05 (2) 16:38 (2)	08:09 16:16
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	16:06 (2) 16:36 (2)	08:11 16:14
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	16:06 (2) 16:34 (2)	08:13 16:13
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	16:07 (2) 16:31 (2)	08:14 16:12
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	16:07 (2) 16:29 (2)	08:16 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	16:08 (2) 16:27 (2)	08:18 16:11
31	05:37 21:27	06:31 20:21		07:22 16:56	16:09 (2) 16:25 (2)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case				600	248	5
Sun reduction				0.29	0.27	0.21
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.66	0.66	0.65
Total reduction				0.19	0.18	0.13
Total, real				117	44	1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: T - H20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	16:32 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	17:06	16:34 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54
3	08:44	08:12	16:29 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26
4	16:16	17:08	16:37 (2)	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02	16:52
5	08:44	08:10	16:27 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
6	16:17	17:10	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50
7	08:43	08:08	16:25 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30
8	16:18	17:12	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48
9	08:43	08:07	16:24 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32
10	16:19	17:14	16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46
11	08:43	08:05	16:23 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34
12	16:21	17:16	16:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44
13	08:42	08:03	16:22 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36
14	16:22	17:18	16:47 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43
15	08:42	08:01	16:21 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38
16	16:24	17:20	16:50 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41
17	08:41	07:59	16:21 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40
18	16:25	17:22	16:52 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39
19	08:40	07:57	16:21 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42
20	16:26	17:24	16:54 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37
21	08:40	07:55	16:20 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44
22	16:28	17:26	16:55 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35
23	08:39	07:53	16:20 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:45
24	16:30	15:53 (3)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34
25	08:38	07:51	16:19 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47
26	16:31	15:55 (3)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32
27	08:37	07:49	16:19 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49
28	16:33	15:57 (3)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31
29	08:36	07:47	16:19 (2)	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51
30	16:34	15:59 (3)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29
31	08:35	07:45	16:20 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	17:04 (2)
32	16:36	16:00 (3)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	17:14 (2)
33	08:34	07:43	16:20 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	17:00 (2)
34	16:38	16:02 (3)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	17:17 (2)
35	08:33	07:41	16:20 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	16:58 (2)
36	16:40	16:05 (3)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	17:19 (2)
37	08:32	07:39	16:21 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	16:56 (2)
38	16:41	16:07 (3)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	17:21 (2)
39	08:31	07:36	16:22 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	16:54 (2)
40	16:43	16:08 (3)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	17:22 (2)
41	08:30	07:34	16:23 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	16:53 (2)
42	16:45	16:11 (3)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	17:22 (2)
43	08:29	07:32	16:23 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	16:52 (2)
44	16:47	16:12 (3)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	17:23 (2)
45	08:27	07:30	16:25 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	16:51 (2)
46	16:49	16:15 (3)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	17:24 (2)
47	08:26	07:28	16:27 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	16:50 (2)
48	16:50	16:16 (3)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	17:24 (2)
49	08:25	07:25	16:29 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	15:50 (2)
50	16:52	16:17 (3)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:24 (2)
51	08:23	07:23	16:34 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	15:49 (2)
52	16:54	16:16 (3)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:24 (2)
53	08:22	07:21	16:39 (2)	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	15:49 (2)
54	16:56	16:15 (3)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:24 (2)
55	08:20	07:18	16:39 (2)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	15:49 (2)
56	16:58	16:16 (3)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:24 (2)
57	08:19	07:17	16:39 (2)	06:10	05:56	05:06	04:57	05:34	06:27	07:22	08:18	15:49 (2)
58	17:00	16:14 (3)	18:01	18:54	20:52	21:41	22:01	21:30	20:25	19:09	18:00	16:24 (2)
59	08:17	07:15	16:39 (2)	06:09	05:54	05:05	04:58	05:35	06:29	07:24	08:20	15:49 (2)
60	17:02	16:13 (3)	18:02	18:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:24 (2)
61	08:15	07:13	16:39 (2)	06:07	05:54	05:04	04:57	05:37	06:31	07:22	08:18	15:49 (2)
62	17:04	16:11 (3)	18:03	18:58	20:56	21:44	22:01	21:27	20:21	19:05	18:00	16:23 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	263	660								471	457	
Sun reduction	0.24	0.23								0.29	0.27	
Oper. time red.	1.00	1.00								1.00	1.00	
Wind dir. red.	0.66	0.65								0.65	0.66	
Total reduction	0.16	0.15								0.19	0.17	
Total, real	42	101								90	80	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: U - H21

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	08:14	16:26 (2) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24	15:48 (2) 08:19
16:15	17:06	8 16:34 (2) 18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	33 16:21 (2) 16:10
2 08:44	08:12	16:24 (2) 07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28		07:26	15:48 (2) 08:21
16:16	17:08	13 16:37 (2) 18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02		16:52	32 16:20 (2) 16:09
3 08:44	08:10	16:23 (2) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28	15:49 (2) 08:22
16:17	17:10	16 16:39 (2) 18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00		16:50	30 16:19 (2) 16:08
4 08:43	08:08	16:22 (2) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31		07:30	15:49 (2) 08:24
16:18	17:12	19 16:41 (2) 18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	28 16:17 (2) 16:08
5 08:43	08:07	16:21 (2) 07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33		07:32	15:50 (2) 08:25
16:19	17:14	22 16:43 (2) 18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55		16:46	24 16:14 (2) 16:07
6 08:43	08:05	16:20 (2) 07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35		07:34	15:51 (2) 08:26
16:21	17:16	25 16:45 (2) 18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52		16:44	21 16:12 (2) 16:07
7 08:42	08:03	16:19 (2) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37		07:36	15:52 (2) 08:28
16:22	17:18	28 16:47 (2) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	18 16:10 (2) 16:06
8 08:42	08:01	16:19 (2) 07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39		07:38	15:53 (2) 08:29
16:24	17:20	31 16:50 (2) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	15 16:08 (2) 16:06
9 08:41	07:59	16:18 (2) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40	15:55 (2) 08:30
16:25	17:22	32 16:50 (2) 18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45		16:39	12 16:07 (2) 16:05
10 08:40	07:57	16:18 (2) 06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42		07:42	15:57 (2) 08:31
16:26	17:24	33 16:51 (2) 18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43		16:37	8 16:05 (2) 16:05
11 08:40	07:55	16:18 (2) 06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44		07:44	16:00 (2) 08:33
16:28	17:26	33 16:51 (2) 18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40		16:35	3 16:03 (2) 16:05
12 08:39	07:53	16:18 (2) 06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46		07:45	16:04 (2) 08:34
16:30	17:28	34 16:52 (2) 18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38		16:34	16:05 (2) 16:05
13 08:38	07:51	16:17 (2) 06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48		07:47	16:06 (2) 08:35
16:31	17:30	34 16:51 (2) 18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32	16:04 (2) 16:04
14 08:37	07:49	16:18 (2) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49	16:05 (2) 08:36
16:33	17:32	33 16:51 (2) 18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31	16:04 (2) 16:04
15 08:36	07:47	16:18 (2) 06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52		07:51	16:05 (2) 08:37
16:34	17:34	33 16:51 (2) 18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	16:04 (2) 16:04
16 08:35	07:45	16:19 (2) 06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54		07:53	16:05 (2) 08:38
16:36	17:36	32 16:51 (2) 18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:27	16:05 (2) 16:05
17 08:34	07:43	16:19 (2) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55		07:55	16:06 (2) 08:38
16:38	17:38	31 16:50 (2) 18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26		16:26	16:05 (2) 16:05
18 08:33	07:41	16:19 (2) 06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	17:01 (2)	07:57	16:06 (2) 08:39
16:40	17:40	30 16:49 (2) 18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	9 17:10 (2)	16:24	16:05 (2) 16:05
19 08:32	07:39	16:20 (2) 06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	16:57 (2)	07:59	16:06 (2) 08:40
16:41	17:42	28 16:48 (2) 18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	17 17:14 (2)	16:23	16:05 (2) 16:05
20 08:31	07:36	16:22 (2) 06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	16:55 (2)	08:00	16:06 (2) 08:41
16:43	17:44	25 16:47 (2) 18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	21 17:16 (2)	16:22	16:06 (2) 16:06
21 08:30	07:34	16:23 (2) 06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	16:53 (2)	08:02	16:07 (2) 08:41
16:45	17:46	23 16:46 (2) 18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	24 17:17 (2)	16:20	16:06 (2) 16:06
22 08:29	07:32	16:24 (2) 06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	16:52 (2)	08:04	16:07 (2) 08:42
16:47	17:48	20 16:44 (2) 18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	26 17:18 (2)	16:19	16:06 (2) 16:06
23 08:27	07:30	16:27 (2) 06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	16:50 (2)	08:06	16:07 (2) 08:42
16:49	17:50	14 16:41 (2) 18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	29 17:19 (2)	16:18	16:07 (2) 16:07
24 08:26	07:28	16:32 (2) 06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	16:49 (2)	08:08	16:08 (2) 08:43
16:50	17:52	5 16:37 (2) 18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	30 17:19 (2)	16:17	16:08 (2) 16:08
25 08:25	07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	15:49 (2)	08:09	16:08 (2) 08:43
16:52	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	31 16:20 (2)	16:16	16:08 (2) 16:08
26 08:23	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	15:48 (2)	08:11	16:09 (2) 08:43
16:54	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	32 16:20 (2)	16:14	16:09 (2) 16:09
27 08:22	07:21		06:13	06:00	05:08	04:56	05:30	06:24	07:19	15:47 (2)	08:13	16:10 (2) 08:44
16:56	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	33 16:20 (2)	16:13	16:10 (2) 16:10
28 08:20	07:18		06:11	05:58	05:07	04:57	05:32	06:26	07:21	15:47 (2)	08:14	16:11 (2) 08:44
16:58	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	33 16:20 (2)	16:12	16:11 (2) 16:10
29 08:19			07:08	05:56	05:06	04:57	05:34	06:27	07:22	15:47 (2)	08:16	16:12 (2) 08:44
17:00			19:54	20:52	21:41	22:01	21:30	20:25	19:09	33 16:20 (2)	16:11	16:13 (2) 16:11
30 08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	15:47 (2)	08:18	16:14 (2) 08:44
17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	33 16:20 (2)	16:11	16:15 (2) 16:12
31 08:15	16:28 (2)		07:04		05:04		05:37	06:31	07:22	15:47 (2)		16:16 (2) 08:44
17:04	16:31 (2)		19:58		21:44		21:27	20:21	16:56	33 16:20 (2)		16:17 (2) 16:13
Potential sun hours	250	3	273	367	420	494	510	512	460	382	259	233
Total, worst case	3		602								224	
Sun reduction	0.24		0.23								0.27	
Oper. time red.	1.00		1.00								1.00	
Wind dir. red.	0.66		0.66								0.66	
Total reduction	0.16		0.15								0.17	
Total, real	0		92								39	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: V - H22

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44		15:07 (3)	08:14		15:21 (2)	07:16	07:01		05:52		05:03		04:59		05:39		06:33		07:26		07:24		08:19		14:52 (2)	
	16:15	30	15:37 (2)	17:06	27	15:48 (2)	18:02	20:00		20:55		21:45		22:00		21:25		20:18		19:05		16:54		16:10	36	15:28 (2)	
2	08:44		15:08 (3)	08:12		15:22 (2)	07:14	06:59		05:50		05:02		04:59		05:40		06:35		07:28		07:26		08:21		14:52 (2)	
	16:16	31	15:39 (2)	17:08	25	15:47 (2)	18:04	20:02		20:57		21:47		22:00		21:23		20:16		19:02		16:52		16:09	35	15:27 (2)	
3	08:44		15:08 (3)	08:10		15:24 (2)	07:12	06:56		05:48		05:01		05:00		05:42		06:36		07:30		07:28		08:22		14:53 (2)	
	16:17	31	15:39 (2)	17:10	21	15:45 (2)	18:06	20:04		20:59		21:48		21:59		21:21		20:13		19:00		16:50		16:08	35	15:28 (2)	
4	08:43		15:09 (3)	08:08		15:27 (2)	07:09	06:54		05:46		05:00		05:01		05:44		06:38		07:31		07:30		08:24		14:54 (2)	
	16:18	32	15:41 (2)	17:12	16	15:43 (2)	18:07	20:06		21:01		21:49		21:59		21:19		20:11		18:57		16:48		16:08	35	15:29 (2)	
5	08:43		15:09 (3)	08:07		15:30 (2)	07:07	06:51		05:44		04:59		05:02		05:45		06:40		07:33		07:32		08:25		14:55 (2)	
	16:19	32	15:41 (2)	17:14	10	15:40 (2)	18:09	20:07		21:03		21:50		21:58		21:17		20:09		18:55		16:46		16:07	33	15:28 (2)	
6	08:43		15:10 (2)	08:05		15:43 (2)	07:04	06:49		05:42		04:58		05:03		05:47		06:42		07:35		07:34		14:59 (2)		14:56 (2)	
	16:21	33	15:43 (2)	17:16		18:11	20:09	21:04		21:04		21:51		21:58		21:15		20:06		18:52		16:44	11	15:10 (2)	16:07	33	15:29 (2)
7	08:42		15:09 (2)	08:03		18:13	20:11	21:06		21:06		21:52		21:57		21:14		20:04		18:50		16:43	17	15:13 (2)	16:06	32	15:28 (2)
	16:22	34	15:43 (2)	17:18		18:13	20:11	21:06		21:06		21:52		21:57		21:14		20:04		18:50		16:43	17	15:13 (2)	16:06	32	15:28 (2)
8	08:42		15:09 (2)	08:01		18:15	20:13	21:08		21:08		21:53		21:56		21:12		20:01		18:48		16:41	21	15:15 (2)	16:06	32	15:28 (2)
	16:24	34	15:43 (2)	17:20		18:15	20:13	21:08		21:08		21:53		21:56		21:12		20:01		18:48		16:41	21	15:15 (2)	16:06	32	15:28 (2)
9	08:41		15:10 (2)	07:59		18:17	20:15	21:10		21:10		21:54		21:55		21:10		19:59		18:45		16:39	25	15:18 (2)	16:05	31	15:28 (2)
	16:25	35	15:45 (2)	17:22		18:17	20:15	21:10		21:10		21:54		21:55		21:10		19:59		18:45		16:39	25	15:18 (2)	16:05	31	15:28 (2)
10	08:40		15:10 (2)	07:57		18:19	20:17	21:11		21:11		21:55		21:55		21:08		19:56		18:43		16:37	27	15:19 (2)	16:05	31	15:28 (2)
	16:26	35	15:45 (2)	17:24		18:19	20:17	21:11		21:11		21:55		21:55		21:08		19:56		18:43		16:37	27	15:19 (2)	16:05	31	15:28 (2)
11	08:40		15:10 (2)	07:55		18:21	20:19	21:13		21:13		21:55		21:54		21:06		19:54		18:40		16:35	29	15:20 (2)	16:05	30	15:27 (2)
	16:28	36	15:46 (2)	17:26		18:21	20:19	21:13		21:13		21:55		21:54		21:06		19:54		18:40		16:35	29	15:20 (2)	16:05	30	15:27 (2)
12	08:39		15:10 (2)	07:53		18:23	20:20	21:15		21:15		21:56		21:53		21:03		19:51		18:38		16:34	31	15:21 (2)	16:05	30	15:27 (2)
	16:30	37	15:47 (2)	17:28		18:23	20:20	21:15		21:15		21:56		21:53		21:03		19:51		18:38		16:34	31	15:21 (2)	16:05	30	15:27 (2)
13	08:38		15:11 (2)	07:51		18:25	20:22	21:17		21:17		21:57		21:52		21:01		19:49		18:36		16:32	33	15:22 (2)	16:04	29	15:26 (2)
	16:31	36	15:47 (2)	17:30		18:25	20:22	21:17		21:17		21:57		21:52		21:01		19:49		18:36		16:32	33	15:22 (2)	16:04	29	15:26 (2)
14	08:37		15:11 (2)	07:49		18:27	20:24	21:18		21:18		21:58		21:51		20:59		19:47		18:33		16:31	34	15:22 (2)	16:04	29	15:27 (2)
	16:33	37	15:48 (2)	17:32		18:27	20:24	21:18		21:18		21:58		21:51		20:59		19:47		18:33		16:31	34	15:22 (2)	16:04	29	15:27 (2)
15	08:36		15:11 (2)	07:47		18:28	20:26	21:21		21:21		21:59		21:49		20:55		19:42		18:29		16:27	35	15:23 (2)	16:05	28	15:26 (2)
	16:34	37	15:48 (2)	17:34		18:28	20:26	21:21		21:21		21:59		21:49		20:55		19:42		18:29		16:27	35	15:23 (2)	16:05	28	15:26 (2)
16	08:35		15:10 (2)	07:45		18:30	20:28	21:22		21:22		21:59		21:49		20:55		19:42		18:29		16:27	35	15:23 (2)	16:05	28	15:26 (2)
	16:36	38	15:48 (2)	17:36		18:30	20:28	21:22		21:22		21:59		21:49		20:55		19:42		18:29		16:27	35	15:23 (2)	16:05	28	15:26 (2)
17	08:34		15:11 (2)	07:43		18:32	20:30	21:23		21:23		21:59		21:47		20:53		19:39		18:26		16:26	37	15:24 (2)	16:05	28	15:27 (2)
	16:38	38	15:49 (2)	17:38		18:32	20:30	21:23		21:23		21:59		21:47		20:53		19:39		18:26		16:26	37	15:24 (2)	16:05	28	15:27 (2)
18	08:33		15:11 (2)	07:41		18:34	20:31	21:25		21:25		22:00		21:46		20:51		19:37		18:24		16:24	37	15:24 (2)	16:05	27	15:27 (2)
	16:40	38	15:49 (2)	17:40		18:34	20:31	21:25		21:25		22:00		21:46		20:51		19:37		18:24		16:24	37	15:24 (2)	16:05	27	15:27 (2)
19	08:32		15:12 (2)	07:39		18:36	20:33	21:27		21:27		22:00		21:45		20:48		19:34		18:22		16:23	38	15:25 (2)	16:05	28	15:28 (2)
	16:41	38	15:50 (2)	17:42		18:36	20:33	21:27		21:27		22:00		21:45		20:48		19:34		18:22		16:23	38	15:25 (2)	16:05	28	15:28 (2)
20	08:31		15:12 (2)	07:36		18:38	20:35	21:28		21:28		22:00		21:44		20:46		19:32		18:20		16:22	38	15:25 (2)	16:06	27	15:27 (2)
	16:43	38	15:50 (2)	17:44		18:38	20:35	21:28		21:28		22:00		21:44		20:46		19:32		18:20		16:22	38	15:25 (2)	16:06	27	15:27 (2)
21	08:30		15:13 (2)	07:34		18:40	20:37	21:30		21:30		22:01		21:42		20:44		19:29		18:17		16:20	38	15:26 (2)	16:06		15:01 (3)
	16:45	38	15:51 (2)	17:46		18:40	20:37	21:30		21:30		22:01		21:42		20:44		19:29		18:17		16:20	38	15:26 (2)	16:06		15:01 (3)
22	08:29		15:12 (2)	07:32		18:42	20:39	21:31		21:31		22:01		21:41		20:42		19:27		18:15		16:19	38	15:26 (2)	16:06		15:01 (3)
	16:47	38	15:50 (2)	17:48		18:42	20:39	21:31		21:31		22:01		21:41		20:42		19:27		18:15		16:19	38	15:26 (2)	16:06		15:01 (3)
23	08:27		15:13 (2)	07:30		18:43	20:41	21:33		21:33		22:01		21:39		20:39		19:24		18:13		16:18	38	15:26 (2)	16:07		15:02 (3)
	16:49	38	15:51 (2)	17:50		18:43	20:41	21:33		21:33		22:01		21:39		20:39		19:24		18:13		16:18	38	15:26 (2)	16:07		15:02 (3)
24	08:26		15:13 (2)	07:28		18:45	20:43	21:34		21:34		22:01		21:38		20:37		19:22		18:11		16:17	39	15:27 (2)	16:08		15:02 (3)
	16:50	37	15:50 (2)	17:52		18:45	20:43	21:34		21:34		22:01		21:38		20:37		19:22		18:11		16:17	39	15:27 (2)	16:08		15:02 (3)
25	08:25		15:15 (2)	07:25		18:47	20:44	21:36		21:36		22:01		21:36		20:35		19:19		17:09		16:16	38	15:27 (2)	16:08		15:03 (3)
	16:52	36	15:51 (2)	17:54		18:47	20:44	21:36		21:36		22:01		21:36		20:35		19:19		17:09		16:16	38	15:27 (2)	16:08		15:03 (3)
26	08:23		15:15 (2)	07:23		18:49	20:46	21:37		21:37		22:01		21:35		20:32		19:17		17:06		16:14	37	15:27 (2)	16:09		15:04 (3)
	16:54	36	15:51 (2)	17:56		18:49	20:46	21:37		21:37		22:01		21:35		20:32		19:17		17:06		16:14	37	15:27 (2)	16:09		15:04 (3)
27	08:22		15:15 (2)	07:21		18:51	20:48	21:39		21:39		22:01		21:33		20:30		19:14		17:04		16:13	38	15:28 (2)	16:10		15:05 (3)

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: W - H23

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	15:01 (2) 08:14	15:16 (2) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:45 (2)
2	16:15	15:35 (2) 17:06	15:41 (2) 18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	15:23 (2)
3	08:44	15:02 (2) 08:12	15:18 (2) 07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	14:45 (2)
4	16:16	15:36 (2) 17:08	15:40 (2) 18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	15:23 (2)
5	08:44	15:01 (2) 08:10	15:21 (2) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	14:46 (2)
6	16:17	15:36 (2) 17:10	15:37 (2) 18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	15:23 (2)
7	08:43	15:02 (2) 08:08	15:24 (2) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	14:47 (2)
8	16:18	15:37 (2) 17:12	15:34 (2) 18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	15:24 (2)
9	08:43	15:02 (2) 08:07	15:21 (2) 07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	14:47 (2)
10	16:19	15:37 (2) 17:14	15:38 (2) 18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	15:24 (2)
11	08:43	15:02 (2) 08:05	15:22 (2) 07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	14:48 (2)
12	16:21	15:38 (2) 17:16	15:39 (2) 18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:07	15:24 (2)
13	08:42	15:02 (2) 08:03	15:23 (2) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	14:49 (2)
14	16:22	15:39 (2) 17:18	15:40 (2) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	15:24 (2)
15	08:42	15:02 (2) 08:01	15:24 (2) 07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	14:49 (2)
16	16:24	15:39 (2) 17:20	15:41 (2) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	15:24 (2)
17	08:41	15:03 (2) 07:59	15:25 (2) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	14:50 (2)
18	16:25	15:40 (2) 17:22	15:42 (2) 18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	15:25 (2)
19	08:40	15:03 (2) 07:57	15:26 (2) 06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	14:51 (2)
20	16:26	15:41 (2) 17:24	15:43 (2) 18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	15:25 (2)
21	08:40	15:03 (2) 07:55	15:27 (2) 06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44	08:33	14:51 (2)
22	16:28	15:41 (2) 17:26	15:44 (2) 18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	16:05	15:25 (2)
23	08:39	15:03 (2) 07:53	15:28 (2) 06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	14:52 (2)
24	16:30	15:42 (2) 17:28	15:45 (2) 18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	15:25 (2)
25	08:38	15:04 (2) 07:51	15:29 (2) 06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	14:52 (2)
26	16:31	15:42 (2) 17:30	15:46 (2) 18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05	15:25 (2)
27	08:37	15:04 (2) 07:49	15:30 (2) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	14:54 (2)
28	16:33	15:43 (2) 17:32	15:47 (2) 18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:04	15:26 (2)
29	08:36	15:04 (2) 07:47	15:31 (2) 06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	08:37	14:53 (2)
30	16:34	15:43 (2) 17:34	15:48 (2) 18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	15:26 (2)
31	08:35	15:04 (2) 07:45	15:32 (2) 06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	14:54 (2)
32	16:36	15:43 (2) 17:36	15:49 (2) 18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	15:26 (2)
33	08:34	15:04 (2) 07:43	15:33 (2) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39	14:55 (2)
34	16:38	15:44 (2) 17:38	15:50 (2) 18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05	15:26 (2)
35	08:33	15:05 (2) 07:41	15:34 (2) 06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	14:56 (2)
36	16:40	15:44 (2) 17:40	15:51 (2) 18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05	15:27 (2)
37	08:32	15:06 (2) 07:39	15:35 (2) 06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	14:56 (2)
38	16:41	15:45 (2) 17:42	15:52 (2) 18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	15:28 (2)
39	08:31	15:05 (2) 07:36	15:36 (2) 06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	14:41 (2)	15:28 (2)
40	16:43	15:44 (2) 17:44	15:53 (2) 18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:06	15:27 (2)
41	08:30	15:06 (2) 07:34	15:37 (2) 06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	14:41 (2)	15:27 (2)
42	16:45	15:45 (2) 17:46	15:54 (2) 18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	15:28 (2)
43	08:29	15:06 (2) 07:32	15:38 (2) 06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	14:42 (2)	15:28 (2)
44	16:47	15:45 (2) 17:48	15:55 (2) 18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06	15:28 (2)
45	08:27	15:07 (2) 07:30	15:39 (2) 06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	14:42 (2)	15:28 (2)
46	16:49	15:45 (2) 17:50	15:56 (2) 18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07	15:29 (2)
47	08:26	15:07 (2) 07:28	15:40 (2) 06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	14:42 (2)	15:28 (2)
48	16:50	15:45 (2) 17:52	15:57 (2) 18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:08	15:29 (2)
49	08:25	15:09 (2) 07:25	15:41 (2) 06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09	14:42 (2)	15:29 (2)
50	16:52	15:45 (2) 17:54	15:58 (2) 18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	16:08	15:30 (2)
51	08:23	15:09 (2) 07:23	15:42 (2) 06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	14:43 (2)	15:29 (2)
52	16:54	15:44 (2) 17:56	15:59 (2) 18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	16:09	15:30 (2)
53	08:22	15:10 (2) 07:21	15:43 (2) 06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13	14:43 (2)	15:30 (2)
54	16:56	15:44 (2) 17:58	15:60 (2) 18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:09	15:31 (2)
55	08:20	15:11 (2) 07:19	15:44 (2) 06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	14:44 (2)	15:30 (2)
56	16:58	15:44 (2) 18:00	15:61 (2) 18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16:09	15:31 (2)
57	08:19	15:12 (2) 07:18	15:45 (2) 06:09	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	14:44 (2)	15:31 (2)
58	17:00	15:43 (2) 18:00	15:62 (2) 18:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:12	16:09	15:32 (2)
59	08:17	15:13 (2) 07:14	15:46 (2) 06:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	14:44 (2)	15:31 (2)
60	17:02	15:42 (2) 18:00	15:63 (2) 18:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:09	15:32 (2)
61	08:15	15:14 (2) 07:15	15:47 (2) 06:07	05:54	05:04	04:57	05:37	06:31	07:22	07:18	08:16	14:44 (2)	15:32 (2)
62	17:04	15:41 (2) 18:00	15:64 (2) 18:58	20:55	21:44	22:01	21:27	20:21	19:05	16:56	16:13	16:10	15:33 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case	1126	73									804	1031	
Sun reduction	0.24	0.23									0.27	0.21	
Oper. time red.	1.00	1.00									1.00	1.00	
Wind dir. red.	0.65	0.65									0.65	0.65	
Total reduction	0.16	0.15									0.17	0.13	
Total, real	179	11									139	139	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: X - H24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February	March	April	May	June	July	August	September	October	November	December		
1	08:44	15:36 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:19 (1)	
2	16:15	15:37 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	15	15:34 (1)
	08:44	15:36 (1)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	15	15:20 (1)
3	16:16	15:38 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	13	15:33 (1)
	08:44	15:36 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	13	15:20 (1)
4	16:17	15:39 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	12	15:32 (1)
	08:43	15:36 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	12	15:21 (1)
5	16:18	15:41 (1)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	11	15:32 (1)
	08:43	15:36 (1)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	11	15:21 (1)
6	16:19	15:42 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	9	15:30 (1)
	08:43	15:36 (1)	08:05	07:05	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	9	15:22 (1)
7	16:21	15:44 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	16:07	8	15:30 (1)
	08:42	15:36 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	8	15:23 (1)
8	16:22	15:45 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	6	15:29 (1)
	08:42	15:36 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	6	15:24 (1)
9	16:24	15:46 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	5	15:29 (1)
	08:41	15:37 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	5	15:25 (1)
10	16:25	15:49 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	3	15:28 (1)
	08:40	15:37 (1)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	3	15:25 (1)
11	16:26	15:50 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	3	15:28 (1)
	08:40	15:37 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	3	15:26 (1)
12	16:28	15:52 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:35	16:05	1	15:27 (1)
	08:39	15:37 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34		
13	16:30	15:53 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	16:05		
	08:38	15:37 (1)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35		
14	16:31	15:55 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05		
	08:37	15:37 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36		
15	16:33	15:57 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:04		
	08:36	15:38 (1)	07:47	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	15:21 (1)		08:37
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	08:35	15:38 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	15:19 (1)		08:38
17	16:36	16:01 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	12	15:31 (1)	16:05
	08:34	15:38 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	15:18 (1)		08:39
18	16:38	16:01 (1)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	15	15:33 (1)	16:05
	08:33	15:39 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	15:17 (1)		08:39
19	16:40	16:01 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:24	17	15:34 (1)	16:05
	08:32	15:39 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	15:16 (1)		08:40
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	08:31	15:39 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	15:16 (1)		08:41
21	16:43	16:01 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	20	15:36 (1)	16:06
	08:30	15:41 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	15:16 (1)		08:41
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	08:29	15:41 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	15:15 (1)		08:42
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	08:26	15:43 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	15:16 (1)		08:43
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	08:23	15:46 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	15:16 (1)		08:43
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	08:22	15:48 (1)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13	15:17 (1)		08:44
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	08:19			07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16	15:17 (1)		08:44
30	17:00			09:05	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:12	18	15:35 (1)	16:11
	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	15:18 (1)		08:44
31	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	17	15:35 (1)	16:12
	08:15			07:04		05:04		05:37	06:31		07:22		08:44		
	17:04			19:58		21:44		21:27	20:21		16:56		16:13		
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	233		
Total, worst case	383											299		86	
Sun reduction	0.24											0.27		0.21	
Oper. time red.	1.00											1.00		1.00	
Wind dir. red.	0.66											0.66		0.66	
Total reduction	0.16											0.18		0.14	
Total, real	61											52		12	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: Y - H25

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	08:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: Z - H26

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AA - H27

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:50 (5) 20:20 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:10 (5) 20:19 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:50 (5) 20:20 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:07 (5) 20:22 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:50 (5) 20:19 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:05 (5) 20:23 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:50 (5) 20:19 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:04 (5) 20:25 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:50 (5) 20:18 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:02 (5) 20:25 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:51 (5) 20:17 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:02 (5) 20:26 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:52 (5) 20:17 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:01 (5) 20:27 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	19:53 (5) 20:15 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:00 (5) 20:27 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	19:54 (5) 20:14 (5)	04:57 21:54	05:06 21:55	05:52 21:09	19:59 (5) 20:28 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	19:55 (5) 20:12 (5)	04:56 21:55	05:07 21:54	05:54 21:07	19:58 (5) 20:28 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	19:58 (5) 20:11 (5)	04:56 21:55	05:08 21:54	05:56 21:05	19:58 (5) 20:28 (5)	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:01 (5) 20:07 (5)	04:55 21:56	05:09 21:53	05:58 21:03	19:58 (5) 20:29 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	19:57 (5) 20:28 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	05:12 21:51	06:01 20:59	19:57 (5) 20:28 (5)	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	05:13 21:50	06:03 20:57	19:57 (5) 20:28 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	19:57 (5) 20:25 (5)	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	19:57 (5) 20:23 (5)	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25		04:54 21:59	05:17 21:46	06:08 20:50	19:58 (5) 20:22 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:00 (5)	04:54 22:00	05:18 21:45	06:10 20:48	19:58 (5) 20:19 (5)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	19:58 (5)	04:54 22:00	05:20 21:44	06:12 20:46	19:58 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	19:55 (5)	04:54 22:00	05:21 21:42	06:13 20:44	20:00 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	19:54 (5)	04:55 22:01	05:23 21:41	06:15 20:42	20:00 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	19:53 (5)	04:55 22:01	05:24 21:39	06:17 20:39	20:01 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	19:52 (5)	04:55 22:01	05:26 21:38	06:19 20:37	20:04 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	19:51 (5)	04:56 22:01	05:27 21:36	06:20 20:35		07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	19:51 (5)	04:56 22:01	05:29 21:35	06:22 20:32		07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	19:50 (5)	04:56 22:01	05:31 21:33	06:24 20:30		07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	19:50 (5)	04:57 22:01	05:32 21:32	06:26 20:28		07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00	07:09 18:04	05:56 19:54	05:06 20:52	05:06 21:41	19:50 (5)	04:58 22:00	05:34 21:30	06:28 20:25		07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02	07:06 18:04	05:54 19:56	05:05 20:53	05:05 21:43	19:50 (5)	04:58 22:00	05:35 21:28	06:29 20:23		07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04	07:04 18:04	05:54 19:58	05:05 20:53	05:04 21:44	20:21 (5)		05:37 21:26	06:31 20:21			07:22 16:56	08:44 16:11	08:44 16:13
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case				255	275				535					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.65	0.65				0.65					
Total reduction				0.23	0.25				0.22					
Total, real				58	68				118					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AB - H28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:49 (5) 20:18 (5)	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:49 (5) 20:17 (5)	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:49 (5) 20:16 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:07 (5) 20:17 (5)	06:36 20:13	07:30 19:00	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:50 (5) 20:16 (5)	05:01 21:49	05:44 21:59	05:44 21:19	20:05 (5) 20:20 (5)	06:38 20:11	07:31 18:57	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:50 (5) 20:15 (5)	05:02 21:50	05:45 21:58	05:45 21:17	20:03 (5) 20:21 (5)	06:40 20:09	07:33 18:55	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:51 (5) 20:13 (5)	05:03 21:51	05:47 21:57	05:47 21:15	20:02 (5) 20:23 (5)	06:42 20:06	07:35 18:52	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:53 (5) 20:13 (5)	05:04 21:52	05:49 21:57	05:49 21:13	20:01 (5) 20:24 (5)	06:43 20:04	07:37 18:50	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	19:54 (5) 20:11 (5)	05:05 21:53	05:51 21:56	05:51 21:11	19:59 (5) 20:24 (5)	06:45 20:01	07:39 18:48	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	19:56 (5) 20:09 (5)	05:06 21:54	05:52 21:55	05:52 21:09	19:59 (5) 20:25 (5)	06:47 19:59	07:41 18:45	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	19:58 (5) 20:06 (5)	05:07 21:55	05:54 21:07	05:54 21:27	19:57 (5) 20:25 (5)	06:49 19:56	07:42 18:43	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13		04:56 21:55	05:08 21:54	05:56 21:05	19:57 (5) 20:26 (5)	06:50 19:54	07:44 18:40	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15		04:55 21:56	05:09 21:53	05:58 21:03	19:57 (5) 20:26 (5)	06:52 19:51	07:46 18:38	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	19:56 (5) 20:26 (5)	06:54 19:49	07:48 18:36	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	05:12 21:51	06:01 20:59	19:56 (5) 20:26 (5)	06:56 19:47	07:50 18:33	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	05:13 21:50	06:03 20:57	19:56 (5) 20:26 (5)	06:58 19:44	07:52 18:31	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	19:55 (5) 20:25 (5)	06:59 19:42	07:54 18:29	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	19:56 (5) 20:23 (5)	07:01 19:39	07:55 18:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:58 (5) 20:03 (5)	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	19:56 (5) 20:22 (5)	07:03 19:37	07:57 18:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	19:56 (5) 20:05 (5)	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	19:56 (5) 20:19 (5)	07:05 19:34	07:59 18:22	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:54 (5) 20:07 (5)	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	19:56 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:52 (5) 20:08 (5)	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	19:57 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	19:51 (5) 20:10 (5)	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	19:57 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:50 (5) 20:12 (5)	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	19:58 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:50 (5) 20:13 (5)	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	20:00 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19:49 (5) 20:15 (5)	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	20:01 (5) 20:06 (5)	07:15 19:19	07:11 17:09	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:49 (5) 20:17 (5)	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32		07:17 19:17	07:13 17:07	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:49 (5) 20:19 (5)	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30		07:19 19:14	07:14 17:04	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	19:48 (5) 20:19 (5)	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28		07:21 19:12	07:16 17:02	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	19:48 (5) 20:19 (5)	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25		07:22 19:09	07:18 17:00	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	19:48 (5) 20:18 (5)	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23		07:24 19:07	07:20 16:58	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44			05:37 21:26	06:31 20:21			07:22 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259
Total, worst case				283	215				500				
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.65	0.65				0.65				
Total reduction				0.23	0.25				0.22				
Total, real				65	53				111				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AC - H29

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	19:48 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:55	20:16 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10			
2	08:44	08:12	07:14	06:59	05:50	19:48 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	20:15 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09			
3	08:43	08:10	07:11	06:56	05:48	19:49 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	20:14 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08			
4	08:43	08:08	07:09	06:54	05:46	19:50 (5)	05:00	05:01	05:44	20:09 (5)	06:38	07:31	08:24			
	16:18	17:12	18:07	20:06	21:01	20:13 (5)	21:49	21:59	21:19	5	20:14 (5)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44	19:51 (5)	04:59	05:02	05:45	20:05 (5)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:03	20:11 (5)	21:50	21:58	21:17	12	20:17 (5)	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42	19:52 (5)	04:59	05:03	05:47	20:03 (5)	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	20:10 (5)	21:51	21:57	21:15	16	20:19 (5)	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40	19:54 (5)	04:58	05:04	05:49	20:02 (5)	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	20:09 (5)	21:52	21:57	21:13	19	20:21 (5)	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38	19:56 (5)	04:57	05:05	05:51	20:00 (5)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	20:06 (5)	21:53	21:56	21:11	21	20:21 (5)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	19:59 (5)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	24	20:23 (5)	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	19:57 (5)	06:49	07:42	07:42	08:31		
	16:27	17:24	18:19	20:17	21:11		21:55	21:54	21:07	26	20:23 (5)	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	19:57 (5)	06:50	07:44	07:43	08:33		
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	26	20:23 (5)	19:54	18:40	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:58	19:56 (5)	06:52	07:46	07:45	08:34		
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	28	20:24 (5)	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:55 (5)	06:54	07:48	07:47	08:35		
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	29	20:24 (5)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:55 (5)	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	29	20:24 (5)	19:47	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	19:55 (5)	06:58	07:52	07:51	08:37		
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	30	20:25 (5)	19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	19:54 (5)	06:59	07:54	07:53	08:38		
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	30	20:24 (5)	19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22	19:58 (5)	04:54	05:16	06:06	19:54 (5)	07:01	07:55	07:55	08:38		
	16:38	17:38	18:32	20:30	3	20:01 (5)	21:59	21:47	20:53	29	20:23 (5)	19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21	19:55 (5)	04:54	05:17	06:08	19:55 (5)	07:03	07:57	07:57	08:39		
	16:40	17:40	18:34	20:31	8	20:03 (5)	21:59	21:46	20:50	27	20:22 (5)	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:18	05:19	19:54 (5)	04:54	05:18	06:10	19:54 (5)	07:05	07:59	07:59	08:40		
	16:41	17:42	18:36	20:33	11	20:05 (5)	21:27	22:00	21:45	20:48	25	20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	05:18	19:52 (5)	05:18	04:54	05:20	06:12	19:55 (5)	07:06	08:01	08:00	08:41	
	16:43	17:44	18:38	20:35	15	20:07 (5)	21:28	22:00	21:43	20:46	22	20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	19:50 (5)	05:16	04:54	05:21	06:13	19:55 (5)	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	18	20:08 (5)	21:30	22:00	21:42	20:44	20	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	05:15	19:49 (5)	05:15	04:55	05:23	06:15	19:55 (5)	07:10	08:05	08:04	08:42	
	16:47	17:48	18:41	20:39	21	20:10 (5)	21:31	22:01	21:41	20:42	17	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	05:13	19:49 (5)	05:13	04:55	05:24	06:17	19:56 (5)	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	23	20:12 (5)	21:33	22:01	21:39	20:39	14	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	19:48 (5)	05:12	04:55	05:26	06:19	19:58 (5)	07:13	08:09	08:07	08:43	
	16:51	17:52	18:45	20:42	25	20:13 (5)	21:34	22:01	21:38	20:37	11	20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	05:11	19:48 (5)	05:11	04:56	05:27	06:20	19:58 (5)	07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	27	20:15 (5)	21:36	22:01	21:36	20:35	8	20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:09	19:48 (5)	05:09	04:56	05:29	06:22	20:01 (5)	07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	29	20:17 (5)	21:37	22:01	21:35	20:32	3	20:04 (5)	19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	05:08	19:48 (5)	05:08	04:56	05:30	06:24		07:19	07:14	08:13	08:44	
	16:56	17:58	18:51	20:48	29	20:17 (5)	21:39	22:01	21:33	20:30		19:14	17:04	16:14	16:10	
28	08:20	07:18	06:11	05:58	05:07	19:48 (5)	05:07	04:57	05:32	06:26		07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	29	20:17 (5)	21:40	22:01	21:32	20:28		19:12	17:02	16:13	16:11	
29	08:18		07:09	05:56	05:06	19:48 (5)	05:06	04:58	05:34	06:28		07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	29	20:17 (5)	21:41	22:00	21:30	20:25		19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	05:05	19:48 (5)	05:05	04:58	05:35	06:29		07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	28	20:16 (5)	21:43	22:00	21:28	20:23		19:07	16:58	16:11	16:12	
31	08:15		07:04		05:04		05:04		05:37	06:31			07:22		08:44	
	17:04		19:58		21:44		21:44		21:26	20:21			16:56		16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233		
Total, worst case				295	166				471							
Sun reduction				0.35	0.38				0.34							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.65	0.65				0.65							
Total reduction				0.23	0.25				0.22							
Total, real				68	41				104							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AD - H30
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	20:09 (5)	05:03	04:59	05:39	20:18 (5)	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:55	17	20:26 (5)	21:45	22:00	21:25	25	20:43 (5)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50		20:09 (5)	05:02	05:00	05:40		20:18 (5)	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	18	20:27 (5)	21:46	22:00	21:23	26	20:44 (5)	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48		20:08 (5)	05:01	05:00	05:42		20:17 (5)	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21	20:29 (5)	21:48	21:59	21:21	26	20:43 (5)	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46		20:07 (5)	05:00	05:01	05:44		20:17 (5)	06:38	07:31	07:30	08:23
	16:18	17:12	18:07	20:06	21:01	23	20:30 (5)	21:49	21:59	21:19	27	20:44 (5)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44		20:07 (5)	04:59	05:02	05:45		20:17 (5)	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07	21:03	25	20:32 (5)	21:50	21:58	21:17	27	20:44 (5)	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42		20:07 (5)	04:59	05:03	05:47		20:17 (5)	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	26	20:33 (5)	21:51	21:57	21:15	27	20:44 (5)	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40		20:07 (5)	04:58	05:04	05:49		20:17 (5)	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	28	20:35 (5)	21:52	21:57	21:13	26	20:43 (5)	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38		20:07 (5)	04:57	05:05	05:51		20:16 (5)	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	27	20:34 (5)	21:53	21:56	21:11	25	20:41 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36		20:07 (5)	04:57	05:06	05:52		20:17 (5)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	27	20:34 (5)	21:54	21:55	21:09	22	20:39 (5)	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34		20:07 (5)	04:56	05:07	05:54		20:17 (5)	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11	26	20:33 (5)	21:54	21:54	21:07	20	20:37 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33		20:08 (5)	04:56	05:08	05:56		20:17 (5)	06:50	07:44	07:43	08:33
	16:28	17:26	18:21	20:18	21:13	25	20:33 (5)	21:55	21:54	21:05	18	20:35 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		20:08 (5)	04:55	05:09	05:58		20:18 (5)	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15	24	20:32 (5)	21:56	21:53	21:03	16	20:34 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		20:09 (5)	04:55	05:11	05:59		20:18 (5)	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17	22	20:31 (5)	21:57	21:52	21:01	13	20:31 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		20:10 (5)	04:55	05:12	06:01		20:19 (5)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:18	21	20:31 (5)	21:57	21:51	20:59	10	20:29 (5)	19:47	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26		20:10 (5)	04:55	05:13	06:03		20:21 (5)	06:58	07:52	07:51	08:37
	16:34	17:34	18:28	20:26	21:20	20	20:30 (5)	21:58	21:50	20:57	7	20:28 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24		20:12 (5)	04:54	05:14	06:05		20:22 (5)	06:59	07:54	07:53	08:37
	16:36	17:36	18:30	20:28	21:22	17	20:29 (5)	21:59	21:48	20:55	3	20:25 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	05:22		20:13 (5)	04:54	05:16	06:06		07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23	14	20:27 (5)	21:59	21:47	20:53		19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21		20:15 (5)	04:54	05:17	06:08		07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	21:25	11	20:26 (5)	21:59	21:46	20:50		19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:18	05:19		20:19 (5)	04:54	05:18	06:10		07:05	07:59	07:59	08:40	
	16:41	17:42	18:36	20:33	21:27	4	20:23 (5)	22:00	21:45	20:48		19:34	18:22	16:23	16:05	
20	08:31	07:36	06:31	06:16	05:18		04:54	05:20	06:12	06:12		07:06	08:01	08:00	08:41	
	16:43	17:44	18:38	20:35	21:28		22:00	21:43	20:46	20:46		19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16		04:54	05:21	06:13	06:13		07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30		22:00	21:42	20:44	20:44		19:29	18:17	16:20	16:06	
22	08:28	07:32	06:26	06:12	05:15		04:55	05:23	06:15	06:15		07:10	08:05	08:04	08:42	
	16:47	17:48	18:41	20:39	21:31		22:01	21:41	20:42	20:42		19:27	18:15	16:19	16:07	
23	08:27	07:30	06:23	06:09	05:13		04:55	05:24	06:17	06:17		07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	21:33		22:01	21:39	20:39	20:39		19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26	06:19	06:19		07:13	08:09	08:07	08:43	
	16:51	17:52	18:45	20:42	21:34		22:01	21:38	20:37	20:37		19:22	18:11	16:17	16:08	
25	08:24	07:25	06:18	06:05	05:11		04:56	05:27		20:27 (5)	06:20	07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	21:36		22:01	21:36	8	20:35 (5)	20:35	19:19	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:09		04:56	05:29		20:25 (5)	06:22	07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	21:37		22:01	21:35	12	20:37 (5)	20:32	19:17	17:06	16:15	16:09	
27	08:21	07:21	06:13	06:01	20:15 (5)	05:08	04:56	05:30		20:24 (5)	06:24	07:19	07:14	08:13	08:43	
	16:56	17:58	18:51	20:48	4	20:19 (5)	21:39	22:01	21:33	15	20:39 (5)	20:30	19:14	17:04	16:14	16:10
28	08:20	07:18	06:11	05:58	20:13 (5)	05:07	04:57	05:32		20:22 (5)	06:26	07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	8	20:21 (5)	21:40	22:01	21:32	18	20:40 (5)	20:28	19:12	17:02	16:13	16:11
29	08:18		07:08	05:56	20:11 (5)	05:06	04:58	05:34		20:21 (5)	06:28	07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	11	20:22 (5)	21:41	22:00	21:30	20	20:41 (5)	20:25	19:09	17:00	16:12	16:11
30	08:17		07:06	05:54	20:10 (5)	05:05	04:58	05:35		20:20 (5)	06:29	07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	14	20:24 (5)	21:43	22:00	21:28	22	20:42 (5)	20:23	19:07	16:58	16:11	16:12
31	08:15		07:04			05:04		05:37		20:20 (5)	06:31		07:22		08:44	
	17:04		19:58			21:44		21:26	23	20:43 (5)	20:21		16:56		16:13	
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233			
Total, worst case					396			318								
Sun reduction					0.38			0.32		0.34						
Oper. time red.					1.00			1.00		1.00						
Wind dir. red.					0.64			0.64		0.64						
Total reduction					0.23			0.22		0.22						
Total, real					8	97		25		70						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AE - H31

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:18 (2)	08:14		09:33 (2)	07:16	07:01	05:52		05:03	04:59	05:39	06:33	07:26		07:24					08:19		09:00 (2)
	16:15	69	14:42 (1)	17:06	21	09:54 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54							16:10	69	14:25 (1)
2	08:44		09:18 (2)	08:12		09:35 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26							08:21		09:01 (2)
	16:16	70	14:43 (1)	17:08	17	09:52 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52							16:09	69	14:26 (1)
3	08:44		09:17 (2)	08:10		09:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28							08:22		09:01 (2)
	16:17	70	14:42 (1)	17:10	11	09:49 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50							16:08	71	14:27 (1)
4	08:43		09:17 (2)	08:09			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30							08:24		09:02 (2)
	16:18	72	14:43 (1)	17:12			18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48							16:08	71	14:28 (1)
5	08:43		09:16 (2)	08:07			07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32							08:25		09:02 (2)
	16:20	73	14:43 (1)	17:14			18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46							16:07	71	14:28 (1)
6	08:43		09:17 (2)	08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34							08:27		09:03 (2)
	16:21	72	14:43 (1)	17:16			18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44							16:07	71	14:29 (1)
7	08:42		09:17 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36							08:28		09:03 (2)
	16:22	71	14:43 (1)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43							16:06	73	14:30 (1)
8	08:42		09:17 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38				09:09 (2)			08:29		09:05 (2)
	16:24	70	14:43 (1)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	11		09:20 (2)				16:06	72	14:31 (1)
9	08:41		09:18 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				09:06 (2)			08:30		09:06 (2)
	16:25	71	14:44 (1)	17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	17		09:23 (2)				16:05	71	14:31 (1)
10	08:40		09:18 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42				09:04 (2)			08:32		09:07 (2)
	16:27	69	14:43 (1)	17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	21		09:25 (2)				16:05	71	14:32 (1)
11	08:40		09:18 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44				09:02 (2)			08:33		09:08 (2)
	16:28	69	14:43 (1)	17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	25		09:27 (2)				16:05	70	14:32 (1)
12	08:39		09:18 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46				09:01 (2)			08:34		09:09 (2)
	16:30	68	14:43 (1)	17:28			18:23	20:20	21:15	21:56	21:53	21:04	19:52	18:38	16:34	27		09:28 (2)				16:05	70	14:33 (1)
13	08:38		09:19 (2)	07:51			06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48				09:00 (2)			08:35		09:11 (2)
	16:31	66	14:42 (1)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	29		09:29 (2)				16:05	69	14:34 (1)
14	08:37		09:19 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				08:59 (2)			08:36		09:12 (2)
	16:33	64	14:42 (1)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	31		09:30 (2)				16:05	69	14:35 (1)
15	08:36		09:20 (2)	07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51				08:58 (2)			08:37		09:13 (2)
	16:34	62	14:41 (1)	17:34			18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	33		09:31 (2)				16:05	67	14:35 (1)
16	08:36		09:20 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53				08:58 (2)			08:38		09:13 (2)
	16:36	59	14:40 (1)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	34		09:32 (2)				16:05	68	14:35 (1)
17	08:34		09:20 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55				08:58 (2)			08:39		09:14 (2)
	16:38	55	14:38 (1)	17:38			18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	35		09:33 (2)				16:05	67	14:36 (1)
18	08:33		09:20 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				08:57 (2)			08:39		09:15 (2)
	16:40	50	14:36 (1)	17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	36		09:33 (2)				16:05	67	14:36 (1)
19	08:32		09:21 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				08:57 (2)			08:40		09:16 (2)
	16:41	39	10:00 (2)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	37		09:34 (2)				16:05	67	14:37 (1)
20	08:31		09:21 (2)	07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01				08:57 (2)			08:41		09:16 (2)
	16:43	38	09:59 (2)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	37		09:34 (2)				16:06	67	14:37 (1)
21	08:30		09:22 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				08:57 (2)			08:41		09:17 (2)
	16:45	38	10:00 (2)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	38		09:35 (2)				16:06	66	14:38 (1)
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	16:47	37	09:59 (2)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	38		09:35 (2)				16:06	66	14:38 (1)
23	08:27		09:23 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				08:57 (2)			08:42		09:18 (2)
	16:49	37	10:00 (2)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	39		09:36 (2)				16:07	66	14:39 (1)
24	08:26		09:23 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08				08:57 (2)			08:43		09:18 (2)
	16:51	36	09:59 (2)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	50		14:13 (1)				16:08	67	14:39 (1)
25	08:25		09:25 (2)	07:25			06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09				08:58 (2)			08:43		09:18 (2)
	16:52	35	10:00 (2)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	55		14:16 (1)				16:08	67	14:39 (1)
26	08:23		09:25 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11				08:58 (2)			08:44		09:19 (2)
	16:54	34	09:59 (2)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15	58		14:18 (1)				16:09	67	14:41 (1)
27	08:22		09:26 (2)	07:21			06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13				08:59 (2)			08:44		09:19 (2)
	16:56	33	09:59 (2)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	61		14:20 (1)				16:10	68	14:41 (1)
28	08:20		09:27 (2)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14				08:59 (2)			08:44		09:19 (2)
	16:58	31	09:58 (2)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	64		14:22 (1)				16:11	67	14:41 (1)
29	08:19		09:28 (2)				07:09	05:56	05:06	04:57	05:34	06:28	07:23	07:19	08:16				08:59 (2)			08:44		09:19 (2)
	17:00	29	09:57 (2)				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	66		14:22 (1)				16:11	69	14:42 (1)
30	08:17		09:29 (2)				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AF - H32

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		09:09 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24					08:19			08:54 (2)		
	16:15		17:06	12	09:21 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54					16:10	8		09:02 (2)		
2	08:44		08:12		09:13 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26					08:21			08:56 (2)		
	16:16		17:08	5	09:18 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52					16:09	7		09:03 (2)		
3	08:44		08:10			07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28					08:22			08:57 (2)		
	16:17		17:10			18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50					16:08	5		09:02 (2)		
4	08:43		08:09			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30					08:24			08:59 (2)		
	16:18		17:12			18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48					16:08	3		09:02 (2)		
5	08:43		08:07			07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32					08:25			09:00 (2)		
	16:20		17:14			18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46					16:07	1		09:01 (2)		
6	08:43		08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34					08:27					
	16:21		17:16			18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44					16:07					
7	08:42		08:03		09:15 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36					08:28					
	16:22	1	09:16 (2)		17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43					16:06					
8	08:42		08:14 (2)		08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38					08:29					
	16:24	3	09:17 (2)		17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41					16:06					
9	08:41		08:14 (2)		07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				08:43 (2)	08:30					
	16:25	5	09:19 (2)		17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	6			08:49 (2)	16:05					
10	08:41		08:13 (2)		07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42				08:40 (2)	08:32					
	16:27	6	09:19 (2)		17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	12			08:52 (2)	16:05					
11	08:40		08:12 (2)		07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44				08:38 (2)	08:33					
	16:28	8	09:20 (2)		17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16			08:54 (2)	16:05					
12	08:39		08:11 (2)		07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46				08:37 (2)	08:34					
	16:30	10	09:21 (2)		17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	19			08:56 (2)	16:05					
13	08:38		08:10 (2)		07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48				08:36 (2)	08:35					
	16:31	12	09:22 (2)		17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	21			08:57 (2)	16:05					
14	08:37		08:09 (2)		07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				08:35 (2)	08:36					
	16:33	14	09:23 (2)		17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	23			08:58 (2)	16:05					
15	08:37		08:08 (2)		07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51				08:35 (2)	08:37					
	16:34	16	09:24 (2)		17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	24			08:59 (2)	16:05					
16	08:36		08:07 (2)		07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53				08:34 (2)	08:38					
	16:36	17	09:24 (2)		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	25			08:59 (2)	16:05					
17	08:35		08:05 (2)		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55				08:34 (2)	08:39					
	16:38	19	09:24 (2)		17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	26			09:00 (2)	16:05					
18	08:33		08:04 (2)		07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				08:34 (2)	08:39					
	16:40	21	09:25 (2)		17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	26			09:00 (2)	16:05					
19	08:32		08:03 (2)		07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				08:34 (2)	08:40					
	16:41	23	09:26 (2)		17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	27			09:01 (2)	16:05					
20	08:31		08:01 (2)		07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01				08:34 (2)	08:41					
	16:43	25	09:26 (2)		17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	27			09:01 (2)	16:06					
21	08:30		08:00 (2)		07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				08:35 (2)	08:41					
	16:45	26	09:26 (2)		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	26			09:01 (2)	16:06					
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23	08:27		08:00 (2)		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				08:39 (2)	08:42					
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24	08:26		08:00 (2)		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08				08:41 (2)	08:43					
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25	08:25		08:01 (2)		07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09				08:43 (2)	08:43					
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	16:56	24	09:27 (2)		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:14	16			09:03 (2)	16:10					
28	08:20		08:03 (2)		07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:15				08:49 (2)	08:44					
	16:58	23	09:26 (2)		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:13	14			09:03 (2)	16:11					
29	08:19		08:04 (2)			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16				08:50 (2)	08:44					
	17:00	21	09:25 (2)			19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:12	12			09:02 (2)	16:11					
30	08:17		08:05 (2)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18				08:52 (2)	08:44					
	17:02	19	09:24 (2)			19:56	20:54	21:43	22:01	21:28	20:23	19:07	18:00	16:11	10			09:02 (2)	16:12					
31	08:15		08:07 (2)			07:04	05:54	05:04	05:37	06:31	07:22	08:17	09:02	08:44										
	17:04	16	09:23 (2)			19:58	20:56	21:44	22:01	21:27	20:21	19:05	18:00	16:16				09:02 (2)	16:13					
Potential sun hours	250		273			367	420	494	510	512	460	382	328	259				435	24					
Total, worst case	440		17															0.27	0.21					
Sun																								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AG - H33

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	11:17 (1) 08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (2) 08:19	
2 08:44	11:18 (1) 08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	07:56 (2) 08:21	
3 08:44	11:19 (1) 08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	07:58 (2) 08:22	
4 08:43	11:21 (1) 08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:00 (2) 08:24	11:16 (1)
5 08:43	11:22 (1) 08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:01 (2) 08:25	11:19 (1)
6 08:43	11:24 (1) 08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:02 (2) 08:27	11:21 (1)
7 08:42	11:26 (1) 08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:03 (2) 08:28	11:23 (1)
8 08:42	11:28 (1) 08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:04 (2) 08:29	11:25 (1)
9 08:41	11:30 (1) 08:01	06:59	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:05 (2) 08:30	11:27 (1)
10 08:41	11:32 (1) 07:59	06:57	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:06 (2) 08:31	11:29 (1)
11 08:40	11:34 (1) 07:57	06:55	06:38	05:32	04:54	05:08	05:56	06:51	07:44	07:44	08:07 (2) 08:32	11:31 (1)
12 08:39	11:36 (1) 07:55	06:53	06:36	05:30	04:52	05:10	05:58	06:53	07:46	07:46	08:08 (2) 08:33	11:33 (1)
13 08:38	11:38 (1) 07:53	06:51	06:34	05:28	04:50	05:12	05:59	06:55	07:48	07:48	08:09 (2) 08:34	11:35 (1)
14 08:37	11:40 (1) 07:51	06:49	06:32	05:26	04:48	05:14	05:59	06:57	07:50	07:49	08:10 (2) 08:35	11:37 (1)
15 08:36	11:42 (1) 07:49	06:47	06:30	05:24	04:46	05:16	05:59	06:59	07:52	07:51	08:11 (2) 08:36	11:39 (1)
16 08:35	11:44 (1) 07:47	06:45	06:28	05:22	04:44	05:18	05:59	06:59	07:52	07:51	08:12 (2) 08:37	11:41 (1)
17 08:35	11:46 (1) 07:45	06:43	06:26	05:20	04:42	05:20	05:59	06:59	07:52	07:51	08:13 (2) 08:38	11:43 (1)
18 08:33	11:48 (1) 07:43	06:41	06:24	05:18	04:40	05:22	05:59	06:59	07:52	07:51	08:14 (2) 08:39	11:45 (1)
19 08:32	11:50 (1) 07:41	06:39	06:22	05:16	04:38	05:24	05:59	06:59	07:52	07:51	08:15 (2) 08:40	11:47 (1)
20 08:31	11:52 (1) 07:39	06:37	06:20	05:14	04:36	05:26	05:59	06:59	07:52	07:51	08:16 (2) 08:41	11:49 (1)
21 08:30	11:54 (1) 07:37	06:35	06:18	05:12	04:34	05:28	05:59	06:59	07:52	07:51	08:17 (2) 08:42	11:51 (1)
22 08:29	11:56 (1) 07:35	06:33	06:16	05:10	04:32	05:30	05:59	06:59	07:52	07:51	08:18 (2) 08:43	11:53 (1)
23 08:27	11:58 (1) 07:33	06:31	06:14	05:08	04:30	05:32	05:59	06:59	07:52	07:51	08:19 (2) 08:44	11:55 (1)
24 08:26	11:59 (1) 07:31	06:29	06:12	05:06	04:28	05:34	05:59	06:59	07:52	07:51	08:20 (2) 08:45	11:57 (1)
25 08:25	12:01 (1) 07:29	06:27	06:10	05:04	04:26	05:36	05:59	06:59	07:52	07:51	08:21 (2) 08:46	11:59 (1)
26 08:23	12:03 (1) 07:27	06:25	06:08	05:02	04:24	05:38	05:59	06:59	07:52	07:51	08:22 (2) 08:47	12:01 (1)
27 08:22	12:05 (1) 07:25	06:23	06:06	05:00	04:22	05:40	05:59	06:59	07:52	07:51	08:23 (2) 08:48	12:03 (1)
28 08:20	12:07 (1) 07:23	06:21	06:04	04:58	04:20	05:42	05:59	06:59	07:52	07:51	08:24 (2) 08:49	12:05 (1)
29 08:19	12:09 (1) 07:21	06:19	06:02	04:56	04:18	05:44	05:59	06:59	07:52	07:51	08:25 (2) 08:50	12:07 (1)
30 08:17	12:11 (1) 07:19	06:17	06:00	04:54	04:16	05:46	05:59	06:59	07:52	07:51	08:26 (2) 08:51	12:09 (1)
31 08:15	12:13 (1) 07:17	06:15	05:58	04:52	04:14	05:48	05:59	06:59	07:52	07:51	08:27 (2) 08:52	12:11 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	234	941
Total, worst case	146	250									22	0.21
Sun reduction	0.24	0.23									0.27	1.00
Oper. time red.	1.00	1.00									0.63	0.60
Wind dir. red.	0.60	0.63									0.17	0.12
Total reduction	0.15	0.15									0.17	0.12
Total, real	21	37									4	117

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AH - H34

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:13 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:04 20:55	06:59 19:42	07:53 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:27 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:12 17:06	08:11 16:14	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:00	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AI - H35

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 18:02 (1)	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 18:02 (1)	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 18:01 (1)	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 18:01 (1)	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 18:00 (1)	05:44 21:03	05:02 21:50	05:02 21:58	05:46 21:18	06:40 20:09	11 08:31 (1)	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 18:00 (1)	05:42 21:05	05:03 21:51	05:03 21:58	05:47 21:16	06:42 20:06	15 08:33 (1)	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 18:00 (1)	05:40 21:06	05:04 21:52	05:04 21:57	05:49 21:14	06:44 20:04	18 08:34 (1)	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 17:57 (1)	05:38 21:08	05:05 21:53	05:05 21:56	05:51 21:12	06:45 20:02	20 08:35 (1)	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 17:55 (1)	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	22 08:36 (1)	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 17:50 (1)	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	23 08:35 (1)	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 18:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	24 08:35 (1)	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 18:20	05:31 21:15	04:56 21:53	05:09 21:53	05:58 21:04	06:52 19:52	22 08:35 (1)	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 18:22	05:29 21:17	04:55 21:52	05:11 21:52	05:59 21:02	06:54 19:49	20 08:35 (1)	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 18:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	17 08:36 (1)	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 18:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	14 08:33 (1)	07:52 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 18:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	11 08:32 (1)	07:54 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 18:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	7 08:30 (1)	07:56 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 18:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	3 08:28 (1)	07:58 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 18:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 18:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 18:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 18:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 18:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:07 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 18:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:09 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	5 07:53 (1) 07:58 (1)	06:19 18:47	06:05 20:45	05:11 21:36	05:27 22:01	06:21 21:37	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	9 08:00 (1) 07:46 (1)	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 19:17	07:17 17:07	08:11 16:15	08:44 16:09
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28	08:20 16:58	07:19 18:00	15 07:43 (1) 08:01 (1)	06:11 18:53	05:59 20:50	05:07 22:01	04:57 21:32	05:32 20:28	06:26 19:12	07:21 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		18 07:09 19:55	07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 17:00	08:16 16:12	08:44 16:12
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31	08:16 17:04		07:04 19:58	07:04 19:58	05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	07:22 16:56		08:19 16:56	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction		59	191							250		
Oper. time red.		0.23	0.27							0.29		
Wind dir. red.		1.00	1.00							1.00		
Total reduction		0.65	0.65							0.65		
Total, real		0.15	0.18							0.19		
		9	34							47		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AJ - H36

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
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17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:07 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:15 16:13	08:44 16:11
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30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:30 20:23	07:24 19:07	08:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AK - H37

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AL - H38

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AM - H39

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AN - H40

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24	16:13	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AO - H41

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AP - H42

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AQ - H43

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	08:17 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:17 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:18	08:18	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AR - H44

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AS - H45
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 07:35 (5)	05:52 20:55
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 07:36 (5)	05:50 20:57
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 07:35 (5)	05:48 20:59
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 07:36 (5)	05:46 21:01
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 07:35 (5)	05:44 21:03
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 07:35 (5)	05:42 21:04
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:11 (5) 07:35 (5)	05:40 21:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:08 (5) 07:34 (5)	05:38 21:08
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:06 (5) 07:34 (5)	05:36 21:10
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:03 (5) 07:32 (5)	05:35 21:12
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:03 (5) 07:32 (5)	05:33 21:13
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	07:04 (5) 07:31 (5)	05:31 21:15
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	07:05 (5) 07:30 (5)	05:29 21:17
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	07:05 (5) 07:27 (5)	05:27 21:18
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	07:07 (5) 07:25 (5)	05:26 21:20
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	07:10 (5) 07:23 (5)	05:24 21:22
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:01
31	08:15 17:04		07:04 19:58	05:54 20:54	05:04 21:44	04:58 22:01
Potential sun hours	250	273	367	420	494	510
Total, worst case			10	339	91	
Sun reduction			0.27	0.35	0.38	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.67	0.67	0.67	
Total reduction			0.18	0.24	0.25	
Total, real			2	81	23	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AS - H45

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	06:09 (4)	06:33	07:02 (5)	07:26	07:24	08:19			
	22:00	21:25	11 06:20 (4)	20:18	29 07:31 (5)	19:05	16:54	16:10			
2	05:00	05:40	06:11 (4)	06:35	07:02 (5)	07:28	07:26	08:21			
	22:00	21:23	10 06:21 (4)	20:16	29 07:31 (5)	19:02	16:52	16:09			
3	05:00	05:42	06:12 (4)	06:37	07:04 (5)	07:30	07:28	08:22			
	21:59	21:21	9 06:21 (4)	20:14	28 07:32 (5)	19:00	16:50	16:09			
4	05:01	05:44	06:14 (4)	06:38	07:05 (5)	07:32	07:30	08:24			
	21:59	21:19	8 06:22 (4)	20:11	26 07:31 (5)	18:57	16:48	16:08			
5	05:02	05:46	06:16 (4)	06:40	07:07 (5)	07:33	07:32	08:25			
	21:58	21:17	6 06:22 (4)	20:09	24 07:31 (5)	18:55	16:46	16:07			
6	05:03	05:47	06:17 (4)	06:42	07:09 (5)	07:35	07:34	08:26			
	21:58	21:16	5 06:22 (4)	20:06	22 07:31 (5)	18:53	16:45	16:07			
7	05:04	05:49	06:19 (4)	06:44	07:10 (5)	07:37	07:36	08:28			
	21:57	21:14	3 06:22 (4)	20:04	20 07:30 (5)	18:50	16:43	16:06			
8	05:05	05:51	06:20 (4)	06:45	07:12 (5)	07:39	07:38	08:29			
	21:56	21:12	1 06:21 (4)	20:01	18 07:30 (5)	18:48	16:41	16:06			
9	05:06	05:52		06:47	07:14 (5)	07:41	07:40	08:30			
	21:55	21:10		19:59	16 07:30 (5)	18:45	16:39	16:06			
10	05:07	05:54		06:49	07:16 (5)	07:43	07:42	08:32			
	21:55	21:08		19:57	13 07:29 (5)	18:43	16:37	16:05			
11	05:08	05:56		06:51	07:17 (5)	07:44	07:44	08:33			
	21:54	21:06		19:54	10 07:27 (5)	18:41	16:36	16:05			
12	05:09	05:58		06:52	07:19 (5)	07:46	07:46	08:34			
	21:53	21:03		19:52	7 07:26 (5)	18:38	16:34	16:05			
13	05:11	05:59		06:54	07:21 (5)	07:48	07:47	08:35			
	21:52	21:01		19:49	4 07:25 (5)	18:36	16:32	16:05			
14	05:12	06:01		06:56		07:50	07:49	08:36			
	21:51	20:59		19:47		18:34	16:31	16:05			
15	05:13	06:03		06:58		07:52	07:51	08:37			
	21:50	20:57		19:44		18:31	16:29	16:05			
16	05:15	06:05		06:59		07:54	07:53	08:38			
	21:49	20:55		19:42		18:29	16:28	16:05			
17	05:16	06:06		07:01		07:56	07:55	08:39			
	21:47	20:53		19:39		18:27	16:26	16:05			
18	05:17	06:08		07:03		07:57	07:57	08:39			
	21:46	20:51		19:37		18:24	16:25	16:05			
19	05:19	06:10		07:05		07:59	07:59	08:40			
	21:45	20:48		19:34		18:22	16:23	16:05			
20	05:20	06:12		07:06		08:01	08:01	08:41			
	21:44	20:46		19:32		18:20	16:22	16:06			
21	05:21	06:13		07:08		08:03	08:02	08:41			
	21:42	20:44		19:29		18:18	16:21	16:06			
22	05:23	06:15		07:10		08:05	08:04	08:42			
	21:41	20:42		19:27		18:15	16:19	16:07			
23	05:24	06:17		07:12		08:07	08:06	08:42			
	21:39	20:39		19:24		18:13	16:18	16:07			
24	05:26	06:19		07:14		08:09	08:08	08:43			
	21:38	20:37		19:22		18:11	16:17	16:08			
25	05:27	06:21		07:15		07:11	08:09	08:43			
	21:36	20:35		19:19		17:09	16:16	16:08			
26	05:29	06:22	07:16 (5)	07:17		07:13	08:11	08:43			
	21:35	20:32	4 07:20 (5)	19:17		17:07	16:15	16:09			
27	05:31	06:24	07:11 (5)	07:19		07:15	08:13	08:44			
	21:33	20:30	14 07:25 (5)	19:15		17:05	16:14	16:10			
28	05:32	06:26	07:09 (5)	07:21		07:17	08:14	08:44			
	21:32	20:28	18 07:27 (5)	19:12		17:02	16:13	16:11			
29	05:34	06:28	07:06 (5)	07:23		07:18	08:16	08:44			
	21:30	20:25	22 07:28 (5)	19:10		17:00	16:12	16:12			
30	05:35	06:29	07:05 (5)	07:24		07:20	08:18	08:44			
	21:28	20:23	25 07:30 (5)	19:07		16:58	16:11	16:13			
31	05:37	06:31	07:04 (5)			07:22		08:44			
	21:27	20:21	27 07:31 (5)			16:56		16:14			
Potential sun hours	512	460		382		328	259	233			
Total, worst case	41	163		246							
Sun reduction	0.32	0.34		0.32							
Oper. time red.	1.00	1.00		1.00							
Wind dir. red.	0.67	0.67		0.67							
Total reduction	0.22	0.23		0.22							
Total, real	9	37		53							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AT - H46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	06:18 (4) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	06:16 (4) 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	06:14 (4) 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	06:12 (4) 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	06:10 (4) 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	06:09 (4) 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	06:10 (4) 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	06:12 (4) 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	07:22 (5) 20:15	05:36 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	07:19 (5) 20:17	05:35 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	07:17 (5) 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	07:14 (5) 20:20	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	07:12 (5) 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	07:09 (5) 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	07:07 (5) 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	07:04 (5) 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	07:02 (5) 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:59 (5) 20:32	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:57 (5) 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:54 (5) 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:52 (5) 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:49 (5) 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:48 (5) 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:49 (5) 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:49 (5) 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:50 (5) 20:46	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:50 (5) 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	06:52 (5) 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	07:53 (5) 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	07:55 (5) 20:54	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	07:58 (5) 20:54	05:04 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			558	41	119	16
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.66	0.68	0.68	0.66
Total reduction			0.18	0.24	0.26	0.21
Total, real			101	10	31	3

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AT - H46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (5) 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (5) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:56 (5) 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:24 (4) 20:11	07:32 18:57	07:58 (5) 16:48	08:24 16:08
5	05:02 21:58	05:46 21:17	06:22 (4) 20:09	07:33 18:55	07:59 (5) 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:19 (4) 20:06	07:35 18:53	08:01 (5) 16:45	08:26 16:07
7	05:04 21:57	05:49 21:14	06:19 (4) 20:04	07:37 18:50	08:02 (5) 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:20 (4) 20:01	07:39 18:48	08:03 (5) 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:22 (4) 19:59	07:41 18:45	08:04 (5) 16:39	08:30 16:06
10	05:07 21:55	05:54 21:08	06:24 (4) 19:57	07:43 18:43	08:05 (5) 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:25 (4) 19:54	07:44 18:41	08:06 (5) 16:36	08:33 16:05
12	05:09 21:53	05:58 21:03	06:27 (4) 19:52	07:46 18:38	08:07 (5) 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	06:28 (4) 19:49	07:47 (5) 18:36	08:08 (5) 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:30 (4) 19:47	07:43 (5) 18:34	08:09 (5) 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	06:32 (4) 19:44	07:41 (5) 18:31	08:10 (5) 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	06:33 (4) 19:42	07:40 (5) 18:29	08:11 (5) 16:28	08:38 16:05
17	05:16 21:47	06:06 20:53	06:35 (4) 19:39	07:39 (5) 18:27	08:12 (5) 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	06:37 (4) 19:37	07:37 (5) 18:24	08:13 (5) 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:36 (5) 18:22	08:14 (5) 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	07:35 (5) 18:20	08:15 (5) 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	07:35 (5) 18:18	08:16 (5) 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	07:36 (5) 18:15	08:17 (5) 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	07:38 (5) 18:13	08:18 (5) 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	07:40 (5) 18:11	08:19 (5) 16:17	08:43 16:08
25	05:27 21:36	06:21 20:35	07:15 19:19	07:42 (5) 18:09	08:20 (5) 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:43 (5) 18:07	08:21 (5) 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:45 (5) 18:04	08:22 (5) 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:47 (5) 18:02	08:23 (5) 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:49 (5) 18:00	08:24 (5) 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:51 (5) 17:58	08:25 (5) 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case		166	530	35		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.68	0.66	0.66		
Total reduction		0.23	0.21	0.19		
Total, real		38	113	7		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AU - H47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 21:03	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:11 (5) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:10 (5) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:08 (5) 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:06 (5) 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:04 (5) 21:13	04:56 21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	07:02 (5) 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	07:00 (5) 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	06:58 (5) 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	06:56 (5) 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	06:54 (5) 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	06:52 (5) 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	06:50 (5) 21:25	04:54 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	06:48 (5) 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	06:46 (5) 21:28	04:55 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	06:44 (5) 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	06:42 (5) 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	06:40 (5) 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	06:38 (5) 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	06:36 (5) 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	06:34 (5) 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	06:32 (5) 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	06:30 (5) 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	05:56 20:52	06:28 (5) 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	05:54 20:54	06:26 (5) 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	05:52 20:56	06:24 (5) 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			25	113	142	141
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.65	0.65
Total reduction			0.18	0.24	0.25	0.21
Total, real			5	27	35	29

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AU - H47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 3	05:45 (3) 05:48 (3) 21:25	05:39 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00 6	05:44 (3) 05:50 (3) 21:23	05:40 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	05:00 21:59 9	05:42 (3) 05:51 (3) 21:21	05:42 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	05:01 21:59 10	05:42 (3) 05:52 (3) 21:19	05:44 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58 12	05:41 (3) 05:53 (3) 21:17	05:46 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58 13	05:41 (3) 05:54 (3) 21:16	05:47 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57 15	05:40 (3) 05:55 (3) 21:14	05:49 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56 16	05:40 (3) 05:56 (3) 21:12	05:51 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55 17	05:40 (3) 05:57 (3) 21:10	05:52 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55 17	05:40 (3) 05:57 (3) 21:08	05:54 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54 17	05:41 (3) 05:58 (3) 21:06	05:56 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	05:10 21:53 16	05:42 (3) 05:58 (3) 21:04	05:58 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52 16	05:43 (3) 05:59 (3) 21:01	05:59 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51 15	05:44 (3) 05:59 (3) 20:59	06:01 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	05:13 21:50 15	05:45 (3) 06:00 (3) 20:57	06:03 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	05:15 21:49 14	05:47 (3) 06:01 (3) 20:55	06:05 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	05:16 21:47 13	05:48 (3) 06:01 (3) 20:53	06:06 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46 12	05:49 (3) 06:01 (3) 20:51	06:08 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45 11	05:51 (3) 06:02 (3) 20:48	06:10 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44 10	05:52 (3) 06:02 (3) 20:46	06:12 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42 9	05:53 (3) 06:02 (3) 20:44	06:14 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41 7	05:55 (3) 06:02 (3) 20:42	06:15 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39 6	05:56 (3) 06:02 (3) 20:39	06:17 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38 5	05:57 (3) 06:02 (3) 20:37	06:19 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:36 3	05:59 (3) 06:02 (3) 20:35	06:21 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35 1	06:00 (3) 06:01 (3) 20:33	06:22 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	288		139			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.65		0.68			
Total reduction	0.21		0.22			
Total, real	61		30			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AV - H48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:16 (5) 21:03	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:18 (5) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:21 (5) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:28 (5) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	1 05:54 (3) 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	3 05:55 (3) 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	5 05:56 (3) 21:25	04:54 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	6 05:55 (3) 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	8 05:56 (3) 21:28	04:55 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	9 05:55 (3) 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	10 05:54 (3) 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	11 05:55 (3) 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	12 05:54 (3) 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	13 05:54 (3) 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	14 05:53 (3) 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	15 05:54 (3) 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	15 05:53 (3) 21:40	04:57 22:01
29	08:19 17:00	07:09 19:55	07:09 19:55	05:56 20:52	16 05:53 (3) 21:41	04:58 22:01
30	08:17 17:02	07:06 19:56	07:06 19:56	05:54 20:54	16 05:52 (3) 21:43	04:58 22:01
31	08:15 17:04	07:04 19:58	07:04 19:58	05:54 20:54	14 05:51 (3) 21:44	04:58 22:01
Potential sun hours	250	273	367	420	494	510
Total, worst case			27	94	181	25
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.66	0.66
Total reduction			0.18	0.24	0.25	0.21
Total, real			5	22	45	5

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AV - H48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:37	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		08:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	208		123			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	44		27			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
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Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AW - H49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	18:44 (4)	05:52
	16:15	17:06	18:02	20:00	40	19:31 (3)
2	08:44	08:12	07:14	06:59	18:46 (4)	05:50
	16:16	17:08	18:04	20:02	32	19:29 (3)
3	08:43	08:10	07:11	06:56	19:12 (3)	05:48
	16:17	17:10	18:06	20:04	15	19:27 (3)
4	08:43	08:08	07:09	06:54	19:14 (3)	05:46
	16:18	17:12	18:07	20:06	11	19:25 (3)
5	08:43	08:07	07:07	06:51	05:44	20:28 (2)
	16:19	17:14	18:09	20:07	4	20:32 (2)
6	08:42	08:05	07:04	06:49	05:42	20:26 (2)
	16:21	17:16	18:11	20:09	7	20:33 (2)
7	08:42	08:03	07:02	06:47	05:40	20:26 (2)
	16:22	17:18	18:13	20:11	10	20:36 (2)
8	08:42	08:01	16:46 (5)	07:00	06:44	20:25 (2)
	16:24	17:20	4	16:50 (5)	18:15	20:37 (2)
9	08:41	07:59	16:45 (5)	06:57	06:42	20:24 (2)
	16:25	17:22	7	16:52 (5)	18:17	20:39 (2)
10	08:40	07:57	16:44 (5)	06:55	06:39	20:23 (2)
	16:26	17:24	10	16:54 (5)	18:19	20:40 (2)
11	08:40	07:55	16:44 (5)	06:52	17:51 (4)	06:37
	16:28	17:26	12	16:56 (5)	18:21	4
12	08:39	07:53	16:42 (5)	06:50	17:48 (4)	06:35
	16:30	17:28	16	16:58 (5)	18:23	8
13	08:38	07:51	16:42 (5)	06:48	17:46 (4)	06:32
	16:31	17:30	18	17:00 (5)	18:25	12
14	08:37	07:49	16:42 (5)	06:45	17:44 (4)	06:30
	16:33	17:32	20	17:02 (5)	18:27	16
15	08:36	07:47	16:42 (5)	06:43	17:43 (4)	06:28
	16:34	17:34	23	17:05 (5)	18:28	19
16	08:35	07:45	16:42 (5)	06:40	17:41 (4)	06:25
	16:36	17:36	24	17:06 (5)	18:30	23
17	08:34	07:43	16:43 (5)	06:38	17:40 (4)	06:23
	16:38	17:38	23	17:06 (5)	18:32	26
18	08:33	07:41	16:43 (5)	06:35	17:39 (4)	06:21
	16:40	17:40	22	17:05 (5)	18:34	28
19	08:32	07:39	16:44 (5)	06:33	17:39 (4)	06:18
	16:41	17:42	20	17:04 (5)	18:36	31
20	08:31	07:36	16:45 (5)	06:31	17:38 (4)	06:16
	16:43	17:44	19	17:04 (5)	18:38	33
21	08:30	07:34	16:46 (5)	06:28	17:38 (4)	06:14
	16:45	17:46	17	17:03 (5)	18:40	35
22	08:28	07:32	16:48 (5)	06:26	17:37 (4)	06:12
	16:47	17:48	12	17:00 (5)	18:41	38
23	08:27	07:30	16:52 (5)	06:23	17:37 (4)	06:09
	16:49	17:50	4	16:56 (5)	18:43	40
24	08:26	07:28	06:21	18:45	41	18:18 (3)
	16:50	17:52	18:45	41	18:18 (3)	20:42
25	08:24	07:25	06:18	17:37 (4)	06:05	05:11
	16:52	17:54	18:47	44	18:21 (3)	20:44
26	08:23	07:23	06:16	17:37 (4)	06:03	05:09
	16:54	17:56	18:49	45	18:22 (3)	20:46
27	08:22	07:21	06:13	17:38 (4)	06:01	05:08
	16:56	17:58	18:51	46	18:24 (3)	20:48
28	08:20	07:18	06:11	17:39 (4)	05:58	05:07
	16:58	18:00	18:53	47	18:26 (3)	20:50
29	08:18		07:08	18:39 (4)	05:56	05:06
	17:00		19:54	49	19:28 (3)	20:52
30	08:17		07:06	18:41 (4)	05:54	05:05
	17:02		19:56	46	19:30 (3)	20:53
31	08:15		07:04	18:42 (4)		05:04
	17:04		19:58	45	19:31 (3)	21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case		251	676	98	580	55
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.67	0.67	0.64	0.64
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		39	124	23	141	11

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AW - H49

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July			August			September			October			November			December		
1	04:59			05:39		20:32 (2)	06:33			07:26		18:26 (4)	07:24		16:14 (5)	08:19		
	22:00			21:25	21	20:53 (2)	20:18			19:05	10	18:36 (4)	16:54	9	16:23 (5)	16:10		
2	04:59			05:40		20:33 (2)	06:35			07:28		18:28 (4)	07:26		16:15 (5)	08:21		
	22:00			21:23	19	20:52 (2)	20:16			19:02	5	18:33 (4)	16:52	6	16:21 (5)	16:09		
3	05:00			05:42		20:33 (2)	06:36			07:30			07:28		16:16 (5)	08:22		
	21:59			21:21	17	20:50 (2)	20:13			19:00			16:50	3	16:19 (5)	16:08		
4	05:01			05:44		20:34 (2)	06:38			07:31			07:30			08:24		
	21:59			21:19	14	20:48 (2)	20:11			18:57			16:48			16:08		
5	05:02			05:45		20:34 (2)	06:40			07:33			07:32			08:25		
	21:58			21:17	12	20:46 (2)	20:09			18:55			16:46			16:07		
6	05:03			05:47		20:36 (2)	06:42			07:35			07:34			08:26		
	21:58			21:15	9	20:45 (2)	20:06			18:52			16:44			16:07		
7	05:04			05:49		20:37 (2)	06:43			07:37			07:36			08:28		
	21:57			21:13	6	20:43 (2)	20:04			18:50			16:43			16:06		
8	05:05		20:42 (2)	05:50		20:38 (2)	06:45		19:09 (3)	07:39			07:38			08:29		
	21:56	7	20:49 (2)	21:11	3	20:41 (2)	20:01	10	19:19 (3)	18:48			16:41			16:06		
9	05:06		20:40 (2)	05:52			06:47		19:06 (3)	07:41			07:40			08:30		
	21:55	11	20:51 (2)	21:09			19:59	15	19:21 (3)	18:45			16:39			16:05		
10	05:07		20:39 (2)	05:54			06:49		18:40 (4)	07:42			07:42			08:31		
	21:55	13	20:52 (2)	21:07			19:56	29	19:22 (3)	18:43			16:37			16:05		
11	05:08		20:38 (2)	05:56			06:50		18:37 (4)	07:44			07:44			08:33		
	21:54	15	20:53 (2)	21:05			19:54	38	19:23 (3)	18:40			16:35			16:05		
12	05:09		20:37 (2)	05:57			06:52		18:34 (4)	07:46			07:45			08:34		
	21:53	17	20:54 (2)	21:03			19:51	45	19:24 (3)	18:38			16:34			16:05		
13	05:10		20:37 (2)	05:59			06:54		18:32 (4)	07:48			07:47			08:35		
	21:52	18	20:55 (2)	21:01			19:49	48	19:22 (3)	18:36			16:32			16:05		
14	05:12		20:36 (2)	06:01			06:56		18:30 (4)	07:50			07:49			08:36		
	21:51	20	20:56 (2)	20:59			19:47	47	19:18 (3)	18:33			16:31			16:04		
15	05:13		20:35 (2)	06:03			06:58		18:28 (4)	07:52			07:51			08:37		
	21:50	21	20:56 (2)	20:57			19:44	48	19:16 (3)	18:31			16:29			16:05		
16	05:14		20:34 (2)	06:04			06:59		18:27 (4)	07:54			07:53			08:38		
	21:49	23	20:57 (2)	20:55			19:42	47	19:14 (3)	18:29			16:27			16:05		
17	05:16		20:35 (2)	06:06			07:01		18:25 (4)	07:55			07:55			08:38		
	21:47	23	20:58 (2)	20:53			19:39	46	19:11 (3)	18:26			16:26			16:05		
18	05:17		20:34 (2)	06:08			07:03		18:25 (4)	07:57			07:57			08:39		
	21:46	24	20:58 (2)	20:50			19:37	43	19:08 (3)	18:24			16:24			16:05		
19	05:18		20:33 (2)	06:10			07:05		18:24 (4)	07:59		17:21 (5)	07:59			08:40		
	21:45	26	20:59 (2)	20:48			19:34	42	19:06 (3)	18:22	8	17:29 (5)	16:23			16:05		
20	05:20		20:33 (2)	06:12			07:06		18:24 (4)	08:01		17:18 (5)	08:00			08:41		
	21:44	27	21:00 (2)	20:46			19:32	40	19:04 (3)	18:20	14	17:32 (5)	16:22			16:06		
21	05:21		20:33 (2)	06:13			07:08		18:22 (4)	08:03		17:16 (5)	08:02			08:41		
	21:42	27	21:00 (2)	20:44			19:29	38	19:00 (4)	18:17	17	17:33 (5)	16:20			16:06		
22	05:23		20:32 (2)	06:15			07:10		18:22 (4)	08:05		17:15 (5)	08:04			08:42		
	21:41	28	21:00 (2)	20:42			19:27	36	18:58 (4)	18:15	19	17:34 (5)	16:19			16:06		
23	05:24		20:33 (2)	06:17			07:12		18:22 (4)	08:07		17:14 (5)	08:06			08:42		
	21:39	28	21:01 (2)	20:39			19:24	34	18:56 (4)	18:13	21	17:35 (5)	16:18			16:07		
24	05:26		20:32 (2)	06:19			07:13		18:22 (4)	08:09		17:13 (5)	08:08			08:43		
	21:38	29	21:01 (2)	20:37			19:22	32	18:54 (4)	18:11	23	17:36 (5)	16:17			16:08		
25	05:27		20:32 (2)	06:20			07:15		18:22 (4)	07:11		16:12 (5)	08:09			08:43		
	21:36	30	21:02 (2)	20:35			19:19	29	18:51 (4)	17:09	24	16:36 (5)	16:16			16:08		
26	05:29		20:32 (2)	06:22			07:17		18:22 (4)	07:13		16:12 (5)	08:11			08:43		
	21:35	29	21:01 (2)	20:32			19:17	26	18:48 (4)	17:06	24	16:36 (5)	16:14			16:09		
27	05:30		20:31 (2)	06:24			07:19		18:22 (4)	07:14		16:12 (5)	08:13			08:44		
	21:33	29	21:00 (2)	20:30			19:14	24	18:46 (4)	17:04	22	16:34 (5)	16:13			16:10		
28	05:32		20:32 (2)	06:26			07:21		18:23 (4)	07:16		16:12 (5)	08:14			08:44		
	21:32	27	20:59 (2)	20:28			19:12	21	18:44 (4)	17:02	19	16:31 (5)	16:12			16:11		
29	05:34		20:31 (2)	06:27			07:22		18:24 (4)	07:18		16:12 (5)	08:16			08:44		
	21:30	26	20:57 (2)	20:25			19:09	17	18:41 (4)	17:00	17	16:29 (5)	16:12			16:11		
30	05:35		20:32 (2)	06:29			07:24		18:24 (4)	07:20		16:12 (5)	08:18			08:44		
	21:28	24	20:56 (2)	20:23			19:07	14	18:38 (4)	16:58	15	16:27 (5)	16:11			16:12		
31	05:37		20:33 (2)	06:31						07:22		16:12 (5)				08:44		
	21:26	22	20:55 (2)	20:21						16:56	13	16:25 (5)				16:13		
Potential sun hours	512			460				382			328			259		233		
Total, worst case		544			101			769			251			18				
Sun reduction		0.32			0.34			0.32			0.29			0.27				
Oper. time red.		1.00			1.00			1.00			1.00			1.00				
Wind dir. red.		0.64			0.64			0.67			0.66			0.66				
Total reduction		0.21			0.22			0.22			0.19			0.18				
Total, real		112			22			166			49			3				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AX - H50

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	12:51 (2) 13:46 (2)	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	15:58 (1) 16:23 (1)	08:19 16:10	12:40 (2) 13:30 (2)
2	08:44 16:16	12:52 (2) 13:47 (2)	08:12 17:08	16:35 (1) 16:37 (1)	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 16:52	15:58 (1) 16:21 (1)	08:21 16:09	12:39 (2) 13:30 (2)
3	08:44 16:17	12:52 (2) 13:46 (2)	08:10 17:10	16:33 (1) 16:39 (1)	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 16:50	15:58 (1) 16:19 (1)	08:22 16:08	12:40 (2) 13:31 (2)
4	08:43 16:18	12:53 (2) 13:47 (2)	08:08 17:12	16:32 (1) 16:41 (1)	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	15:59 (1) 16:17 (1)	08:24 16:08	12:40 (2) 13:32 (2)
5	08:43 16:19	12:53 (2) 13:47 (2)	08:07 17:14	16:30 (1) 16:43 (1)	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	15:59 (1) 16:14 (1)	08:25 16:07	12:40 (2) 13:33 (2)
6	08:43 16:21	12:54 (2) 13:48 (2)	08:05 17:16	16:30 (1) 16:45 (1)	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	16:00 (1) 16:12 (1)	08:26 16:07	12:40 (2) 13:34 (2)
7	08:42 16:22	12:55 (2) 13:47 (2)	08:03 17:18	16:29 (1) 16:47 (1)	07:02 18:13	06:47 18:13	05:40 20:11	04:58 21:06	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	16:01 (1) 16:10 (1)	08:28 16:06	12:40 (2) 13:34 (2)
8	08:42 16:24	12:55 (2) 13:47 (2)	08:01 17:20	16:28 (1) 16:50 (1)	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	16:03 (1) 16:08 (1)	08:29 16:06	12:40 (2) 13:34 (2)
9	08:41 16:25	12:57 (2) 13:48 (2)	07:59 17:22	16:28 (1) 16:52 (1)	06:57 18:17	06:42 20:15	05:36 21:10	04:53 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	16:06 (1) 16:07 (1)	08:30 16:05	12:41 (2) 13:36 (2)
10	08:40 16:26	12:57 (2) 13:48 (2)	07:57 17:24	16:28 (1) 16:54 (1)	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	16:07 (1) 16:05	16:05 16:05	12:41 (2) 13:36 (2)
11	08:40 16:28	12:58 (2) 13:48 (2)	07:55 17:26	16:28 (1) 16:54 (1)	06:53 18:21	06:37 20:19	05:33 21:13	04:55 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	16:05 16:05	16:05 16:05	12:41 (2) 13:36 (2)
12	08:39 16:30	12:59 (2) 13:48 (2)	07:53 17:28	16:28 (1) 16:55 (1)	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:52	07:46 18:38	16:05 16:05	16:05 16:05	12:41 (2) 13:37 (2)
13	08:38 16:31	13:00 (2) 13:48 (2)	07:51 17:30	16:27 (1) 16:54 (1)	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	16:05 16:05	16:05 16:05	12:42 (2) 13:38 (2)
14	08:37 16:33	13:01 (2) 13:47 (2)	07:49 17:32	16:28 (1) 16:54 (1)	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	16:06 16:06	16:06 16:06	12:42 (2) 13:39 (2)
15	08:36 16:34	13:02 (2) 13:47 (2)	07:47 17:34	16:29 (1) 16:53 (1)	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	16:06 16:06	16:06 16:06	12:42 (2) 13:38 (2)
16	08:35 16:36	13:03 (2) 13:47 (2)	07:45 17:36	16:29 (1) 16:53 (1)	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	16:06 16:06	16:06 16:06	12:42 (2) 13:39 (2)
17	08:34 16:38	13:04 (2) 13:46 (2)	07:43 17:38	16:31 (1) 16:52 (1)	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:26	16:07 16:07	16:07 16:07	12:43 (2) 13:40 (2)
18	08:33 16:40	13:05 (2) 13:45 (2)	07:41 17:40	16:31 (1) 16:50 (1)	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	16:07 16:07	16:07 16:07	12:44 (2) 13:40 (2)
19	08:32 16:41	13:07 (2) 13:45 (2)	07:39 17:42	16:33 (1) 16:49 (1)	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	16:07 16:07	16:07 16:07	12:44 (2) 13:41 (2)
20	08:31 16:43	13:08 (2) 13:43 (2)	07:37 17:44	16:36 (1) 16:47 (1)	06:37 18:38	06:19 20:35	21:28	22:00	05:20 21:46	06:12 20:46	07:06 19:32	07:59 18:20	16:07 16:07	16:07 16:07	12:44 (2) 13:41 (2)
21	08:30 16:45	13:10 (2) 13:43 (2)	07:34 17:46	16:38 (1) 16:49 (1)	07:34 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:09 (1) 17:14 (1)	08:02 16:20	12:45 (2) 13:42 (2)
22	08:29 16:47	13:12 (2) 13:41 (2)	07:32 17:48	16:39 (1) 16:48 (1)	07:32 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:05 (1) 17:18 (1)	08:04 16:19	12:45 (2) 13:42 (2)
23	08:27 16:49	13:15 (2) 13:39 (2)	07:30 17:50	16:23 (1) 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 20:39	08:07 19:24	08:07 18:13	17:03 (1) 17:20 (1)	08:06 16:18	12:46 (2) 13:43 (2)
24	08:26 16:50	13:18 (2) 13:37 (2)	07:28 17:52	16:21 (1) 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:09 17:21 (1)	17:01 (1) 17:21 (1)	08:08 16:17	12:46 (2) 13:43 (2)
25	08:25 16:52	13:24 (2) 13:33 (2)	07:25 17:54	16:18 (1) 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	16:00 (1) 16:22 (1)	08:09 16:16	12:42 (2) 16:16	12:46 (2) 13:43 (2)
26	08:23 16:54	13:23 (2) 13:54 (2)	07:23 17:56	16:16 (1) 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	15:59 (1) 16:22 (1)	16:11 (1) 16:14 (1)	08:11 16:13	12:48 (2) 13:44 (2)
27	08:22 16:56	13:21 (2) 13:51 (2)	07:21 17:58	16:13 (1) 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:04 19:14	07:03 17:04	15:58 (1) 16:23 (1)	08:13 16:13	12:48 (2) 16:10	12:48 (2) 13:45 (2)
28	08:20 16:58	13:19 (2) 18:00	07:19 18:00	16:11 (1) 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	15:57 (1) 16:23 (1)	08:14 16:12	12:49 (2) 16:11	12:49 (2) 13:45 (2)
29	08:19 17:00	13:17 (2) 13:55 (2)	07:17 17:50	16:09 (1) 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	15:57 (1) 16:23 (1)	08:16 16:12	12:40 (2) 16:11	12:49 (2) 13:45 (2)
30	08:17 17:02	13:15 (2) 13:53 (2)	07:15 17:48	16:07 (1) 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	15:57 (1) 16:23 (1)	08:18 16:11	12:40 (2) 16:11	12:50 (2) 13:46 (2)
31	08:15 17:04	13:13 (2) 13:51 (2)	07:13 17:46	16:05 (1) 19:58	05:52 20:50	05:04 21:44	04:59 22:01	05:37 21:27	06:31 20:21	07:22 16:56	07:22 16:24 (1)	15:58 (1) 16:24 (1)	08:11 16:11	12:40 (2) 16:11	12:50 (2) 13:45 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233			
Total, worst case	1083	356													
Sun reduction	0.24	0.23													
Oper. time red.	1.00	1.00													
Wind dir. red.	0.63	0.65													
Total reduction	0.15	0.15													
Total, real	166	54													

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AY - H51

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February	March	April	May	June	July	August	September	October	November	December		
1	08:44		08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	08:54 (2)	
	16:15		17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	11 09:05 (2)	
2	08:44		08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	08:56 (2)	
	16:16		17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	10 09:06 (2)	
3	08:44		08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	08:57 (2)	
	16:17		17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08	8 09:05 (2)	
4	08:43		09:17 (2)	08:09	07:09	06:54	05:46	05:00	05:44	06:38	07:32	07:30	08:24	08:59 (2)	
	16:18	1	09:18 (2)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08	7 09:06 (2)	
5	08:43		09:16 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	09:00 (2)
	16:20	2	09:18 (2)	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07	5 09:05 (2)
6	08:43		09:16 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	09:02 (2)
	16:21	4	09:20 (2)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	16:07	4 09:06 (2)
7	08:42		09:15 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28	09:03 (2)
	16:22	5	09:20 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	2 09:05 (2)
8	08:42		09:14 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	09:05 (2)
	16:24	7	09:21 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	1 09:06 (2)
9	08:41		09:14 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	
	16:25	8	09:22 (2)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	
10	08:41		09:13 (2)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32	
	16:27	10	09:23 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05	
11	08:40		09:12 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	
	16:28	11	09:23 (2)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05	
12	08:39		09:11 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	08:46 (2)
	16:30	13	09:24 (2)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	5 08:51 (2)	16:05
13	08:38		09:10 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:43 (2)	08:35
	16:31	14	09:24 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	11 08:54 (2)	16:05
14	08:37		09:09 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:41 (2)	08:36
	16:33	16	09:25 (2)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	15 08:56 (2)	16:05
15	08:37		09:08 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:40 (2)	08:37
	16:34	18	09:26 (2)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	18 08:58 (2)	16:05
16	08:36		09:07 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:39 (2)	08:38
	16:36	19	09:26 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	20 08:59 (2)	16:05
17	08:35		09:05 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:38 (2)	08:39
	16:38	21	09:26 (2)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	22 09:00 (2)	16:05
18	08:33		09:04 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:38 (2)	08:39
	16:40	23	09:27 (2)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	22 09:00 (2)	16:05
19	08:32		09:03 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:37 (2)	08:40
	16:41	24	09:27 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	24 09:01 (2)	16:05
20	08:31		09:01 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:37 (2)	08:41
	16:43	26	09:27 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	25 09:02 (2)	16:06
21	08:30		09:02 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:37 (2)	08:41
	16:45	25	09:27 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	25 09:02 (2)	16:06
22	08:29		09:03 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:37 (2)	08:42
	16:47	25	09:28 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	26 09:03 (2)	16:07
23	08:27		09:03 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:39 (2)	08:42
	16:49	24	09:27 (2)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	24 09:03 (2)	16:07
24	08:26		09:04 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:41 (2)	08:43
	16:51	22	09:26 (2)	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	23 09:04 (2)	16:08
25	08:25		09:05 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09	08:43 (2)	08:43
	16:52	22	09:27 (2)	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	21 09:04 (2)	16:08
26	08:23		09:06 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:45 (2)	08:44
	16:54	20	09:26 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	19 09:04 (2)	16:09
27	08:22		09:08 (2)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13	08:47 (2)	08:44
	16:56	18	09:26 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	16:14	18 09:05 (2)	16:10
28	08:20		09:09 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:15	08:49 (2)	08:44
	16:58	15	09:24 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16 09:05 (2)	16:11
29	08:19		09:11 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16	08:51 (2)	08:44
	17:00	11	09:22 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	15 09:06 (2)	16:11
30	08:17		09:14 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	08:52 (2)	08:44
	17:02	4	09:18 (2)		19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	13 09:05 (2)	16:12
31	08:15				07:04		05:04		05:37	06:31		07:22			08:44
	17:04				19:58		21:44		21:27	20:21		16:56			16:13
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	362	233	
Total, worst case	408												48		
Sun reduction	0.24												0.27		0.21
Oper. time red.	1.00												1.00		1.00
Wind dir. red.	0.61												0.61		0.61
Total reduction	0.15												0.16		0.13
Total, real	60											58			6

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AZ - H52

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		09:18 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24				06:33	07:26	07:24				08:19	08:59 (2)	
	16:15	20	09:38 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54				20:18	19:05	16:54				16:10	25	09:24 (2)
2	08:44		09:18 (2)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26				06:35	07:28	07:26				08:21	25	09:00 (2)
	16:16	21	09:39 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				20:16	19:02	16:52				16:09	25	09:25 (2)
3	08:44		09:17 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28				06:36	07:30	07:28				08:22		08:59 (2)
	16:17	21	09:38 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50				20:14	19:00	16:50				16:08	26	09:25 (2)
4	08:43		09:17 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30				06:38	07:32	07:30				08:24		09:00 (2)
	16:18	22	09:39 (2)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48				20:11	18:57	16:48				16:08	26	09:26 (2)
5	08:43		09:16 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32				06:40	07:33	07:32				08:25		09:00 (2)
	16:20	23	09:39 (2)	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46				20:09	18:55	16:46				16:07	25	09:25 (2)
6	08:43		09:16 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34				06:42	07:35	07:34				08:27		09:02 (2)
	16:21	24	09:40 (2)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44				20:06	18:53	16:44				16:07	24	09:26 (2)
7	08:42		09:15 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36				06:44	07:37	07:36				08:28		09:03 (2)
	16:22	25	09:40 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				20:04	18:50	16:43				16:06	23	09:26 (2)
8	08:42		09:16 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38				06:45	07:39	07:38				08:29		09:05 (2)
	16:24	25	09:41 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41				20:01	18:48	16:41				16:06	22	09:27 (2)
9	08:41		09:16 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				06:47	07:41	07:40				08:30		09:06 (2)
	16:25	26	09:42 (2)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39				21:10	19:59	18:45				16:05	22	09:28 (2)
10	08:41		09:16 (2)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42				06:49	07:43	07:42				08:32		09:07 (2)
	16:27	26	09:42 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37				21:08	19:57	18:43				16:05	21	09:28 (2)
11	08:40		09:17 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44				06:51	07:44	07:44				08:33		09:08 (2)
	16:28	25	09:42 (2)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36				21:06	19:54	18:41				16:05	20	09:28 (2)
12	08:39		09:17 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46				06:52	07:46	07:46				08:34		09:10 (2)
	16:30	25	09:42 (2)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34				21:04	19:52	18:38				16:05	19	09:29 (2)
13	08:38		09:18 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48				06:54	07:48	07:48				08:35		09:11 (2)
	16:31	24	09:42 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32				21:01	19:49	18:36				16:05	18	09:29 (2)
14	08:37		09:19 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				06:01	06:56	07:50				08:36		09:12 (2)
	16:33	23	09:42 (2)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31				20:59	19:47	18:33				16:05	18	09:30 (2)
15	08:37		09:20 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51				06:03	06:58	07:52				08:37		09:13 (2)
	16:34	22	09:42 (2)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				20:57	19:44	18:31				16:05	17	09:30 (2)
16	08:36		09:21 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53				06:05	06:59	07:54				08:38		09:13 (2)
	16:36	21	09:42 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28				20:55	19:42	18:29				16:05	17	09:30 (2)
17	08:35		09:21 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55				06:06	07:01	07:56				08:39		09:14 (2)
	16:38	20	09:41 (2)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26				20:53	19:39	18:27				16:05	16	09:30 (2)
18	08:33		09:22 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				06:08	07:03	07:57				08:39		09:15 (2)
	16:40	19	09:41 (2)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25				20:51	19:37	18:24				16:05	16	09:31 (2)
19	08:32		09:24 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				06:10	07:05	07:59				08:40		09:16 (2)
	16:41	17	09:41 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23				20:48	19:34	18:22				16:05	16	09:32 (2)
20	08:31		09:25 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01				06:12	07:06	08:01			09:04 (2)	08:41		09:16 (2)
	16:43	14	09:39 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22				20:46	19:32	18:20			09:11 (2)	16:06	15	09:31 (2)
21	08:30		09:27 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				06:13	07:08	08:03			09:02 (2)	08:42		09:17 (2)
	16:45	11	09:38 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20				20:44	19:29	18:17			09:13 (2)	16:06	15	09:32 (2)
22	08:29		09:30 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04				06:15	07:10	08:05			09:01 (2)	08:42		09:17 (2)
	16:47	7	09:37 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19				20:42	19:27	18:15			09:15 (2)	16:06	15	09:32 (2)
23	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				06:17	07:12	08:07			09:00 (2)	08:42		09:18 (2)
	16:49			17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18				20:39	19:24	18:13			09:17 (2)	16:07	15	09:33 (2)
24	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08				06:19	07:14	08:09			08:59 (2)	08:43		09:18 (2)
	16:51			17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17				20:37	19:22	18:11			09:18 (2)	16:08	16	09:34 (2)
25	08:25			07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09				06:20	07:15	07:11			08:59 (2)	08:43		09:18 (2)
	16:52			17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16				20:35	19:19	17:09			09:19 (2)	16:16	20	09:34 (2)
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11				06:22	07:17	07:13			08:59 (2)	08:44		09:19 (2)
	16:54			17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15				20:33	19:17	17:07			09:20 (2)	16:09	16	09:35 (2)
27	08:22			07:21	06:14	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13				06:24	07:19	07:15			08:59 (2)	08:44		09:19 (2)
	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:14				20:30	19:14	17:04			09:21 (2)	16:10	16	09:35 (2)
28	08:20			07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:15				06:26	07:21	07:17			08:59 (2)	08:		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BA - H53

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:18 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BB - H54

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	08:11 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	6 08:17 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
3	08:44	08:10	07:12		06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48
5	08:43	08:07	07:07		06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
	16:20	17:14	18:10		20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46
6	08:43	08:05	07:05		06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12		20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45
7	08:42	08:03	07:02		06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13		20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43
8	08:42	08:01	07:00		06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41
9	08:41	07:59	06:58		06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
	16:25	17:22	18:17		20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39
10	08:41	07:57	06:55		06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24	18:19		20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37
11	08:40	07:55	06:53		06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
	16:28	17:26	18:21		20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36
12	08:39	07:53	06:50		06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34
	16:30	17:28	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34
13	08:38	07:51	06:48		06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
	16:31	17:30	18:25		20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29
16	08:36	07:45	06:41		06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40
	16:41	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17
25	08:25	07:26	06:19		06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:43
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	18:09	16:16
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:44
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:15
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:44
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	18:05	16:14
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:44
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:13
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	18:58	16:11
31	08:15		07:04			05:04		05:37	06:31		07:22	08:44
	17:04		19:58			21:44		21:27	20:21		18:56	16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328	259
Total, worst case		320		6							328	233
Sun reduction		0.23		0.27							0.29	
Oper. time red.		1.00		1.00							1.00	
Wind dir. red.		0.64		0.64							0.64	
Total reduction		0.15		0.17							0.19	
Total, real		47		1							61	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BC - H55

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	09:20 (3)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19	09:11 (3)
	16:15	11:17 (1)	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10	11:00 (1)
2	08:44	09:21 (3)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21	09:11 (3)
	16:16	11:17 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09	11:01 (1)
3	08:44	09:21 (3)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22	09:10 (3)
	16:17	11:17 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:08	11:01 (1)
4	08:43	09:22 (3)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24	09:10 (3)
	16:18	11:18 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08	11:02 (1)
5	08:43	09:23 (3)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25	09:09 (3)
	16:20	11:17 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07	11:03 (1)
6	08:43	09:24 (3)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27	09:10 (3)
	16:21	11:18 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:07	11:04 (1)
7	08:42	09:24 (3)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28	09:10 (3)
	16:22	11:18 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06	11:04 (1)
8	08:42	09:25 (3)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29	09:10 (3)
	16:24	11:17 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06	11:06 (1)
9	08:41	09:27 (3)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30	09:10 (3)
	16:25	11:18 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:05	11:06 (1)
10	08:41	09:28 (3)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32	09:10 (3)
	16:27	11:18 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05	11:06 (1)
11	08:40	09:29 (3)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33	09:10 (3)
	16:28	11:18 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05	11:07 (1)
12	08:39	09:30 (3)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34	09:11 (3)
	16:30	11:17 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05	11:08 (1)
13	08:38	09:32 (3)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35	09:12 (3)
	16:31	11:17 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:05	11:09 (1)
14	08:37	09:34 (3)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36	09:12 (3)
	16:33	11:16 (1)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05	11:10 (1)
15	08:37	10:41 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37	09:13 (3)
	16:35	11:16 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05	11:10 (1)
16	08:36	10:43 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38	09:13 (3)
	16:36	11:15 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05	11:10 (1)
17	08:35	10:43 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39	09:14 (3)
	16:38	11:14 (1)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05	11:10 (1)
18	08:33	10:45 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39	09:15 (3)
	16:40	11:13 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05	11:11 (1)
19	08:32	10:48 (1)	07:39	06:34	06:19	05:19	04:54	05:18	06:10	07:05	07:59	08:40	09:16 (3)
	16:41	11:12 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:05	11:12 (1)
20	08:31	10:50 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:41	09:16 (3)
	16:43	11:09 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:06	11:12 (1)
21	08:30	10:53 (1)	07:34	06:30	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:31	09:17 (3)
	16:45	11:07 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06	11:13 (1)
22	08:29	10:55 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:33	09:17 (3)
	16:47	11:07 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:07	11:13 (1)
23	08:27	10:57 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:35	09:18 (3)
	16:49	11:08 (1)	17:50	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:07	11:14 (1)
24	08:26	10:58 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:37	09:18 (3)
	16:51	11:09 (1)	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:07	11:14 (1)
25	08:25	10:59 (1)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:39	09:18 (3)
	16:52	11:10 (1)	17:53	18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:09	16:08	11:14 (1)
26	08:23	10:59 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:12	08:41	09:19 (3)
	16:54	11:11 (1)	17:55	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:09	11:15 (1)
27	08:22	10:59 (1)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:14	08:43	09:19 (3)
	16:56	11:12 (1)	17:57	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	16:10	11:16 (1)
28	08:20	10:59 (1)	07:19	06:11	06:05	05:07	04:57	05:32	06:26	07:21	08:16	08:45	09:19 (3)
	16:58	11:13 (1)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:11	11:16 (1)
29	08:19	10:59 (1)	07:17	06:09	06:03	05:06	04:58	05:34	06:28	07:23	08:18	08:47	09:19 (3)
	17:00	11:14 (1)	18:01	18:54	20:51	21:42	22:01	21:30	20:26	19:10	18:00	16:12	11:16 (1)
30	08:17	10:59 (1)	07:15	06:07	06:01	05:05	04:58	05:35	06:29	07:24	08:19	08:49	09:19 (3)
	17:02	11:15 (1)	18:02	18:55	20:52	21:43	22:01	21:28	20:23	19:07	18:00	16:11	11:17 (1)
31	08:15	10:59 (1)	07:13	06:05	06:00	05:04	04:57	05:37	06:31	07:26	08:21	08:51	09:19 (3)
	17:04	11:16 (1)	18:03	18:56	20:53	21:44	22:01	21:27	20:21	19:05	18:00	16:13	11:16 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case	1056	209											2194
Sun reduction	0.24	0.23											0.21
Oper. time red.	1.00	1.00											1.00
Wind dir. red.	0.60	0.64											0.60
Total reduction	0.15	0.15											0.12
Total, real	153	31											272

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BD - H56

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	70	09:26 (3) 11:28 (1)	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10	09:19 (3) 46
2	08:44 16:16	68	09:27 (3) 11:28 (1)	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	09:18 (3) 51
3	08:44 16:17	68	09:27 (3) 11:28 (1)	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08	09:17 (3) 54
4	08:43 16:18	65	09:28 (3) 11:28 (1)	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08	09:17 (3) 57
5	08:43 16:20	64	09:29 (3) 11:28 (1)	08:07 17:14	07:07 18:10	06:52 20:03	05:44 21:03	05:02 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07	09:16 (3) 60
6	08:43 16:21	62	09:30 (3) 11:28 (1)	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	05:04 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07	09:16 (3) 61
7	08:42 16:22	60	09:31 (3) 11:28 (1)	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	05:04 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06	09:16 (3) 64
8	08:42 16:24	57	09:32 (3) 11:28 (1)	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	05:07 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06	09:17 (3) 64
9	08:41 16:25	54	09:34 (3) 11:28 (1)	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	05:07 21:54	05:06 21:56	06:12 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05	09:16 (3) 67
10	08:41 16:27	51	09:35 (3) 11:28 (1)	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	05:06 21:55	05:07 21:58	07:41 21:08	07:43 19:57	07:43 18:43	07:42 16:37	08:32 16:05	09:16 (3) 68
11	08:40 16:28	46	09:37 (3) 11:27 (1)	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	05:08 21:56	05:05 21:54	07:44 21:06	07:44 19:54	07:44 18:41	07:44 16:36	08:33 16:04	09:16 (3) 70
12	08:39 16:30	40	09:40 (3) 11:27 (1)	07:53 17:28	06:50 18:23	06:35 20:24	05:31 21:13	05:09 21:56	05:08 21:53	07:46 21:06	07:46 19:52	07:46 18:34	07:46 16:34	08:34 16:03	09:17 (3) 69
13	08:38 16:31	33	09:41 (3) 11:26 (1)	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	05:05 21:57	05:11 21:52	07:48 21:01	07:48 19:49	07:48 18:36	07:48 16:32	08:35 16:05	09:17 (3) 71
14	08:37 16:33	32	09:42 (3) 11:26 (1)	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	05:12 21:58	06:01 21:51	07:49 21:06	07:50 19:47	07:50 18:34	07:49 16:31	08:36 16:05	09:18 (3) 72
15	08:37 16:35	29	09:43 (3) 11:25 (1)	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	05:13 21:58	06:03 21:50	07:51 20:57	07:52 19:44	07:51 18:31	07:51 16:29	08:37 16:05	09:18 (3) 72
16	08:36 16:36	26	09:44 (3) 11:24 (1)	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	05:14 21:59	06:05 21:49	07:54 20:55	07:54 19:42	07:54 18:29	07:53 16:28	08:38 16:05	09:17 (3) 73
17	08:35 16:38	23	09:45 (1) 11:22 (1)	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	05:16 21:59	06:06 21:48	07:56 20:53	07:56 19:39	07:56 18:27	07:55 16:26	08:39 16:05	09:18 (3) 72
18	08:33 16:40	18	09:47 (1) 11:20 (1)	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	05:17 22:00	06:08 21:46	07:57 20:51	07:57 19:34	07:57 18:24	07:57 16:25	08:39 16:05	09:19 (3) 72
19	08:32 16:41	12	09:49 (1) 11:17 (1)	07:39 17:42	06:33 18:36	06:18 20:36	05:19 21:27	05:14 22:00	06:10 21:45	07:58 20:48	07:59 19:32	07:59 18:23	07:59 16:23	08:40 16:05	09:20 (3) 73
20	08:31 16:43	11	09:51 (1) 11:14 (1)	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:14 22:00	06:12 21:44	07:59 20:46	08:01 19:32	08:01 18:20	08:01 16:22	08:41 16:06	09:19 (3) 74
21	08:30 16:45	10	09:52 (1) 11:13 (1)	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:21 22:01	06:13 21:42	08:03 20:44	08:03 19:29	08:03 18:18	08:02 16:20	08:41 16:06	09:20 (3) 74
22	08:29 16:47	9	09:53 (1) 11:12 (1)	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	05:23 22:01	06:15 21:41	08:05 20:42	08:05 19:27	08:05 18:15	08:04 16:19	08:42 16:07	09:20 (3) 74
23	08:27 16:49	8	09:54 (1) 11:11 (1)	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	05:24 22:01	06:17 21:40	08:07 20:39	08:07 19:24	08:07 18:13	08:06 16:18	08:42 16:05	09:21 (3) 74
24	08:26 16:51	7	09:55 (1) 11:10 (1)	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	05:26 22:01	06:19 21:38	08:09 20:37	08:09 19:22	08:09 18:11	08:08 16:17	08:43 16:05	09:22 (3) 74
25	08:25 16:52	6	09:56 (1) 11:09 (1)	07:25 17:54	06:18 18:47	06:05 20:46	05:11 21:36	05:27 22:01	06:21 21:37	08:11 20:35	08:11 19:19	08:11 18:12	08:10 16:16	08:44 16:05	09:23 (3) 74
26	08:23 16:54	5	09:57 (1) 11:08 (1)	07:23 17:56	06:16 18:49	06:03 20:45	05:09 21:37	05:29 22:01	06:22 21:35	08:12 20:36	08:12 19:17	08:12 18:17	08:11 16:15	08:46 16:05	09:24 (3) 74
27	08:22 16:56	4	09:58 (1) 11:07 (1)	07:21 17:58	06:14 18:52	06:01 20:48	05:08 21:39	05:31 22:01	06:24 21:33	08:13 20:30	08:13 19:15	08:13 18:14	08:13 16:14	08:48 16:05	09:25 (3) 74
28	08:20 16:58	3	09:59 (1) 11:06 (1)	07:19 18:00	06:11 18:59	05:58 20:49	05:07 21:40	05:32 22:01	06:26 21:32	08:14 20:28	08:14 19:12	08:14 18:13	08:14 16:13	08:49 16:05	09:26 (3) 74
29	08:19 17:00	2	10:00 (1) 11:05 (1)	07:17 18:01	06:10 19:00	05:56 20:50	05:06 21:42	05:34 22:01	06:28 21:30	08:15 20:26	08:15 19:10	08:15 18:12	08:15 16:12	08:50 16:05	09:27 (3) 74
30	08:17 17:02	1	10:01 (1) 11:04 (1)	07:15 18:00	06:08 18:59	05:54 20:48	05:05 21:43	05:35 22:00	06:29 21:28	08:16 20:23	08:16 19:07	08:16 18:11	08:16 16:11	08:51 16:05	09:28 (3) 74
31	08:15 17:04	0	10:02 (1) 11:03 (1)	07:13 18:00	06:06 18:57	05:52 20:46	05:04 21:41	05:37 22:01	06:31 21:27	08:17 20:21	08:17 19:06	08:17 18:10	08:17 16:10	08:52 16:05	09:29 (3) 74
Potential sun hours	250		273		367	420	494	510	512	460	382	328	259	233	2103
Total, worst case		878		230								232			2103
Sun reduction		0.24		0.23								0.29			0.21
Oper. time red.		1.00		1.00								1.00			1.00
Wind dir. red.		0.60		0.64								0.64			0.60
Total reduction		0.15		0.15								0.19			0.12
Total, real		128		34								43			261

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BE - H57

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 (1) 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	08:24 (1) 16:54	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:18 (1) 16:52	07:26 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	08:16 (1) 16:50	07:28 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:14 (1) 16:48	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	08:13 (1) 16:46	07:32 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:35 (1) 16:45	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:36 (1) 16:43	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	08:37 (1) 16:41	07:38 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:37 (1) 16:39	07:40 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:38 (1) 16:37	07:42 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:54	05:08 21:06	05:56 21:06	06:51 19:54	07:44 18:41	08:39 (1) 16:36	07:44 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:53	05:09 21:04	05:58 21:04	06:52 19:52	07:46 18:38	08:40 (1) 16:34	07:46 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:52	05:11 21:02	05:59 21:02	06:54 19:49	07:48 18:36	08:41 (1) 16:32	07:48 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:42 (1) 16:31	07:50 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:43 (1) 16:29	07:51 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	08:44 (1) 16:28	07:53 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	08:45 (1) 16:26	07:55 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:46 (1) 16:25	07:57 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	08:47 (1) 16:23	07:59 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:48 (1) 16:22	08:01 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:49 (1) 16:21	08:03 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:50 (1) 16:19	08:04 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:51 (1) 16:18	08:06 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:52 (1) 16:17	08:08 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 18:09	08:53 (1) 16:16	08:09 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 18:07	08:54 (1) 16:15	08:11 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 18:05	08:55 (1) 16:14	08:13 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 18:02	08:56 (1) 16:13	08:15 16:11
29	08:19 17:00	07:09 17:55	06:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 18:00	08:57 (1) 16:12	08:16 16:12
30	08:17 17:02	07:06 19:57	06:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 18:58	08:58 (1) 16:11	08:18 16:13
31	08:16 17:04	07:04 19:58	06:04 19:58	05:54 21:44	05:04 21:44	04:57 21:27	05:37 20:21	06:31 20:21	07:22 18:56	07:22 18:56	08:59 (1) 16:14	08:19 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		45	252							302		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		7	44							57		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BF - H58

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	07:55 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04	07:56 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	07:12	07:36 (1)	06:57	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06	07:55 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
4	08:43	08:09	07:09	07:34 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08	07:56 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	08:07	07:07	07:33 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
	16:20	17:14	18:10	07:54 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05	07:05	07:33 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12	07:54 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03	07:02	07:34 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13	07:54 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01	07:00	07:35 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15	07:52 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:06
9	08:41	07:59	06:58	07:37 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:31
	16:25	17:22	18:17	07:50 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06
10	08:41	07:57	06:55	07:39 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24	18:19	07:46 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:39	08:33
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	17:29	16:05
12	08:39	07:53	06:50	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:40	08:34
	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	17:26	16:05
13	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:42	08:35
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	17:24	16:05
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:44	08:36
	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	17:22	16:05
15	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:46	08:37
	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	17:19	16:05
16	08:36	07:45	06:41	06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:48	08:38
	16:36	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	17:17	16:05
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:50	08:39
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	17:15	16:05
18	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:52	08:39
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	17:12	16:05
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:53	08:40
	16:42	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	17:10	16:05
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:55	08:41
	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	17:08	16:06
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:57	08:41
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	17:06	16:06
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:59	08:42
	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	17:04	16:07
23	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	09:01	08:43
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	17:02	16:07
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	09:03	08:43
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	17:00	16:08
25	08:25	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:10	09:04	08:43
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09	17:00	16:08
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:12	09:06	08:44
	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	17:00	16:09
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:14	09:08	08:44
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:05	17:00	16:10
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:16	09:10	08:44
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	17:00	16:11
29	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:18	09:12	08:44
	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	17:00	16:12
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:19	09:13	08:44
	17:02		19:57	20:54	21:43	22:01	21:28	20:23	19:07	18:00	17:00	16:13
31	08:16		07:04		05:04		05:37	06:31		07:23		08:44
	17:04		19:58		21:44		21:27	20:21		16:56		16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		26	171							195		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		4	30							37		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BG - H59

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: BH - H60

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March		April	May	June	July	August	September		October		November	December
1	08:44 16:15	08:14 17:06	07:16 18:02		07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18		07:26 19:05		07:58 (1) 08:17 (1)	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04		06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16		07:28 19:02		07:56 (1) 08:17 (1)	07:26 16:52
3	08:44 16:17	08:10 17:10	07:12 18:06		06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14		07:30 19:00		07:56 (1) 08:17 (1)	07:28 16:50
4	08:43 16:18	08:09 17:12	07:09 18:08		07:34 (1) 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11		07:32 18:57		07:58 (1) 08:17 (1)	07:30 16:48
5	08:43 16:20	08:07 17:14	07:07 18:10		07:31 (1) 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09		07:33 18:55		08:00 (1) 08:17 (1)	07:32 16:46
6	08:43 16:21	08:05 17:16	07:05 18:12		07:29 (1) 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06		07:35 18:53		08:02 (1) 08:16 (1)	07:34 16:45
7	08:42 16:22	08:03 17:18	07:02 18:13		07:27 (1) 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04		07:37 18:50		08:04 (1) 08:16 (1)	07:36 16:43
8	08:42 16:24	08:01 17:20	07:00 18:15		07:24 (1) 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02		07:39 18:48		08:06 (1) 08:15 (1)	07:38 16:41
9	08:41 16:25	07:59 17:22	06:58 18:17		07:22 (1) 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59		07:41 18:45		08:07 (1) 08:13 (1)	07:40 16:39
10	08:41 16:27	07:57 17:24	06:55 18:19		07:19 (1) 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57		07:43 18:43		08:09 (1) 08:11 (1)	07:42 16:37
11	08:40 16:28	07:55 17:26	06:53 18:21		07:18 (1) 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54		07:45 18:41		07:44 08:13 (1)	08:33 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23		07:18 (1) 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52		07:46 18:38		07:46 08:13 (1)	08:34 16:35
13	08:38 16:31	07:51 17:30	06:48 18:25		07:19 (1) 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49		07:48 18:36		07:48 08:15 (1)	08:35 16:34
14	08:37 16:33	07:49 17:32	06:45 18:27		07:19 (1) 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47		07:50 18:34		07:50 08:16 (1)	08:36 16:33
15	08:37 16:35	07:47 17:34	06:43 18:29		07:22 (1) 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44		07:52 18:31		07:51 08:17 (1)	08:37 16:32
16	08:36 16:36	07:45 17:36	06:41 18:31		06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42		07:54 18:29		07:53 08:18 (1)	08:38 16:31
17	08:35 16:38	07:43 17:38	06:38 18:32		06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39		07:56 18:27		07:55 08:19 (1)	08:39 16:30
18	08:34 16:40	07:41 17:40	06:36 18:34		06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37		07:58 18:24		07:57 08:20 (1)	08:39 16:29
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34		07:59 18:22		07:59 08:21 (1)	08:40 16:28
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32		08:01 18:20		08:01 08:22 (1)	08:41 16:27
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29		08:03 18:18		08:02 08:23 (1)	08:41 16:26
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27		08:05 18:15		08:04 08:24 (1)	08:42 16:25
23	08:27 16:49	07:30 17:50	06:23 18:44		06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24		08:07 18:13		08:06 08:25 (1)	08:43 16:24
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22		08:09 18:11		08:08 08:26 (1)	08:43 16:23
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20		07:11 17:09		08:10 08:27 (1)	08:43 16:22
26	08:23 16:54	07:23 17:56	06:16 18:49		06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17		07:13 17:07		08:11 08:28 (1)	08:44 16:21
27	08:22 16:56	07:21 17:58	06:14 18:51		06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15		07:15 17:05		08:13 08:29 (1)	08:44 16:20
28	08:20 16:58	07:19 18:00	06:11 18:53		05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12		07:17 17:02		08:15 08:31 (1)	08:44 16:19
29	08:19 17:00		07:09 19:55		05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10		08:01 (1) 08:14 (1)		07:19 17:00	08:44 16:18
30	08:17 17:02		07:06 19:57		05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07		07:59 (1) 08:16 (1)		07:21 16:58	08:44 16:17
31	08:16 17:04		07:04 19:58			05:04 21:44		05:37 21:27	06:31 20:21			07:23 16:56			08:44 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233
Total, worst case			171							38		140			
Sun reduction			0.27							0.32		0.29			
Oper. time red.			1.00							1.00		1.00			
Wind dir. red.			0.65							0.65		0.65			
Total reduction			0.18							0.21		0.19			
Total, real			30							8		27			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: BI - H61

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December			
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26		07:53 (1)	07:24	08:19		
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	14	08:07 (1)	16:54	16:10		
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26	08:21		
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	12	08:06 (1)	16:52	16:09		
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22		
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	9	08:05 (1)	16:50	16:09		
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24		
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	6	08:04 (1)	16:48	16:08		
5	08:43	08:07	07:07		06:52	05:44	04:59	05:02	05:46	06:40		07:33		08:00 (1)	07:32	08:25		
	16:20	17:14	18:10		20:08	21:03	21:50	21:58	21:18	20:09		18:55	2	08:02 (1)	16:46	16:07		
6	08:43	08:05	07:05		06:49	05:42	04:59	05:03	05:47	06:42		07:35		07:34	08:27			
	16:21	17:16	18:12		20:10	21:05	21:51	21:58	21:16	20:06		18:53		16:45	16:07			
7	08:42	08:03	07:02		06:47	05:40	04:58	05:04	05:49	06:44		07:37		07:36	08:28			
	16:22	17:18	18:13		20:11	21:06	21:52	21:57	21:14	20:04		18:50		16:43	16:06			
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	06:45		07:39		07:38	08:29			
	16:24	17:20	18:15	1	07:25 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48		16:41	16:06			
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40	08:31			
	16:25	17:22	18:17	4	07:26 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	16:06			
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43		07:42	08:32			
	16:27	17:24	18:19	8	07:27 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	16:05			
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:45		07:44	08:33			
	16:28	17:26	18:21	10	07:27 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	16:05			
12	08:39	07:53	06:50		07:14 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46		07:46	08:34			
	16:30	17:28	18:23	13	07:27 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	16:05			
13	08:38	07:51	06:48		07:12 (1)	06:33	05:29	04:55	05:11	05:59	06:54	07:48		07:48	08:35			
	16:31	17:30	18:25	15	07:27 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36		16:32	16:05			
14	08:37	07:49	06:45		07:09 (1)	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:50	08:36			
	16:33	17:32	18:27	17	07:26 (1)	20:24	21:19	21:58	21:51	20:59	19:47	18:34		16:31	16:05			
15	08:37	07:47	06:43		07:07 (1)	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51	08:37			
	16:35	17:34	18:29	19	07:26 (1)	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	16:05			
16	08:36	07:45	06:41		07:05 (1)	06:25	05:24	04:55	05:15	06:05	07:00	07:54		07:53	08:38			
	16:36	17:36	18:31	20	07:25 (1)	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28	16:05			
17	08:35	07:43	06:38		07:06 (1)	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55	08:39			
	16:38	17:38	18:32	18	07:24 (1)	20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26	16:05			
18	08:34	07:41	06:36		07:07 (1)	06:21	05:21	04:54	05:17	06:08	07:03	07:58		07:57	08:39			
	16:40	17:40	18:34	15	07:22 (1)	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25	16:05			
19	08:32	07:39	06:33		07:09 (1)	06:19	05:19	04:54	05:19	06:10	07:05	07:59		07:59	08:40			
	16:42	17:42	18:36	11	07:20 (1)	20:34	21:27	22:00	21:45	20:49	19:34	18:22		16:23	16:05			
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01		08:01	08:41			
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20		16:22	16:06			
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03		08:02	08:41			
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18		16:21	16:06			
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05		08:04	08:42			
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15		16:19	16:07			
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07		08:06	08:43			
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13		16:18	16:07			
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09		08:08	08:43			
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	10	08:03 (1)	18:11		16:17	16:08		
25	08:25	07:26	06:19		06:05	05:11	04:56	05:28	06:21	07:15		07:51 (1)	07:11		08:10	08:43		
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	14	08:05 (1)	17:09		16:16	16:08		
26	08:23	07:23	06:16		06:03	05:10	04:56	05:29	06:22	07:17		07:48 (1)	07:13		08:11	08:44		
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	17	08:05 (1)	17:07		16:15	16:09		
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:47 (1)	07:15		08:13	08:44		
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	19	08:06 (1)	17:05		16:14	16:10		
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:47 (1)	07:17		08:15	08:44		
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	20	08:07 (1)	17:02		16:13	16:11		
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:49 (1)	07:19		08:16	08:44		
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	18	08:07 (1)	17:00		16:12	16:12		
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		07:51 (1)	07:21		08:18	08:44		
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	16	08:07 (1)	16:58		16:11	16:13		
31	08:16		07:04			05:04		05:37	06:31			07:23				08:44		
	17:04		19:58			21:44		21:27	20:21			16:56				16:14		
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233			
Total, worst case				151							114		43					
Sun reduction				0.27							0.32		0.29					
Oper. time red.				1.00							1.00		1.00					
Wind dir. red.				0.66							0.66		0.66					
Total reduction				0.18							0.21		0.19					
Total, real				27							24		8					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: BJ - H62

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:41 (3)	07:01	07:25 (1)
	16:15	17:06	18:02	9 07:50 (3)	20:00	9 07:34 (1)
2	08:44	08:12	07:14	07:39 (3)	06:59	07:23 (1)
	16:16	17:08	18:04	12 07:51 (3)	20:02	16 07:39 (1)
3	08:44	08:10	07:12	07:36 (3)	06:56	07:20 (1)
	16:17	17:10	18:06	14 07:50 (3)	20:04	21 07:41 (1)
4	08:43	08:09	07:09	07:34 (3)	06:54	07:18 (1)
	16:18	17:12	18:08	16 07:50 (3)	20:06	25 07:43 (1)
5	08:43	08:07	07:07	07:31 (3)	06:52	07:15 (1)
	16:20	17:14	18:10	18 07:49 (3)	20:08	29 07:44 (1)
6	08:43	08:05	07:05	07:29 (3)	06:49	07:13 (1)
	16:21	17:16	18:11	20 07:49 (3)	20:09	32 07:45 (1)
7	08:42	08:03	07:02	07:26 (3)	06:47	07:11 (1)
	16:22	17:18	18:13	22 07:48 (3)	20:11	36 07:47 (1)
8	08:42	08:01	07:00	07:25 (3)	06:44	07:08 (1)
	16:24	17:20	18:15	22 07:47 (3)	20:13	39 07:47 (1)
9	08:41	07:59	06:57	07:27 (3)	06:42	07:06 (1)
	16:25	17:22	18:17	20 07:47 (3)	20:15	42 07:48 (1)
10	08:41	07:57	06:55	07:27 (3)	06:40	07:03 (1)
	16:27	17:24	18:19	17 07:44 (3)	20:17	45 07:48 (1)
11	08:40	07:55	06:53	07:30 (3)	06:37	07:01 (1)
	16:28	17:26	18:21	12 07:42 (3)	20:19	48 07:49 (1)
12	08:39	07:53	06:50	07:33 (3)	06:35	07:00 (1)
	16:30	17:28	18:23	4 07:37 (3)	20:21	49 07:49 (1)
13	08:38	07:51	06:48		06:32	07:00 (1)
	16:31	17:30	18:25		20:22	50 07:50 (1)
14	08:37	07:49	06:45		06:30	06:58 (1)
	16:33	17:32	18:27		20:24	51 07:49 (1)
15	08:36	07:47	06:43		06:28	06:58 (1)
	16:35	17:34	18:29		20:26	51 07:49 (1)
16	08:36	07:45	06:41		06:25	06:58 (1)
	16:36	17:36	18:30		20:28	52 07:50 (1)
17	08:35	07:43	06:38		06:23	06:57 (1)
	16:38	17:38	18:32		20:30	52 07:49 (1)
18	08:33	07:41	06:36		06:21	06:57 (1)
	16:40	17:40	18:34		20:32	52 07:49 (1)
19	08:32	07:39	06:33		06:18	06:57 (1)
	16:41	17:42	18:36		20:33	52 07:49 (1)
20	08:31	07:37	06:31		06:16	06:57 (1)
	16:43	17:44	18:38		20:35	51 07:48 (1)
21	08:30	07:34	06:28		06:14	06:57 (1)
	16:45	17:46	18:40		20:37	51 07:48 (1)
22	08:29	07:32	06:26		06:12	06:56 (1)
	16:47	17:48	18:42		20:39	51 07:47 (1)
23	08:27	07:30	06:23		06:09	06:56 (1)
	16:49	17:50	18:44		20:41	50 07:46 (1)
24	08:26	07:28	06:21		06:07	06:57 (1)
	16:51	17:52	18:45		20:43	49 07:46 (1)
25	08:25	07:25	06:18		06:05	06:57 (1)
	16:53	17:54	18:47		20:45	48 07:45 (1)
26	08:23	07:23	06:16		06:03	06:58 (1)
	16:54	17:56	18:49		20:46	46 07:44 (1)
27	08:22	07:21	06:14		06:01	06:58 (1)
	16:56	17:58	3 07:49 (3)		20:48	45 07:43 (1)
28	08:20	07:19	07:43 (3)		05:59	06:59 (1)
	16:58	18:00	6 07:49 (3)		20:50	43 07:42 (1)
29	08:19				05:56	07:00 (1)
	17:00				20:52	41 07:41 (1)
30	08:17				05:54	07:00 (1)
	17:02				20:54	40 07:40 (1)
31	08:15					
	17:04					
Potential sun hours	250	273	367	420	494	510
Total, worst case		9	186	1266	193	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.65	0.67	0.67	
Total reduction		0.15	0.18	0.24	0.26	
Total, real		1	33	301	50	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: BJ - H62

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:00 (1) 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:02 (1) 19:02	08:09 (3) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:37 20:14	07:04 (1) 19:00	08:06 (3) 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:38 20:11	07:05 (1) 18:57	08:04 (3) 16:48	08:24 16:08
5	05:02 21:58	05:46 21:18	07:26 (1) 20:09	07:07 (1) 18:55	08:03 (3) 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	07:20 (1) 20:06	07:43 (1) 18:53	08:24 (3) 16:45	08:27 16:07
7	05:04 21:57	05:49 21:14	07:37 (1) 20:04	07:42 (1) 18:50	08:25 (3) 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	07:40 (1) 20:01	07:39 (1) 18:48	08:26 (3) 16:41	08:29 16:06
9	05:06 21:56	05:52 21:10	07:14 (1) 19:59	07:14 (1) 18:45	08:07 (3) 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	07:43 (1) 19:57	07:35 (1) 18:43	08:24 (3) 16:37	08:31 16:05
11	05:08 21:54	05:56 21:06	07:12 (1) 19:54	07:17 (1) 18:41	08:11 (3) 16:36	08:33 16:05
12	05:09 21:53	05:58 21:04	07:09 (1) 19:52	07:27 (1) 18:38	08:24 (3) 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	07:47 (1) 19:49	07:48 18:36	08:23 (3) 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	07:09 (1) 19:47	07:50 18:34	08:23 (3) 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	07:07 (1) 19:44	07:52 18:31	08:22 (3) 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	07:06 (1) 19:42	07:54 18:29	08:20 (3) 16:28	08:38 16:05
17	05:16 21:48	06:06 20:53	07:50 (1) 19:39	07:56 18:27	16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:04 (1) 19:37	07:58 18:24	16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:52 (1) 19:34	07:59 18:22	16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:02 (1) 19:32	08:01 18:20	16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:52 (1) 19:29	08:03 18:18	16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:01 (1) 19:27	08:05 18:15	16:21	08:42 16:07
23	05:24 21:40	06:17 20:39	07:52 (1) 19:24	08:07 18:13	16:19	08:42 16:07
24	05:26 21:38	06:19 20:37	07:00 (1) 19:22	08:09 18:11	16:18	08:43 16:08
25	05:27 21:37	06:21 20:35	07:52 (1) 19:19	08:11 17:09	16:17	08:43 16:08
26	05:29 21:35	06:22 20:33	06:59 (1) 19:17	07:13 17:07	16:16	08:44 16:09
27	05:31 21:33	06:24 20:30	07:51 (1) 19:15	07:15 17:05	16:15	08:44 16:10
28	05:32 21:32	06:26 20:28	07:00 (1) 19:12	07:17 17:02	16:14	08:44 16:11
29	05:34 21:30	06:28 20:26	07:52 (1) 19:10	07:19 17:00	16:13	08:44 16:12
30	05:35 21:28	06:29 20:23	07:50 (1) 19:07	07:20 16:58	16:12	08:44 16:13
31	05:37 21:27	06:31 20:21	07:00 (1) 19:04	07:22 16:56	16:11	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case		1133		344	197	
Sun reduction		0.34		0.32	0.29	
Oper. time red.		1.00		1.00	1.00	
Wind dir. red.		0.67		0.67	0.65	
Total reduction		0.23		0.22	0.19	
Total, real		261		74	37	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: BK - H63

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	05:50 (1)	04:59	05:39	06:09 (1)	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	21:45	7 05:57 (1)	22:00	21:25	2 06:11 (1)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02		05:00	05:41		06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:47		22:00	21:23		20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:57	05:48	05:01		05:01	05:42		06:37	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48		21:59	21:21		20:14	19:00	16:50	16:09
4	08:43	08:09	07:09	06:54	05:46	05:00		05:01	05:44		06:38	07:32	07:30	08:24
	16:18	17:12	18:08	20:06	21:01	21:49		21:59	21:19		20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	04:59		05:02	05:46		06:40	07:33	07:32	08:25
	16:20	17:14	18:10	20:08	21:03	21:50		21:58	21:18		20:09	18:55	16:47	16:07
6	08:43	08:05	07:05	06:49	05:42	04:59		05:03	05:47		06:42	07:35	07:34	08:27
	16:21	17:16	18:12	20:09	21:05	21:51		21:58	21:16		20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58		05:04	05:49		06:44	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52		21:57	21:14		20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	04:57		05:05	05:51		06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53		21:56	21:12		20:01	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36	04:57		05:06	05:52		06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54		21:56	21:10		19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35	04:56		05:07	05:54		06:49	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12	21:55		21:55	21:08		19:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33	06:00 (1)	04:56	05:08	05:58 (1)	05:56	06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13	1 06:01 (1)	21:56	21:54	5 06:03 (1)	21:06	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	05:58 (1)	04:56	05:10	05:56 (1)	05:58	06:52	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	21:15	3 06:01 (1)	21:56	21:53	9 06:05 (1)	21:04	19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29	05:57 (1)	04:55	05:11	05:55 (1)	05:59	06:54	07:48	07:48	08:35
	16:31	17:30	18:25	20:22	21:17	5 06:02 (1)	21:57	21:52	11 06:06 (1)	21:01	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27	05:55 (1)	04:55	05:12	05:54 (1)	06:01	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:19	7 06:02 (1)	21:58	21:51	13 06:07 (1)	20:59	19:47	18:34	16:31	16:05
15	08:37	07:47	06:43	06:28	05:26	05:54 (1)	04:55	05:13	05:54 (1)	06:03	06:58	07:52	07:51	08:37
	16:35	17:34	18:29	20:26	21:20	9 06:03 (1)	21:58	21:50	15 06:09 (1)	20:57	19:44	18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24	05:52 (1)	04:55	05:15	05:53 (1)	06:05	07:00	07:54	07:53	08:38
	16:36	17:36	18:31	20:28	21:22	11 06:03 (1)	21:59	21:49	17 06:10 (1)	20:55	19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22	05:51 (1)	04:54	05:16	05:53 (1)	06:06	07:01	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21:24	12 06:03 (1)	21:59	21:48	17 06:10 (1)	20:53	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21	05:49 (1)	04:54	05:17	05:52 (1)	06:08	07:03	07:58	07:57	08:39
	16:40	17:40	18:34	20:32	21:25	14 06:03 (1)	22:00	21:46	19 06:11 (1)	20:51	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19	05:48 (1)	04:54	05:19	05:52 (1)	06:10	07:05	07:59	07:59	08:40
	16:42	17:42	18:36	20:34	21:27	15 06:03 (1)	22:00	21:45	20 06:12 (1)	20:48	19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	06:16	05:18	05:46 (1)	04:55	05:20	05:52 (1)	06:12	07:07	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	21:28	16 06:02 (1)	22:00	21:44	20 06:12 (1)	20:46	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	05:45 (1)	04:55	05:22	05:53 (1)	06:14	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30	18 06:03 (1)	22:01	21:42	19 06:12 (1)	20:44	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	05:44 (1)	04:55	05:23	05:55 (1)	06:15	07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	21:31	19 06:03 (1)	22:01	21:41	18 06:13 (1)	20:42	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13	05:43 (1)	04:55	05:24	05:56 (1)	06:17	07:12	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	21:33	20 06:03 (1)	22:01	21:40	17 06:13 (1)	20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	05:41 (1)	04:55	05:26	05:57 (1)	06:19	07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	21:35	20 06:01 (1)	22:01	21:38	16 06:13 (1)	20:37	19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11	05:42 (1)	04:56	05:28	05:59 (1)	06:21	07:15	07:11	08:09	08:43
	16:53	17:54	18:47	20:45	21:36	19 06:01 (1)	22:01	21:37	15 06:14 (1)	20:35	19:20	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:10	05:43 (1)	04:56	05:29	06:00 (1)	06:22	07:17	07:13	08:11	08:44
	16:55	17:56	18:49	20:46	21:37	18 06:01 (1)	22:01	21:35	13 06:13 (1)	20:33	19:17	17:07	16:15	16:09
27	08:22	07:21	06:14	06:01	05:08	05:44 (1)	04:57	05:31	06:02 (1)	06:24	07:19	07:15	08:13	08:44
	16:56	17:58	18:51	20:48	21:39	16 06:00 (1)	22:01	21:33	12 06:14 (1)	20:30	19:15	17:05	16:14	16:10
28	08:20	07:19	06:11	05:59	05:07	05:44 (1)	04:57	05:32	06:03 (1)	06:26	07:21	07:17	08:15	08:44
	16:58	18:00	18:53	20:50	21:40	16 06:00 (1)	22:01	21:32	10 06:13 (1)	20:28	19:12	17:02	16:13	16:11
29	08:19		07:09	05:56	05:06	05:45 (1)	04:58	05:34	06:05 (1)	06:28	07:23	07:19	08:16	08:44
	17:00		19:55	20:52	21:42	14 05:59 (1)	22:01	21:30	8 06:13 (1)	20:26	19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05	05:46 (1)	04:58	05:36	06:06 (1)	06:29	07:24	07:21	08:18	08:44
	17:02		19:57	20:54	21:43	12 05:58 (1)	22:00	21:28	6 06:12 (1)	20:23	19:07	16:58	16:11	16:13
31	08:15		07:04		05:04	05:47 (1)		05:37	06:08 (1)	06:31		07:22		08:44
	17:04		19:58		21:44	10 05:57 (1)		21:27	4 06:12 (1)	20:21		16:56		16:14
Potential sun hours	250	273	367	420	494	510		512	460		382	328	259	233
Total, worst case					275	7		284	2					
Sun reduction					0.38	0.32		0.32	0.34					
Oper. time red.					1.00	1.00		1.00	1.00					
Wind dir. red.					0.66	0.66		0.66	0.66					
Total reduction					0.25	0.21		0.21	0.23					
Total, real					69	1		61	0					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BL - H64

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:40 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BM - H65

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: BN - H66

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	07:25 (1)	05:52	05:03	04:59	05:39	06:33	07:05 (1)	07:26
	16:15	17:06	18:02		17:38 (1)	20:56	21:45	22:00	21:25	20:18	07:43 (1)	19:05
2	08:44	08:12	07:14	06:59	07:23 (1)	05:50	05:02	05:00	05:40	06:35	07:05 (1)	07:28
	16:16	17:08	18:04	20:02	18	07:41 (1)	20:57	21:47	22:00	21:23	07:43 (1)	19:02
3	08:44	08:10	07:12	07:36 (3)	06:56	07:20 (1)	05:48	05:01	05:00	05:42	07:05 (1)	07:30
	16:17	17:10	18:06	1	07:37 (3)	20:04	21:48	21:59	21:21	20:14	07:43 (1)	19:00
4	08:43	08:09	07:09	07:34 (3)	06:54	07:18 (1)	05:46	05:00	05:01	05:44	07:05 (1)	07:32
	16:18	17:12	18:08	4	07:38 (3)	20:06	21:49	21:59	21:19	20:11	07:41 (1)	18:57
5	08:43	08:07	07:07	07:31 (3)	06:52	07:15 (1)	05:44	04:59	05:02	05:46	07:07 (1)	07:33
	16:20	17:14	18:10	7	07:38 (3)	20:08	21:50	21:58	21:18	20:09	07:41 (1)	18:55
6	08:43	08:05	07:05	07:29 (3)	06:49	07:13 (1)	05:42	04:59	05:03	05:47	07:09 (1)	07:35
	16:21	17:16	18:11	10	07:39 (3)	20:09	21:51	21:58	21:16	20:06	07:40 (1)	18:53
7	08:42	08:03	07:02	07:27 (3)	06:47	07:11 (1)	05:40	04:58	05:04	05:49	07:10 (1)	07:37
	16:22	17:18	18:13	12	07:39 (3)	20:11	21:52	21:57	21:14	20:04	07:38 (1)	18:50
8	08:42	08:01	07:00	07:24 (3)	06:44	07:08 (1)	05:38	04:57	05:05	05:51	07:12 (1)	07:39
	16:24	17:20	18:15	14	07:38 (3)	20:13	21:53	21:56	21:12	20:01	07:37 (1)	18:48
9	08:41	07:59	06:57	07:22 (3)	06:42	07:07 (1)	05:36	04:57	05:06	05:52	07:14 (1)	07:41
	16:25	17:22	18:17	16	07:38 (3)	20:15	21:54	21:56	21:10	19:59	07:36 (1)	18:45
10	08:41	07:57	06:55	07:19 (3)	06:40	07:07 (1)	05:35	04:56	05:07	05:54	07:16 (1)	07:43
	16:27	17:24	18:19	18	07:37 (3)	20:17	21:55	21:55	21:08	19:57	07:34 (1)	18:43
11	08:40	07:55	06:53	07:18 (3)	06:37	07:06 (1)	05:33	04:56	05:08	05:56	07:17 (1)	07:44
	16:28	17:26	18:21	18	07:36 (3)	20:19	21:56	21:54	21:06	19:54	07:31 (1)	18:41
12	08:39	07:53	06:50	07:18 (3)	06:35	07:06 (1)	05:31	04:56	05:09	05:58	07:19 (1)	07:46
	16:30	17:28	18:23	16	07:34 (3)	20:21	21:56	21:53	21:04	19:52	07:28 (1)	18:38
13	08:38	07:51	06:48	07:20 (3)	06:32	07:06 (1)	05:29	04:55	05:11	05:59		07:48
	16:31	17:30	18:25	13	07:33 (3)	20:22	21:57	21:52	21:01	19:49		18:36
14	08:37	07:49	06:45	07:23 (3)	06:30	07:05 (1)	05:27	04:55	05:12	06:01		07:50
	16:33	17:32	18:27	6	07:29 (3)	20:24	21:58	21:51	20:59	19:47		18:34
15	08:37	07:47	06:43		06:28	07:06 (1)	05:26	04:55	05:13	06:03		07:52
	16:35	17:34	18:29		20:26	07:43 (1)	21:20	21:58	21:50	20:57		18:31
16	08:36	07:45	06:41		06:25	07:06 (1)	05:24	04:55	05:14	06:05		07:54
	16:36	17:36	18:30		20:28	07:42 (1)	21:22	21:59	21:49	20:55		18:29
17	08:35	07:43	06:38		06:23	07:06 (1)	05:22	04:54	05:16	06:06		07:01
	16:38	17:38	18:32		20:30	07:41 (1)	21:24	21:59	21:48	20:53		19:39
18	08:33	07:41	06:36		06:21	07:06 (1)	05:21	04:54	05:17	06:08		07:24 (1)
	16:40	17:40	18:34		20:32	07:40 (1)	21:25	22:00	21:46	20:51	9	07:33 (1)
19	08:32	07:39	06:33		06:19	07:07 (1)	05:19	04:54	05:19	06:10		07:18 (1)
	16:42	17:42	18:36		20:33	07:39 (1)	21:27	22:00	21:45	20:48	16	07:35 (1)
20	08:31	07:37	06:31		06:16	07:08 (1)	05:18	04:54	05:20	06:12		07:17 (1)
	16:43	17:44	18:38		20:35	07:38 (1)	21:28	22:00	21:44	20:46	21	07:38 (1)
21	08:30	07:34	06:28		06:14	07:09 (1)	05:16	04:55	05:21	06:14		07:15 (1)
	16:45	17:46	18:40		20:37	07:36 (1)	21:30	22:01	21:42	20:44	25	07:40 (1)
22	08:29	07:32	06:26		06:12	07:10 (1)	05:15	04:55	05:23	06:15		07:13 (1)
	16:47	17:48	18:42		20:39	07:34 (1)	21:31	22:01	21:41	20:42	27	07:40 (1)
23	08:27	07:30	06:23		06:09	07:12 (1)	05:13	04:55	05:24	06:17		07:12 (1)
	16:49	17:50	18:44		20:41	07:32 (1)	21:33	22:01	21:40	20:39	30	07:42 (1)
24	08:26	07:28	06:21		06:07	07:14 (1)	05:12	04:55	05:26	06:19		07:11 (1)
	16:51	17:52	18:45		20:43	07:29 (1)	21:35	22:01	21:38	20:37	32	07:43 (1)
25	08:25	07:26	06:18		06:05	07:18 (1)	05:11	04:56	05:27	06:21		07:10 (1)
	16:53	17:54	18:47		20:45	7	07:25 (1)	21:36	22:01	21:37	34	07:44 (1)
26	08:23	07:23	06:16		06:03	07:19	05:09	04:56	05:29	06:22		07:08 (1)
	16:54	17:56	18:49		20:46		21:37	22:01	21:35	20:33	35	07:43 (1)
27	08:22	07:21	06:14		06:01		05:08	04:57	05:31	06:24		07:08 (1)
	16:56	17:58	18:51		20:48		21:39	22:01	21:33	20:30	36	07:44 (1)
28	08:20	07:19	06:11		05:59		05:07	04:57	05:32	06:26		07:08 (1)
	16:58	18:00	18:53		20:50		21:40	22:01	21:32	20:28	37	07:45 (1)
29	08:19		07:09		05:56		05:06	04:58	05:34	06:28		07:06 (1)
	17:00		19:55		20:52		21:42	22:01	21:30	20:26	38	07:44 (1)
30	08:17		07:06		05:54		05:05	04:58	05:35	06:29		07:06 (1)
	17:02		19:57		20:54		21:43	22:00	21:28	20:23	38	07:44 (1)
31	08:15		07:04		07:27 (1)		05:04		05:37	06:31		07:06 (1)
	17:04		19:58	8	07:35 (1)		21:44		21:27	20:21	38	07:44 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case			143	731					416	342	126	
Sun reduction			0.27	0.35					0.34	0.32	0.29	
Oper. time red.			1.00	1.00					1.00	1.00	1.00	
Wind dir. red.			0.65	0.68					0.68	0.67	0.65	
Total reduction			0.18	0.24					0.23	0.22	0.19	
Total, real			25	174				96	74	24		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BO - H67

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BP - H68

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: BQ - H69

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February	March	April	May	June	July	August	September	October	November	December	
1	08:44	10:49 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	10:45 (2)
2	08:44	10:50 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	10:44 (2)
3	08:44	10:50 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	10:42 (2)
4	08:43	10:52 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	10:41 (2)
5	08:43	10:52 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	10:40 (2)
6	08:43	10:54 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	10:40 (2)
7	08:42	10:55 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	10:39 (2)
8	08:42	10:56 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	10:40 (2)
9	08:41	10:59 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	10:39 (2)
10	08:40	11:00 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32	10:39 (2)
11	08:40	11:03 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	10:39 (2)
12	08:39	11:07 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	15:03 (1)	08:34
13	08:38	11:13 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47	15:09 (1)	08:35
14	08:37	11:14 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	15:12 (1)	08:36
15	08:36	11:14 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	15:15 (1)	08:37
16	08:35	11:15 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	15:16 (1)	08:38
17	08:34	11:16 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	15:17 (1)	08:39
18	08:33	11:17 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	15:18 (1)	08:40
19	08:32	11:18 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	15:19 (1)	08:41
20	08:31	11:19 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	15:20 (1)	08:42
21	08:30	11:20 (2)	07:35	06:29	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:03	15:21 (1)	08:43
22	08:29	11:21 (2)	07:33	06:27	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	15:22 (1)	08:44
23	08:28	11:22 (2)	07:31	06:25	06:10	05:13	04:55	05:25	06:17	07:12	08:07	08:06	15:23 (1)	08:45
24	08:27	11:23 (2)	07:29	06:23	06:08	05:11	04:55	05:27	06:19	07:14	08:09	08:08	15:24 (1)	08:46
25	08:26	11:24 (2)	07:27	06:21	06:06	05:09	04:56	05:29	06:21	07:16	08:11	08:10	15:25 (1)	08:47
26	08:25	11:25 (2)	07:25	06:19	06:04	05:07	04:56	05:31	06:23	07:18	08:13	08:12	15:26 (1)	08:48
27	08:24	11:26 (2)	07:23	06:17	06:02	05:05	04:56	05:33	06:25	07:20	08:15	08:14	15:27 (1)	08:49
28	08:23	11:27 (2)	07:21	06:15	06:00	05:03	04:56	05:35	06:27	07:22	08:17	08:16	15:28 (1)	08:50
29	08:22	11:28 (2)	07:19	06:13	05:58	05:01	04:56	05:37	06:29	07:24	08:19	08:18	15:29 (1)	08:51
30	08:21	11:29 (2)	07:17	06:11	05:56	05:00	04:56	05:39	06:31	07:26	08:21	08:20	15:30 (1)	08:52
31	08:20	11:30 (2)	07:15	06:09	05:54	05:00	04:56	05:41	06:33	07:28	08:23	08:22	15:31 (1)	08:53
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	233	1766
Total, worst case		1104										502		1766
Sun reduction		0.24										0.27		0.21
Oper. time red.		1.00										1.00		1.00
Wind dir. red.		0.64										0.65		0.63
Total reduction		0.16										0.17		0.13
Total, real		172										87		229

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BR - H70

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December				
1	08:44	12:22 (2)	08:14	16:23 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:49 (1)	08:19	12:13 (2)											
	16:15	53	17:06	11	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	28	16:17 (1)	16:10	45	12:58 (2)									
2	08:44	12:23 (2)	08:12	16:22 (1)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	15:49 (1)	08:21	12:13 (2)											
	16:16	53	17:08	15	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	28	16:17 (1)	16:09	46	12:59 (2)									
3	08:44	12:23 (2)	08:10	16:21 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	15:49 (1)	08:22	12:12 (2)											
	16:17	52	17:10	18	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	28	16:17 (1)	16:08	48	13:00 (2)									
4	08:43	12:24 (2)	08:08	16:20 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	15:49 (1)	08:24	12:12 (2)											
	16:18	52	17:12	21	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	28	16:17 (1)	16:08	49	13:01 (2)									
5	08:43	12:25 (2)	08:07	16:20 (1)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	15:49 (1)	08:25	12:12 (2)											
	16:19	51	17:14	23	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	25	16:14 (1)	16:07	49	13:01 (2)									
6	08:43	12:26 (2)	08:05	16:20 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	15:50 (1)	08:26	12:12 (2)											
	16:21	50	17:16	25	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	22	16:12 (1)	16:07	50	13:02 (2)									
7	08:42	12:26 (2)	08:03	16:19 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	15:50 (1)	08:28	12:12 (2)											
	16:22	50	17:18	28	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	20	16:10 (1)	16:06	51	13:03 (2)									
8	08:42	12:27 (2)	08:01	16:19 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	15:51 (1)	08:29	12:11 (2)											
	16:24	49	17:20	28	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	17	16:08 (1)	16:06	52	13:03 (2)									
9	08:41	12:29 (2)	07:59	16:19 (1)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	15:53 (1)	08:30	12:12 (2)											
	16:25	48	17:22	28	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	14	16:07 (1)	16:05	52	13:04 (2)									
10	08:40	12:29 (2)	07:57	16:20 (1)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	15:54 (1)	08:32	12:12 (2)											
	16:26	47	17:24	27	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	11	16:05 (1)	16:05	53	13:05 (2)									
11	08:40	12:30 (2)	07:55	16:20 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	15:55 (1)	08:33	12:12 (2)											
	16:28	46	17:26	27	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36	8	16:03 (1)	16:05	53	13:05 (2)									
12	08:39	12:31 (2)	07:53	16:21 (1)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	15:57 (1)	08:34	12:12 (2)											
	16:30	45	17:28	26	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	4	16:01 (1)	16:05	54	13:06 (2)									
13	08:38	12:32 (2)	07:51	16:20 (1)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	15:58 (1)	08:35	12:13 (2)											
	16:31	42	17:30	26	18:26	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	11	16:05 (1)	16:07	54	13:07 (2)									
14	08:37	12:34 (2)	07:49	16:21 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	15:59 (1)	08:36	12:14 (2)											
	16:33	41	17:32	24	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	10	16:05 (1)	16:05	54	13:08 (2)									
15	08:36	12:35 (2)	07:47	16:22 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	15:59 (1)	08:37	12:13 (2)											
	16:34	40	17:34	22	18:24	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	9	16:05 (1)	16:05	54	13:07 (2)									
16	08:35	12:37 (2)	07:45	16:24 (1)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	15:59 (1)	08:38	12:14 (2)											
	16:36	37	17:36	19	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	8	16:05 (1)	16:05	54	13:08 (2)									
17	08:34	12:38 (2)	07:43	16:26 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	15:59 (1)	08:39	12:14 (2)											
	16:38	34	17:38	16	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	7	16:05 (1)	16:05	55	13:09 (2)									
18	08:33	12:40 (2)	07:41	16:28 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	15:59 (1)	08:39	12:15 (2)											
	16:40	32	17:41	10	18:38	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	6	16:05 (1)	16:05	55	13:10 (2)									
19	08:32	12:41 (2)	07:39	16:33 (1)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	15:59 (1)	08:40	12:15 (2)											
	16:41	29	17:42	18	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	5	16:05 (1)	16:05	55	13:10 (2)									
20	08:31	12:44 (2)	07:37	16:31	06:33	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	12:26 (2)	08:41	12:15 (2)											
	16:43	24	17:44	18	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	11	16:05 (1)	16:06	55	13:10 (2)									
21	08:30	12:47 (2)	07:34	16:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:03	08:02	12:22 (2)	08:41	12:16 (2)											
	16:45	19	17:46	18	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	19	16:05 (1)	16:06	55	13:11 (2)									
22	08:29	12:51 (2)	07:32	16:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:05	08:04	12:20 (2)	08:42	12:16 (2)											
	16:47	11	17:48	18	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	24	12:44 (2)	16:06	55	13:11 (2)									
23	08:27	12:52 (2)	07:30	16:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	17:03 (1)	16:19	12:06	12:18 (2)	08:42	12:17 (2)									
	16:49		17:50	18	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	1	17:04 (1)	16:18	29	12:47 (2)	16:07	55	13:12 (2)							
24	08:26	12:53 (2)	07:28	16:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	16:57 (1)	16:08	12:17 (2)	08:43	12:17 (2)										
	16:50		17:52	18	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	13	17:10 (1)	16:17	32	12:49 (2)	16:08	55	13:12 (2)							
25	08:25	12:54 (2)	07:25	16:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09	15:55 (1)	16:09	12:16 (2)	08:43	12:18 (2)										
	16:52		17:54	18	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	17	16:12 (1)	16:16	34	12:50 (2)	16:08	55	13:13 (2)							
26	08:23	12:55 (2)	07:23	16:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	15:53 (1)	16:11	12:15 (2)	08:43	12:19 (2)										
	16:54		17:56	18	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:07	20	16:13 (1)	16:14	37	12:52 (2)	16:09	55	13:14 (2)							
27	08:22	12:56 (2)	07:21	16:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13	15:52 (1)	16:13	12:14 (2)	08:44	12:19 (2)										
	16:56		17:58	18	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	22	16:14 (1)	16:13	40	12:54 (2)	16:10	55	13:14 (2)							
28	08:20	12:57 (2)	07:19	16:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14	15:51 (1)	16:14	12:14 (2)	08:44	12:20 (2)										
	16:58		18:00	18	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	24	16:15 (1)	16:12	41	12:55 (2)	16:11	54	13:14 (2)							
29	08:19	12:58 (2)	07:18	16:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16	15:50 (1)	16:16	12:13 (2)	08:44	12:21 (2)										
	17:00			19	19:55	20:52	21:41	22:01	21:30	20:25	19:10	18:00	25	16:15 (1)	16:12	42	12:55 (2)	16:11	54	13:15 (2)							
30	08:17	13:00 (2)	07:17	16:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	15:49 (1)	16:18	12:13 (2)	08:44	12:21 (2)										
	17:02	4	18:01	19	19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:05	27	16:16 (1)	16:11	44	12:57 (2)	16:12	54	13:15 (2)							
31	08:15	13:01 (2)	07:16	16:04	05:53	05:04	04:57	05:37	06:31	07:26	08:22	08:20	15:50 (1)	16:19	12:14 (2)	08:44	12:21 (2)										
	17:04	8	18:01 (1)	19	19:58	20:56	21:44	22:00	21:27	20:21	19:05	18:03	27	16:17 (1)	16:11	44	12:57 (2)	16:12	54	13:15 (2)							
Potential sun hours	250			273			367		420		494		510		512		460		382		328		259		233		1639
Total, worst case		917				394																					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm)	

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BS - H71

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	13:32 (2) 08:14	13:54 (2) 07:16	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
2 08:44	13:32 (2) 08:14	13:54 (2) 07:16	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
3 08:44	13:32 (2) 08:14	13:54 (2) 07:16	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
4 08:43	13:34 (2) 08:08	13:59 (2) 07:09	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
5 08:43	13:34 (2) 08:08	13:59 (2) 07:09	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
6 08:43	13:35 (2) 08:05	14:05 (2) 07:05	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
7 08:42	13:35 (2) 08:03	14:10 (2) 07:02	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
8 08:42	13:35 (2) 08:01	14:15 (2) 06:59	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
9 08:41	13:36 (2) 07:59	14:20 (2) 06:57	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
10 08:40	13:37 (2) 07:57	14:25 (2) 06:55	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
11 08:40	13:37 (2) 07:55	14:30 (2) 06:53	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
12 08:39	13:37 (2) 07:53	14:35 (2) 06:51	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
13 08:38	13:38 (2) 07:51	14:40 (2) 06:49	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
14 08:37	13:38 (2) 07:49	14:45 (2) 06:47	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
15 08:36	13:39 (2) 07:47	14:50 (2) 06:45	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
16 08:35	13:39 (2) 07:45	14:55 (2) 06:43	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
17 08:34	13:40 (2) 07:43	15:00 (2) 06:41	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
18 08:33	13:40 (2) 07:41	15:05 (2) 06:39	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
19 08:32	13:41 (2) 07:39	15:10 (2) 06:37	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
20 08:31	13:41 (2) 07:36	15:15 (2) 06:35	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
21 08:30	13:42 (2) 07:34	15:20 (2) 06:33	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
22 08:29	13:43 (2) 07:32	15:25 (2) 06:31	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
23 08:27	13:44 (2) 07:30	15:30 (2) 06:29	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
24 08:26	13:44 (2) 07:28	15:35 (2) 06:27	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
25 08:25	13:46 (2) 07:25	15:40 (2) 06:25	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
26 08:23	13:46 (2) 07:23	15:45 (2) 06:23	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
27 08:22	13:47 (2) 07:21	15:50 (2) 06:21	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
28 08:20	13:49 (2) 07:19	15:55 (2) 06:19	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
29 08:19	13:49 (2) 07:17	16:00 (2) 06:17	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
30 08:17	13:50 (2) 07:15	16:05 (2) 06:15	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
31 08:15	13:52 (2) 07:13	16:10 (2) 06:13	14:02 (2) 07:01	14:39 (2) 05:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	19:19 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	1895	531										2115
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.65	0.66										0.65
Total reduction	0.16	0.15										0.13
Total, real	298	81										284

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: BU - H73

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	15:57 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:28 (2)	08:19		
	16:15	17:06	16:30 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	32	16:00 (2)	16:10	
2	08:44	08:12	15:57 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	15:28 (2)	08:21		
	16:16	17:08	16:31 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	32	16:00 (2)	16:09	
3	08:44	08:10	15:57 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	15:27 (2)	08:22		
	16:17	17:10	16:31 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	34	16:01 (2)	16:08	
4	08:43	08:08	15:56 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	15:27 (2)	08:24		
	16:18	17:12	16:31 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	34	16:01 (2)	16:08	
5	08:43	08:07	15:57 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	15:26 (2)	08:25		
	16:19	17:14	16:31 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	35	16:01 (2)	16:07	
6	08:43	08:05	15:57 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	15:26 (2)	08:26		
	16:21	17:16	16:31 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	35	16:01 (2)	16:07	
7	08:42	08:03	15:57 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	15:26 (2)	08:28		
	16:22	17:18	16:31 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	35	16:01 (2)	16:06	
8	08:42	08:01	15:58 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	15:26 (2)	08:29		
	16:24	17:20	16:31 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	35	16:01 (2)	16:06	
9	08:41	07:59	15:58 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	15:27 (2)	08:30		
	16:25	17:22	16:31 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	35	16:02 (2)	16:05	
10	08:40	07:57	15:59 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	15:28 (2)	08:32		
	16:26	17:24	16:30 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	33	16:01 (2)	16:05	
11	08:40	07:55	16:00 (2)	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	15:28 (2)	08:33		
	16:28	17:26	16:30 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	33	16:01 (2)	16:05	
12	08:39	07:53	16:01 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	15:29 (2)	08:34		
	16:30	17:28	16:29 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	32	16:01 (2)	16:05	
13	08:38	07:51	16:01 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	15:29 (2)	08:35		
	16:31	17:30	16:27 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	30	15:59 (2)	16:04	
14	08:37	07:49	16:03 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	15:30 (2)	08:36		
	16:33	17:32	16:26 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	27	15:57 (2)	16:04	
15	08:36	07:47	16:05 (2)	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	15:31 (2)	08:37		
	16:34	17:34	16:24 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	25	15:56 (2)	16:04	
16	08:35	07:45	16:08 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	15:31 (2)	08:38		
	16:36	17:36	16:22 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	23	15:54 (2)	16:05	
17	08:34	07:43	16:13 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	15:33 (2)	08:38		
	16:38	17:38	16:17 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	19	15:52 (2)	16:05	
18	08:33	07:41	16:35	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	15:34 (2)	08:39		
	16:40	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:24	16	15:50 (2)	16:05	
19	08:32	07:39	16:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	07:59	15:35 (2)	08:40		
	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:23	14	15:49 (2)	16:05	
20	08:31	7	16:06 (2)	07:36	06:31	05:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	15:37 (2)	08:41	
	16:43	2	16:08 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	10	15:47 (2)	16:06
21	08:30	16:04 (2)	07:34	16:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	15:39 (2)	08:41		
	16:45	7	16:11 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	7	15:46 (2)	16:06
22	08:29	16:02 (2)	07:32	16:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	15:42 (2)	08:42		
	16:47	10	16:12 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	2	15:44 (2)	16:06
23	08:27	16:01 (2)	07:30	16:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	15:37 (2)	08:42		
	16:49	14	16:15 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	18	15:47 (2)	16:07
24	08:26	16:00 (2)	07:28	16:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	15:38 (2)	08:43		
	16:50	16	16:16 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	17	15:48 (2)	16:08
25	08:25	16:00 (2)	07:25	16:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	15:40 (2)	08:09	08:43		
	16:52	19	16:19 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	9	15:49 (2)	16:16	
26	08:23	15:58 (2)	07:23	16:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	15:36 (2)	08:11	08:43		
	16:54	23	16:21 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16	15:52 (2)	16:14	
27	08:22	15:58 (2)	07:21	16:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	15:34 (2)	08:13	08:44		
	16:56	25	16:23 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	20	15:54 (2)	16:13	
28	08:20	15:58 (2)	07:18	16:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	15:32 (2)	08:14	08:44		
	16:58	28	16:26 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	24	15:56 (2)	16:12	
29	08:19	15:57 (2)		17:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	15:30 (2)	08:16	08:44		
	17:00	30	16:27 (2)		19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	27	15:57 (2)	16:11	
30	08:17	15:57 (2)		17:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	15:29 (2)	08:18	08:44		
	17:02	32	16:29 (2)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	29	15:58 (2)	16:12	
31	08:15	15:56 (2)		17:04	05:54	05:04	05:04	05:37	06:31	07:22	07:18	15:28 (2)		08:44		
	17:04	33	16:29 (2)		19:58	21:44	21:44	21:27	20:21	16:56	30	15:58 (2)		16:13		
Potential sun hours	250	273	367	420	494	510	512	460	382	328	155	259	578	233		
Total, worst case	239	479									155	578				
Sun reduction	0.24	0.23									0.29	0.27				
Oper. time red.	1.00	1.00									1.00	1.00				
Wind dir. red.	0.66	0.66									0.66	0.66				
Total reduction	0.16	0.15									0.19	0.18				
Total, real	38	74									30	101				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BV - H74

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BW - H75

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BX - H76

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: BY - H77

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	09:02 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	09:19 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	08:10	09:06 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	17:10	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08
4	08:43	08:09	09:15 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24
	16:18	17:12	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	07:32	08:25
	16:20	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:46	16:07
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	07:34	08:27
	16:21	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:39	16:05
10	08:41	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	07:42	08:32
	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:37	16:05
11	08:40	09:12 (2)	07:55	06:53	06:37	05:33	04:56	05:08	06:56	06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:36	16:05
12	08:39	09:11 (2)	07:53	06:50	06:35	05:31	04:55	05:09	06:58	06:52	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:34	16:05
13	08:38	09:10 (2)	07:51	06:48	06:32	05:29	04:55	05:11	06:59	06:54	07:48	07:48	08:35
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:32	16:05
14	08:37	09:09 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	16:31	16:05
15	08:37	09:08 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37
	16:34	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:29	16:05
16	08:36	09:07 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38
	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16:28	16:05
17	08:35	09:05 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	16:26	16:05
18	08:33	09:04 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:25	16:05
19	08:32	09:03 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40
	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:23	16:05
20	08:31	09:01 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:22	16:06
21	08:30	09:00 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:20	16:06
22	08:29	08:59 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:19	16:07
23	08:27	08:57 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	16:18	16:07
24	08:26	08:55 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	16:17	16:08
25	08:25	08:56 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09	08:43
	16:52	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:09	16:16	16:16	16:08
26	08:23	08:56 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:44
	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:15	16:15	16:09
27	08:22	08:57 (2)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13	08:44
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	16:14	16:14	16:10
28	08:20	08:57 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:15	08:44
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:13	16:13	16:11
29	08:19	08:58 (2)	07:17	07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16	08:44
	17:00	18:01	18:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:12	16:12	16:11
30	08:17	08:58 (2)	07:15	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	08:44
	17:02	18:03	18:56	20:54	21:43	22:01	21:28	20:23	19:07	18:00	16:11	16:11	16:12
31	08:15	09:00 (2)	07:13	07:04	05:54	05:04	04:57	05:37	06:31	07:22	08:18	08:16	08:44
	17:04	18:05	18:58	20:55	21:44	22:01	21:27	20:21	19:05	18:00	16:12	16:12	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	233
Total, worst case	360	40									400		1
Sun reduction	0.24	0.23									0.27		0.21
Oper. time red.	1.00	1.00									1.00		1.00
Wind dir. red.	0.61	0.61									0.61		0.61
Total reduction	0.15	0.14									0.16		0.13
Total, real	53	6									64		0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BZ - H78

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	12:22 (1) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 06:33	07:26 07:24	07:55 (2) 08:19					
2 08:44	12:23 (1) 08:12	08:40 (2) 07:14	06:59 05:50	05:02 05:00	05:40 06:35	07:26 07:26	07:56 (2) 08:21					
3 08:44	12:24 (1) 08:10	08:38 (2) 07:12	06:56 05:48	05:01 05:00	05:42 06:36	07:28 07:28	07:58 (2) 08:22					
4 08:43	12:25 (1) 08:09	08:36 (2) 07:09	06:54 05:46	05:00 05:01	05:44 06:38	07:30 07:30	08:00 (2) 08:24					
5 08:43	12:26 (1) 08:07	08:34 (2) 07:07	06:52 05:44	04:59 05:02	05:45 06:40	07:32 07:32	08:02 (2) 08:25					
6 08:43	12:27 (1) 08:05	08:32 (2) 07:05	06:49 05:42	04:59 05:03	05:47 06:42	07:34 07:34	08:04 (2) 08:27					
7 08:42	12:28 (1) 08:03	08:30 (2) 07:02	06:47 05:40	04:58 05:04	05:49 06:44	07:36 07:36	08:06 (2) 08:28					
8 08:42	12:29 (1) 08:01	08:28 (2) 07:00	06:44 05:38	04:57 05:05	05:51 06:45	07:38 07:38	08:08 (2) 08:29					
9 08:41	12:30 (1) 07:59	08:26 (2) 06:57	06:42 05:36	04:55 05:06	05:52 06:47	07:40 07:40	08:10 (2) 08:30					
10 08:40	12:31 (1) 07:57	08:25 (2) 06:55	06:40 05:34	04:56 05:07	05:54 06:49	07:42 07:42	08:12 (2) 08:32					
11 08:40	12:32 (1) 07:55	08:24 (2) 06:53	06:37 05:33	04:56 05:08	05:56 06:51	07:44 07:44	08:14 (2) 08:33					
12 08:39	12:33 (1) 07:53	08:23 (2) 06:50	06:35 05:31	04:55 05:09	05:58 06:52	07:46 07:46	08:16 (2) 08:34					
13 08:38	12:34 (1) 07:51	08:22 (2) 06:48	06:32 05:29	04:55 05:11	05:59 06:54	07:48 07:48	08:18 (2) 08:35					
14 08:37	12:35 (1) 07:49	08:21 (2) 06:46	06:30 05:27	04:55 05:12	06:01 06:56	07:50 07:50	08:20 (2) 08:36					
15 08:36	12:36 (1) 07:47	08:20 (2) 06:43	06:28 05:26	04:55 05:13	06:03 06:58	07:52 07:52	08:22 (2) 08:37					
16 08:36	12:37 (1) 07:45	08:19 (2) 06:40	06:25 05:24	04:54 05:14	06:05 06:59	07:54 07:54	08:24 (2) 08:38					
17 08:35	12:38 (1) 07:43	08:18 (2) 06:38	06:23 05:22	04:54 05:16	06:06 07:01	07:56 07:56	08:26 (2) 08:39					
18 08:33	12:39 (1) 07:41	08:17 (2) 06:36	06:21 05:21	04:54 05:17	06:08 07:03	07:57 07:57	08:28 (2) 08:40					
19 08:32	12:40 (1) 07:39	08:16 (2) 06:33	06:18 05:19	04:54 05:18	06:10 07:05	07:59 07:59	08:30 (2) 08:41					
20 08:31	12:41 (1) 07:37	08:15 (2) 06:31	06:16 05:18	04:54 05:20	06:12 07:06	08:01 08:01	08:32 (2) 08:42					
21 08:30	12:42 (1) 07:34	08:14 (2) 06:28	06:14 05:16	04:54 05:21	06:13 07:08	08:03 08:03	08:34 (2) 08:43					
22 08:29	12:43 (1) 07:32	08:13 (2) 06:26	06:12 05:15	04:55 05:23	06:15 07:10	08:05 08:05	08:36 (2) 08:44					
23 08:27	12:44 (1) 07:30	08:12 (2) 06:23	06:09 05:13	04:55 05:24	06:17 07:12	08:07 08:07	08:38 (2) 08:45					
24 08:26	12:45 (1) 07:28	08:11 (2) 06:21	06:07 05:12	04:55 05:26	06:19 07:14	08:09 08:09	08:40 (2) 08:46					
25 08:25	12:46 (1) 07:25	08:10 (2) 06:18	06:05 05:11	04:56 05:27	06:21 07:15	08:11 08:11	08:42 (2) 08:47					
26 08:23	12:47 (1) 07:23	08:09 (2) 06:16	06:03 05:09	04:56 05:29	06:22 07:17	08:13 08:13	08:44 (2) 08:48					
27 08:22	12:48 (1) 07:21	08:08 (2) 06:14	06:01 05:08	04:56 05:31	06:24 07:19	08:15 08:15	08:46 (2) 08:49					
28 08:20	12:49 (1) 07:19	08:07 (2) 06:11	05:58 05:07	04:57 05:32	06:26 07:21	08:17 08:17	08:48 (2) 08:50					
29 08:19	12:50 (1) 07:17	08:06 (2) 06:09	05:56 05:06	04:58 05:34	06:28 07:23	08:19 08:19	08:50 (2) 08:51					
30 08:17	12:51 (1) 07:15	08:05 (2) 06:07	05:54 05:05	04:59 05:36	06:30 07:25	08:21 08:21	08:52 (2) 08:52					
31 08:15	12:52 (1) 07:13	08:04 (2) 06:05	05:52 05:04	04:59 05:38	06:32 07:27	08:23 08:23	08:54 (2) 08:53					
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	123	409										
Sun reduction	0.24	0.23										
Oper. time red.	1.00	1.00										
Wind dir. red.	0.62	0.62										
Total reduction	0.15	0.14										
Total, real	19	59										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CA - H79

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	12:02 (1) 12:39 (1)	08:14 17:06	07:16 18:02	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:54 (2) 08:14 (2)	08:19 16:10
2	08:44 16:16	12:03 (1) 12:40 (1)	08:12 17:08	07:14 18:04	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:56 (2) 08:13 (2)	08:21 16:09
3	08:44 16:17	12:04 (1) 12:39 (1)	08:10 17:10	07:12 18:06	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:58 (2) 08:12 (2)	08:22 16:08
4	08:43 16:18	12:05 (1) 12:39 (1)	08:09 17:12	07:09 18:08	05:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 20:11	06:38 18:57	08:00 (2) 08:12 (2)	08:24 16:08
5	08:43 16:20	12:06 (1) 12:39 (1)	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:02 21:50	05:45 21:18	06:40 20:09	07:33 18:55	08:02 (2) 08:11 (2)	08:25 16:07
6	08:43 16:21	12:08 (1) 12:39 (1)	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	05:03 21:51	05:47 21:16	06:42 20:06	07:35 18:53	08:04 (2) 08:09 (2)	08:27 16:07
7	08:42 16:22	12:09 (1) 12:38 (1)	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	05:04 21:52	05:49 21:14	06:44 20:04	07:37 18:50	08:06 (2) 08:08 (2)	08:28 16:06
8	08:42 16:24	12:10 (1) 12:37 (1)	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	05:05 21:53	05:51 21:12	06:45 20:01	07:39 18:48	08:09 (2) 08:12 (2)	08:29 16:06
9	08:41 16:25	12:12 (1) 12:37 (1)	07:59 17:22	06:57 18:17	06:42 20:15	05:52 21:10	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:11 (2) 08:13 (2)	08:30 16:05
10	08:40 16:27	12:14 (1) 12:36 (1)	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:12 (2) 08:14 (2)	08:32 16:05
11	08:40 16:28	12:16 (1) 12:34 (1)	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	05:08 21:56	05:56 21:06	06:51 19:54	07:44 18:41	08:15 (2) 08:17 (2)	08:33 16:05
12	08:39 16:30	12:19 (1) 12:32 (1)	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:18 (2) 08:20 (2)	08:34 16:05
13	08:38 16:31	12:20 (1) 12:30 (1)	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	08:19 (2) 08:21 (2)	08:35 16:05
14	08:37 16:33	12:21 (1) 12:32 (1)	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	05:12 21:58	06:01 20:59	06:56 19:47	07:50 18:33	08:22 (2) 08:24 (2)	08:36 16:05
15	08:36 16:35	12:22 (1) 12:34 (1)	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	05:13 21:58	06:03 20:57	06:58 19:44	07:52 18:31	08:25 (2) 08:27 (2)	08:37 16:05
16	08:36 16:36	12:23 (1) 12:36 (1)	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	05:14 21:59	06:05 20:55	06:59 19:42	07:54 18:29	08:28 (2) 08:30 (2)	08:38 16:05
17	08:35 16:38	12:24 (1) 12:38 (1)	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	05:16 21:59	06:06 20:53	07:01 19:39	07:56 18:27	08:31 (2) 08:33 (2)	08:39 16:05
18	08:33 16:40	12:25 (1) 12:40 (1)	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	05:17 22:00	06:08 20:51	07:03 19:37	07:57 18:24	08:34 (2) 08:36 (2)	08:39 16:05
19	08:32 16:41	12:26 (1) 12:42 (1)	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	05:18 22:00	06:10 21:45	07:05 20:48	07:59 18:22	08:37 (2) 08:39 (2)	08:40 16:05
20	08:31 16:43	12:27 (1) 12:44 (1)	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:20 22:00	06:12 21:44	07:06 20:46	08:01 18:20	08:41 (2) 08:43 (2)	08:41 16:06
21	08:30 16:45	12:28 (1) 12:46 (1)	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:21 22:01	06:13 21:42	07:08 20:44	08:03 18:18	08:42 (2) 08:44 (2)	08:42 16:06
22	08:29 16:47	12:29 (1) 12:48 (1)	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	05:23 22:01	06:15 21:41	07:10 20:42	08:05 18:15	08:43 (2) 08:45 (2)	08:42 16:07
23	08:27 16:49	12:30 (1) 12:50 (1)	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	05:24 22:01	06:17 21:40	07:12 20:39	08:07 18:13	08:46 (2) 08:48 (2)	08:42 16:07
24	08:26 16:51	12:31 (1) 12:52 (1)	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	05:26 22:01	06:19 21:38	07:14 20:37	08:09 18:11	08:47 (2) 08:49 (2)	08:43 16:08
25	08:25 16:52	12:32 (1) 12:54 (1)	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	05:27 22:01	06:21 21:37	07:15 20:35	08:09 18:09	08:48 (2) 08:50 (2)	08:43 16:08
26	08:23 16:54	12:33 (1) 12:56 (1)	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	05:29 22:01	06:22 21:35	07:17 20:33	08:13 18:17	08:49 (2) 08:51 (2)	08:44 16:09
27	08:22 16:56	12:34 (1) 12:58 (1)	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	05:31 22:01	06:24 21:33	07:19 20:30	08:14 18:15	08:52 (2) 08:54 (2)	08:44 16:10
28	08:20 16:58	12:35 (1) 13:00 (1)	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	05:32 22:01	06:26 21:32	07:21 20:28	08:15 18:12	08:53 (2) 08:55 (2)	08:44 16:11
29	08:19 17:00	12:36 (1) 13:02 (1)	07:18 18:01	06:10 18:54	05:56 20:52	05:06 21:42	05:34 22:01	06:28 21:30	07:23 20:25	08:16 18:10	08:54 (2) 08:56 (2)	08:44 16:11
30	08:17 17:02	12:37 (1) 13:04 (1)	07:17 18:02	06:09 18:56	05:54 20:54	05:05 21:43	05:35 22:00	06:29 21:28	07:24 20:23	08:18 18:07	08:55 (2) 08:57 (2)	08:44 16:12
31	08:15 17:04	12:38 (1) 13:06 (1)	07:16 18:03	06:08 18:58	05:53 20:56	05:04 21:44	05:36 22:01	06:31 21:27	07:22 20:21	08:19 18:06	08:56 (2) 08:58 (2)	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	341	385	420	494	510	512	460	382	328	259	233	1130
Sun reduction	0.24	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.21
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.62	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.62
Total reduction	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.13
Total, real	51	56	56	56	56	56	56	56	56	56	56	145

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CB - H80

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	11:44 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	39	12:23 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05
2	08:44	11:46 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	38	12:24 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
3	08:44	11:46 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
	16:17	37	12:23 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
4	08:43	11:47 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	36	12:23 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
5	08:43	11:48 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25
	16:20	35	12:23 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55
6	08:43	11:50 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	33	12:23 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53
7	08:42	11:51 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	31	12:22 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
8	08:42	11:52 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	30	12:22 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48
9	08:41	11:54 (1)	07:59	06:42	06:57	06:42	04:57	05:06	05:52	06:47	07:41	08:30
	16:25	28	12:22 (1)	17:22	18:16	20:15	21:10	21:54	21:56	21:10	19:59	18:45
10	08:41	11:55 (1)	07:57	06:42	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43
	16:27	26	12:21 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43
11	08:40	11:57 (1)	07:55	06:42	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
	16:28	22	12:19 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41
12	08:39	11:59 (1)	07:53	06:40	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46
	16:30	19	12:18 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38
13	08:38	12:02 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:41
	16:31	13	12:15 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36
14	08:37	12:04 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:43
	16:33	11	17:32	23	08:38 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47
15	08:36	12:06 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:45
	16:35	9	17:34	26	08:39 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44
16	08:36	12:08 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:47
	16:36	7	17:36	28	08:39 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42
17	08:35	12:10 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:49
	16:38	5	17:38	29	08:39 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39
18	08:33	12:12 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:50
	16:40	3	17:40	27	08:38 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37
19	08:32	12:14 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:52
	16:41	1	17:42	26	08:37 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34
20	08:31	12:16 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:54
	16:43	0	17:44	24	08:36 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32
21	08:30	12:18 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:57
	16:45	0	17:46	23	08:36 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29
22	08:29	12:20 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:59
	16:47	0	17:48	20	08:33 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27
23	08:27	12:22 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	09:01
	16:49	0	17:50	17	08:32 (2)	18:43	20:41	21:33	22:01	21:40	20:39	19:24
24	08:26	12:24 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	09:03
	16:51	0	17:52	11	08:29 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22
25	08:25	12:26 (1)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10	09:04
	16:52	0	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	15:08
26	08:23	12:28 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:12	09:06
	16:54	0	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	15:06
27	08:22	12:30 (1)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:14	09:08
	16:56	0	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	15:04
28	08:20	12:32 (1)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	09:10
	16:58	0	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	15:02
29	08:19	12:34 (1)	07:17	06:09	05:56	05:06	04:58	05:34	06:28	07:23	08:18	09:12
	17:00	0	19:55	19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	15:00
30	08:17	12:36 (1)	07:15	06:07	05:54	05:05	04:58	05:35	06:29	07:24	08:19	09:14
	17:02	0	19:56	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	14:58
31	08:15	12:38 (1)	07:13	06:04	05:51	05:04	04:55	05:37	06:31	07:26	08:21	09:16
	17:04	0	19:58	19:58	21:44	21:44	21:27	20:21	19:16	17:56	16:56	15:56
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	387	344									63	1272
Sun reduction	0.24	0.23									0.27	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.61	0.63									0.62	0.61
Total reduction	0.15	0.15									0.16	0.13
Total, real	57	50									10	160

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CC - H81

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44		14:51 (4)	08:14		16:26 (3)	07:16		17:09 (2)	07:01		05:52		05:03			
	16:15	29	15:20 (4)	17:06	8	16:34 (3)	18:02	25	17:34 (2)	20:00		20:55		21:45			
2	08:44		14:52 (4)	08:12		16:26 (3)	07:14		17:07 (2)	06:59		05:50		05:02			
	16:16	28	15:20 (4)	17:08	11	16:37 (3)	18:04	29	17:36 (2)	20:02		20:57		21:46			
3	08:44		14:52 (4)	08:10		16:26 (3)	07:12		17:07 (2)	06:56		05:48		05:01			
	16:17	28	15:20 (4)	17:10	13	16:39 (3)	18:06	31	17:38 (2)	20:04		20:59		21:48			
4	08:43		14:54 (4)	08:08		16:25 (3)	07:09		17:07 (2)	06:54		05:46		05:00			
	16:18	26	15:20 (4)	17:12	16	16:41 (3)	18:07	34	17:41 (2)	20:06		21:01		21:49			
5	08:43		14:54 (4)	08:07		16:26 (3)	07:07		17:06 (2)	06:51		05:44		04:59			
	16:19	26	15:20 (4)	17:14	17	16:43 (3)	18:09	36	17:42 (2)	20:07		21:03		21:50			
6	08:43		14:55 (4)	08:05		16:26 (3)	07:04		17:06 (2)	06:49		05:42		04:58			
	16:21	25	15:20 (4)	17:16	19	16:45 (3)	18:11	37	17:43 (2)	20:09		21:04		21:51			
7	08:42		14:56 (4)	08:03		16:26 (3)	07:02		17:05 (2)	06:47		05:40		04:58			
	16:22	24	15:20 (4)	17:18	21	16:47 (3)	18:13	38	17:43 (2)	20:11		21:06		21:52			
8	08:42		14:57 (4)	08:01		16:27 (3)	07:00		17:05 (2)	06:44		05:38		04:57			
	16:24	23	15:20 (4)	17:20	22	16:49 (3)	18:15	38	17:43 (2)	20:13		21:08		21:53			
9	08:41		14:58 (4)	07:59		16:28 (3)	06:57		17:05 (2)	06:42		05:36		04:57			
	16:25	22	15:20 (4)	17:22	21	16:49 (3)	18:17	37	17:42 (2)	20:15		21:10		21:54			
10	08:40		14:59 (4)	07:57		16:29 (3)	06:55		17:05 (2)	06:39		05:34		04:56			
	16:26	21	15:20 (4)	17:24	19	16:48 (3)	18:19	37	17:42 (2)	20:17		21:11		21:55			
11	08:40		15:01 (4)	07:55		16:30 (3)	06:53		17:06 (2)	06:37		05:33		04:56			
	16:28	18	15:19 (4)	17:26	17	16:47 (3)	18:21	35	17:41 (2)	20:19		21:13		21:55			
12	08:39		15:02 (4)	07:53		16:32 (3)	06:50		17:06 (2)	06:35		05:31		04:55			
	16:30	16	15:18 (4)	17:28	13	16:45 (3)	18:23	34	17:40 (2)	20:20		21:15		21:56			
13	08:38		15:04 (4)	07:51		16:34 (3)	06:48		17:07 (2)	06:32		05:29		04:55			
	16:31	13	15:17 (4)	17:30	8	16:42 (3)	18:25	32	17:39 (2)	20:22		21:17		21:57			
14	08:37		15:07 (4)	07:49			06:45		17:07 (2)	06:30		05:27		04:55			
	16:33	9	15:16 (4)	17:32			18:27	30	17:37 (2)	20:24		21:18		21:58			
15	08:36			07:47			06:43		17:09 (2)	06:28		05:26		04:54			
	16:34			17:34			18:28	27	17:36 (2)	20:26		21:20		21:58			
16	08:35			07:45			06:40		17:10 (2)	06:25		05:24		04:54			
	16:36			17:36			18:30	24	17:34 (2)	20:28		21:22		21:59			
17	08:34			07:43			06:38		17:12 (2)	06:23		05:22		04:54			
	16:38			17:38			18:32	20	17:32 (2)	20:30		21:23		21:59			
18	08:33			07:41			06:35		17:15 (2)	06:21		05:21		04:54			
	16:40			17:40			18:34	13	17:28 (2)	20:31		21:25		22:00			
19	08:32			07:39			06:33			06:18		05:19		04:54			
	16:41			17:42			18:36			20:33		21:27		22:00			
20	08:31			07:36			06:31			06:16		05:18		04:54			
	16:43			17:44			18:38			20:35		21:28		22:00			
21	08:30			07:34			06:28			06:14		05:16		04:54			
	16:45			17:46			18:40			20:37		21:30		22:01			
22	08:29			07:32			06:26			06:12		05:15		04:55			
	16:47			17:48			18:42			20:39		21:31		22:01			
23	08:27			07:30		17:21 (2)	06:23			06:09		05:13		04:55			
	16:49			17:50	1	17:22 (2)	18:43			20:41		21:33		22:01			
24	08:26			07:28		17:17 (2)	06:21			06:07		05:12		04:55			
	16:50			17:52	7	17:24 (2)	18:45			20:43		21:34		22:01			
25	08:24			07:25		17:14 (2)	06:18			06:05		05:11		04:55			
	16:52			17:54	12	17:26 (2)	18:47			20:44		21:36		22:01			
26	08:23			07:23		17:13 (2)	06:16			06:03		05:09		04:56			
	16:54			17:56	15	17:28 (2)	18:49			20:46		21:37		22:01			
27	08:22			07:21		17:12 (2)	06:13			06:00		05:08		04:56			
	16:56			17:58	19	17:31 (2)	18:51			20:48		21:39		22:01			
28	08:20			07:18		17:10 (2)	06:11			05:58		05:07		04:57			
	16:58			18:00	22	17:32 (2)	18:53			20:50		21:40		22:01			
29	08:19		16:27 (3)				07:08			05:56		05:06		04:57			
	17:00	1	16:28 (3)				19:54			20:52		21:41		22:01			
30	08:17		16:26 (3)				07:06			05:54		05:05		04:58			
	17:02	3	16:29 (3)				19:56			20:54		21:43		22:00			
31	08:15		16:26 (3)				07:04					05:04					
	17:04	5	16:31 (3)				19:58					21:44					
Potential sun hours	250		273		367		420		494		510						
Total, worst case	317		281		557												
Sun reduction	0.24		0.23		0.27												
Oper. time red.	1.00		1.00		1.00												
Wind dir. red.	0.65		0.66		0.68												
Total reduction	0.16		0.15		0.18												
Total, real	50		43		102												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: CC - H81

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:45 (2) 18:18 (2)	07:24 16:54	15:58 (3) 16:18 (3)	08:19 16:10	14:43 (4) 15:01 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:44 (2) 18:19 (2)	07:26 16:52	15:57 (3) 16:18 (3)	08:21 16:09	14:42 (4) 15:02 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:44 (2) 18:19 (2)	07:28 16:50	15:56 (3) 16:19 (3)	08:22 16:08	14:42 (4) 15:03 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:43 (2) 18:20 (2)	07:30 16:48	15:56 (3) 16:17 (3)	08:24 16:08	14:42 (4) 15:05 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:42 (2) 18:20 (2)	07:32 16:46	15:55 (3) 16:15 (3)	08:25 16:07	14:41 (4) 15:05 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:42 (2) 18:20 (2)	07:34 16:44	15:55 (3) 16:12 (3)	08:26 16:07	14:41 (4) 15:07 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:41 (2) 18:19 (2)	07:36 16:43	15:55 (3) 16:10 (3)	08:28 16:06	14:41 (4) 15:07 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:41 (2) 18:18 (2)	07:38 16:41	15:55 (3) 16:08 (3)	08:29 16:06	14:41 (4) 15:07 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:41 (2) 18:16 (2)	07:40 16:39	15:57 (3) 16:07 (3)	08:30 16:05	14:41 (4) 15:09 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:41 (2) 18:14 (2)	07:42 16:37	15:57 (3) 16:05 (3)	08:31 16:05	14:41 (4) 15:09 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:41 (2) 18:11 (2)	07:44 16:35	15:58 (3) 16:03 (3)	08:33 16:05	14:41 (4) 15:10 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:42 (2) 18:09 (2)	07:45 16:34	15:58 (3) 16:01 (3)	08:34 16:05	14:41 (4) 15:10 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:42 (2) 18:07 (2)	07:47 16:32	15:57 (3) 16:05	08:35 16:05	14:42 (4) 15:11 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:43 (2) 18:04 (2)	07:49 16:31	15:57 (3) 16:04	08:36 16:04	14:42 (4) 15:11 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:44 (2) 18:02 (2)	07:51 16:29	15:58 (3) 16:04	08:37 16:04	14:42 (4) 15:12 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:46 (2) 17:59 (2)	07:53 16:27	15:58 (3) 16:05	08:38 16:05	14:43 (4) 15:12 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:47 (2) 17:57 (2)	07:55 16:26	15:58 (3) 16:05	08:38 16:05	14:43 (4) 15:13 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:50 (2) 17:55 (2)	07:57 16:24	15:58 (3) 16:05	08:39 16:05	14:44 (4) 15:14 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:59 (2) 18:22	07:59 16:23	15:59 (3) 16:05	08:40 16:05	14:45 (4) 15:15 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	18:00 16:22	08:00 16:22	16:05 16:06	08:41 16:06	14:44 (4) 15:15 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	18:02 16:20	08:02 16:20	16:06 16:06	08:41 16:06	14:45 (4) 15:16 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	18:04 16:19	08:04 16:19	16:06 16:06	08:42 16:06	14:45 (4) 15:16 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	18:06 16:18	08:06 16:18	16:06 16:07	08:42 16:07	14:46 (4) 15:17 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	18:08 16:17	08:08 16:17	16:07 16:08	08:43 16:08	14:46 (4) 15:17 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	17:59 (2) 18:09 (2)	07:11 17:09	08:09 16:16	16:08 16:08	08:43 16:08	14:47 (4) 15:17 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	17:55 (2) 18:13 (2)	07:13 17:06	08:11 16:14	16:08 16:09	08:43 16:09	14:47 (4) 15:17 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	17:52 (2) 18:15 (2)	07:15 17:04	08:13 16:13	16:09 16:10	08:44 16:10	14:48 (4) 15:18 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	17:50 (2) 18:17 (2)	07:16 17:02	08:14 16:12	14:47 (4) 14:56 (4)	08:44 16:10	14:49 (4) 15:19 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	17:49 (2) 18:18 (2)	07:18 17:00	08:16 16:12	14:44 (4) 14:57 (4)	08:44 16:11	14:50 (4) 15:19 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:46 (2) 18:18 (2)	07:20 16:58	08:18 16:14	14:43 (4) 14:59 (4)	08:44 16:12	14:49 (4) 15:18 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	15:58 (3) 16:16 (3)	08:44 16:13	14:50 (4) 16:13	08:44 16:13	14:50 (4) 15:19 (4)
Potential sun hours	512	460	382	328	259	233			
Total, worst case			139	550	214	867			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.68	0.68	0.65	0.65			
Total reduction			0.22	0.20	0.17	0.13			
Total, real			30	109	37	116			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CD - H82

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:04 (5)	07:16	16:42 (4)	07:01				05:52	19:39 (2)	05:03				
	16:15			17:06	6 16:10 (5)	18:02	12 16:54 (4)	20:00				20:55	28 20:07 (2)	21:45				
2	08:44			08:12		07:14		06:59				05:50	19:40 (2)	05:02				
	16:16			17:08		18:04		20:02				20:57	26 20:06 (2)	21:46				
3	08:44			08:10	16:37 (4)	07:12	17:36 (3)	06:56				05:48	19:41 (2)	05:01				
	16:17			17:10	2 16:39 (4)	18:06	2 17:38 (3)	20:04				20:59	23 20:04 (2)	21:48				
4	08:43			08:08	16:36 (4)	07:09	17:35 (3)	06:54				05:46	19:42 (2)	05:00				
	16:18			17:12	5 16:41 (4)	18:07	6 17:41 (3)	20:06				21:01	20 20:02 (2)	21:49				
5	08:43			08:07	16:34 (4)	07:07	17:33 (3)	06:51				05:44	19:44 (2)	04:59				
	16:19			17:14	9 16:43 (4)	18:09	9 17:42 (3)	20:07				21:03	16 20:00 (2)	21:50				
6	08:43			08:05	16:33 (4)	07:04	17:33 (3)	06:49				05:42	19:46 (2)	04:59				
	16:21			17:16	12 16:45 (4)	18:11	12 17:45 (3)	20:09				21:04	11 19:57 (2)	21:51				
7	08:42			08:03	16:32 (4)	07:02	17:32 (3)	06:47				05:40		04:58				
	16:22			17:18	15 16:47 (4)	18:13	14 17:46 (3)	20:11				21:06		21:52				
8	08:42			08:01	16:32 (4)	07:00	17:32 (3)	06:44				05:38		04:57				
	16:24			17:20	18 16:50 (4)	18:15	16 17:48 (3)	20:13				21:08		21:53				
9	08:41			07:59	16:31 (4)	06:57	17:31 (3)	06:42				05:36		04:57				
	16:25			17:22	21 16:52 (4)	18:17	19 17:50 (3)	20:15				21:10		21:54				
10	08:40			07:57	16:30 (4)	06:55	17:31 (3)	06:39				05:34		04:56				
	16:26			17:24	24 16:54 (4)	18:19	21 17:52 (3)	20:17				21:11		21:55				
11	08:40			07:55	16:30 (4)	06:52	17:32 (3)	06:37				05:33		04:56				
	16:28			17:26	26 16:56 (4)	18:21	23 17:55 (3)	20:19				21:13		21:55				
12	08:39	15:52 (5)		07:53	16:29 (4)	06:50	17:32 (3)	06:35		19:48 (2)		05:31		04:55				
	16:30	2 15:54 (5)		17:28	29 16:58 (4)	18:23	22 17:54 (3)	20:20		5 19:53 (2)		21:15		21:56				
13	08:38	15:52 (5)		07:51	16:29 (4)	06:48	17:33 (3)	06:32		19:45 (2)		05:29		04:55				
	16:31	3 15:55 (5)		17:30	31 17:00 (4)	18:25	21 17:54 (3)	20:22		9 19:54 (2)		21:17		21:57				
14	08:37	15:52 (5)		07:49	16:29 (4)	06:45	17:34 (3)	06:30		19:43 (2)		05:27		04:55				
	16:33	5 15:57 (5)		17:32	33 17:02 (4)	18:27	18 17:52 (3)	20:24		13 19:56 (2)		21:18		21:58				
15	08:36	15:52 (5)		07:47	16:29 (4)	06:43	17:36 (3)	06:28		19:42 (2)		05:26		04:54				
	16:34	7 15:59 (5)		17:34	36 17:05 (4)	18:28	14 17:50 (3)	20:26		16 19:58 (2)		21:20		21:58				
16	08:35	15:51 (5)		07:45	16:29 (4)	06:40	17:38 (3)	06:25		19:41 (2)		05:24		04:54				
	16:36	9 16:00 (5)		17:36	38 17:07 (4)	18:30	8 17:46 (3)	20:28		19 20:00 (2)		21:22		21:59				
17	08:34	15:51 (5)		07:43	16:29 (4)	06:38		06:23		19:39 (2)		05:22		04:54				
	16:38	12 16:03 (5)		17:38	40 17:09 (4)	18:32		20:30		22 20:01 (2)		21:23		21:59				
18	08:33	15:51 (5)		07:41	16:28 (4)	06:35		06:21		19:38 (2)		05:21		04:54				
	16:40	14 16:05 (5)		17:40	41 17:09 (4)	18:34		20:31		25 20:03 (2)		21:25		22:00				
19	08:32	15:52 (5)		07:39	16:29 (4)	06:33		06:18		19:38 (2)		05:19		04:54				
	16:41	15 16:07 (5)		17:42	40 17:09 (4)	18:36		20:33		27 20:05 (2)		21:27		22:00				
20	08:31	15:51 (5)		07:36	16:29 (4)	06:31		06:16		19:37 (2)		05:18		04:54				
	16:43	17 16:08 (5)		17:44	39 17:08 (4)	18:38		20:35		30 20:07 (2)		21:28		22:00				
21	08:30	15:52 (5)		07:34	16:30 (4)	06:28		06:14		19:36 (2)		05:16		04:54				
	16:45	19 16:11 (5)		17:46	38 17:08 (4)	18:40		20:37		32 20:08 (2)		21:30		22:01				
22	08:29	15:52 (5)		07:32	16:30 (4)	06:26		06:12		19:36 (2)		05:15		04:55				
	16:47	20 16:12 (5)		17:48	37 17:07 (4)	18:42		20:39		34 20:10 (2)		21:31		22:01				
23	08:27	15:53 (5)		07:30	16:31 (4)	06:23		06:09		19:36 (2)		05:13		04:55				
	16:49	22 16:15 (5)		17:50	35 17:06 (4)	18:43		20:41		35 20:11 (2)		21:33		22:01				
24	08:26	15:53 (5)		07:28	16:32 (4)	06:21		06:07		19:36 (2)		05:12		04:55				
	16:50	23 16:16 (5)		17:52	33 17:05 (4)	18:45		20:43		35 20:11 (2)		21:34		22:01				
25	08:24	15:54 (5)		07:25	16:33 (4)	06:18		06:05		19:36 (2)		05:11		04:55				
	16:52	23 16:17 (5)		17:54	30 17:03 (4)	18:47		20:44		35 20:11 (2)		21:36		22:01				
26	08:23	15:54 (5)		07:23	16:35 (4)	06:16		06:03		19:36 (2)		05:09		04:56				
	16:54	22 16:16 (5)		17:56	27 17:02 (4)	18:49		20:46		35 20:11 (2)		21:37		22:01				
27	08:22	15:55 (5)		07:21	16:37 (4)	06:13		06:01		19:36 (2)		05:08		04:56				
	16:56	21 16:16 (5)		17:58	23 17:00 (4)	18:51		20:48		34 20:10 (2)		21:39		22:01				
28	08:20	15:56 (5)		07:18	16:38 (4)	06:11		05:58		19:37 (2)		05:07		04:57				
	16:58	20 16:16 (5)		18:00	19 16:57 (4)	18:53		20:50		33 20:10 (2)		21:40		22:01				
29	08:18	15:57 (5)				07:08		05:56				05:06		04:57				
	17:00	18 16:15 (5)				19:54		20:52		32 20:09 (2)		21:41		22:01				
30	08:17	15:58 (5)				07:06		05:54				19:38 (2)		05:05				
	17:02	16 16:14 (5)				19:56		20:54		30 20:08 (2)		21:43		22:00				
31	08:15	16:00 (5)				07:04						05:04						
	17:04	12 16:12 (5)				19:58						21:44						
Potential sun hours	250			273		367		420		494				510				
Total, worst case		300		707		217		501		124								
Sun reduction		0.24		0.23		0.27		0.35		0.38								
Oper. time red.		1.00		1.00		1.00		1.00		1.00								
Wind dir. red.		0.66		0.66		0.68		0.65		0.65								
Total reduction		0.16		0.15		0.18		0.23		0.25								
Total, real		48		108		40		115		31								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: CD - H82

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:11 (3) 16:54	16:00 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:10 (3) 16:52	16:01 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:09 (3) 16:50	16:01 (4) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:09 (3) 16:48	16:02 (4) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:09 (3) 16:46	16:03 (4) 16:07
6	05:03 21:58	05:47 21:15	20:00 (2) 20:06	07:35 18:52	18:09 (3) 16:44	16:04 (4) 16:07
7	05:04 21:57	05:49 21:13	19:56 (2) 20:04	07:37 18:50	18:08 (3) 16:43	16:06 (4) 16:06
8	05:05 21:56	05:50 21:12	19:53 (2) 20:01	07:39 18:48	18:08 (3) 16:41	16:07 (4) 16:06
9	05:06 21:55	05:52 21:10	19:51 (2) 19:59	07:41 18:45	18:08 (3) 16:39	16:08 (4) 16:05
10	05:07 21:55	05:54 21:07	19:49 (2) 19:56	07:42 18:43	18:09 (3) 16:37	15:34 (5) 16:05
11	05:08 21:54	05:56 21:05	19:48 (2) 19:54	07:44 18:40	18:10 (3) 16:35	15:32 (5) 16:05
12	05:09 21:53	05:57 21:03	19:47 (2) 19:51	07:46 18:38	18:11 (3) 16:34	15:30 (5) 16:05
13	05:10 21:52	05:59 21:01	19:45 (2) 19:49	07:48 18:36	17:14 (4) 16:32	15:29 (5) 16:05
14	05:12 21:51	06:01 20:59	19:45 (2) 19:47	07:50 18:33	17:10 (4) 16:31	15:28 (5) 16:04
15	05:13 21:50	06:03 20:57	19:44 (2) 19:44	07:52 18:31	17:08 (4) 16:29	15:28 (5) 16:05
16	05:14 21:49	06:04 20:55	19:43 (2) 19:42	07:54 18:29	17:06 (4) 16:27	15:27 (5) 16:05
17	05:16 21:47	06:06 20:53	19:43 (2) 19:39	07:55 18:26	17:05 (4) 16:26	15:27 (5) 16:05
18	05:17 21:46	06:08 20:51	19:43 (2) 19:37	07:57 18:24	17:03 (4) 16:24	15:27 (5) 16:05
19	05:18 21:45	06:10 20:48	19:41 (2) 19:34	07:59 18:22	17:02 (4) 16:23	15:27 (5) 16:05
20	05:20 21:44	06:12 20:46	19:42 (2) 19:32	08:01 18:20	17:01 (4) 16:22	15:27 (5) 16:06
21	05:21 21:42	06:13 20:44	19:42 (2) 19:29	08:03 18:17	17:00 (4) 16:20	15:27 (5) 16:06
22	05:23 21:41	06:15 20:42	19:41 (2) 19:27	08:05 18:15	17:00 (4) 16:19	15:27 (5) 16:06
23	05:24 21:39	06:17 20:39	19:41 (2) 19:24	08:07 18:13	16:59 (4) 16:18	15:28 (5) 16:07
24	05:26 21:38	06:19 20:37	19:42 (2) 19:22	08:09 18:11	16:59 (4) 16:17	15:28 (5) 16:08
25	05:27 21:36	06:20 20:35	19:41 (2) 19:19	07:11 17:09	15:58 (4) 16:16	15:29 (5) 16:08
26	05:29 21:35	06:22 20:32	19:42 (2) 19:17	07:13 17:06	15:58 (4) 16:14	15:30 (5) 16:09
27	05:30 21:33	06:24 20:30	19:43 (2) 19:14	07:15 18:22 (3)	15:58 (4) 17:04	15:31 (5) 16:10
28	05:32 21:32	06:26 20:28	19:43 (2) 19:12	07:16 18:17 (3)	15:58 (4) 17:02	15:32 (5) 16:11
29	05:34 21:30	06:27 20:25	19:44 (2) 19:09	07:18 18:15 (3)	15:58 (4) 17:00	15:32 (5) 16:11
30	05:35 21:28	06:29 20:23	19:46 (2) 19:07	07:20 18:12 (3)	15:58 (4) 16:11	15:33 (5) 16:12
31	05:37 21:26	06:31 20:21	19:47 (2) 19:52 (2)	07:22 16:56	15:59 (4) 16:25 (4)	15:35 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		631	53	774	411	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.68	0.66	0.66	
Total reduction		0.22	0.22	0.19	0.18	
Total, real		140	11	150	72	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CE - H83

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:23 (5)	07:16	17:15 (4)	07:01		05:52		20:05 (2)	05:03					
	16:15			17:06	12 16:35 (5)	18:02	19 17:34 (4)	20:00		20:55	21	20:26 (2)	21:45					
2	08:44			08:12	16:23 (5)	07:14	17:13 (4)	06:59		05:50		20:04 (2)	05:02					
	16:16			17:08	14 16:37 (5)	18:04	23 17:36 (4)	20:02		20:57	23	20:27 (2)	21:46					
3	08:43			08:10	16:22 (5)	07:12	17:13 (4)	06:56		05:48		20:04 (2)	05:01					
	16:17			17:10	17 16:39 (5)	18:06	25 17:38 (4)	20:04		20:59	25	20:29 (2)	21:48					
4	08:43			08:08	16:22 (5)	07:09	17:12 (4)	06:54		05:46		20:03 (2)	05:00					
	16:18			17:12	19 16:41 (5)	18:07	29 17:41 (4)	20:06		21:01	27	20:30 (2)	21:49					
5	08:43			08:07	16:22 (5)	07:07	17:11 (4)	06:51		05:44		20:03 (2)	04:59					
	16:19			17:14	21 16:43 (5)	18:09	31 17:42 (4)	20:07		21:03	29	20:32 (2)	21:50					
6	08:42			08:05	16:22 (5)	07:04	17:11 (4)	06:49		05:42		20:03 (2)	04:59					
	16:21			17:16	23 16:45 (5)	18:11	34 17:45 (4)	20:09		21:04	30	20:33 (2)	21:51					
7	08:42			08:03	16:23 (5)	07:02	17:10 (4)	06:47		05:40		20:03 (2)	04:58					
	16:22			17:18	23 16:46 (5)	18:13	36 17:46 (4)	20:11		21:06	32	20:35 (2)	21:52					
8	08:42			08:01	16:23 (5)	07:00	17:11 (4)	06:44		05:38		20:03 (2)	04:57					
	16:24			17:20	23 16:46 (5)	18:15	37 17:48 (4)	20:13		21:08	31	20:34 (2)	21:53					
9	08:41			07:59	16:24 (5)	06:57	17:10 (4)	06:42		05:36		20:03 (2)	04:57					
	16:25			17:22	22 16:46 (5)	18:17	39 17:49 (4)	20:15		21:10	31	20:34 (2)	21:54					
10	08:40			07:57	16:25 (5)	06:55	17:10 (4)	06:39		05:34		20:03 (2)	04:56					
	16:26			17:24	20 16:45 (5)	18:19	39 17:49 (4)	20:17		21:11	30	20:33 (2)	21:55					
11	08:40			07:55	16:26 (5)	06:52	17:11 (4)	06:37		05:33		20:04 (2)	04:56					
	16:28			17:26	18 16:44 (5)	18:21	37 17:48 (4)	20:19		21:13	29	20:33 (2)	21:55					
12	08:39			07:53	16:27 (5)	06:50	17:11 (4)	06:35		05:31		20:04 (2)	04:55					
	16:30			17:28	15 16:42 (5)	18:23	36 17:47 (4)	20:20		21:15	29	20:33 (2)	21:56					
13	08:38			07:51	16:29 (5)	06:48	17:12 (4)	06:32		05:29		20:04 (2)	04:55					
	16:31			17:30	11 16:40 (5)	18:25	35 17:47 (4)	20:22		21:17	28	20:32 (2)	21:57					
14	08:37			07:49		06:45	17:12 (4)	06:30		05:27		20:06 (2)	04:55					
	16:33			17:32		18:27	33 17:45 (4)	20:24		21:18	25	20:31 (2)	21:57					
15	08:36			07:47		06:43	17:13 (4)	06:28		05:26		20:06 (2)	04:55					
	16:34			17:34		18:28	34 18:02 (3)	20:26		21:20	24	20:30 (2)	21:58					
16	08:35			07:45		06:40	17:14 (4)	06:25		05:24		20:08 (2)	04:54					
	16:36			17:36		18:30	35 18:04 (3)	20:28		21:22	22	20:30 (2)	21:59					
17	08:34			07:43		06:38	17:16 (4)	06:23		05:22		20:08 (2)	04:54					
	16:38			17:38		18:32	34 18:06 (3)	20:30		21:23	20	20:28 (2)	21:59					
18	08:33			07:41		06:35	17:17 (4)	06:21		05:21		20:10 (2)	04:54					
	16:40			17:40		18:34	32 18:07 (3)	20:31		21:25	17	20:27 (2)	22:00					
19	08:32			07:39		06:33	17:21 (4)	06:18		05:19		20:12 (2)	04:54					
	16:41			17:42		18:36	28 18:10 (3)	20:33		21:27	14	20:26 (2)	22:00					
20	08:31			07:36		06:31	17:54 (3)	06:16		05:18		20:13 (2)	04:54					
	16:43			17:44		18:38	17 18:11 (3)	20:35		21:28	11	20:24 (2)	22:00					
21	08:30			07:34		06:28	17:54 (3)	06:14		05:16			04:54					
	16:45			17:46		18:40	19 18:13 (3)	20:37		21:30			22:01					
22	08:28			07:32		06:26	17:54 (3)	06:12		05:15			04:55					
	16:47			17:48		18:41	21 18:15 (3)	20:39		21:31			22:01					
23	08:27			07:30		06:23	17:55 (3)	06:09		05:13			04:55					
	16:49			17:50		18:43	22 18:17 (3)	20:41		21:33			22:01					
24	08:26			07:28		06:21	17:55 (3)	06:07		05:12			04:55					
	16:50			17:52		18:45	20 18:15 (3)	20:42		21:34			22:01					
25	08:24			07:25	17:21 (4)	06:18	17:56 (3)	06:05		05:11			04:55					
	16:52			17:54	5 17:26 (4)	18:47	18 18:14 (3)	20:44	3 20:15 (2)	21:36			22:01					
26	08:23			07:23	17:19 (4)	06:16	17:57 (3)	06:03		05:09			04:56					
	16:54			17:56	9 17:28 (4)	18:49	14 18:11 (3)	20:46	7 20:17 (2)	21:37			22:01					
27	08:22			07:21	17:18 (4)	06:13	18:00 (3)	06:01		05:08			04:56					
	16:56			17:58	13 17:31 (4)	18:51	8 18:08 (3)	20:48	11 20:19 (2)	21:39			22:01					
28	08:20	16:25 (5)	07:18	17:16 (4)	06:11			05:58		05:07			04:57					
	16:58	1 16:26 (5)	18:00	16 17:32 (4)	18:53			20:50	14 20:21 (2)	21:40			22:01					
29	08:18	16:24 (5)			07:08			05:56		05:06			04:57					
	17:00	4 16:28 (5)			19:54			20:52	16 20:22 (2)	21:41			22:01					
30	08:17	16:23 (5)			07:06			05:54		05:05			04:58					
	17:02	7 16:30 (5)			19:56			20:53	19 20:24 (2)	21:43			22:00					
31	08:15	16:23 (5)			07:04					05:04								
	17:04	9 16:32 (5)			19:58					21:44								
Potential sun hours	250		273			367		420		494			510					
Total, worst case	21		281			755		70		498								
Sun reduction	0.24		0.23			0.27		0.35		0.38								
Oper. time red.	1.00		1.00			1.00		1.00		1.00								
Wind dir. red.	0.66		0.66			0.68		0.65		0.65								
Total reduction	0.16		0.15			0.18		0.23		0.25								
Total, real	3		43			139		16		122								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CE - H83

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July		August		September		October		November		December	
1	04:59		05:39	20:14 (2)	06:33		07:26	17:50 (4)	07:24	15:54 (5)	08:19	
	22:00		21:25	29 20:43 (2)	20:18		19:05	36 18:26 (4)	16:54	21 16:15 (5)	16:10	
2	04:59		05:40	20:14 (2)	06:35		07:28	17:49 (4)	07:26	15:54 (5)	08:21	
	22:00		21:23	30 20:44 (2)	20:16		19:02	37 18:26 (4)	16:52	21 16:15 (5)	16:09	
3	05:00		05:42	20:13 (2)	06:36		07:30	17:49 (4)	07:28	15:53 (5)	08:22	
	21:59		21:21	31 20:44 (2)	20:13		19:00	37 18:26 (4)	16:50	23 16:16 (5)	16:08	
4	05:01		05:44	20:13 (2)	06:38		07:31	17:48 (4)	07:30	15:52 (5)	08:24	
	21:59		21:19	31 20:44 (2)	20:11		18:57	39 18:27 (4)	16:48	24 16:16 (5)	16:08	
5	05:02		05:45	20:13 (2)	06:40		07:33	17:48 (4)	07:32	15:52 (5)	08:25	
	21:58		21:17	31 20:44 (2)	20:09		18:55	38 18:26 (4)	16:46	23 16:15 (5)	16:07	
6	05:03		05:47	20:13 (2)	06:42		07:35	17:47 (4)	07:34	15:52 (5)	08:26	
	21:58		21:15	31 20:44 (2)	20:06		18:52	37 18:24 (4)	16:44	20 16:12 (5)	16:07	
7	05:04		05:49	20:13 (2)	06:43		07:37	17:46 (4)	07:36	15:52 (5)	08:28	
	21:57		21:13	30 20:43 (2)	20:04		18:50	35 18:21 (4)	16:43	18 16:10 (5)	16:06	
8	05:05		05:50	20:12 (2)	06:45		07:39	17:46 (4)	07:38	15:52 (5)	08:29	
	21:56		21:12	29 20:41 (2)	20:01		18:48	32 18:18 (4)	16:41	16 16:08 (5)	16:06	
9	05:06		05:52	20:13 (2)	06:47		07:41	17:46 (4)	07:40	15:52 (5)	08:30	
	21:55		21:10	26 20:39 (2)	19:59		18:45	30 18:16 (4)	16:39	14 16:06 (5)	16:05	
10	05:07		05:54	20:12 (2)	06:49		07:42	17:47 (4)	07:42	15:54 (5)	08:31	
	21:55		21:07	25 20:37 (2)	19:56		18:43	27 18:14 (4)	16:37	11 16:05 (5)	16:05	
11	05:08		05:56	20:13 (2)	06:50		07:44	17:47 (4)	07:44	15:54 (5)	08:33	
	21:54		21:05	22 20:35 (2)	19:54		18:40	24 18:11 (4)	16:35	9 16:03 (5)	16:05	
12	05:09		05:57	20:13 (2)	06:52		07:46	17:48 (4)	07:45	15:55 (5)	08:34	
	21:53		21:03	21 20:34 (2)	19:51		18:38	21 18:09 (4)	16:34	6 16:01 (5)	16:05	
13	05:10		05:59	20:13 (2)	06:54		07:48	17:48 (4)	07:47	15:56 (5)	08:35	
	21:52		21:01	18 20:31 (2)	19:49		18:36	19 18:07 (4)	16:32	3 15:59 (5)	16:05	
14	05:12		06:01	20:14 (2)	06:56		07:50	17:49 (4)	07:49	15:57 (5)	08:36	
	21:51		20:59	15 20:29 (2)	19:47		18:33	15 18:04 (4)	16:31	1 15:58 (5)	16:04	
15	05:13		06:03	20:15 (2)	06:58		07:52	17:50 (4)	07:51		08:37	
	21:50		20:57	13 20:28 (2)	19:44		18:31	12 18:02 (4)	16:29		16:05	
16	05:14		06:04	20:15 (2)	06:59	18:51 (3)	07:54	17:52 (4)	07:53		08:38	
	21:49		20:55	10 20:25 (2)	19:42	6 18:57 (3)	18:29	7 17:59 (4)	16:27		16:05	
17	05:16		06:06	20:17 (2)	07:01	18:46 (3)	07:55	17:54 (4)	07:55		08:38	
	21:47		20:53	6 20:23 (2)	19:39	13 18:59 (3)	18:26	3 17:57 (4)	16:26		16:05	
18	05:17		06:08	20:19 (2)	07:03	18:44 (3)	07:57		07:57		08:39	
	21:46		20:50	3 20:22 (2)	19:37	17 19:01 (3)	18:24		16:24		16:05	
19	05:18		06:10		07:05	18:42 (3)	07:59		07:59		08:40	
	21:45		20:48		19:34	20 19:02 (3)	18:22		16:23		16:05	
20	05:20		06:12		07:06	18:41 (3)	08:01		08:00		08:41	
	21:44		20:46		19:32	22 19:03 (3)	18:20		16:22		16:06	
21	05:21		06:13		07:08	18:40 (3)	08:03		08:02		08:41	
	21:42		20:44		19:29	21 19:01 (3)	18:17		16:20		16:06	
22	05:23		06:15		07:10	18:39 (3)	08:05		08:04		08:42	
	21:41		20:42		19:27	19 18:58 (3)	18:15		16:19		16:06	
23	05:24	20:26 (2)	06:17		07:12	18:39 (3)	08:07		08:06		08:42	
	21:39	7 20:33 (2)	20:39		19:24	17 18:56 (3)	18:13		16:18		16:07	
24	05:26	20:23 (2)	06:19		07:13	18:06 (4)	08:09		08:08		08:43	
	21:38	12 20:35 (2)	20:37		19:22	26 18:54 (3)	18:11		16:17		16:08	
25	05:27	20:22 (2)	06:20		07:15	18:01 (4)	07:11		08:09		08:43	
	21:36	15 20:37 (2)	20:35		19:19	31 18:51 (3)	17:09		16:16		16:08	
26	05:29	20:20 (2)	06:22		07:17	17:58 (4)	07:13		08:11		08:43	
	21:35	18 20:38 (2)	20:32		19:17	33 18:48 (3)	17:06		16:14		16:09	
27	05:30	20:18 (2)	06:24		07:19	17:56 (4)	07:15		08:13		08:44	
	21:33	21 20:39 (2)	20:30		19:14	35 18:46 (3)	17:04		16:13		16:10	
28	05:32	20:18 (2)	06:26		07:21	17:55 (4)	07:16	16:03 (5)	08:14		08:44	
	21:32	23 20:41 (2)	20:28		19:12	34 18:44 (3)	17:02	2 16:05 (5)	16:12		16:11	
29	05:34	20:16 (2)	06:27		07:22	17:53 (4)	07:18	15:58 (5)	08:16		08:44	
	21:30	25 20:41 (2)	20:25		19:09	33 18:41 (3)	17:00	12 16:10 (5)	16:12		16:11	
30	05:35	20:16 (2)	06:29		07:24	17:51 (4)	07:20	15:56 (5)	08:18		08:44	
	21:28	26 20:42 (2)	20:23		19:07	34 18:25 (4)	16:58	16 16:12 (5)	16:11		16:12	
31	05:37	20:16 (2)	06:31				07:22	15:55 (5)			08:44	
	21:26	27 20:43 (2)	20:21				16:56	18 16:13 (5)			16:13	
Potential sun hours	512		460		382		328		259		233	
Total, worst case	174		401		361		497		210			
Sun reduction	0.32		0.34		0.32		0.29		0.27			
Oper. time red.	1.00		1.00		1.00		1.00		1.00			
Wind dir. red.	0.65		0.65		0.68		0.68		0.66			
Total reduction	0.21		0.22		0.22		0.20		0.17			
Total, real	36		88		78		98		37			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CF - H84

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:18 (5)	07:16	17:08 (4)	07:01		05:52		20:05 (2)	05:03					
	16:15			17:06	17	16:35 (5)	18:02	26	17:34 (4)	20:00		20:55	21	20:26 (2)	21:45			
2	08:44			08:12	16:18 (5)	07:14	17:07 (4)	06:59		05:50		20:04 (2)	05:02					
	16:16			17:08	19	16:37 (5)	18:04	29	17:36 (4)	20:02		20:57	23	20:27 (2)	21:46			
3	08:43			08:10	16:18 (5)	07:12	17:07 (4)	06:56		05:48		20:03 (2)	05:01					
	16:17			17:10	21	16:39 (5)	18:06	31	17:38 (4)	20:04		20:59	26	20:29 (2)	21:48			
4	08:43			08:08	16:18 (5)	07:09	17:07 (4)	06:54		05:46		20:03 (2)	05:00					
	16:18			17:12	23	16:41 (5)	18:07	34	17:41 (4)	20:06		21:01	27	20:30 (2)	21:49			
5	08:43			08:07	16:19 (5)	07:07	17:06 (4)	06:51		05:44		20:03 (2)	04:59					
	16:19			17:14	24	16:43 (5)	18:09	36	17:42 (4)	20:07		21:03	29	20:32 (2)	21:50			
6	08:42			08:05	16:19 (5)	07:04	17:06 (4)	06:49		05:42		20:02 (2)	04:59					
	16:21			17:16	23	16:42 (5)	18:11	39	17:45 (4)	20:09		21:04	31	20:33 (2)	21:51			
7	08:42			08:03	16:20 (5)	07:02	17:05 (4)	06:47		05:40		20:03 (2)	04:58					
	16:22			17:18	22	16:42 (5)	18:13	41	17:46 (4)	20:11		21:06	33	20:36 (2)	21:52			
8	08:42			08:01	16:20 (5)	07:00	17:06 (4)	06:44		05:38		20:03 (2)	04:57					
	16:24			17:20	21	16:41 (5)	18:15	40	17:46 (4)	20:13		21:08	32	20:35 (2)	21:53			
9	08:41			07:59	16:21 (5)	06:57	17:05 (4)	06:42		05:36		20:03 (2)	04:57					
	16:25			17:22	20	16:41 (5)	18:17	40	17:45 (4)	20:15		21:10	32	20:35 (2)	21:54			
10	08:40			07:57	16:23 (5)	06:55	17:06 (4)	06:39		05:34		20:03 (2)	04:56					
	16:26			17:24	17	16:40 (5)	18:19	38	17:44 (4)	20:17		21:11	31	20:34 (2)	21:55			
11	08:40			07:55	16:25 (5)	06:52	17:07 (4)	06:37		05:33		20:04 (2)	04:56					
	16:28			17:26	13	16:38 (5)	18:21	37	17:44 (4)	20:19		21:13	31	20:35 (2)	21:55			
12	08:39			07:53	16:27 (5)	06:50	17:07 (4)	06:35		05:31		20:04 (2)	04:55					
	16:30			17:28	7	16:34 (5)	18:23	35	17:42 (4)	20:20		21:15	30	20:34 (2)	21:56			
13	08:38			07:51		06:48	17:08 (4)	06:32		05:29		20:04 (2)	04:55					
	16:31			17:30		18:25	34	17:42 (4)	20:22		21:17	29	20:33 (2)	21:57				
14	08:37			07:49		06:45	17:09 (4)	06:30		05:27		20:05 (2)	04:55					
	16:33			17:32		18:27	34	18:00 (3)	20:24		21:18	28	20:33 (2)	21:57				
15	08:36			07:47		06:43	17:10 (4)	06:28		05:26		20:05 (2)	04:55					
	16:34			17:34		18:28	34	18:02 (3)	20:26		21:20	27	20:32 (2)	21:58				
16	08:35			07:45		06:40	17:11 (4)	06:25		05:24		20:07 (2)	04:54					
	16:36			17:36		18:30	35	18:04 (3)	20:28		21:22	24	20:31 (2)	21:59				
17	08:34			07:43		06:38	17:14 (4)	06:23		05:22		20:07 (2)	04:54					
	16:38			17:38		18:32	32	18:06 (3)	20:30		21:23	23	20:30 (2)	21:59				
18	08:33			07:41		06:35	17:17 (4)	06:21		05:21		20:08 (2)	04:54					
	16:40			17:40		18:34	26	18:07 (3)	20:31		21:25	21	20:29 (2)	22:00				
19	08:32			07:39		06:33	17:53 (3)	06:18		05:19		20:10 (2)	04:54					
	16:41			17:42		18:36	17	18:10 (3)	20:33		21:27	19	20:29 (2)	22:00				
20	08:31			07:36		06:31	17:52 (3)	06:16		05:18		20:11 (2)	04:54					
	16:43			17:44		18:38	19	18:11 (3)	20:35		21:28	16	20:27 (2)	22:00				
21	08:30			07:34		06:28	17:52 (3)	06:14		05:16		20:13 (2)	04:54					
	16:45			17:46		18:40	21	18:13 (3)	20:37		21:30	12	20:25 (2)	22:01				
22	08:28			07:32		06:26	17:52 (3)	06:12		05:15		20:16 (2)	04:55					
	16:47			17:48		18:41	23	18:15 (3)	20:39		21:31	7	20:23 (2)	22:01				
23	08:27			07:30		17:16 (4)	06:23	17:53 (3)	06:09		05:13		04:55					
	16:49			17:50	6	17:22 (4)	18:43	22	18:15 (3)	20:41		21:33		22:01				
24	08:26			07:28		17:15 (4)	06:21	17:53 (3)	06:07		05:12		04:55					
	16:50			17:52	9	17:24 (4)	18:45	20	18:13 (3)	20:42		21:34		22:01				
25	08:24			07:25		17:12 (4)	06:18	17:55 (3)	06:05		05:11		04:55					
	16:52			17:54	14	17:26 (4)	18:47	16	18:11 (3)	20:44	3	20:15 (2)	21:36		22:01			
26	08:23		16:20 (5)	07:23		17:11 (4)	06:16	17:58 (3)	06:03		05:09		04:56					
	16:54	1	16:21 (5)	17:56	17	17:28 (4)	18:49	11	18:09 (3)	20:46	7	20:17 (2)	21:37		22:01			
27	08:22		16:19 (5)	07:21		17:11 (4)	06:13		06:01		05:08		04:56					
	16:56	4	16:23 (5)	17:58	20	17:31 (4)	18:51		20:48	10	20:19 (2)	21:39		22:01				
28	08:20		16:19 (5)	07:18		17:09 (4)	06:11		05:58		20:07 (2)	05:07	04:57					
	16:58	7	16:26 (5)	18:00	23	17:32 (4)	18:53		20:50	14	20:21 (2)	21:40		22:01				
29	08:18		16:19 (5)			07:08			05:56		20:06 (2)	05:06	04:57					
	17:00	9	16:28 (5)			19:54			20:52	16	20:22 (2)	21:41		22:01				
30	08:17		16:18 (5)			07:06			05:54		20:05 (2)	05:05	04:58					
	17:02	12	16:30 (5)			19:56			20:53	19	20:24 (2)	21:43		22:00				
31	08:15		16:18 (5)			07:04					05:04							
	17:04	14	16:32 (5)			19:58					21:44							
Potential sun hours	250			273			367		420		494					510		
Total, worst case		47			316			770		69		552						
Sun reduction		0.24			0.23			0.27		0.35		0.38						
Oper. time red.		1.00			1.00			1.00		1.00		1.00						
Wind dir. red.		0.66			0.66			0.68		0.64		0.64						
Total reduction		0.16			0.15			0.18		0.23		0.25						
Total, real		8			49			141		16		136						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CF - H84

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1 04:59	05:39	20:14 (2) 06:33	07:26	17:46 (4) 07:24	15:52 (5) 08:19	
22:00	21:25 30	20:44 (2) 20:18	19:05 35	18:21 (4) 16:54 17	16:09 (5) 16:10	
2 04:59	05:40	20:14 (2) 06:35	07:28	17:45 (4) 07:26	15:51 (5) 08:21	
22:00	21:23 31	20:45 (2) 20:16	19:02 37	18:22 (4) 16:52 19	16:10 (5) 16:09	
3 05:00	05:42	20:13 (2) 06:36	07:30	17:44 (4) 07:28	15:50 (5) 08:22	
21:59	21:21 32	20:45 (2) 20:13	19:00 38	18:22 (4) 16:50 21	16:11 (5) 16:08	
4 05:01	05:44	20:13 (2) 06:38	07:31	17:44 (4) 07:30	15:49 (5) 08:24	
21:59	21:19 32	20:45 (2) 20:11	18:57 38	18:22 (4) 16:48 23	16:12 (5) 16:08	
5 05:02	05:45	20:12 (2) 06:40	07:33	17:43 (4) 07:32	15:49 (5) 08:25	
21:58	21:17 33	20:45 (2) 20:09	18:55 40	18:23 (4) 16:46 23	16:12 (5) 16:07	
6 05:03	05:47	20:12 (2) 06:42	07:35	17:43 (4) 07:34	15:48 (5) 08:26	
21:58	21:15 33	20:45 (2) 20:06	18:52 40	18:23 (4) 16:44 24	16:12 (5) 16:07	
7 05:04	05:49	20:13 (2) 06:43	07:37	17:41 (4) 07:36	15:48 (5) 08:28	
21:57	21:13 30	20:43 (2) 20:04	18:50 40	18:21 (4) 16:43 22	16:10 (5) 16:06	
8 05:05	05:50	20:12 (2) 06:45	07:39	17:41 (4) 07:38	15:48 (5) 08:29	
21:56	21:12 29	20:41 (2) 20:01	18:48 37	18:18 (4) 16:41 20	16:08 (5) 16:06	
9 05:06	05:52	20:13 (2) 06:47	07:41	17:41 (4) 07:40	15:48 (5) 08:30	
21:55	21:10 26	20:39 (2) 19:59	18:45 35	18:16 (4) 16:39 18	16:06 (5) 16:05	
10 05:07	05:54	20:12 (2) 06:49	07:42	17:41 (4) 07:42	15:49 (5) 08:31	
21:55	21:07 25	20:37 (2) 19:56	18:43 33	18:14 (4) 16:37 16	16:05 (5) 16:05	
11 05:08	05:56	20:13 (2) 06:50	07:44	17:41 (4) 07:44	15:49 (5) 08:33	
21:54	21:05 22	20:35 (2) 19:54	18:40 30	18:11 (4) 16:35 14	16:03 (5) 16:05	
12 05:09	05:57	20:13 (2) 06:52	07:46	17:41 (4) 07:45	15:50 (5) 08:34	
21:53	21:03 21	20:34 (2) 19:51	18:38 28	18:09 (4) 16:34 11	16:01 (5) 16:05	
13 05:10	05:59	20:13 (2) 06:54	07:48	17:42 (4) 07:47	15:51 (5) 08:35	
21:52	21:01 18	20:31 (2) 19:49	18:36 25	18:07 (4) 16:32 8	15:59 (5) 16:05	
14 05:12	06:01	20:14 (2) 06:56	07:50	17:42 (4) 07:49	15:51 (5) 08:36	
21:51	20:59 15	20:29 (2) 19:47	18:33 22	18:04 (4) 16:31 7	15:58 (5) 16:04	
15 05:13	06:03	20:15 (2) 06:58	07:52	17:43 (4) 07:51	15:52 (5) 08:37	
21:50	20:57 13	20:28 (2) 19:44	18:31 19	18:02 (4) 16:29 4	15:56 (5) 16:05	
16 05:14	06:04	20:16 (2) 06:59	07:54	17:44 (4) 07:53	15:53 (5) 08:38	
21:49	20:55 9	20:25 (2) 19:42	18:29 15	17:59 (4) 16:27 1	15:54 (5) 16:05	
17 05:16	06:06	20:17 (2) 07:01	18:46 (3) 07:55	17:45 (4) 07:55	08:38	
21:47	20:53 6	20:23 (2) 19:39	10 18:56 (3) 18:26 12	17:57 (4) 16:26	16:05	
18 05:17	06:08	20:19 (2) 07:03	18:43 (3) 07:57	17:46 (4) 07:57	08:39	
21:46	20:50 3	20:22 (2) 19:37	15 18:58 (3) 18:24 9	17:55 (4) 16:24	16:05	
19 05:18	06:10	07:05	18:41 (3) 07:59	17:48 (4) 07:59	08:40	
21:45	20:48	19:34 19	19:00 (3) 18:22 4	17:52 (4) 16:23	16:05	
20 05:20	06:12	07:06	18:40 (3) 08:01	08:00	08:41	
21:44	20:46	19:32 21	19:01 (3) 18:20	16:22	16:06	
21 05:21	06:13	07:08	18:38 (3) 08:03	08:02	08:41	
21:42	20:44	19:29 23	19:01 (3) 18:17	16:20	16:06	
22 05:23	20:24 (2) 06:15	07:10	18:37 (3) 08:05	08:04	08:42	
21:41 10	20:34 (2) 20:42	19:27 21	18:58 (3) 18:15	16:19	16:06	
23 05:24	20:23 (2) 06:17	07:12	18:37 (3) 08:07	08:06	08:42	
21:39 14	20:37 (2) 20:39	19:24 19	18:56 (3) 18:13	16:18	16:07	
24 05:26	20:21 (2) 06:19	07:13	18:36 (3) 08:09	08:08	08:43	
21:38 17	20:38 (2) 20:37	19:22 18	18:54 (3) 18:11	16:17	16:08	
25 05:27	20:20 (2) 06:20	07:15	18:01 (4) 07:11	08:09	08:43	
21:36 20	20:40 (2) 20:35	19:19 25	18:51 (3) 17:09	16:16	16:08	
26 05:29	20:18 (2) 06:22	07:17	17:57 (4) 07:13	08:11	08:43	
21:35 22	20:40 (2) 20:32	19:17 30	18:48 (3) 17:06	16:14	16:09	
27 05:30	20:17 (2) 06:24	07:19	17:54 (4) 07:15	08:13	08:44	
21:33 24	20:41 (2) 20:30	19:14 33	18:46 (3) 17:04	16:13	16:10	
28 05:32	20:17 (2) 06:26	07:21	17:52 (4) 07:16	08:14	08:44	
21:32 25	20:42 (2) 20:28	19:12 35	18:44 (3) 17:02	16:12	16:11	
29 05:34	20:15 (2) 06:27	07:22	17:50 (4) 07:18	08:16	08:44	
21:30 27	20:42 (2) 20:25	19:09 34	18:41 (3) 17:00	16:12	16:11	
30 05:35	20:15 (2) 06:29	07:24	17:48 (4) 07:20	15:56 (5) 08:18	08:44	
21:28 28	20:43 (2) 20:23	19:07 33	18:38 (3) 16:58 9	16:05 (5) 16:11	16:12	
31 05:37	20:15 (2) 06:31	07:22	17:53 (5) 07:22	15:53 (5) 08:44	16:12	
21:26 29	20:44 (2) 20:21	16:56 14	16:07 (5) 16:13	16:13	16:13	
Potential sun hours	512	460	382	328	259	233
Total, worst case	216	408	336	560	248	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.64	0.64	0.68	0.68	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.17	
Total, real	45	90	73	111	43	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CG - H85

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44 16:15	08:14 17:06	21	16:35 (5) 18:02	32	17:02 (4) 17:34 (4)	07:01 20:00	05:52 20:55	22	20:04 (2) 20:26 (2)	05:03 21:45
2	08:44 16:16	08:12 17:08	23	16:14 (5) 16:37 (5)	35	17:01 (4) 17:36 (4)	06:59 20:02	05:50 20:57	23	20:04 (2) 20:27 (2)	05:02 21:46
3	08:43 16:17	08:10 17:10	25	16:14 (5) 16:39 (5)	37	17:01 (4) 17:38 (4)	06:56 20:04	05:48 20:59	26	20:03 (2) 20:29 (2)	05:01 21:48
4	08:43 16:18	08:08 17:12	24	16:14 (5) 16:38 (5)	40	17:01 (4) 17:41 (4)	06:54 20:06	05:46 21:01	27	20:03 (2) 20:30 (2)	05:00 21:49
5	08:43 16:19	08:07 17:14	23	16:15 (5) 16:38 (5)	42	17:00 (4) 17:42 (4)	06:51 20:07	05:44 21:03	30	20:02 (2) 20:32 (2)	04:59 21:50
6	08:42 16:21	08:05 17:16	22	16:15 (5) 16:37 (5)	42	17:00 (4) 17:42 (4)	06:49 20:09	05:42 21:04	31	20:02 (2) 20:33 (2)	04:59 21:51
7	08:42 16:22	08:03 17:18	21	16:16 (5) 16:37 (5)	41	17:00 (4) 17:41 (4)	06:47 20:11	05:40 21:06	34	20:02 (2) 20:36 (2)	04:58 21:52
8	08:42 16:24	08:01 17:20	18	16:18 (5) 16:36 (5)	40	17:01 (4) 17:41 (4)	06:44 20:13	05:38 21:08	34	20:02 (2) 20:36 (2)	04:57 21:53
9	08:41 16:25	07:59 17:22	15	16:19 (5) 16:34 (5)	39	17:00 (4) 17:39 (4)	06:42 20:15	05:36 21:10	34	20:02 (2) 20:36 (2)	04:57 21:54
10	08:40 16:26	07:57 17:24	10	16:22 (5) 16:32 (5)	38	17:01 (4) 17:39 (4)	06:39 20:17	05:34 21:11	33	20:02 (2) 20:35 (2)	04:56 21:55
11	08:40 16:28	07:55 17:26		06:52 18:21	35	17:03 (4) 17:38 (4)	06:37 20:19	05:33 21:13	32	20:03 (2) 20:35 (2)	04:56 21:55
12	08:39 16:30	07:53 17:28		06:50 18:23	33	17:03 (4) 17:36 (4)	06:35 20:20	05:31 21:15	32	20:03 (2) 20:35 (2)	04:55 21:56
13	08:38 16:31	07:51 17:30		06:48 18:25	34	17:04 (4) 17:58 (3)	06:32 20:22	05:29 21:17	31	20:03 (2) 20:34 (2)	04:55 21:57
14	08:37 16:33	07:49 17:32		06:45 18:27	35	17:05 (4) 18:00 (3)	06:30 20:24	05:27 21:18	30	20:04 (2) 20:34 (2)	04:55 21:58
15	08:36 16:34	07:47 17:34		06:43 18:28	32	17:08 (4) 18:02 (3)	06:28 20:26	05:26 21:20	29	20:04 (2) 20:33 (2)	04:55 21:58
16	08:35 16:36	07:45 17:36		06:40 18:30	30	17:10 (4) 18:04 (3)	06:25 20:28	05:24 21:22	28	20:05 (2) 20:33 (2)	04:54 21:59
17	08:34 16:38	07:43 17:38		06:38 18:32	23	17:15 (4) 18:06 (3)	06:23 20:30	05:22 21:23	26	20:05 (2) 20:31 (2)	04:54 21:59
18	08:33 16:40	07:41 17:40		06:35 18:34	17	17:50 (3) 18:07 (3)	06:21 20:31	05:21 21:25	24	20:07 (2) 20:31 (2)	04:54 22:00
19	08:32 16:41	07:39 17:42		06:33 18:36	20	17:50 (3) 18:10 (3)	06:18 20:33	05:19 21:27	22	20:08 (2) 20:30 (2)	04:54 22:00
20	08:31 16:43	07:36 17:44	3	17:13 (4) 17:16 (4)	21	17:50 (3) 18:11 (3)	06:16 20:35	05:18 21:28	20	20:09 (2) 20:29 (2)	04:54 22:00
21	08:30 16:45	07:34 17:46	7	17:11 (4) 17:18 (4)	23	17:50 (3) 18:13 (3)	06:14 20:37	05:16 21:30	17	20:11 (2) 20:28 (2)	04:54 22:01
22	08:29 16:47	07:32 17:48	11	17:08 (4) 17:19 (4)	23	17:50 (3) 18:13 (3)	06:12 20:39	05:15 21:31	15	20:12 (2) 20:27 (2)	04:55 22:01
23	08:27 16:49	07:30 17:50	15	18:42 17:22 (4)	21	18:13 (3) 18:12 (3)	20:39 20:41	05:13 21:33	10	20:14 (2) 20:24 (2)	04:55 22:01
24	08:26 16:50	07:28 17:52	18	18:43 17:06 (4)	18	18:12 (3) 18:10 (3)	20:41 20:42	05:12 21:34			04:55 22:01
25	08:24 16:52	07:25 16:19 (5)	22	18:45 17:24 (4)	14	18:10 (3) 18:08 (3)	20:42 20:44	21:34 21:36			22:01 22:01
26	08:23 16:54	07:23 16:21 (5)	24	18:47 17:28 (4)	7	18:03 (3) 18:05 (3)	20:46 20:46	21:37 21:37			22:01 22:01
27	08:22 16:56	07:21 16:23 (5)	28	18:49 17:31 (4)			20:46 20:48	21:37 21:39			22:01 22:01
28	08:20 16:58	07:18 16:14 (5)	30	18:51 17:02 (4)			20:48 20:50	21:39 21:40			22:01 22:01
29	08:18 17:00	16:13 (5) 16:28 (5)		18:53 19:54			20:50 20:52	21:40 21:41			22:01 22:01
30	08:17 17:02	16:13 (5) 16:30 (5)		19:56 19:56			20:54 20:53	21:05 21:43			22:01 22:00
31	08:15 17:04	16:13 (5) 16:32 (5)		20:04 19:58			20:54 21:44	21:05 21:44			22:01 22:00
Potential sun hours	250		273		367		420		494		510
Total, worst case	86		360		772		69		610		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.67		0.68		0.64		0.64		
Total reduction	0.16		0.16		0.18		0.23		0.25		
Total, real	14		56		142		16		150		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CG - H85

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July		August		September		October		November		December	
1	04:59		05:39	20:13 (2)	06:33		07:26	17:42 (4)	07:24	15:51 (5)	08:19	
	22:00		21:25	32 20:45 (2)	20:18		19:05	33 18:36 (3)	16:54	11 16:02 (5)	16:10	
2	04:59		05:40	20:13 (2)	06:35		07:28	17:41 (4)	07:26	15:49 (5)	08:21	
	22:00		21:23	33 20:46 (2)	20:16		19:02	34 18:15 (4)	16:52	15 16:04 (5)	16:09	
3	05:00		05:42	20:12 (2)	06:36		07:30	17:40 (4)	07:28	15:47 (5)	08:22	
	21:59		21:21	33 20:45 (2)	20:13		19:00	36 18:16 (4)	16:50	19 16:06 (5)	16:08	
4	05:01		05:44	20:12 (2)	06:38		07:31	17:39 (4)	07:30	15:46 (5)	08:24	
	21:59		21:19	34 20:46 (2)	20:11		18:57	38 18:17 (4)	16:48	20 16:06 (5)	16:08	
5	05:02		05:45	20:12 (2)	06:40		07:33	17:38 (4)	07:32	15:45 (5)	08:25	
	21:58		21:17	33 20:45 (2)	20:09		18:55	39 18:17 (4)	16:46	22 16:07 (5)	16:07	
6	05:03		05:47	20:12 (2)	06:42		07:35	17:37 (4)	07:34	15:44 (5)	08:26	
	21:58		21:15	33 20:45 (2)	20:06		18:52	41 18:18 (4)	16:44	24 16:08 (5)	16:07	
7	05:04		05:49	20:12 (2)	06:43		07:37	17:36 (4)	07:36	15:44 (5)	08:28	
	21:57		21:13	31 20:43 (2)	20:04		18:50	41 18:17 (4)	16:43	24 16:08 (5)	16:06	
8	05:05		05:51	20:12 (2)	06:45		07:39	17:35 (4)	07:38	15:44 (5)	08:29	
	21:56		21:12	29 20:41 (2)	20:01		18:48	42 18:17 (4)	16:41	24 16:08 (5)	16:06	
9	05:06		05:52	20:12 (2)	06:47		07:41	17:35 (4)	07:40	15:43 (5)	08:30	
	21:55		21:10	27 20:39 (2)	19:59		18:45	41 18:16 (4)	16:39	23 16:06 (5)	16:05	
10	05:07		05:54	20:12 (2)	06:49		07:42	17:35 (4)	07:42	15:44 (5)	08:31	
	21:55		21:07	25 20:37 (2)	19:56		18:43	39 18:14 (4)	16:37	21 16:05 (5)	16:05	
11	05:08		05:56	20:12 (2)	06:50		07:44	17:35 (4)	07:44	15:45 (5)	08:33	
	21:54		21:05	23 20:35 (2)	19:54		18:40	36 18:11 (4)	16:35	18 16:03 (5)	16:05	
12	05:09		05:57	20:13 (2)	06:52		07:46	17:35 (4)	07:45	15:45 (5)	08:34	
	21:53		21:03	21 20:34 (2)	19:51		18:38	34 18:09 (4)	16:34	16 16:01 (5)	16:05	
13	05:10		05:59	20:13 (2)	06:54		07:48	17:35 (4)	07:47	15:45 (5)	08:35	
	21:52		21:01	18 20:31 (2)	19:49		18:36	32 18:07 (4)	16:32	14 15:59 (5)	16:05	
14	05:12		06:01	20:14 (2)	06:56		07:50	17:35 (4)	07:49	15:46 (5)	08:36	
	21:51		20:59	15 20:29 (2)	19:47		18:33	29 18:04 (4)	16:31	12 15:58 (5)	16:04	
15	05:13		06:03	20:15 (2)	06:58		07:52	17:35 (4)	07:51	15:46 (5)	08:37	
	21:50		20:57	13 20:28 (2)	19:44		18:31	27 18:02 (4)	16:29	10 15:56 (5)	16:05	
16	05:14		06:04	20:15 (2)	06:59		07:54	17:36 (4)	07:53	15:47 (5)	08:38	
	21:49		20:55	10 20:25 (2)	19:42		18:29	23 17:59 (4)	16:27	7 15:54 (5)	16:05	
17	05:16		06:06	20:17 (2)	07:01	18:47 (3)	07:55	17:37 (4)	07:55	15:48 (5)	08:38	
	21:47		20:53	6 20:23 (2)	19:39	3 18:50 (3)	18:26	20 17:57 (4)	16:26	4 15:52 (5)	16:05	
18	05:17		06:08	20:19 (2)	07:03	18:42 (3)	07:57	17:38 (4)	07:57	15:49 (5)	08:39	
	21:46		20:50	3 20:22 (2)	19:37	13 18:55 (3)	18:24	17 17:55 (4)	16:24	2 15:51 (5)	16:05	
19	05:18		06:10		07:05	18:40 (3)	07:59	17:39 (4)	07:59		08:40	
	21:45		20:48		19:34	17 18:57 (3)	18:22	13 17:52 (4)	16:23		16:05	
20	05:20	20:26 (2)	06:12		07:06	18:38 (3)	08:01	17:40 (4)	08:00		08:41	
	21:44	7 20:33 (2)	20:46		19:32	20 18:58 (3)	18:20	10 17:50 (4)	16:22		16:06	
21	05:21	20:23 (2)	06:13		07:08	18:36 (3)	08:03	17:41 (4)	08:02		08:41	
	21:42	12 20:35 (2)	20:44		19:29	22 18:58 (3)	18:17	7 17:48 (4)	16:20		16:06	
22	05:23	20:21 (2)	06:15		07:10	18:35 (3)	08:05	17:44 (4)	08:04		08:42	
	21:41	16 20:37 (2)	20:42		19:27	23 18:58 (3)	18:15	1 17:45 (4)	16:19		16:06	
23	05:24	20:20 (2)	06:17		07:12	18:35 (3)	08:07		08:06		08:42	
	21:39	19 20:39 (2)	20:39		19:24	21 18:56 (3)	18:13		16:18		16:07	
24	05:26	20:19 (2)	06:19		07:13	18:34 (3)	08:09		08:08		08:43	
	21:38	21 20:40 (2)	20:37		19:22	20 18:54 (3)	18:11		16:17		16:08	
25	05:27	20:18 (2)	06:20		07:15	18:33 (3)	07:11		08:09		08:43	
	21:36	23 20:41 (2)	20:35		19:19	18 18:51 (3)	17:09		16:16		16:08	
26	05:29	20:17 (2)	06:22		07:17	18:33 (3)	07:13		08:11		08:43	
	21:35	25 20:42 (2)	20:32		19:17	15 18:48 (3)	17:06		16:14		16:09	
27	05:30	20:15 (2)	06:24		07:19	17:53 (4)	07:15		08:13		08:44	
	21:33	27 20:42 (2)	20:30		19:14	28 18:46 (3)	17:04		16:13		16:10	
28	05:32	20:15 (2)	06:26		07:21	17:49 (4)	07:16		08:14		08:44	
	21:32	28 20:43 (2)	20:28		19:12	33 18:44 (3)	17:02		16:12		16:11	
29	05:34	20:14 (2)	06:27		07:22	17:47 (4)	07:18		08:16		08:44	
	21:30	29 20:43 (2)	20:25		19:09	33 18:41 (3)	17:00		16:12		16:11	
30	05:35	20:14 (2)	06:29		07:24	17:44 (4)	07:20		08:18		08:44	
	21:28	30 20:44 (2)	20:23		19:07	33 18:38 (3)	16:58		16:11		16:12	
31	05:37	20:14 (2)	06:31				07:22	15:54 (5)			08:44	
	21:26	31 20:45 (2)	20:21				16:56	3 15:57 (5)			16:13	
Potential sun hours	512		460		382		328		259		233	
Total, worst case		268	419		299		636		286			
Sun reduction		0.32	0.34		0.32		0.29		0.27			
Oper. time red.		1.00	1.00		1.00		1.00		1.00			
Wind dir. red.		0.64	0.64		0.67		0.68		0.66			
Total reduction		0.21	0.22		0.22		0.20		0.18			
Total, real		56	92		65		126		50			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CH - H86

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44 16:15	08:14 17:06	25 16:33 (5)	07:16 18:02	41 17:34 (4)	07:01 20:00		05:52 20:55		20:05 (2) 20:26 (2)	05:03 21:45
2	08:44 16:16	08:12 17:08	25 16:33 (5)	07:14 18:04	44 17:36 (4)	06:59 20:02		05:50 20:57	21	20:04 (2) 20:27 (2)	05:02 21:46
3	08:44 16:17	08:10 17:10	23 16:32 (5)	07:12 18:06	44 17:36 (4)	06:56 20:04		05:48 20:59	26	20:03 (2) 20:29 (2)	05:01 21:48
4	08:43 16:18	08:08 17:12	22 16:32 (5)	07:09 18:07	43 17:36 (4)	06:54 20:06		05:46 21:01	27	20:03 (2) 20:30 (2)	05:00 21:49
5	08:43 16:19	08:07 17:14	20 16:31 (5)	07:07 18:09	42 17:35 (4)	06:51 20:07		05:44 21:03	30	20:02 (2) 20:32 (2)	04:59 21:50
6	08:42 16:21	08:05 17:16	18 16:30 (5)	07:04 18:11	42 17:35 (4)	06:49 20:09		05:42 21:04	31	20:02 (2) 20:33 (2)	04:59 21:51
7	08:42 16:22	08:03 17:18	15 16:28 (5)	07:02 18:13	41 17:34 (4)	06:47 20:11		05:40 21:06	34	20:02 (2) 20:36 (2)	04:58 21:52
8	08:42 16:24	08:01 17:20	10 16:26 (5)	07:00 18:15	39 17:33 (4)	06:44 20:13		05:38 21:08	35	20:02 (2) 20:37 (2)	04:57 21:53
9	08:41 16:25	07:59 17:22		06:57 18:17	37 17:31 (4)	06:42 20:15		05:36 21:10	35	20:02 (2) 20:37 (2)	04:57 21:54
10	08:40 16:26	07:57 17:24		06:55 18:19	34 17:30 (4)	06:39 20:17		05:34 21:11	36	20:01 (2) 20:37 (2)	04:56 21:55
11	08:40 16:28	07:55 17:26		06:52 18:21	33 17:55 (3)	06:37 20:19		05:33 21:13	35	20:02 (2) 20:37 (2)	04:56 21:55
12	08:39 16:30	07:53 17:28		06:50 18:23	33 17:56 (3)	06:35 20:20		05:31 21:15	34	20:02 (2) 20:36 (2)	04:55 21:56
13	08:38 16:31	07:51 17:30		06:48 18:25	32 17:58 (3)	06:32 20:22		05:29 21:17	34	20:02 (2) 20:36 (2)	04:55 21:57
14	08:37 16:33	07:49 17:32		06:45 18:27	31 18:00 (3)	06:30 20:24		05:27 21:18	33	20:03 (2) 20:36 (2)	04:55 21:58
15	08:36 16:34	07:47 17:34		06:43 18:28	25 18:02 (3)	06:28 20:26		05:26 21:20	32	20:03 (2) 20:35 (2)	04:55 21:58
16	08:35 16:36	07:45 17:36		06:40 18:30	16 18:04 (3)	06:25 20:28		05:24 21:22	31	20:04 (2) 20:35 (2)	04:54 21:59
17	08:34 16:38	07:43 17:38	4 17:09 (4)	06:38 18:32	18 18:06 (3)	06:23 20:30		05:22 21:23	30	20:04 (2) 20:34 (2)	04:54 21:59
18	08:33 16:40	07:41 17:40	9 17:11 (4)	06:35 18:34	20 18:07 (3)	06:21 20:31		05:21 21:25	29	20:05 (2) 20:34 (2)	04:54 22:00
19	08:32 16:41	07:39 17:42	13 17:13 (4)	06:33 18:36	23 18:10 (3)	06:18 20:33		05:19 21:27	27	20:06 (2) 20:33 (2)	04:54 22:00
20	08:31 16:43	07:36 17:44	17 17:16 (4)	06:31 18:38	24 18:11 (3)	06:16 20:35		05:18 21:28	25	20:07 (2) 20:32 (2)	04:54 22:00
21	08:30 16:45	16:08 (5) 16:11 (5)	07:34 17:46	16:58 (4) 17:18 (4)	06:28 18:40	06:14 20:37		05:16 21:30	24	20:08 (2) 20:32 (2)	04:54 22:01
22	08:29 16:47	16:07 (5) 16:12 (5)	07:32 17:48	16:57 (4) 17:19 (4)	06:26 18:42	06:12 20:39		05:15 21:31	22	20:09 (2) 20:31 (2)	04:55 22:01
23	08:27 16:49	16:07 (5) 16:15 (5)	07:30 17:50	16:56 (4) 17:22 (4)	06:23 18:43	06:09 20:41		05:13 21:33	19	20:10 (2) 20:29 (2)	04:55 22:01
24	08:26 16:50	16:07 (5) 16:17 (5)	07:28 17:52	16:55 (4) 17:24 (4)	06:21 18:45	06:07 20:43		05:12 21:34	17	20:11 (2) 20:28 (2)	04:55 22:01
25	08:24 16:52	16:07 (5) 16:19 (5)	07:25 17:54	16:54 (4) 17:26 (4)	06:18 18:47	06:05 20:44	20:14 (2)	05:11 21:36	14	20:13 (2) 20:27 (2)	04:55 22:01
26	08:23 16:54	16:06 (5) 16:21 (5)	07:23 17:56	16:54 (4) 17:28 (4)	06:16 18:49	06:03 20:46	20:11 (2)	05:09 21:37	9	20:16 (2) 20:25 (2)	04:56 22:01
27	08:22 16:56	16:06 (5) 16:23 (5)	07:21 17:58	16:54 (4) 17:31 (4)	06:13 18:51	06:01 20:48	20:09 (2)	05:08 21:39			04:56 22:01
28	08:20 16:58	16:07 (5) 16:26 (5)	07:18 18:00	16:53 (4) 17:32 (4)	06:11 18:53	05:58 20:50	20:19 (2)	05:07 21:40			04:57 22:01
29	08:18 17:00	16:07 (5) 16:28 (5)		07:08 19:54		05:56 20:52	20:07 (2)	05:06 21:41			04:57 22:01
30	08:17 17:02	16:07 (5) 16:30 (5)		07:06 19:56		05:54 20:53	20:06 (2)	05:05 21:43			04:58 22:00
31	08:15 17:04	16:07 (5) 16:32 (5)		07:04 19:58				05:04 21:44			
Potential sun hours	250		273		367		420		494		510
Total, worst case		158		440		748			713		
Sun reduction		0.24		0.23		0.27		0.35	0.38		
Oper. time red.		1.00		1.00		1.00			1.00		
Wind dir. red.		0.66		0.67		0.67		0.64	0.64		
Total reduction		0.16		0.16		0.18		0.23	0.25		
Total, real		25		69		137		14	175		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CH - H86

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1 04:59		05:39	20:12 (2) 06:33	07:26	17:38 (4) 07:24	08:19
22:00		21:25 35	20:47 (2) 20:18	19:05 33	18:36 (3) 16:54	16:10
2 04:59		05:40	20:12 (2) 06:35	07:28	17:36 (4) 07:26	08:21
22:00		21:23 36	20:48 (2) 20:16	19:02 33	18:33 (3) 16:52 1	15:51 (5) 16:09
3 05:00		05:42	20:12 (2) 06:36	07:30	17:34 (4) 07:28	15:45 (5) 08:22
21:59		21:21 35	20:47 (2) 20:13	19:00 34	18:08 (4) 16:50 11	15:56 (5) 16:08
4 05:01		05:44	20:12 (2) 06:38	07:31	17:33 (4) 07:30	15:43 (5) 08:24
21:59		21:19 35	20:47 (2) 20:11	18:57 36	18:09 (4) 16:48 15	15:58 (5) 16:08
5 05:02		05:45	20:11 (2) 06:40	07:33	17:31 (4) 07:32	15:41 (5) 08:25
21:58		21:17 35	20:46 (2) 20:09	18:55 39	18:10 (4) 16:46 19	16:00 (5) 16:07
6 05:03		05:47	20:12 (2) 06:42	07:35	17:30 (4) 07:34	15:40 (5) 08:26
21:58		21:15 33	20:45 (2) 20:06	18:52 40	18:10 (4) 16:44 21	16:01 (5) 16:07
7 05:04		05:49	20:12 (2) 06:43	07:37	17:29 (4) 07:36	15:39 (5) 08:28
21:57		21:13 31	20:43 (2) 20:04	18:50 41	18:10 (4) 16:43 22	16:01 (5) 16:06
8 05:05		05:51	20:12 (2) 06:45	07:39	17:28 (4) 07:38	15:39 (5) 08:29
21:56		21:12 29	20:41 (2) 20:01	18:48 42	18:10 (4) 16:41 23	16:02 (5) 16:06
9 05:06		05:52	20:12 (2) 06:47	07:41	17:27 (4) 07:40	15:38 (5) 08:30
21:55		21:10 27	20:39 (2) 19:59	18:45 43	18:10 (4) 16:39 24	16:02 (5) 16:05
10 05:07		05:54	20:12 (2) 06:49	07:42	17:27 (4) 07:42	15:39 (5) 08:31
21:55		21:07 25	20:37 (2) 19:56	18:43 43	18:10 (4) 16:37 25	16:04 (5) 16:05
11 05:08		05:56	20:13 (2) 06:50	07:44	17:26 (4) 07:44	15:39 (5) 08:33
21:54		21:05 22	20:35 (2) 19:54	18:40 44	18:10 (4) 16:35 24	16:03 (5) 16:05
12 05:09		05:57	20:13 (2) 06:52	07:46	17:26 (4) 07:45	15:38 (5) 08:34
21:53		21:03 21	20:34 (2) 19:51	18:38 43	18:09 (4) 16:34 23	16:01 (5) 16:05
13 05:10		05:59	20:13 (2) 06:54	07:48	17:26 (4) 07:47	15:38 (5) 08:35
21:52		21:01 18	20:31 (2) 19:49	18:36 41	18:07 (4) 16:32 21	15:59 (5) 16:05
14 05:12		06:01	20:14 (2) 06:56	07:50	17:26 (4) 07:49	15:39 (5) 08:36
21:51		20:59 15	20:29 (2) 19:47	18:33 38	18:04 (4) 16:31 19	15:58 (5) 16:04
15 05:13		06:03	20:16 (2) 06:58	07:52	17:26 (4) 07:51	15:39 (5) 08:37
21:50		20:57 12	20:28 (2) 19:44	18:31 36	18:02 (4) 16:29 17	15:56 (5) 16:05
16 05:14		06:04	20:16 (2) 06:59	07:54	17:26 (4) 07:53	15:39 (5) 08:38
21:49		20:55 9	20:25 (2) 19:42	18:29 33	17:59 (4) 16:27 15	15:54 (5) 16:05
17 05:16		20:27 (2) 06:06	20:18 (2) 07:01	07:55	17:27 (4) 07:55	15:40 (5) 08:38
21:47	5	20:32 (2) 20:53	20:23 (2) 19:39	18:26 30	17:57 (4) 16:26 12	15:52 (5) 16:05
18 05:17		20:24 (2) 06:08	20:21 (2) 07:03	07:57	17:27 (4) 07:57	15:41 (5) 08:39
21:46	11	20:35 (2) 20:51	20:22 (2) 19:37	7 18:42 (3) 18:24	28 17:55 (4) 16:24 10	15:51 (5) 16:05
19 05:18		20:22 (2) 06:10	07:05	18:39 (3) 07:59	17:27 (4) 07:59	15:41 (5) 08:40
21:45	15	20:37 (2) 20:48	19:34 14	18:53 (3) 18:22	25 17:52 (4) 16:23 8	15:49 (5) 16:05
20 05:20		20:21 (2) 06:12	07:06	18:36 (3) 08:01	17:28 (4) 08:00	15:42 (5) 08:41
21:44	18	20:39 (2) 20:46	19:32 18	18:54 (3) 18:20	22 17:50 (4) 16:22 5	15:47 (5) 16:06
21 05:21		20:20 (2) 06:13	07:08	18:34 (3) 08:03	17:29 (4) 08:02	15:43 (5) 08:41
21:42	20	20:40 (2) 20:44	19:29 21	18:55 (3) 18:17	19 17:48 (4) 16:20 3	15:46 (5) 16:06
22 05:23		20:18 (2) 06:15	07:10	18:33 (3) 08:05	17:30 (4) 08:04	08:42
21:41	23	20:41 (2) 20:42	19:27 23	18:56 (3) 18:15	15 17:45 (4) 16:19	16:06
23 05:24		20:18 (2) 06:17	07:12	18:32 (3) 08:07	17:31 (4) 08:06	08:42
21:39	24	20:42 (2) 20:39	19:24 24	18:56 (3) 18:13	12 17:43 (4) 16:18	16:07
24 05:26		20:16 (2) 06:19	07:13	18:31 (3) 08:09	17:33 (4) 08:08	08:43
21:38	27	20:43 (2) 20:37	19:22 23	18:54 (3) 18:11	8 17:41 (4) 16:17	16:08
25 05:27		20:16 (2) 06:20	07:15	18:30 (3) 07:11	16:35 (4) 08:09	08:43
21:36	28	20:44 (2) 20:35	19:19 21	18:51 (3) 17:09	3 16:38 (4) 16:16	16:08
26 05:29		20:15 (2) 06:22	07:17	18:29 (3) 07:13	08:11	08:43
21:35	29	20:44 (2) 20:32	19:17 19	18:48 (3) 17:06	16:14	16:09
27 05:30		20:14 (2) 06:24	07:19	18:29 (3) 07:15	08:13	08:44
21:33	30	20:44 (2) 20:30	19:14 17	18:46 (3) 17:04	16:13	16:10
28 05:32		20:14 (2) 06:26	07:21	17:50 (4) 07:16	08:14	08:44
21:32	32	20:46 (2) 20:28	19:12 21	18:44 (3) 17:02	16:12	16:11
29 05:34		20:13 (2) 06:27	07:22	17:44 (4) 07:18	08:16	08:44
21:30	33	20:46 (2) 20:25	19:09 29	18:41 (3) 17:00	16:12	16:11
30 05:35		20:13 (2) 06:29	07:24	17:40 (4) 07:20	08:18	08:44
21:28	33	20:46 (2) 20:23	19:07 32	18:38 (3) 16:58	16:11	16:12
31 05:37		20:13 (2) 06:31		07:22		08:44
21:26	34	20:47 (2) 20:21		16:56		16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case	362	424	269	781	318	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.64	0.64	0.67	0.67	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.18	
Total, real	75	93	58	154	56	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CI - H87

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CJ - H88

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:22 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:18 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:19	08:19	08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CK - H89

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CL - H90

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CM - H91

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:54	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CN - H92

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CO - H93

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CP - H94

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CQ - H95

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CR - H96

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CS - H97

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:57	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case							7					
Sun reduction							0.32					
Oper. time red.							1.00					
Wind dir. red.							0.61					
Total reduction							0.19					
Total, real							1					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CT - H98

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:00	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CU - H99

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:04	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	04:59 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CV - H100

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: CW - H101

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:17 (4) 21:24 (4)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:18 (4) 21:24 (4)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	21:17 (4) 21:23 (4)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26		06:31 20:21		07:22 16:56	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case						213						
Sun reduction						0.32						
Oper. time red.						1.00						
Wind dir. red.						0.61						
Total reduction						0.19						
Total, real						41						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: CX - H102

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:53 (5) 20:14 (5)	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:54 (5) 20:13 (5)	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:55 (5) 20:11 (5)	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:57 (5) 20:09 (5)	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	20:00 (5) 20:06 (5)	05:02 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04		05:03 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06		05:04 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08		05:05 21:53	05:05 21:56	05:51 21:11	20:08 (5) 20:16 (5)	06:45 20:01	07:39 18:48	08:29 16:41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10		05:06 21:54	05:06 21:55	05:52 21:09	06:47 20:19 (5)	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11		05:07 21:54	05:07 21:54	05:54 21:07	06:49 20:20 (5)	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13		05:08 21:55	05:08 21:54	05:56 21:05	06:50 20:21 (5)	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15		05:09 21:56	05:57 21:53	05:57 21:03	06:52 20:22 (5)	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		05:11 21:57	05:59 21:52	05:59 21:01	06:54 20:22 (5)	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		05:12 21:57	06:01 21:51	06:01 20:59	06:56 20:23 (5)	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		05:13 21:58	06:03 21:50	06:03 20:57	06:58 20:24 (5)	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		05:14 21:59	05:14 21:48	06:05 20:55	06:59 20:23 (5)	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		05:16 21:59	05:16 21:47	06:06 20:53	07:01 20:23 (5)	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 20:03 (5)	19:58 (5)	05:17 21:59	06:08 21:46	06:08 20:50	07:03 20:22 (5)	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 20:05 (5)	19:57 (5)	05:18 22:00	06:10 21:45	06:10 20:48	07:05 20:19 (5)	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 20:07 (5)	19:56 (5)	05:18 22:00	06:12 21:43	06:12 20:46	07:06 20:17 (5)	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 20:08 (5)	19:54 (5)	05:16 22:00	06:13 21:42	06:13 20:44	07:08 20:15 (5)	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 20:10 (5)	19:53 (5)	05:15 22:01	06:15 21:41	06:15 20:42	07:10 20:12 (5)	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 20:12 (5)	19:52 (5)	05:13 22:01	06:17 21:39	06:17 20:39	07:12 20:10 (5)	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 20:13 (5)	19:52 (5)	05:12 22:01	06:19 21:38	06:19 20:37	07:13 20:09 (5)	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 20:15 (5)	19:52 (5)	05:11 22:01	06:20 21:36	06:20 20:35	07:15 20:06 (5)	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 20:17 (5)	19:52 (5)	05:09 22:01	06:22 21:35	06:22 20:32	07:17 20:09	07:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 20:17 (5)	19:52 (5)	05:08 22:01	06:24 21:33	06:24 20:30	07:19 20:14	07:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 20:16 (5)	19:52 (5)	05:07 22:01	06:26 21:32	06:26 20:28	07:21 20:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 20:15 (5)	19:52 (5)	05:06 22:00	06:28 21:30	06:28 20:25	07:22 20:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 20:15 (5)	19:53 (5)	05:05 22:00	06:29 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44			06:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233
Total, worst case				238	74				315				
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.65	0.65				0.65				
Total reduction				0.23	0.25				0.22				
Total, real				54	18				70				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CY - H103

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:04 (5) 20:26 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:16 (5) 20:36 (5)	06:33 19:05	07:26 16:54	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	20:03 (5) 20:27 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:16 (5) 20:37 (5)	06:35 19:02	07:28 16:52	07:26 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	20:03 (5) 20:29 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:14 (5) 20:38 (5)	06:36 19:03	07:30 16:50	07:28 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	20:03 (5) 20:30 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:14 (5) 20:38 (5)	06:38 19:01	07:31 16:48	07:30 16:23
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	20:02 (5) 20:30 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:13 (5) 20:38 (5)	06:40 19:00	07:33 16:46	07:32 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:02 (5) 20:29 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:13 (5) 20:39 (5)	06:42 19:06	07:35 16:44	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:03 (5) 20:29 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:13 (5) 20:40 (5)	06:43 19:04	07:37 16:43	07:36 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:04 (5) 20:29 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:12 (5) 20:39 (5)	06:45 19:01	07:39 16:41	07:38 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:04 (5) 20:28 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:12 (5) 20:39 (5)	06:47 19:05	07:41 16:39	07:40 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:04 (5) 20:27 (5)	04:56 21:54	05:07 21:54	05:54 21:07	20:11 (5) 20:37 (5)	06:49 19:06	07:42 16:37	07:42 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:06 (5) 20:27 (5)	04:56 21:55	05:08 21:54	05:56 21:05	20:12 (5) 20:35 (5)	06:50 19:04	07:44 16:36	07:43 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:06 (5) 20:25 (5)	04:55 21:56	05:09 21:53	05:58 21:03	20:12 (5) 20:34 (5)	06:52 19:01	07:46 16:38	07:45 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:07 (5) 20:24 (5)	04:55 21:57	05:11 21:52	05:59 21:01	20:12 (5) 20:31 (5)	06:54 19:05	07:48 16:32	07:47 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:09 (5) 20:23 (5)	04:55 21:57	05:12 21:51	06:01 20:59	20:13 (5) 20:29 (5)	06:56 19:07	07:50 16:31	07:49 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:10 (5) 20:21 (5)	04:55 21:58	05:13 21:50	06:03 20:57	20:13 (5) 20:28 (5)	06:58 19:04	07:52 16:29	07:51 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	05:14 21:48	06:05 20:55	20:14 (5) 20:25 (5)	06:59 19:02	07:54 16:27	07:53 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	05:16 21:47	06:06 20:53	20:15 (5) 20:23 (5)	07:01 19:03	07:55 16:26	07:55 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	05:17 21:46	06:08 20:50	20:17 (5) 20:22 (5)	07:03 19:07	07:57 16:25	07:57 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	05:18 21:45	06:10 20:48	20:18 (5) 20:19 (5)	07:05 19:34	07:59 16:23	07:59 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:01 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	05:21 21:42	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:02 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:04 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:06 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:07 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:09 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:15	08:11 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	05:30 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:13 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:14 16:11
29	08:18 17:00	07:08 19:54	05:56 20:52	05:06 21:41	05:06 22:02	04:58 22:00	05:34 21:30	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:16 16:11
30	08:17 17:02	07:06 19:56	05:54 20:53	05:05 21:43	05:05 20:24 (5)	04:58 22:00	05:35 21:28	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:17 16:12
31	08:15 17:04	07:04 19:58	05:54 20:53	05:04 21:44	05:04 21:44	05:37 21:26	06:31 20:36 (5)	06:31 20:21	06:31 20:21	07:22 16:56	07:22 16:56	08:17 16:13	08:17 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	233
Total, worst case					334			52		367			
Sun reduction				0.35	0.38			0.32		0.34			
Oper. time red.				1.00	1.00			1.00		1.00			
Wind dir. red.				0.65	0.65			0.65		0.65			
Total reduction				0.23	0.25			0.21		0.22			
Total, real				18	82		11	81					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: CZ - H104
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	24 20:26 (5)	05:03 21:45	04:59 22:00	05:39 21:25	28 20:40 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10	
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	25 20:02 (5)	05:02 21:46	05:00 22:00	05:40 21:23	29 20:41 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	28 20:01 (5)	05:01 21:48	05:00 21:59	05:42 21:21	30 20:41 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08	
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	29 20:01 (5)	05:00 21:49	05:01 21:59	05:44 21:19	30 20:41 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08	
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	31 20:01 (5)	04:59 21:50	05:02 21:58	05:45 21:17	31 20:10 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07	
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	31 20:00 (5)	04:59 21:51	05:03 21:57	05:47 21:15	31 20:10 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	31 20:01 (5)	04:58 21:52	05:04 21:57	05:49 21:13	31 20:11 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06	
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	30 20:01 (5)	04:57 21:53	05:05 21:56	05:51 21:11	31 20:10 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06	
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	30 20:01 (5)	04:57 21:54	05:06 21:55	05:52 21:09	29 20:10 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05	
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	29 20:01 (5)	04:56 21:55	05:07 21:54	05:54 21:07	27 20:10 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05	
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	28 20:02 (5)	04:56 21:55	05:08 21:54	05:56 21:05	25 20:10 (5)	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05	
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	28 20:02 (5)	04:55 21:56	05:09 21:53	05:58 21:03	23 20:11 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05	
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	27 20:02 (5)	04:55 21:57	05:11 21:52	05:59 21:01	20 20:11 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05	
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	25 20:03 (5)	04:55 21:57	05:12 21:51	06:01 20:59	17 20:12 (5)	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05	
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	23 20:04 (5)	04:55 21:58	05:13 21:50	06:03 20:57	15 20:13 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05	
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	22 20:05 (5)	04:54 21:59	05:14 21:48	06:05 20:55	12 20:13 (5)	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05	
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	19 20:06 (5)	04:54 21:59	05:16 21:47	06:06 20:53	8 20:15 (5)	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05	
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	16 20:08 (5)	04:54 21:59	05:17 21:46	06:08 20:50	5 20:17 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05	
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	13 20:10 (5)	04:54 22:00	05:18 21:45	06:10 20:48		07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05	
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	8 20:12 (5)	04:54 22:00	05:20 21:43	06:12 20:46		07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06	
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30		04:54 22:00	05:21 21:42	06:13 20:44		07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06	
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31		04:55 22:01	05:23 21:41	06:15 20:42		07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07	
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33		04:55 22:01	05:24 21:39	06:17 20:39	4 20:25 (5)	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34		04:55 22:01	05:26 21:38	06:19 20:37	11 20:21 (5)	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	20:10 (5) 21:36		04:56 22:01	05:27 21:36	06:20 20:35	15 20:19 (5)	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	20:08 (5) 21:37		04:56 22:01	05:29 21:35	06:22 20:32	17 20:18 (5)	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	20:06 (5) 21:39		04:56 22:01	05:31 21:33	06:24 20:30	20 20:17 (5)	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:10	
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30	08:17 17:02		07:06 19:56	05:54 20:53	20:03 (5) 21:43		04:58 22:00	05:35 21:28	06:29 20:23	24 20:14 (5)	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	
31	08:15 17:04		07:04 19:58		20:24 (5) 21:44			05:37 21:26	06:31 20:40 (5)		06:31 20:21	07:22 16:56		08:44 16:13	
Potential sun hours	250	273	367	420	494		510		512		460		382	259	233
Total, worst case				82	497			166		422					
Sun reduction				0.35	0.38			0.32		0.34					
Oper. time red.				1.00	1.00			1.00		1.00					
Wind dir. red.				0.65	0.65			0.65		0.65					
Total reduction				0.23	0.25			0.21		0.22					
Total, real				19	122			35		93					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DA - H105

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	21:00 (5) 22:00	04:59 22:24 (5)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	21:00 (5) 22:00	05:00 21:24 (5)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	21:05 (5) 21:59	05:00 21:23 (5)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:05 (5) 21:59	05:01 21:23 (5)	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	21:05 (5) 21:58	05:02 21:23 (5)	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:05 (5) 21:57	05:03 21:22 (5)	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:06 (5) 21:56	05:05 21:21 (5)	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	21:07 (5) 21:54	05:07 21:20 (5)	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	21:08 (5) 21:54	05:08 21:19 (5)	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:09 (5) 21:53	05:09 21:18 (5)	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:09 (5) 21:52	05:11 21:17 (5)	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:10 (5) 21:51	05:12 21:16 (5)	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:11 (5) 21:50	05:13 21:15 (5)	06:03 21:05	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:12 (5) 21:48	05:14 21:13 (5)	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:13 (5) 21:47	05:16 21:06	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:14 (5) 21:46	05:17 21:08	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	21:15 (5) 21:45	05:18 21:03	06:10 21:03	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	21:17 (5) 21:42	05:21 21:03	06:13 21:03	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:19 (5) 21:39	05:24 21:06	06:17 21:06	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:20 (5) 21:38	05:26 21:05	06:19 21:05	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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30	08:17 17:02	07:06 18:06	05:54 19:56	05:05 20:53	05:05 21:43	04:58 22:01	21:02 (5) 21:37	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04	07:04 18:08	05:54 19:58	05:04 20:54	05:04 21:44	04:58 22:01	21:03 (5) 21:38	05:37 21:26	06:31 20:21	07:22 19:08	08:21 16:59	08:18 16:11	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case					21	645							
Sun reduction					0.38	0.32							
Oper. time red.					1.00	1.00							
Wind dir. red.					0.61	0.61							
Total reduction					0.23	0.19							
Total, real					5	125							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DB - H106

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DC - H107

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DD - H108

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		18:44 (5)	05:52			05:03		20:40 (3)
	16:15	17:06	18:02						20:00	37	19:21 (5)	20:55			21:45	28	21:08 (3)
2	08:44	08:12	07:14						06:59		18:44 (5)	05:50			05:02		20:41 (3)
	16:16	17:08	18:04						20:02	36	19:20 (5)	20:57			21:46	28	21:09 (3)
3	08:43	08:10	07:12						06:56		18:44 (5)	05:48			05:01		20:41 (3)
	16:17	17:10	18:06						20:04	36	19:20 (5)	20:59			21:48	28	21:09 (3)
4	08:43	08:08	07:09						06:54		18:45 (5)	05:46			05:00		20:42 (3)
	16:18	17:12	18:07						20:06	34	19:19 (5)	21:01			21:49	26	21:08 (3)
5	08:43	08:07	07:07						06:51		18:45 (5)	05:44			04:59		20:43 (3)
	16:20	17:14	18:09						20:07	32	19:17 (5)	21:03			21:50	26	21:09 (3)
6	08:42	08:05	07:04						06:49		18:47 (5)	05:42			04:59		20:43 (3)
	16:21	17:16	18:11						20:09	29	19:16 (5)	21:04			21:51	25	21:08 (3)
7	08:42	08:03	07:02						06:47		18:47 (5)	05:40			04:58		20:43 (3)
	16:22	17:18	18:13						20:11	27	19:14 (5)	21:06			21:52	25	21:08 (3)
8	08:41	08:01	07:00						06:44		18:49 (5)	05:38			04:57		20:43 (3)
	16:24	17:20	18:15						20:13	23	19:12 (5)	21:08			21:53	25	21:08 (3)
9	08:41	07:59	06:57						06:42		18:51 (5)	05:36			04:57		20:44 (3)
	16:25	17:22	18:17						20:15	19	19:10 (5)	21:10			21:54	24	21:08 (3)
10	08:40	07:57	06:55						06:39		18:54 (5)	05:34			04:56		20:44 (3)
	16:27	17:24	18:19						20:17	12	19:06 (5)	21:11			21:55	24	21:08 (3)
11	08:40	07:55	06:52						06:37			05:33			04:56		20:45 (3)
	16:28	17:26	18:21						20:19			21:13			21:55	23	21:08 (3)
12	08:39	07:53	06:50						06:35			05:31			04:55		20:46 (3)
	16:30	17:28	18:23						20:20			21:15			21:56	22	21:08 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		20:45 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	23	21:08 (3)
14	08:37	07:49	06:45						06:30			05:27		20:43 (3)	04:55		20:46 (3)
	16:33	17:32	18:27						20:24			21:18	4	20:47 (3)	21:57	22	21:08 (3)
15	08:36	07:47	06:43						06:28			05:26		20:42 (3)	04:55		20:46 (3)
	16:34	17:34	18:28						20:26			21:20	6	20:48 (3)	21:58	22	21:08 (3)
16	08:35	07:45	06:40						06:25			05:24		20:42 (3)	04:54		20:47 (3)
	16:36	17:36	18:30						20:28			21:22	8	20:50 (3)	21:59	21	21:08 (3)
17	08:34	07:43	06:38						06:23			05:22		20:40 (3)	04:54		20:47 (3)
	16:38	17:38	18:32						20:30			21:23	11	20:51 (3)	21:59	21	21:08 (3)
18	08:33	07:41	06:35					18:00 (5)	06:21			05:21		20:40 (3)	04:54		20:47 (3)
	16:40	17:40	18:34	7	18:07 (5)			20:31				21:25	13	20:53 (3)	22:00	21	21:08 (3)
19	08:32	07:39	06:33					17:57 (5)	06:18			05:19		20:40 (3)	04:54		20:48 (3)
	16:41	17:42	18:36	13	18:10 (5)			20:33				21:27	14	20:54 (3)	22:00	20	21:08 (3)
20	08:31	07:36	06:31					17:54 (5)	06:16			05:18		20:39 (3)	04:54		20:48 (3)
	16:43	17:44	18:38	17	18:11 (5)			20:35				21:28	16	20:55 (3)	22:00	20	21:08 (3)
21	08:30	07:34	06:28					17:52 (5)	06:14			05:16		20:39 (3)	04:54		20:48 (3)
	16:45	17:46	18:40	21	18:13 (5)			20:37				21:30	18	20:57 (3)	22:00	20	21:08 (3)
22	08:28	07:32	06:26					17:50 (5)	06:12			05:15		20:40 (3)	04:55		20:49 (3)
	16:47	17:48	18:42	25	18:15 (5)			20:39				21:31	19	20:59 (3)	22:01	20	21:09 (3)
23	08:27	07:30	06:23					17:49 (5)	06:09			05:13		20:39 (3)	04:55		20:49 (3)
	16:49	17:50	18:43	28	18:17 (5)			20:41				21:33	20	20:59 (3)	22:01	20	21:09 (3)
24	08:26	07:28	06:21					17:47 (5)	06:07			05:12		20:39 (3)	04:55		20:49 (3)
	16:51	17:52	18:45	31	18:18 (5)			20:42				21:34	22	21:01 (3)	22:01	20	21:09 (3)
25	08:24	07:25	06:18					17:47 (5)	06:05			05:11		20:39 (3)	04:56		20:49 (3)
	16:52	17:54	18:47	34	18:21 (5)			20:44				21:36	23	21:02 (3)	22:01	21	21:10 (3)
26	08:23	07:23	06:16					17:47 (5)	06:03			05:09		20:39 (3)	04:56		20:49 (3)
	16:54	17:56	18:49	36	18:23 (5)			20:46				21:37	25	21:04 (3)	22:01	21	21:10 (3)
27	08:22	07:21	06:13					17:45 (5)	06:01			05:08		20:39 (3)	04:56		20:49 (3)
	16:56	17:58	18:51	38	18:23 (5)			20:48				21:39	26	21:05 (3)	22:01	21	21:10 (3)
28	08:20	07:18	06:11					17:45 (5)	05:58			05:07		20:40 (3)	04:57		20:49 (3)
	16:58	18:00	18:53	38	18:23 (5)			20:50				21:40	26	21:06 (3)	22:01	22	21:11 (3)
29	08:18		07:09					18:44 (5)	05:56			05:06		20:40 (3)	04:58		20:50 (3)
	17:00		19:54	38	19:22 (5)			20:52				21:41	27	21:07 (3)	22:01	22	21:12 (3)
30	08:17		07:06					18:44 (5)	05:54			05:05		20:40 (3)	04:58		20:49 (3)
	17:02		19:56	39	19:23 (5)			20:53				21:43	28	21:08 (3)	22:00	23	21:12 (3)
31	08:15		07:04					18:44 (5)				05:04		20:40 (3)			
	17:04		19:58	37	19:21 (5)							21:44	28	21:08 (3)			
Potential sun hours	250	273	367					420				494			510		
Total, worst case				402				285				334			684		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.68				0.68				0.63			0.63		
Total reduction				0.18				0.24				0.24			0.20		
Total, real				74				68				80			137		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DD - H108

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	23 21:12 (3) 21:25	05:39 21:25 20:18		07:26 19:05	08:19 16:54
2	05:00 22:00	24 21:13 (3) 21:23	05:40 20:16 13	18:52 (5) 19:05 (5)	07:28 19:02	08:21 16:09
3	05:00 21:59	24 21:13 (3) 21:21	05:42 20:13 19	18:49 (5) 19:08 (5)	07:30 19:00	08:22 16:08
4	05:01 21:59	24 20:49 (3) 21:19	05:44 06:38 23	18:46 (5) 19:09 (5)	07:31 18:57	08:24 16:08
5	05:02 21:58	25 20:49 (3) 21:17	05:45 06:40 27	18:44 (5) 19:11 (5)	07:33 18:55	08:25 16:07
6	05:03 21:57	25 21:14 (3) 21:15	05:47 20:09 29	18:43 (5) 19:12 (5)	07:35 18:52	08:26 16:07
7	05:04 21:57	26 20:49 (3) 21:13	05:49 06:43 31	18:41 (5) 19:12 (5)	07:37 18:50	08:28 16:06
8	05:05 21:56	26 21:15 (3) 21:11	05:51 06:45 33	18:40 (5) 19:13 (5)	07:39 18:48	08:29 16:06
9	05:06 21:55	27 20:49 (3) 21:09	05:52 06:47 35	18:39 (5) 19:14 (5)	07:41 18:45	08:30 16:05
10	05:07 21:55	27 21:16 (3) 21:07	05:54 06:49 36	18:37 (5) 19:13 (5)	07:42 18:43	08:31 16:05
11	05:08 21:54	27 20:49 (3) 21:05	05:56 06:50 38	18:36 (5) 19:14 (5)	07:44 18:40	08:33 16:05
12	05:09 21:53	28 21:17 (3) 21:03	05:58 06:52 38	18:35 (5) 19:14 (5)	07:46 18:38	08:34 16:05
13	05:11 21:52	28 20:49 (3) 21:01	05:59 06:54 38	18:36 (5) 19:14 (5)	07:48 18:36	08:35 16:05
14	05:12 21:51	28 20:48 (3) 20:59	06:01 06:56 38	18:35 (5) 19:13 (5)	07:50 18:33	08:36 16:05
15	05:13 21:50	27 20:48 (3) 20:57	06:03 06:58 38	18:35 (5) 19:13 (5)	07:52 18:31	08:37 16:05
16	05:14 21:49	26 20:49 (3) 20:55	06:05 06:59 37	18:35 (5) 19:12 (5)	07:54 18:29	08:38 16:05
17	05:16 21:47	25 21:14 (3) 20:53	06:06 07:01 37	18:34 (5) 19:11 (5)	07:55 18:26	08:38 16:05
18	05:17 21:46	23 20:49 (3) 20:50	06:08 07:03 34	18:34 (5) 19:08 (5)	07:57 18:24	08:39 16:05
19	05:18 21:45	23 20:48 (3) 20:48	06:10 07:05 31	18:35 (5) 19:06 (5)	07:59 18:22	08:40 16:05
20	05:20 21:44	21 20:49 (3) 20:46	06:12 07:06 28	18:36 (5) 19:04 (5)	08:01 18:20	08:41 16:06
21	05:21 21:42	20 21:10 (3) 20:44	06:13 07:08 26	18:35 (5) 19:01 (5)	08:03 18:17	08:41 16:06
22	05:23 21:41	18 21:09 (3) 20:44	06:15 07:10 22	18:37 (5) 18:59 (5)	08:05 18:15	08:42 16:07
23	05:24 21:39	17 20:49 (3) 20:42	06:17 07:12 18	18:38 (5) 18:58 (5)	08:07 18:13	08:42 16:07
24	05:26 21:38	15 21:07 (3) 20:39	06:19 07:13 14	18:40 (5) 18:54 (5)	08:09 18:11	08:43 16:08
25	05:27 21:36	13 21:05 (3) 20:37	06:20 07:15 10	18:41 (5) 18:51 (5)	07:11 17:09	08:43 16:08
26	05:29 21:35	11 21:04 (3) 20:35	06:22 07:17 2	18:46 (5) 18:48 (5)	07:13 17:07	08:43 16:09
27	05:30 21:33	9 21:02 (3) 20:32	06:24 07:19 19	17:07 17:15	16:15 08:13	16:09 08:44
28	05:32 21:32	7 21:01 (3) 20:30	06:26 07:21 19	17:16 17:04	08:14 16:13	08:44 16:10
29	05:34 21:30	4 20:52 (3) 06:26	06:28 07:22 19	17:02 17:18	16:11 08:16	16:11 08:44
30	05:35 21:28	2 20:54 (3) 06:28	06:29 07:24 19	17:00 17:20	16:12 08:18	16:11 08:44
31	05:37 21:26	2 20:56 (3) 06:23	06:31 07:23 19	16:58 17:22	16:11 08:18	16:12 08:44
Potential sun hours	512	460	382	328	259	233
Total, worst case	623		695			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.63		0.68			
Total reduction	0.20		0.22			
Total, real	126		150			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DE - H109

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	19:00	07:01	18:38 (5)	20:00	05:52	20:55	21:45	05:03	20:33 (3)	
2	08:44	16:16	08:12	17:08	18:04	07:14	18:04	19:00	14	18:52 (5)	20:00	05:50	20:57	21:46	05:02	20:34 (3)	
3	08:43	16:17	08:10	17:10	18:06	07:12	18:06	19:00			20:04	05:48	20:59	21:48	05:01	20:35 (3)	
4	08:43	16:18	08:08	17:12	18:07	07:09	18:07	19:00			20:06	05:46	21:01	21:49	05:00	20:36 (3)	
5	08:43	16:20	08:07	17:14	18:09	07:07	18:09	19:00			20:07	05:44	21:03	21:50	04:59	20:38 (3)	
6	08:42	16:21	08:05	17:16	18:11	07:04	18:11	19:00			20:09	05:42	21:04	21:51	04:59	20:39 (3)	
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	19:00			20:11	05:40	21:06	21:52	04:58	20:41 (3)	
8	08:42	16:24	08:01	17:20	18:15	07:00	18:15	19:00			20:13	05:38	21:08	21:53	04:57	20:45 (3)	
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	19:00			20:15	05:36	21:10	21:54	04:57	21:18 (4)	
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	19:00	3	17:50 (5)	20:15	05:34	21:11	21:55	04:56	21:19 (4)	
11	08:40	16:28	07:55	17:26	18:21	06:53	18:21	19:00	9	17:52 (5)	20:17	05:33	21:13	21:56	04:55	21:20 (4)	
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	19:00	15	17:55 (5)	20:19	05:31	21:15	21:57	04:54	21:21 (4)	
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	19:00	18	17:56 (5)	20:20	05:29	21:17	21:58	04:54	21:22 (4)	
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	19:00	22	17:58 (5)	20:22	05:27	21:18	21:59	04:54	21:23 (4)	
15	08:36	16:34	07:47	17:34	18:28	06:43	18:28	19:00	26	17:59 (5)	20:24	05:26	21:20	22:00	04:54	21:24 (4)	
16	08:35	16:36	07:45	17:36	18:30	06:40	18:30	19:00	29	18:00 (5)	20:26	05:24	21:22	22:01	04:54	21:25 (4)	
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	19:00	32	18:01 (5)	20:28	05:22	21:24	22:02	04:54	21:26 (4)	
18	08:33	16:40	07:41	17:40	18:34	06:35	18:34	19:00	35	18:02 (5)	20:30	05:21	21:26	22:03	04:54	21:27 (4)	
19	08:32	16:41	07:39	17:42	18:36	06:33	18:36	19:00	37	18:03 (5)	20:31	05:20	21:27	22:04	04:54	21:28 (4)	
20	08:31	16:43	07:36	17:44	18:38	06:31	18:38	19:00	38	18:04 (5)	20:33	05:19	21:28	22:05	04:54	21:29 (4)	
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	19:00	38	18:05 (5)	20:35	05:18	21:29	22:06	04:54	21:30 (4)	
22	08:28	16:47	07:32	17:48	18:42	06:26	18:42	19:00	38	18:06 (5)	20:37	05:16	21:30	22:07	04:54	21:31 (4)	
23	08:27	16:49	07:30	17:50	18:44	06:23	18:44	19:00	38	18:07 (5)	20:39	05:15	21:31	22:08	04:54	21:32 (4)	
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45	19:00	37	18:08 (5)	20:41	05:13	21:33	22:09	04:54	21:33 (4)	
25	08:24	16:52	07:25	17:54	18:47	06:18	18:47	19:00	37	18:09 (5)	20:42	05:12	21:34	22:10	04:54	21:34 (4)	
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	19:00	36	18:10 (5)	20:44	05:11	21:36	22:11	04:54	21:35 (4)	
27	08:22	16:56	07:21	17:58	18:51	06:13	18:51	19:00	36	18:11 (5)	20:46	05:09	21:37	22:12	04:54	21:36 (4)	
28	08:20	16:58	07:18	18:00	18:53	06:11	18:53	19:00	34	18:12 (5)	20:48	05:08	21:39	22:13	04:54	21:37 (4)	
29	08:18	17:00	07:16	18:02	18:55	06:09	18:55	19:00	34	18:13 (5)	20:50	05:07	21:41	22:14	04:54	21:38 (4)	
30	08:17	17:02	07:14	18:04	18:57	06:07	18:57	19:00	34	18:14 (5)	20:52	05:06	21:43	22:15	04:54	21:39 (4)	
31	08:15	17:04	07:12	18:06	18:59	06:05	18:59	19:00	24	18:15 (5)	20:54	05:04	21:45	22:16	04:54	21:40 (4)	
Potential sun hours	250	273	367	420	494	510	237	1.00	0.32	0.62	0.20	47					
Total, worst case																	
Sun reduction																	
Oper. time red.																	
Wind dir. red.																	
Total reduction																	
Total, real																	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DE - H109

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	21:20 (4)	05:39	20:37 (3)	06:33	07:26	18:16 (5)	07:24	08:19		
	22:00	4	21:24 (4)	21:25	16	20:53 (3)	20:18	19:05	20	18:36 (5)	16:54
2	05:00		21:22 (4)	05:40		20:38 (3)	06:35	07:28		18:17 (5)	07:26
	22:00	2	21:24 (4)	21:23	14	20:52 (3)	20:16	19:02	16	18:33 (5)	16:52
3	05:00		21:22 (4)	05:42		20:38 (3)	06:36	07:30		18:19 (5)	07:28
	21:59	1	21:23 (4)	21:21	12	20:50 (3)	20:13	19:00	12	18:31 (5)	16:50
4	05:01			05:44		20:39 (3)	06:38	07:31		18:22 (5)	07:30
	21:59			21:19	9	20:48 (3)	20:11	18:57	7	18:29 (5)	16:48
5	05:02			05:45		20:39 (3)	06:40	07:33		07:32	08:25
	21:58			21:17	7	20:46 (3)	20:09	18:55		16:46	16:07
6	05:03		20:46 (3)	05:47		20:41 (3)	06:42	07:35		07:34	08:26
	21:57	7	20:53 (3)	21:15	4	20:45 (3)	20:06	18:52		16:44	16:07
7	05:04		20:45 (3)	05:49		20:42 (3)	06:43	07:37		07:36	08:28
	21:57	10	20:55 (3)	21:13	1	20:43 (3)	20:04	18:50		16:43	16:06
8	05:05		20:44 (3)	05:51			06:45	07:39		07:38	08:29
	21:56	12	20:56 (3)	21:11			20:01	18:48		16:41	16:06
9	05:06		20:43 (3)	05:52			06:47	07:41		07:40	08:30
	21:55	14	20:57 (3)	21:09			19:59	18:45		16:39	16:05
10	05:07		20:42 (3)	05:54			06:49	07:42		07:42	08:31
	21:55	16	20:58 (3)	21:07			19:56	18:43		16:37	16:05
11	05:08		20:42 (3)	05:56			06:50	18:31 (5)	07:44	07:44	08:33
	21:54	17	20:59 (3)	21:05		12	19:54	18:43 (5)	18:40	16:36	16:05
12	05:09		20:41 (3)	05:58			06:52	18:28 (5)	07:46	07:45	08:34
	21:53	19	21:00 (3)	21:03		19	19:51	18:47 (5)	18:38	16:34	16:05
13	05:11		20:40 (3)	05:59			06:54	18:25 (5)	07:48	07:47	08:35
	21:52	21	21:01 (3)	21:01		24	19:49	18:49 (5)	18:36	16:32	16:05
14	05:12		20:39 (3)	06:01			06:56	18:22 (5)	07:50	07:49	08:36
	21:51	22	21:01 (3)	20:59		27	19:47	18:49 (5)	18:33	16:31	16:05
15	05:13		20:39 (3)	06:03			06:58	18:21 (5)	07:52	07:51	08:37
	21:50	23	21:02 (3)	20:57		29	19:44	18:50 (5)	18:31	16:29	16:05
16	05:14		20:39 (3)	06:05			06:59	18:20 (5)	07:54	07:53	08:38
	21:49	24	21:03 (3)	20:55		31	19:42	18:51 (5)	18:29	16:27	16:05
17	05:16		20:38 (3)	06:06			07:01	18:18 (5)	07:55	07:55	08:38
	21:47	25	21:03 (3)	20:53		33	19:39	18:51 (5)	18:26	16:26	16:05
18	05:17		20:38 (3)	06:08			07:03	18:17 (5)	07:57	07:57	08:39
	21:46	26	21:04 (3)	20:50		35	19:37	18:52 (5)	18:24	16:25	16:05
19	05:18		20:37 (3)	06:10			07:05	18:16 (5)	07:59	07:59	08:40
	21:45	27	21:04 (3)	20:48		36	19:34	18:52 (5)	18:22	16:23	16:05
20	05:20		20:38 (3)	06:12			07:06	18:16 (5)	08:01	08:00	08:41
	21:44	27	21:05 (3)	20:46		37	19:32	18:53 (5)	18:20	16:22	16:06
21	05:21		20:37 (3)	06:13			07:08	18:14 (5)	08:03	08:02	08:41
	21:42	28	21:05 (3)	20:44		38	19:29	18:52 (5)	18:17	16:20	16:06
22	05:23		20:36 (3)	06:15			07:10	18:14 (5)	08:05	08:04	08:42
	21:41	29	21:05 (3)	20:42		38	19:27	18:52 (5)	18:15	16:19	16:07
23	05:24		20:37 (3)	06:17			07:12	18:14 (5)	08:07	08:06	08:42
	21:39	29	21:06 (3)	20:39		38	19:24	18:52 (5)	18:13	16:18	16:07
24	05:26		20:36 (3)	06:19			07:13	18:14 (5)	08:09	08:08	08:43
	21:38	29	21:05 (3)	20:37		37	19:22	18:51 (5)	18:11	16:17	16:08
25	05:27		20:37 (3)	06:20			07:15	18:13 (5)	07:11	08:09	08:43
	21:36	27	21:04 (3)	20:35		37	19:19	18:50 (5)	17:09	16:16	16:08
26	05:29		20:36 (3)	06:22			07:17	18:13 (5)	07:13	08:11	08:43
	21:35	26	21:02 (3)	20:32		35	19:17	18:48 (5)	17:07	16:15	16:09
27	05:30		20:37 (3)	06:24			07:19	18:13 (5)	07:15	08:13	08:44
	21:33	24	21:01 (3)	20:30		33	19:14	18:46 (5)	17:04	16:13	16:10
28	05:32		20:36 (3)	06:26			07:21	18:14 (5)	07:16	08:14	08:44
	21:32	23	20:59 (3)	20:28		30	19:12	18:44 (5)	17:02	16:13	16:11
29	05:34		20:37 (3)	06:28			07:22	18:15 (5)	07:18	08:16	08:44
	21:30	21	20:58 (3)	20:25		26	19:09	18:41 (5)	17:00	16:12	16:11
30	05:35		20:37 (3)	06:29			07:24	18:15 (5)	07:20	08:18	08:44
	21:28	19	20:56 (3)	20:23		23	19:07	18:38 (5)	16:58	16:11	16:12
31	05:37		20:37 (3)	06:31				07:22			08:44
	21:26	18	20:55 (3)	20:21				16:56			16:13
Potential sun hours	512			460		382		328		259	233
Total, worst case		570		63		618		55			
Sun reduction		0.32		0.34		0.32		0.29			
Oper. time red.		1.00		1.00		1.00		1.00			
Wind dir. red.		0.63		0.63		0.67		0.67			
Total reduction		0.21		0.22		0.22		0.20			
Total, real		117		14		133		11			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DF - H110

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:19 (3) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	20:18 (3) 20:57	21:46 31
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	20:17 (3) 20:59	21:48 33
4	08:43 16:18	08:08 17:12	07:09 18:07	17:34 (5) 20:06	05:46 21:01	20:16 (3) 20:30 (3)
5	08:43 16:20	08:07 17:14	07:07 18:09	17:30 (5) 20:07	05:44 21:03	20:15 (3) 20:32 (3)
6	08:42 16:21	08:05 17:16	07:04 18:11	17:28 (5) 20:09	05:42 21:04	20:15 (3) 20:33 (3)
7	08:42 16:22	08:03 17:18	07:02 18:13	17:26 (5) 20:11	05:40 21:06	20:15 (3) 20:36 (3)
8	08:42 16:24	08:01 17:20	07:00 18:15	17:25 (5) 20:13	05:38 21:08	20:14 (3) 20:37 (3)
9	08:41 16:25	07:59 17:22	06:57 18:17	17:23 (5) 20:15	05:36 21:10	20:14 (3) 20:39 (3)
10	08:40 16:27	07:57 17:24	06:55 18:19	17:22 (5) 20:17	05:34 21:11	20:14 (3) 20:40 (3)
11	08:40 16:28	07:55 17:26	06:52 18:21	17:22 (5) 20:19	05:33 21:13	20:14 (3) 20:42 (3)
12	08:39 16:30	07:53 17:28	06:50 18:23	17:21 (5) 20:20	05:31 21:15	20:14 (3) 20:43 (3)
13	08:38 16:31	07:51 17:30	06:48 18:25	17:20 (5) 20:22	05:29 21:17	20:14 (3) 20:43 (3)
14	08:37 16:33	07:49 17:32	06:45 18:27	17:19 (5) 20:24	05:27 21:18	20:15 (3) 20:43 (3)
15	08:36 16:34	07:47 17:34	06:43 18:28	17:19 (5) 20:26	05:26 21:20	20:15 (3) 20:42 (3)
16	08:35 16:36	07:45 17:36	06:40 18:30	17:19 (5) 20:28	05:24 21:22	20:16 (3) 20:42 (3)
17	08:34 16:38	07:43 17:38	06:38 18:32	17:19 (5) 20:30	05:22 21:23	20:16 (3) 20:41 (3)
18	08:33 16:40	07:41 17:40	06:35 18:34	17:19 (5) 20:31	05:21 21:25	20:17 (3) 20:41 (3)
19	08:32 16:41	07:39 17:42	06:33 18:36	17:20 (5) 20:33	05:19 21:27	20:18 (3) 20:41 (3)
20	08:31 16:43	07:36 17:44	06:31 18:38	17:20 (5) 20:35	05:18 21:28	20:18 (3) 20:55 (4)
21	08:30 16:45	07:34 17:46	06:28 18:40	17:21 (5) 20:37	05:16 21:30	20:20 (3) 20:57 (4)
22	08:28 16:47	07:32 17:48	06:26 18:42	17:21 (5) 20:39	05:15 21:31	20:21 (3) 20:59 (4)
23	08:27 16:49	07:30 17:50	06:23 18:43	17:23 (5) 20:41	05:13 21:33	20:22 (3) 20:59 (4)
24	08:26 16:51	07:28 17:52	06:21 18:45	17:24 (5) 20:42	05:12 21:34	20:24 (3) 21:01 (4)
25	08:24 16:52	07:25 17:54	06:18 18:47	17:27 (5) 20:44	05:11 21:36	20:26 (3) 21:02 (4)
26	08:23 16:54	07:23 17:56	06:16 18:49	17:31 (5) 20:46	05:09 21:37	20:44 (4) 21:04 (4)
27	08:22 16:56	07:21 17:58	06:13 18:51	17:39 (5) 20:48	05:08 21:39	20:43 (4) 21:05 (4)
28	08:20 16:58	07:18 18:00	06:11 18:53	20:50	05:07 21:40	20:43 (4) 21:06 (4)
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	20:42 (4) 21:07 (4)
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	20:41 (4) 21:08 (4)
31	08:15 17:04		07:04 19:58		05:04 21:44	20:41 (4) 21:09 (4)
Potential sun hours	250	273	367	420	494	510
Total, worst case			615	3	706	1213
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.64	0.63	0.61
Total reduction			0.18	0.23	0.24	0.20
Total, real			113	1	170	237

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

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Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DF - H110

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July			August			September			October			November		December	
1	04:59		20:43 (4)	05:39		20:24 (3)	06:33			07:26		17:59 (5)	07:24		08:19	
	22:00	41	21:24 (4)	21:25	29	20:53 (3)	20:18			19:05	36	18:35 (5)	16:54		16:10	
2	05:00		20:44 (4)	05:40		20:25 (3)	06:35			07:28		18:00 (5)	07:26		08:21	
	22:00	40	21:24 (4)	21:23	27	20:52 (3)	20:16			19:02	33	18:33 (5)	16:52		16:09	
3	05:00		20:44 (4)	05:42		20:24 (3)	06:36			07:30		18:00 (5)	07:28		08:22	
	21:59	39	21:23 (4)	21:21	26	20:50 (3)	20:13			19:00	31	18:31 (5)	16:50		16:08	
4	05:01		20:44 (4)	05:44		20:24 (3)	06:38			07:31		18:00 (5)	07:30		08:24	
	21:59	39	21:23 (4)	21:19	24	20:48 (3)	20:11			18:57	29	18:29 (5)	16:48		16:08	
5	05:02		20:45 (4)	05:45		20:24 (3)	06:40			07:33		18:01 (5)	07:32		08:25	
	21:58	38	21:23 (4)	21:17	22	20:46 (3)	20:09			18:55	25	18:26 (5)	16:46		16:07	
6	05:03		20:46 (4)	05:47		20:24 (3)	06:42			07:35		18:02 (5)	07:34		08:26	
	21:57	36	21:22 (4)	21:15	21	20:45 (3)	20:06			18:52	22	18:24 (5)	16:44		16:07	
7	05:04		20:46 (4)	05:49		20:25 (3)	06:43			07:37		18:02 (5)	07:36		08:28	
	21:57	36	21:22 (4)	21:13	18	20:43 (3)	20:04			18:50	19	18:21 (5)	16:43		16:06	
8	05:05		20:47 (4)	05:51		20:25 (3)	06:45			07:39		18:04 (5)	07:38		08:29	
	21:56	34	21:21 (4)	21:11	16	20:41 (3)	20:01			18:48	14	18:18 (5)	16:41		16:06	
9	05:06		20:47 (4)	05:52		20:26 (3)	06:47			07:41		18:06 (5)	07:40		08:30	
	21:55	34	21:21 (4)	21:09	13	20:39 (3)	19:59			18:45	10	18:16 (5)	16:39		16:05	
10	05:07		20:48 (4)	05:54		20:26 (3)	06:49			07:42		18:10 (5)	07:42		08:31	
	21:55	32	21:20 (4)	21:07	11	20:37 (3)	19:56			18:43	4	18:14 (5)	16:37		16:05	
11	05:08		20:48 (4)	05:56		20:27 (3)	06:50			07:44			07:44		08:33	
	21:54	31	21:19 (4)	21:05	8	20:35 (3)	19:54			18:40			16:36		16:05	
12	05:09		20:49 (4)	05:58		20:28 (3)	06:52			07:46			07:45		08:34	
	21:53	29	21:18 (4)	21:03	6	20:34 (3)	19:51			18:38			16:34		16:05	
13	05:11		20:50 (4)	05:59		20:29 (3)	06:54			07:48			07:47		08:35	
	21:52	27	21:17 (4)	21:01	2	20:31 (3)	19:49			18:36			16:32		16:05	
14	05:12		20:50 (4)	06:01			06:56			07:50			07:49		08:36	
	21:51	26	21:16 (4)	20:59			19:47			18:33			16:31		16:05	
15	05:13		20:51 (4)	06:03			06:58			07:52			07:51		08:37	
	21:50	24	21:15 (4)	20:57			19:44			18:31			16:29		16:05	
16	05:14		20:52 (4)	06:05			06:59			07:54			07:53		08:38	
	21:49	23	21:15 (4)	20:55			19:42			18:29			16:27		16:05	
17	05:16		20:53 (4)	06:06			07:01		18:20 (5)	07:55			07:55		08:38	
	21:47	21	21:14 (4)	20:53			19:39	5	18:25 (5)	18:26			16:26		16:05	
18	05:17		20:54 (4)	06:08			07:03		18:15 (5)	07:57			07:57		08:39	
	21:46	18	21:12 (4)	20:50			19:37	15	18:30 (5)	18:24			16:25		16:05	
19	05:18		20:34 (3)	06:10			07:05		18:12 (5)	07:59			07:59		08:40	
	21:45	25	21:11 (4)	20:48			19:34	20	18:32 (5)	18:22			16:23		16:05	
20	05:20		20:33 (3)	06:12			07:06		18:10 (5)	08:01			08:00		08:41	
	21:44	26	21:10 (4)	20:46			19:32	24	18:34 (5)	18:20			16:22		16:06	
21	05:21		20:31 (3)	06:13			07:08		18:07 (5)	08:03			08:02		08:41	
	21:42	27	21:09 (4)	20:44			19:29	28	18:35 (5)	18:17			16:20		16:06	
22	05:23		20:30 (3)	06:15			07:10		18:06 (5)	08:05			08:04		08:42	
	21:41	26	21:07 (4)	20:42			19:27	30	18:36 (5)	18:15			16:19		16:07	
23	05:24		20:30 (3)	06:17			07:12		18:05 (5)	08:07			08:06		08:42	
	21:39	25	21:07 (4)	20:39			19:24	31	18:36 (5)	18:13			16:18		16:07	
24	05:26		20:28 (3)	06:19			07:13		18:04 (5)	08:09			08:08		08:43	
	21:38	22	20:50 (3)	20:37			19:22	33	18:37 (5)	18:11			16:17		16:08	
25	05:27		20:28 (3)	06:20			07:15		18:02 (5)	07:11			08:09		08:43	
	21:36	23	20:51 (3)	20:35			19:19	35	18:37 (5)	17:09			16:16		16:08	
26	05:29		20:27 (3)	06:22			07:17		18:01 (5)	07:13			08:11		08:43	
	21:35	25	20:52 (3)	20:32			19:17	36	18:37 (5)	17:07			16:15		16:09	
27	05:30		20:27 (3)	06:24			07:19		18:01 (5)	07:15			08:13		08:44	
	21:33	26	20:53 (3)	20:30			19:14	36	18:37 (5)	17:04			16:13		16:10	
28	05:32		20:26 (3)	06:26			07:21		18:00 (5)	07:16			08:14		08:44	
	21:32	27	20:53 (3)	20:28			19:12	37	18:37 (5)	17:02			16:13		16:11	
29	05:34		20:26 (3)	06:28			07:22		18:00 (5)	07:18			08:16		08:44	
	21:30	28	20:54 (3)	20:25			19:09	37	18:37 (5)	17:00			16:12		16:11	
30	05:35		20:25 (3)	06:29			07:24		17:59 (5)	07:20			08:18		08:44	
	21:28	29	20:54 (3)	20:23			19:07	37	18:36 (5)	16:58			16:11		16:12	
31	05:37		20:25 (3)	06:31						07:22					08:44	
	21:26	29	20:54 (3)	20:21						16:56					16:13	
Potential sun hours	512			460			382			328			259		233	
Total, worst case		906			223			404			223					
Sun reduction		0.32			0.34			0.32			0.29					
Oper. time red.		1.00			1.00			1.00			1.00					
Wind dir. red.		0.62			0.64			0.68			0.68					
Total reduction		0.20			0.22			0.22			0.20					
Total, real		182			49			87			44					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
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Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DG - H111

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:58 (2) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	12 20:07 (2)	21:45 21:46
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	5 20:07 (2)	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	17:40 (4) 20:06	06:54 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	17:38 (4) 20:07	06:51 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	17:37 (4) 20:09	06:49 21:04	04:58 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	17:35 (4) 20:11	06:47 21:06	04:58 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	17:35 (4) 20:13	06:44 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	17:33 (4) 20:15	06:42 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	17:33 (4) 20:17	06:39 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	17:33 (4) 20:18	06:37 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	17:33 (4) 20:20	06:35 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	17:33 (4) 20:22	06:32 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	17:33 (4) 20:24	06:30 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	17:34 (4) 20:26	06:28 21:20	04:54 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	17:34 (4) 20:28	06:25 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	17:35 (4) 20:30	19:58 (2) 20:01 (2)	05:22 21:23
18	08:33 16:40	07:41 17:40	06:35 18:34	17:36 (4) 20:31	3 20:01 (2)	21:23 21:59
19	08:32 16:41	07:39 17:42	06:33 18:36	17:36 (4) 20:33	6 20:03 (2)	21:25 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	17:39 (4) 20:35	9 20:05 (2)	05:19 21:27
21	08:30 16:45	07:34 17:46	06:28 18:40	06:18 20:37	12 20:07 (2)	05:18 21:28
22	08:28 16:47	07:32 17:48	06:26 18:41	06:16 20:39	14 20:08 (2)	05:16 21:30
23	08:27 16:49	07:30 17:50	06:23 18:43	06:11 20:41	17 20:10 (2)	05:15 21:31
24	08:26 16:50	07:28 17:52	06:21 18:45	06:09 20:42	19 20:12 (2)	05:13 21:33
25	08:24 16:52	07:25 17:54	06:18 18:47	06:07 20:44	21 20:14 (2)	05:12 21:34
26	08:23 16:54	07:23 17:56	06:16 18:49	06:05 20:46	22 20:15 (2)	05:11 21:36
27	08:22 16:56	07:21 17:58	06:13 18:51	06:03 20:48	22 20:16 (2)	05:09 21:37
28	08:20 16:58	07:18 18:00	06:11 18:53	06:00 20:50	22 20:16 (2)	05:08 21:39
29	08:18 17:00		07:08 19:54	05:58 20:52	20 20:15 (2)	05:07 21:40
30	08:17 17:02		07:06 19:56	05:54 20:53	18 20:14 (2)	05:05 21:41
31	08:15 17:04		07:04 19:58		15 20:12 (2)	05:04 21:43
Potential sun hours	250	273	367	420	494	510
Total, worst case			267	220	17	
Sun reduction			0.27	0.35	0.38	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.68	0.65	0.65	
Total reduction			0.18	0.23	0.25	
Total, real			49	50	4	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
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abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DG - H111

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:12 (4) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:11 (4) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:11 (4) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:11 (4) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:11 (4) 16:46	08:25 16:07
6	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	18:12 (4) 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	18:11 (4) 16:43	08:28 16:06
8	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	18:12 (4) 16:41	08:29 16:06
9	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	18:13 (4) 16:39	08:30 16:05
10	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	18:16 (4) 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	20:09 (2) 19:54	07:44 18:40	16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	20:06 (2) 19:51	07:46 18:38	16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	20:04 (2) 19:49	07:48 18:36	16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	20:03 (2) 19:46	07:50 18:33	16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	20:02 (2) 19:44	07:52 18:31	16:31	08:37 16:04
16	05:14 21:49	06:04 20:55	20:01 (2) 19:42	07:54 18:29	16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	20:00 (2) 19:39	07:55 18:26	16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:00 (2) 19:37	07:57 18:24	16:25	08:39 16:05
19	05:18 21:45	06:10 20:48	19:59 (2) 19:34	07:59 18:22	16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	19:59 (2) 19:32	08:01 18:20	16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	19:59 (2) 19:29	08:03 18:17	16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	19:58 (2) 19:27	08:05 18:15	16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	19:59 (2) 19:24	08:07 18:13	16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	20:00 (2) 19:22	18:24 (4) 18:11	16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	20:00 (2) 19:19	18:20 (4) 18:35 (4)	16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	20:01 (2) 19:17	18:18 (4) 18:37 (4)	16:11	08:43 16:09
27	05:30 21:33	06:24 20:30	20:04 (2) 19:14	19:17 18:38 (4)	16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	19:12 18:39 (4)	17:04 17:02	16:13	08:44 16:10
29	05:34 21:30	06:27 20:25	17:22 19:09	18:14 (4) 18:40 (4)	16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	17:24 19:07	18:12 (4) 18:38 (4)	16:17	08:44 16:12
31	05:37 21:26	06:31 20:21		16:58 16:56	16:11	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		237	142	130		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.68	0.68		
Total reduction		0.22	0.22	0.20		
Total, real		52	31	26		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DH - H112

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:32 (5)	08:14	16:11 (4)	07:16		07:01	05:52		19:47 (2)	05:03
	16:15	5	15:37 (5)	17:06	24	16:35 (4)	18:02	20:55	39	20:26 (2)	21:45
2	08:44	15:32 (5)	08:12	16:11 (4)	07:14		17:34 (3)	06:59		19:47 (2)	05:02
	16:16	7	15:39 (5)	17:08	26	16:37 (4)	18:04	20:57	40	20:27 (2)	21:46
3	08:44	15:32 (5)	08:10	16:10 (4)	07:12		17:33 (3)	06:56		19:46 (2)	05:01
	16:17	7	15:39 (5)	17:10	29	16:39 (4)	18:06	20:59	43	20:29 (2)	21:48
4	08:43	15:32 (5)	08:08	16:10 (4)	07:09		17:32 (3)	06:54		19:46 (2)	05:00
	16:18	9	15:41 (5)	17:12	31	16:41 (4)	18:07	21:01	43	20:29 (2)	21:49
5	08:43	15:32 (5)	08:07	16:09 (4)	07:07		17:30 (3)	06:51		19:46 (2)	04:59
	16:19	10	15:42 (5)	17:14	34	16:43 (4)	18:09	21:03	42	20:28 (2)	21:50
6	08:43	15:33 (5)	08:05	16:09 (4)	07:04		17:30 (3)	06:49		19:46 (2)	04:59
	16:21	11	15:44 (5)	17:16	36	16:45 (4)	18:11	21:04	42	20:28 (2)	21:51
7	08:42	15:33 (5)	08:03	16:09 (4)	07:02		17:29 (3)	06:47		19:47 (2)	04:58
	16:22	12	15:45 (5)	17:18	38	16:47 (4)	18:13	21:06	41	20:28 (2)	21:52
8	08:42	15:33 (5)	08:01	16:09 (4)	07:00		17:29 (3)	06:44		19:47 (2)	04:57
	16:24	13	15:46 (5)	17:20	41	16:50 (4)	18:15	21:08	41	20:28 (2)	21:53
9	08:41	15:34 (5)	07:59	16:09 (4)	06:57		17:28 (3)	06:42		19:47 (2)	04:57
	16:25	15	15:49 (5)	17:22	43	16:52 (4)	18:17	21:10	40	20:27 (2)	21:54
10	08:40	15:34 (5)	07:57	16:09 (4)	06:55		17:29 (3)	06:39		19:47 (2)	04:56
	16:26	16	15:50 (5)	17:24	45	16:54 (4)	18:19	21:11	39	20:26 (2)	21:55
11	08:40	15:34 (5)	07:55	16:09 (4)	06:53		17:29 (3)	06:37		19:48 (2)	04:56
	16:28	18	15:52 (5)	17:26	47	16:56 (4)	18:21	21:13	38	20:26 (2)	21:55
12	08:39	15:34 (5)	07:53	16:08 (4)	06:50		17:29 (3)	06:35		19:49 (2)	04:55
	16:30	20	15:54 (5)	17:28	50	16:58 (4)	18:23	21:15	36	20:25 (2)	21:56
13	08:38	15:35 (5)	07:51	16:08 (4)	06:48		17:30 (3)	06:32		19:49 (2)	04:55
	16:31	20	15:55 (5)	17:30	50	16:58 (4)	18:25	21:17	35	20:24 (2)	21:57
14	08:37	15:35 (5)	07:49	16:09 (4)	06:45		17:30 (3)	06:30		19:50 (2)	04:55
	16:33	22	15:57 (5)	17:32	49	16:58 (4)	18:27	21:18	34	20:24 (2)	21:58
15	08:36	15:36 (5)	07:47	16:09 (4)	06:43		17:32 (3)	06:28		19:51 (2)	04:55
	16:34	23	15:59 (5)	17:34	49	16:58 (4)	18:28	21:20	32	20:23 (2)	21:58
16	08:35	15:35 (5)	07:45	16:10 (4)	06:40		17:33 (3)	06:25		19:52 (2)	04:54
	16:36	25	16:00 (5)	17:36	48	16:58 (4)	18:30	21:22	31	20:23 (2)	21:59
17	08:34	15:36 (5)	07:43	16:11 (4)	06:38		17:37 (3)	06:23		19:52 (2)	04:54
	16:38	26	16:02 (5)	17:38	47	16:58 (4)	18:32	21:23	29	20:21 (2)	21:59
18	08:33	15:37 (5)	07:41	16:10 (4)	06:35		17:46 (3)	06:21		19:54 (2)	04:54
	16:40	26	16:03 (5)	17:40	46	16:56 (4)	18:34	21:25	27	20:21 (2)	22:00
19	08:32	15:38 (5)	07:39	16:11 (4)	06:33		17:46 (3)	06:18		19:56 (2)	04:54
	16:41	25	16:03 (5)	17:42	45	16:56 (4)	18:36	20:33	5	20:05 (2)	21:27
20	08:31	15:38 (5)	07:36	16:12 (4)	06:31		17:46 (3)	06:16		19:58 (2)	05:18
	16:43	25	16:03 (5)	17:44	43	16:55 (4)	18:38	20:35	9	20:07 (2)	21:28
21	08:30	15:39 (5)	07:34	16:14 (4)	06:28		17:46 (3)	06:14		19:55 (2)	05:16
	16:45	24	16:03 (5)	17:46	40	16:54 (4)	18:40	20:37	13	20:08 (2)	21:30
22	08:29	15:39 (5)	07:32	16:14 (4)	06:26		17:46 (3)	06:12		19:53 (2)	05:15
	16:47	23	16:02 (5)	17:48	38	16:52 (4)	18:42	20:39	17	20:10 (2)	21:31
23	08:27	15:41 (5)	07:30	16:15 (4)	06:23		17:46 (3)	06:09		19:52 (2)	05:13
	16:49	21	16:02 (5)	17:50	36	16:51 (4)	18:43	20:41	20	20:12 (2)	21:33
24	08:26	15:42 (5)	07:28	16:17 (4)	06:21		17:46 (3)	06:07		19:51 (2)	05:12
	16:50	19	16:01 (5)	17:52	33	16:50 (4)	18:45	20:43	23	20:14 (2)	21:34
25	08:24	15:44 (5)	07:25	16:19 (4)	06:18		17:46 (3)	06:05		19:50 (2)	05:11
	16:52	19	16:19 (4)	17:54	28	16:47 (4)	18:47	20:44	25	20:15 (2)	21:36
26	08:23	15:45 (5)	07:23	16:21 (4)	06:16		17:46 (3)	06:03		19:49 (2)	05:09
	16:54	19	16:21 (4)	17:56	24	16:45 (4)	18:49	20:46	28	20:17 (2)	21:37
27	08:22	15:47 (5)	07:21	16:25 (4)	06:13		17:46 (3)	06:01		19:49 (2)	05:08
	16:56	19	16:23 (4)	17:58	17	16:42 (4)	18:51	20:48	30	20:19 (2)	21:39
28	08:20	16:14 (4)	07:18	16:31 (4)	06:11		17:46 (3)	05:58		19:48 (2)	05:07
	16:58	12	16:26 (4)	18:00	4	16:35 (4)	18:53	20:50	33	20:21 (2)	21:40
29	08:18	16:13 (4)			07:09		17:46 (3)	05:56		19:48 (2)	05:06
	17:00	15	16:28 (4)		19:54		17:46 (3)	20:52	34	20:22 (2)	21:41
30	08:17	16:12 (4)			07:06		17:46 (3)	05:54		19:47 (2)	05:05
	17:02	18	16:30 (4)		19:56		17:46 (3)	20:54	37	20:24 (2)	21:43
31	08:15	16:11 (4)			07:04		17:46 (3)			05:04	
	17:04	21	16:32 (4)		19:58		17:46 (3)			21:44	
Potential sun hours	250		273		367		420		494		510
Total, worst case		545		1041		270		274		757	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.66		0.68		0.65		0.65	
Total reduction		0.16		0.15		0.18		0.23		0.25	
Total, real		87		159		50		63		187	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DH - H112

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July		August		September		October		November		December						
1	04:59		05:39		19:59 (2)	06:33		07:26	18:08 (3)	07:24	15:38 (4)	08:19	15:16 (5)				
	22:00		21:25	37	20:36 (2)	20:18		19:05	26	18:34 (3)	16:54	45	16:23 (4)	16:10	18	15:34 (5)	
2	04:59		05:40		19:59 (2)	06:35		07:28		18:07 (3)	07:26		15:38 (4)	08:21		15:16 (5)	
	22:00		21:23	38	20:37 (2)	20:16		19:02	26	18:33 (3)	16:52	43	16:21 (4)	16:09	17	15:33 (5)	
3	05:00		05:42		19:57 (2)	06:36		07:30		18:07 (3)	07:28		15:38 (4)	08:22		15:17 (5)	
	21:59		21:21	40	20:37 (2)	20:13		19:00	24	18:31 (3)	16:50	41	16:19 (4)	16:08	15	15:32 (5)	
4	05:01		05:44		19:57 (2)	06:38		07:31		18:06 (3)	07:30		15:39 (4)	08:24		15:18 (5)	
	21:59		21:19	41	20:38 (2)	20:11		18:57	23	18:29 (3)	16:48	38	16:17 (4)	16:08	14	15:32 (5)	
5	05:02		05:45		19:56 (2)	06:40		07:33		18:06 (3)	07:32		15:39 (4)	08:25		15:18 (5)	
	21:58		21:17	41	20:37 (2)	20:09		18:55	20	18:26 (3)	16:46	36	16:15 (4)	16:07	12	15:30 (5)	
6	05:03		05:47		19:56 (2)	06:42		07:35		18:06 (3)	07:34		15:39 (4)	08:26		15:19 (5)	
	21:58		21:15	42	20:38 (2)	20:06		18:52	18	18:24 (3)	16:44	33	16:12 (4)	16:07	11	15:30 (5)	
7	05:04		05:49		19:56 (2)	06:43		07:37		18:05 (3)	07:36		15:40 (4)	08:28		15:19 (5)	
	21:57		21:13	42	20:38 (2)	20:04		18:50	16	18:21 (3)	16:43	30	16:10 (4)	16:06	10	15:29 (5)	
8	05:05		05:51		19:56 (2)	06:45		07:39		18:05 (3)	07:38		15:40 (4)	08:29		15:19 (5)	
	21:56		21:12	42	20:38 (2)	20:01		18:48	13	18:18 (3)	16:41	28	16:08 (4)	16:06	9	15:28 (5)	
9	05:06		05:52		19:56 (2)	06:47		07:41		18:06 (3)	07:40		15:41 (4)	08:30		15:21 (5)	
	21:55		21:10	42	20:38 (2)	19:59		18:45	10	18:16 (3)	16:39	25	16:06 (4)	16:05	8	15:29 (5)	
10	05:07		05:54		19:55 (2)	06:49		07:42		18:06 (3)	07:42		15:42 (4)	08:31		15:21 (5)	
	21:55		21:08	42	20:37 (2)	19:56		18:43	8	18:14 (3)	16:37	23	16:05 (4)	16:05	7	15:28 (5)	
11	05:08		05:56		19:55 (2)	06:50		07:44		18:07 (3)	07:44		15:43 (4)	08:33		15:22 (5)	
	21:54		21:05	40	20:35 (2)	19:54		18:40	4	18:11 (3)	16:35	20	16:03 (4)	16:05	5	15:27 (5)	
12	05:09		05:57		19:55 (2)	06:52		07:46		18:08 (3)	07:45		15:44 (4)	08:34		15:22 (5)	
	21:53		21:03	39	20:34 (2)	19:51		18:38	1	18:09 (3)	16:34	17	16:01 (4)	16:05	5	15:27 (5)	
13	05:10		05:59		19:55 (2)	06:54		07:48			07:47		15:45 (4)	08:35		15:23 (5)	
	21:52		21:01	36	20:31 (2)	19:49		18:36			16:32	14	15:59 (4)	16:05	4	15:27 (5)	
14	05:12		06:01		19:55 (2)	06:56		07:50		17:00 (4)	07:49		15:46 (4)	08:36		15:23 (5)	
	21:51		20:59	34	20:29 (2)	19:47		18:33	12	17:12 (4)	16:31	12	15:58 (4)	16:05	3	15:26 (5)	
15	05:13		06:03		19:56 (2)	06:58		07:52		16:56 (4)	07:51		15:20 (5)	08:37		15:24 (5)	
	21:50		20:57	32	20:28 (2)	19:44		18:31	20	17:16 (4)	16:29	19	15:56 (4)	16:05	2	15:26 (5)	
16	05:14		06:04		19:55 (2)	06:59		07:54		16:52 (4)	07:53		15:18 (5)	08:38		15:25 (5)	
	21:49		20:55	30	20:25 (2)	19:42		18:29	26	17:18 (4)	16:27	20	15:54 (4)	16:05	2	15:27 (5)	
17	05:16		06:06		19:56 (2)	07:01		07:55		16:50 (4)	07:55		15:17 (5)	08:38		15:25 (5)	
	21:47		20:53	27	20:23 (2)	19:39		18:26	30	17:20 (4)	16:26	19	15:52 (4)	16:05	2	15:27 (5)	
18	05:17		06:08		19:57 (2)	07:03		07:57		16:48 (4)	07:57		15:16 (5)	08:39		15:26 (5)	
	21:46		20:51	25	20:22 (2)	19:37		18:24	34	17:22 (4)	16:24	19	15:35 (5)	16:05	1	15:27 (5)	
19	05:18		06:10		19:57 (2)	07:05		07:59		16:46 (4)	07:59		15:15 (5)	08:40		15:27 (5)	
	21:45		20:48	22	20:19 (2)	19:34		18:22	37	17:23 (4)	16:23	21	15:36 (5)	16:05	1	15:28 (5)	
20	05:20		06:12		19:58 (2)	07:06		08:01		16:45 (4)	08:00		15:14 (5)	08:41			
	21:44		20:46	19	20:17 (2)	19:32		18:20	39	17:24 (4)	16:22	23	15:37 (5)	16:06			
21	05:21		20:12 (2)		06:13	19:59 (2)	07:08	08:03		16:43 (4)	08:02		15:14 (5)	08:41			
	21:42	11	20:23 (2)	20:44	16	20:15 (2)	19:29	18:17	42	17:25 (4)	16:20	24	15:38 (5)	16:06			
22	05:23		20:09 (2)	06:15		20:00 (2)	07:10	08:05		16:42 (4)	08:04		15:14 (5)	08:42			
	21:41	16	20:25 (2)	20:42	12	20:12 (2)	19:27	18:15	44	17:26 (4)	16:19	25	15:39 (5)	16:06			
23	05:24		20:08 (2)	06:17		20:02 (2)	07:12	08:07		16:41 (4)	08:06		15:14 (5)	08:42			
	21:39	20	20:28 (2)	20:39	8	20:10 (2)	19:24	18:13	45	17:26 (4)	16:18	25	15:39 (5)	16:07			
24	05:26		20:06 (2)	06:19		20:04 (2)	07:13	08:09		16:41 (4)	08:08		15:14 (5)	08:43		15:29 (5)	
	21:38	23	20:29 (2)	20:37	5	20:09 (2)	19:22	18:11	46	17:27 (4)	16:17	26	15:40 (5)	16:08	1	15:30 (5)	
25	05:27		20:06 (2)	06:20		07:15		07:11		15:40 (4)	08:09		15:14 (5)	08:43		15:29 (5)	
	21:36	25	20:31 (2)	20:35		19:19		17:09	47	16:27 (4)	16:16	26	15:40 (5)	16:08	1	15:30 (5)	
26	05:29		20:04 (2)	06:22		07:17		07:13		15:39 (4)	08:11		15:14 (5)	08:43		15:29 (5)	
	21:35	27	20:31 (2)	20:32		19:17	6	18:26 (3)	17:06	48	16:27 (4)	16:14	26	15:40 (5)	16:09	2	15:31 (5)
27	05:30		20:03 (2)	06:24		07:19		18:16 (3)	07:15		15:39 (4)	08:13		15:15 (5)	08:44		15:31 (5)
	21:33	30	20:33 (2)	20:30		19:14	14	18:30 (3)	17:04	49	16:28 (4)	16:13	23	15:38 (5)	16:10	1	15:32 (5)
28	05:32		20:02 (2)	06:26		07:21		18:14 (3)	07:16		15:38 (4)	08:14		15:15 (5)	08:44		15:31 (5)
	21:32	31	20:33 (2)	20:28		19:12	18	18:32 (3)	17:02	50	16:28 (4)	16:12	23	15:38 (5)	16:11	2	15:33 (5)
29	05:34		20:01 (2)	06:28		07:22		18:12 (3)	07:18		15:38 (4)	08:16		15:15 (5)	08:44		15:31 (5)
	21:30	33	20:34 (2)	20:25		19:09	21	18:33 (3)	17:00	50	16:28 (4)	16:12	21	15:36 (5)	16:11	3	15:34 (5)
30	05:35		20:00 (2)	06:29		07:24		18:09 (3)	07:20		15:38 (4)	08:18		15:16 (5)	08:44		15:31 (5)
	21:28	35	20:35 (2)	20:23		19:07	24	18:33 (3)	16:58	49	16:27 (4)	16:11	19	15:35 (5)	16:12	3	15:34 (5)
31	05:37		20:00 (2)	06:31				07:22		15:37 (4)				08:44			15:31 (5)
	21:27	36	20:36 (2)	20:21				16:56	48	16:25 (4)				16:13	4	15:35 (5)	
Potential sun hours	512		460			382		328		259			233				
Total, worst case	287		752			83		905		764			163				
Sun reduction	0.32		0.34			0.32		0.29		0.27			0.21				
Oper. time red.	1.00		1.00			1.00		1.00		1.00			1.00				
Wind dir. red.	0.65		0.65			0.68		0.66		0.66			0.66				
Total reduction	0.21		0.22			0.22		0.19		0.17			0.14				
Total, real	60		166			18		175		133			22				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DI - H113

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14			07:16		16:35 (4)	07:01		05:52		19:48 (2)	05:03			
	16:15			17:06			18:02	28	17:03 (4)	20:00		20:55	38	20:26 (2)	21:45			
2	08:44			08:12			07:14		16:36 (4)	06:59		05:50		19:48 (2)	05:02			
	16:16			17:08			18:04	24	17:00 (4)	20:02		20:57	39	20:27 (2)	21:46			
3	08:44			08:10		16:36 (4)	07:12		16:40 (4)	06:56		05:48		19:48 (2)	05:01			
	16:17			17:10	3	16:39 (4)	18:06	17	16:57 (4)	20:04		20:59	38	20:26 (2)	21:48			
4	08:43			08:08		16:34 (4)	07:09		16:46 (4)	06:54		05:46		19:48 (2)	05:00			
	16:18			17:12	7	16:41 (4)	18:07	6	16:52 (4)	20:06		21:01	38	20:26 (2)	21:49			
5	08:43			08:07		16:33 (4)	07:07		17:39 (3)	06:51		05:44		19:48 (2)	04:59			
	16:19			17:14	10	16:43 (4)	18:09	3	17:42 (3)	20:07		21:03	37	20:25 (2)	21:50			
6	08:43			08:05		16:32 (4)	07:04		17:38 (3)	06:49		05:42		19:48 (2)	04:59			
	16:21			17:16	13	16:45 (4)	18:11	7	17:45 (3)	20:09		21:04	37	20:25 (2)	21:51			
7	08:42			08:03		16:31 (4)	07:02		17:36 (3)	06:47		05:40		19:49 (2)	04:58			
	16:22			17:18	16	16:47 (4)	18:13	10	17:46 (3)	20:11		21:06	36	20:25 (2)	21:52			
8	08:42			08:01		16:30 (4)	07:00		17:36 (3)	06:44		05:38		19:50 (2)	04:57			
	16:24			17:20	20	16:50 (4)	18:15	12	17:48 (3)	20:13		21:08	34	20:24 (2)	21:53			
9	08:41		15:48 (5)	07:59		16:30 (4)	06:57		17:35 (3)	06:42		05:36		19:50 (2)	04:57			
	16:25	1	15:49 (5)	17:22	22	16:52 (4)	18:17	15	17:50 (3)	20:15		21:10	33	20:23 (2)	21:54			
10	08:40		15:47 (5)	07:57		16:29 (4)	06:55		17:35 (3)	06:39		05:34		19:50 (2)	04:56			
	16:26	3	15:50 (5)	17:24	25	16:54 (4)	18:19	17	17:52 (3)	20:17		21:11	32	20:22 (2)	21:55			
11	08:40		15:47 (5)	07:55		16:29 (4)	06:52		17:35 (3)	06:37		05:33		19:52 (2)	04:56			
	16:28	5	15:52 (5)	17:26	27	16:56 (4)	18:21	20	17:55 (3)	20:19		21:13	30	20:22 (2)	21:55			
12	08:39		15:47 (5)	07:53		16:27 (4)	06:50		17:35 (3)	06:35		05:31		19:52 (2)	04:55			
	16:30	7	15:54 (5)	17:28	31	16:58 (4)	18:23	21	17:56 (3)	20:20		21:15	29	20:21 (2)	21:56			
13	08:38		15:47 (5)	07:51		16:27 (4)	06:48		17:35 (3)	06:32		05:29		19:53 (2)	04:55			
	16:31	8	15:55 (5)	17:30	33	17:00 (4)	18:25	23	17:58 (3)	20:22		21:17	26	20:19 (2)	21:57			
14	08:37		15:47 (5)	07:49		16:27 (4)	06:45		17:35 (3)	06:30		05:27		19:55 (2)	04:55			
	16:33	10	15:57 (5)	17:32	35	17:02 (4)	18:27	25	18:00 (3)	20:24		21:18	24	20:19 (2)	21:58			
15	08:36		15:48 (5)	07:47		16:27 (4)	06:43		17:36 (3)	06:28		05:26		19:56 (2)	04:55			
	16:34	11	15:59 (5)	17:34	38	17:05 (4)	18:28	23	17:59 (3)	20:26		21:20	21	20:17 (2)	21:58			
16	08:35		15:47 (5)	07:45		16:27 (4)	06:40		17:36 (3)	06:25		05:24		19:58 (2)	04:54			
	16:36	13	16:00 (5)	17:36	40	17:07 (4)	18:30	21	17:57 (3)	20:28		21:22	18	20:16 (2)	21:59			
17	08:34		15:47 (5)	07:43		16:27 (4)	06:38		17:38 (3)	06:23		05:22		19:59 (2)	04:54			
	16:38	16	16:03 (5)	17:38	42	17:09 (4)	18:32	18	17:56 (3)	20:30		21:23	14	20:13 (2)	21:59			
18	08:33		15:48 (5)	07:41		16:26 (4)	06:35		17:40 (3)	06:21		05:21		20:03 (2)	04:54			
	16:40	17	16:05 (5)	17:40	45	17:11 (4)	18:34	13	17:53 (3)	20:31	2	20:03 (2)	7	20:10 (2)	22:00			
19	08:32		15:48 (5)	07:39		16:27 (4)	06:33		17:45 (3)	06:18		19:59 (2)			04:54			
	16:41	19	16:07 (5)	17:42	45	17:12 (4)	18:36	3	17:48 (3)	20:33	6	20:05 (2)			22:00			
20	08:31		15:48 (5)	07:36		16:27 (4)	06:31			06:16		19:57 (2)			04:54			
	16:43	20	16:08 (5)	17:44	45	17:12 (4)	18:38			20:35	10	20:07 (2)			22:00			
21	08:30		15:49 (5)	07:34		16:28 (4)	06:28			06:14		19:54 (2)			04:54			
	16:45	22	16:11 (5)	17:46	44	17:12 (4)	18:40			20:37	14	20:08 (2)			22:01			
22	08:29		15:49 (5)	07:32		16:27 (4)	06:26			06:12		19:53 (2)			04:55			
	16:47	23	16:12 (5)	17:48	44	17:11 (4)	18:42			20:39	17	20:10 (2)			22:01			
23	08:27		15:50 (5)	07:30		16:28 (4)	06:23			06:09		19:52 (2)			04:55			
	16:49	25	16:15 (5)	17:50	42	17:10 (4)	18:43			20:41	20	20:12 (2)			22:01			
24	08:26		15:50 (5)	07:28		16:29 (4)	06:21			06:07		19:51 (2)			04:55			
	16:50	24	16:14 (5)	17:52	41	17:10 (4)	18:45			20:43	23	20:14 (2)			22:01			
25	08:24		15:51 (5)	07:25		16:29 (4)	06:18			06:05		19:50 (2)			04:55			
	16:52	24	16:15 (5)	17:54	39	17:08 (4)	18:47			20:44	25	20:15 (2)			22:01			
26	08:23		15:51 (5)	07:23		16:31 (4)	06:16			06:03		19:50 (2)			04:56			
	16:54	23	16:14 (5)	17:56	36	17:07 (4)	18:49			20:46	27	20:17 (2)			22:01			
27	08:22		15:52 (5)	07:21		16:32 (4)	06:13			06:01		19:49 (2)			04:56			
	16:56	21	16:13 (5)	17:58	34	17:06 (4)	18:51			20:48	30	20:19 (2)			22:01			
28	08:20		15:54 (5)	07:18		16:33 (4)	06:11			05:58		19:49 (2)			04:57			
	16:58	19	16:13 (5)	18:00	31	17:04 (4)	18:53			20:50	32	20:21 (2)			22:01			
29	08:18		15:55 (5)				07:08			05:56		19:49 (2)			04:57			
	17:00	17	16:12 (5)				19:54			20:52	33	20:22 (2)			22:01			
30	08:17		15:56 (5)				07:06			05:54		19:48 (2)			04:58			
	17:02	15	16:11 (5)				19:56			20:54	36	20:24 (2)			22:00			
31	08:15		15:58 (5)				07:04					05:04						
	17:04	11	16:09 (5)				19:58					21:44						
Potential sun hours	250			273			367		420			494			510			
Total, worst case		354		808			306		275		531							
Sun reduction		0.24		0.23			0.27		0.35		0.38							
Oper. time red.		1.00		1.00			1.00		1.00		1.00							
Wind dir. red.		0.66		0.66			0.67		0.65		0.65							
Total reduction		0.16		0.15			0.18		0.23		0.25							
Total, real		57		124			56		63		131							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DI - H113

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:02 (2) 20:31 (2)	06:33 20:18	07:26 18:14 (3)	07:24 15:59 (4)
2	04:59 22:00	05:40 21:23	20:02 (2) 20:33 (2)	06:35 20:16	18:13 (3) 19:02	16:23 (4) 16:52
3	05:00 21:59	05:42 21:21	20:00 (2) 20:33 (2)	06:36 20:13	18:13 (3) 19:00	16:00 (4) 16:50
4	05:01 21:59	05:44 21:19	20:00 (2) 20:34 (2)	06:38 20:11	18:31 (3) 18:29 (3)	16:19 (4) 16:48
5	05:02 21:58	05:45 21:17	19:59 (2) 20:34 (2)	06:40 20:09	18:13 (3) 18:55	16:02 (4) 16:46
6	05:03 21:58	05:47 21:15	19:59 (2) 20:34 (2)	06:42 20:06	18:13 (3) 18:52	16:03 (4) 16:44
7	05:04 21:57	05:49 21:13	19:58 (2) 20:35 (2)	06:43 20:04	18:24 (3) 18:50	16:12 (4) 16:43
8	05:05 21:56	05:51 21:12	19:57 (2) 20:35 (2)	06:45 20:01	18:13 (3) 18:48	16:06 (4) 16:41
9	05:06 21:55	05:52 21:10	19:57 (2) 20:35 (2)	06:47 19:59	18:14 (3) 18:45	16:08 (4) 16:39
10	05:07 21:55	05:54 21:07	19:56 (2) 20:35 (2)	06:49 19:56	17:16 (4) 18:43	16:08 (4) 16:37
11	05:08 21:54	05:56 21:05	19:56 (2) 20:35 (2)	06:50 19:54	17:12 (4) 18:40	15:37 (5) 16:35
12	05:09 21:53	05:57 21:03	19:57 (2) 20:34 (2)	06:52 19:51	17:09 (4) 18:38	15:41 (5) 16:34
13	05:10 21:52	05:59 21:01	19:56 (2) 20:31 (2)	06:54 19:49	17:07 (4) 18:36	15:28 (5) 16:32
14	05:12 21:51	06:01 20:59	19:56 (2) 20:29 (2)	06:56 19:47	17:05 (4) 18:33	15:44 (5) 16:31
15	05:13 21:50	06:03 20:57	19:57 (2) 20:28 (2)	06:58 19:44	17:04 (4) 18:31	15:45 (5) 16:29
16	05:14 21:49	06:04 20:55	19:56 (2) 20:25 (2)	06:59 19:42	17:02 (4) 18:29	15:24 (5) 16:27
17	05:16 21:47	06:06 20:53	19:57 (2) 20:23 (2)	07:01 19:39	17:01 (4) 18:26	15:47 (5) 16:26
18	05:17 21:46	06:08 20:51	19:57 (2) 20:22 (2)	07:03 19:37	17:00 (4) 18:24	15:24 (5) 16:24
19	05:18 21:45	06:10 20:48	19:57 (2) 20:19 (2)	07:05 19:34	16:59 (4) 18:22	15:24 (5) 16:23
20	05:20 21:44	06:12 20:46	19:58 (2) 20:17 (2)	07:06 19:32	16:58 (4) 18:20	15:24 (5) 16:22
21	05:21 21:42	06:13 20:44	19:59 (2) 20:15 (2)	07:08 19:29	16:58 (4) 18:17	15:47 (5) 16:20
22	05:23 21:41	06:15 20:42	19:59 (2) 20:12 (2)	07:10 19:27	16:57 (4) 18:15	15:24 (5) 16:19
23	05:24 21:39	06:17 20:39	20:01 (2) 20:10 (2)	07:12 19:24	16:57 (4) 18:13	15:24 (5) 16:18
24	05:26 21:38	06:19 20:37	20:03 (2) 20:09 (2)	07:13 19:22	16:57 (4) 18:11	15:25 (5) 16:17
25	05:27 21:36	06:20 20:35	20:04 (2) 20:06 (2)	07:15 19:19	15:56 (4) 18:23 (3)	15:25 (5) 16:11
26	05:29 21:35	20:12 (2) 20:22 (2)	06:22 20:32	19:17 19:16	16:38 (4) 18:37 (3)	16:16 17:06
27	05:30 21:33	20:09 (2) 20:24 (2)	06:24 20:30	19:19 19:14	17:05 18:38 (3)	16:14 17:04
28	05:32 21:32	20:07 (2) 20:27 (2)	06:26 20:28	19:21 19:12	17:16 18:39 (3)	16:13 17:02
29	05:34 21:30	20:05 (2) 20:28 (2)	06:27 20:25	19:22 19:09	17:18 18:40 (3)	16:12 17:00
30	05:35 21:28	20:05 (2) 20:29 (2)	06:29 20:23	19:24 19:07	17:20 18:38 (3)	16:18 16:58
31	05:37 21:26	20:04 (2) 20:31 (2)	06:31 20:21	19:24 16:56	17:22 16:25 (4)	16:11 16:25
Potential sun hours	512	460	382	328	259	233
Total, worst case	119	691	116	904	462	9
Sun reduction	0.32	0.34	0.32	0.29	0.27	0.21
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.65	0.65	0.68	0.66	0.66	0.66
Total reduction	0.21	0.22	0.22	0.19	0.18	0.14
Total, real	25	153	25	175	81	1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DJ - H114

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:03 (5)	07:16	16:40 (4)	07:01		05:52		19:49 (2)	05:03					
	16:15			17:06	16	16:19 (5)	18:02	35	17:15 (4)	20:00		20:55	37	20:26 (2)	21:45			
2	08:44			08:12	16:05 (5)	07:14	16:41 (4)	06:59		05:50		19:49 (2)	05:02					
	16:16			17:08	12	16:17 (5)	18:04	32	17:13 (4)	20:02		20:57	37	20:26 (2)	21:46			
3	08:44			08:10	16:08 (5)	07:12	16:43 (4)	06:56		05:48		19:49 (2)	05:01					
	16:17			17:10	6	16:14 (5)	18:06	28	17:11 (4)	20:04		20:59	36	20:25 (2)	21:48			
4	08:43			08:08		07:09	16:45 (4)	06:54		05:46		19:50 (2)	05:00					
	16:18			17:12		18:07	17:10 (4)	20:06		21:01	35	20:25 (2)	21:49					
5	08:43			08:07		07:07	16:47 (4)	06:51		05:44		19:50 (2)	04:59					
	16:19			17:14		18:09	17:06 (4)	20:07		21:03	34	20:24 (2)	21:50					
6	08:43			08:05		07:04	16:51 (4)	06:49		05:42		19:50 (2)	04:59					
	16:21			17:16		18:11	17:45 (3)	20:09		21:04	33	20:23 (2)	21:51					
7	08:42			08:03		07:02	17:42 (3)	06:47		05:40		19:51 (2)	04:58					
	16:22			17:18	1	16:47 (4)	18:13	4	17:46 (3)	20:11		21:06	33	20:24 (2)	21:52			
8	08:42			08:01		07:00	17:41 (3)	06:44		05:38		19:52 (2)	04:57					
	16:24			17:20	5	16:50 (4)	18:15	7	17:48 (3)	20:13		21:08	31	20:23 (2)	21:53			
9	08:41			07:59		06:57	17:39 (3)	06:42		05:36		19:52 (2)	04:57					
	16:25			17:22	9	16:52 (4)	18:17	11	17:50 (3)	20:15		21:10	30	20:22 (2)	21:54			
10	08:40			07:57		06:55	17:39 (3)	06:39		05:34		19:53 (2)	04:56					
	16:26			17:24	12	16:54 (4)	18:19	13	17:52 (3)	20:17		21:11	27	20:20 (2)	21:55			
11	08:40			07:55		06:52	17:39 (3)	06:37		05:33		19:54 (2)	04:56					
	16:28			17:26	15	16:56 (4)	18:21	16	17:55 (3)	20:19		21:13	26	20:20 (2)	21:55			
12	08:39			07:53		06:50	17:38 (3)	06:35		05:31		19:55 (2)	04:55					
	16:30			17:28	18	16:58 (4)	18:23	18	17:56 (3)	20:20		21:15	24	20:19 (2)	21:56			
13	08:38			07:51		06:48	17:39 (3)	06:32		05:29		19:56 (2)	04:55					
	16:31			17:30	21	17:00 (4)	18:25	19	17:58 (3)	20:22		21:17	21	20:17 (2)	21:57			
14	08:37		15:56 (5)	07:49		06:45	17:38 (3)	06:30		05:27		19:58 (2)	04:55					
	16:33	1	15:57 (5)	17:32	24	17:02 (4)	18:27	22	18:00 (3)	20:24		21:18	18	20:16 (2)	21:58			
15	08:36		15:56 (5)	07:47		06:43	17:39 (3)	06:28		05:26		20:00 (2)	04:55					
	16:34	3	15:59 (5)	17:34	27	17:05 (4)	18:28	23	18:02 (3)	20:26		21:20	13	20:13 (2)	21:58			
16	08:35		15:55 (5)	07:45		06:40	17:39 (3)	06:25		05:24		20:04 (2)	04:54					
	16:36	5	16:00 (5)	17:36	29	17:07 (4)	18:30	23	18:02 (3)	20:28		21:22	6	20:10 (2)	21:59			
17	08:34		15:55 (5)	07:43		06:38	17:40 (3)	06:23		05:22			04:54					
	16:38	8	16:03 (5)	17:38	31	17:09 (4)	18:32	21	18:01 (3)	20:30		21:23			21:59			
18	08:33		15:55 (5)	07:41		06:35	17:41 (3)	06:21		20:01 (2)	05:21		04:54					
	16:40	10	16:05 (5)	17:40	34	17:11 (4)	18:34	17	17:58 (3)	20:31	2	20:03 (2)	21:25			22:00		
19	08:32		15:55 (5)	07:39		06:33	17:43 (3)	06:18		19:59 (2)	05:19		04:54					
	16:41	12	16:07 (5)	17:42	36	17:13 (4)	18:36	13	17:56 (3)	20:33	6	20:05 (2)	21:27			22:00		
20	08:31		15:55 (5)	07:36		06:31	17:47 (3)	06:16		19:57 (2)	05:18		04:54					
	16:43	13	16:08 (5)	17:44	39	17:16 (4)	18:38	4	17:51 (3)	20:35	10	20:07 (2)	21:28			22:00		
21	08:30		15:55 (5)	07:34		06:28		06:14		19:55 (2)	05:16		04:54					
	16:45	16	16:11 (5)	17:46	41	17:18 (4)	18:40		20:37	13	20:08 (2)	21:30	22:01					
22	08:29		15:55 (5)	07:32		06:26		06:12		19:54 (2)	05:15		04:55					
	16:47	17	16:12 (5)	17:48	43	17:19 (4)	18:42		20:39	16	20:10 (2)	21:31	22:01					
23	08:27		15:56 (5)	07:30		06:23		06:09		19:53 (2)	05:13		04:55					
	16:49	19	16:15 (5)	17:50	43	17:20 (4)	18:43		20:41	19	20:12 (2)	21:33	22:01					
24	08:26		15:56 (5)	07:28		06:21		06:07		19:52 (2)	05:12		04:55					
	16:50	21	16:17 (5)	17:52	43	17:20 (4)	18:45		20:43	22	20:14 (2)	21:34	22:01					
25	08:24		15:57 (5)	07:25		06:18		06:05		19:51 (2)	05:11		04:55					
	16:52	22	16:19 (5)	17:54	41	17:18 (4)	18:47		20:44	24	20:15 (2)	21:36	22:01					
26	08:23		15:57 (5)	07:23		06:16		06:03		19:51 (2)	05:09		04:56					
	16:54	24	16:21 (5)	17:56	40	17:18 (4)	18:49		20:46	26	20:17 (2)	21:37	22:01					
27	08:22		15:57 (5)	07:21		06:13		06:01		19:50 (2)	05:08		04:56					
	16:56	24	16:21 (5)	17:58	38	17:17 (4)	18:51		20:48	29	20:19 (2)	21:39	22:01					
28	08:20		15:58 (5)	07:18		06:11		05:58		19:50 (2)	05:07		04:57					
	16:58	23	16:21 (5)	18:00	37	17:16 (4)	18:53		20:50	31	20:21 (2)	21:40	22:01					
29	08:18		15:59 (5)			07:08		05:56		19:50 (2)	05:06		04:57					
	17:00	22	16:21 (5)			19:54		20:52	32	20:22 (2)	21:41		22:01					
30	08:17		16:00 (5)			07:06		05:54		19:50 (2)	05:05		04:58					
	17:02	20	16:20 (5)			19:56		20:54	34	20:24 (2)	21:43		22:00					
31	08:15		16:01 (5)			07:04					05:04							
	17:04	18	16:19 (5)			19:58					21:44							
Potential sun hours	250			273		367		420		494			510					
Total, worst case		278		661		363		264		441								
Sun reduction		0.24		0.23		0.27		0.35		0.38								
Oper. time red.		1.00		1.00		1.00		1.00		1.00								
Wind dir. red.		0.66		0.67		0.67		0.65		0.65								
Total reduction		0.16		0.15		0.18		0.23		0.25								
Total, real		45		102		66		60		109								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DJ - H114

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1 04:59	05:39	20:05 (2) 06:33	07:26	18:17 (3) 07:24	16:12 (4) 08:19	
22:00	21:25 24	20:29 (2) 20:18	19:05 19	18:36 (3) 16:54 11	16:23 (4) 16:10	
2 04:59	05:40	20:04 (2) 06:35	07:28	18:17 (3) 07:26	16:13 (4) 08:21	
22:00	21:23 27	20:31 (2) 20:16	19:02 16	18:33 (3) 16:52 8	16:21 (4) 16:09	
3 05:00	05:42	20:03 (2) 06:36	07:30	18:17 (3) 07:28	16:15 (4) 08:22	
21:59	21:21 28	20:31 (2) 20:13	19:00 14	18:31 (3) 16:50 4	16:19 (4) 16:08	
4 05:01	05:44	20:02 (2) 06:38	07:31	18:17 (3) 07:30	16:16 (4) 08:24	
21:59	21:19 30	20:32 (2) 20:11	18:57 12	18:29 (3) 16:48 1	16:17 (4) 16:08	
5 05:02	05:45	20:01 (2) 06:40	07:33	18:18 (3) 07:32	08:25	
21:58	21:17 31	20:32 (2) 20:09	18:55 8	18:26 (3) 16:46	16:07	
6 05:03	05:47	20:00 (2) 06:42	07:35	18:18 (3) 07:34	08:26	
21:58	21:15 33	20:33 (2) 20:06	18:52 6	18:24 (3) 16:44	16:07	
7 05:04	05:49	20:00 (2) 06:43	07:37	17:32 (4) 07:36	08:28	
21:57	21:13 34	20:34 (2) 20:04	18:50 4	18:21 (3) 16:43	16:06	
8 05:05	05:51	19:59 (2) 06:45	07:39	17:24 (4) 07:38	15:37 (5) 08:29	
21:56	21:12 35	20:34 (2) 20:01	18:48 16	17:40 (4) 16:41 7	15:44 (5) 16:06	
9 05:06	05:52	19:59 (2) 06:47	07:41	17:21 (4) 07:40	15:34 (5) 08:30	
21:55	21:10 35	20:34 (2) 19:59	18:45 22	17:43 (4) 16:39 13	15:47 (5) 16:05	
10 05:07	05:54	19:58 (2) 06:49	07:42	17:18 (4) 07:42	15:34 (5) 08:31	
21:55	21:07 36	20:34 (2) 19:56	18:43 27	17:45 (4) 16:37 16	15:50 (5) 16:05	
11 05:08	05:56	19:58 (2) 06:50	07:44	17:16 (4) 07:44	15:32 (5) 08:33	
21:54	21:05 36	20:34 (2) 19:54	18:40 30	17:46 (4) 16:35 19	15:51 (5) 16:05	
12 05:09	05:57	19:58 (2) 06:52	07:46	17:14 (4) 07:45	15:31 (5) 08:34	
21:53	21:03 36	20:34 (2) 19:51	18:38 33	17:47 (4) 16:34 21	15:52 (5) 16:05	
13 05:10	05:59	19:57 (2) 06:54	07:48	17:13 (4) 07:47	15:31 (5) 08:35	
21:52	21:01 34	20:31 (2) 19:49	18:36 35	17:48 (4) 16:32 22	15:53 (5) 16:05	
14 05:12	06:01	19:57 (2) 06:56	07:50	17:12 (4) 07:49	15:30 (5) 08:36	
21:51	20:59 32	20:29 (2) 19:47	18:33 37	17:49 (4) 16:31 23	15:53 (5) 16:04	
15 05:13	06:03	19:58 (2) 06:58	07:52	17:11 (4) 07:51	15:30 (5) 08:37	
21:50	20:57 30	20:28 (2) 19:44	18:31 39	17:50 (4) 16:29 24	15:54 (5) 16:05	
16 05:14	06:04	19:57 (2) 06:59	07:54	17:10 (4) 07:53	15:30 (5) 08:38	
21:49	20:55 28	20:25 (2) 19:42	18:29 40	17:50 (4) 16:27 24	15:54 (5) 16:05	
17 05:16	06:06	19:58 (2) 07:01	07:55	17:09 (4) 07:55	15:30 (5) 08:38	
21:47	20:53 25	20:23 (2) 19:39	18:26 42	17:51 (4) 16:26 22	15:52 (5) 16:05	
18 05:17	06:08	19:58 (2) 07:03	07:57	17:08 (4) 07:57	15:30 (5) 08:39	
21:46	20:51 24	20:22 (2) 19:37	18:24 43	17:51 (4) 16:24 21	15:51 (5) 16:05	
19 05:18	06:10	19:58 (2) 07:05	07:59	17:08 (4) 07:59	15:30 (5) 08:40	
21:45	20:48 21	20:19 (2) 19:34	18:22 43	17:51 (4) 16:23 19	15:49 (5) 16:05	
20 05:20	06:12	19:59 (2) 07:06	08:01	17:08 (4) 08:00	15:30 (5) 08:41	
21:44	20:46 18	20:17 (2) 19:32	18:20 42	17:50 (4) 16:22 17	15:47 (5) 16:06	
21 05:21	06:13	20:00 (2) 07:08	08:03	17:07 (4) 08:02	15:30 (5) 08:41	
21:42	20:44 15	20:15 (2) 19:29	18:17 41	17:48 (4) 16:20 16	15:46 (5) 16:06	
22 05:23	06:15	20:00 (2) 07:10	08:05	17:07 (4) 08:04	15:31 (5) 08:42	
21:41	20:42 12	20:12 (2) 19:27	18:15 38	17:45 (4) 16:19 13	15:44 (5) 16:06	
23 05:24	06:17	20:01 (2) 07:12	08:07	17:07 (4) 08:06	15:32 (5) 08:42	
21:39	20:39 9	20:10 (2) 19:24	18:13 36	17:43 (4) 16:18 11	15:43 (5) 16:07	
24 05:26	06:19	20:03 (2) 07:13	18:28 (3) 08:09	17:07 (4) 08:08	15:32 (5) 08:43	
21:38	20:37 6	20:09 (2) 19:22 11	18:39 (3) 18:11 34	17:41 (4) 16:17 10	15:42 (5) 16:08	
25 05:27	06:20	20:05 (2) 07:15	18:24 (3) 07:11	16:07 (4) 08:09	15:33 (5) 08:43	
21:36	20:35 1	20:06 (2) 19:19 16	18:40 (3) 17:09 31	16:38 (4) 16:16 8	15:41 (5) 16:08	
26 05:29	06:22	19:17 07:17	18:22 (3) 07:13	16:07 (4) 08:11	15:34 (5) 08:43	
21:35	20:32	19:17 07:17	18:42 (3) 17:06 29	16:36 (4) 16:14 6	15:40 (5) 16:09	
27 05:30	06:24	19:19 07:19	18:21 (3) 07:15	16:08 (4) 08:13	15:35 (5) 08:44	
21:33	20:30	19:14 07:14	18:43 (3) 17:04 26	16:34 (4) 16:13 3	15:38 (5) 16:10	
28 05:32	20:13 (2) 06:26	19:12 07:12	18:20 (3) 07:16	16:08 (4) 08:14	15:36 (5) 08:44	
21:32	9 20:22 (2) 20:28	19:12 07:12	18:44 (3) 17:02 24	16:31 (4) 16:12 2	15:38 (5) 16:11	
29 05:34	20:09 (2) 06:27	19:09 07:22	18:19 (3) 07:18	16:09 (4) 08:16	08:44	
21:30	15 20:24 (2) 20:25	19:09 07:22	18:41 (3) 17:00 20	16:29 (4) 16:12	16:11	
30 05:35	20:08 (2) 06:29	19:09 07:24	18:18 (3) 07:20	16:09 (4) 08:18	08:44	
21:28	19 20:27 (2) 20:23	19:07 07:24	18:38 (3) 16:58 18	16:27 (4) 16:11	16:12	
31 05:37	20:07 (2) 06:31	07:22	17:22 16:10 (4)	08:44	16:13	
21:26	22 20:29 (2) 20:21	16:56 15	16:25 (4)	16:13	233	
Potential sun hours	512	460	382	328	259	
Total, worst case	65	640	135	839	341	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.65	0.65	0.67	0.67	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.18	
Total, real	14	142	29	164	60	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DK - H115

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44		15:22 (5)	08:14		15:55 (4)	07:16		17:30 (3)	07:01			05:52		19:49 (2)	05:03		20:06 (2)
	16:15	15	15:37 (5)	17:06	40	16:35 (4)	18:02	4	17:34 (3)	20:00			20:55	37	20:26 (2)	21:45	11	20:17 (2)
2	08:44		15:22 (5)	08:12		15:54 (4)	07:14		17:28 (3)	06:59			05:50		19:49 (2)	05:02		20:11 (2)
	16:16	17	15:39 (5)	17:08	43	16:37 (4)	18:04	8	17:36 (3)	20:02			20:57	38	20:27 (2)	21:46	3	20:14 (2)
3	08:44		15:22 (5)	08:10		15:54 (4)	07:12		17:28 (3)	06:56			05:48		19:48 (2)	05:01		
	16:17	17	15:39 (5)	17:10	45	16:39 (4)	18:06	10	17:38 (3)	20:04			20:59	41	20:29 (2)	21:48		
4	08:43		15:23 (5)	08:08		15:54 (4)	07:09		17:27 (3)	06:54			05:46		19:48 (2)	05:00		
	16:18	18	15:41 (5)	17:12	47	16:41 (4)	18:07	14	17:41 (3)	20:06			21:01	42	20:30 (2)	21:49		
5	08:43		15:23 (5)	08:07		15:54 (4)	07:07		17:26 (3)	06:51			05:44		19:48 (2)	04:59		
	16:19	19	15:42 (5)	17:14	49	16:43 (4)	18:09	16	17:42 (3)	20:07			21:03	44	20:32 (2)	21:50		
6	08:43		15:24 (5)	08:05		15:54 (4)	07:04		17:26 (3)	06:49			05:42		19:47 (2)	04:59		
	16:21	20	15:44 (5)	17:16	51	16:45 (4)	18:11	19	17:45 (3)	20:09			21:04	46	20:33 (2)	21:51		
7	08:42		15:24 (5)	08:03		15:54 (4)	07:02		17:25 (3)	06:47			05:40		19:48 (2)	04:58		
	16:22	21	15:45 (5)	17:18	53	16:47 (4)	18:13	21	17:46 (3)	20:11			21:06	46	20:34 (2)	21:52		
8	08:42		15:24 (5)	08:01		15:54 (4)	07:00		17:25 (3)	06:44			05:38		19:48 (2)	04:57		
	16:24	22	15:46 (5)	17:20	54	16:48 (4)	18:15	23	17:48 (3)	20:13			21:08	46	20:34 (2)	21:53		
9	08:41		15:25 (5)	07:59		15:54 (4)	06:57		17:24 (3)	06:42			05:36		19:47 (2)	04:57		
	16:25	24	15:49 (5)	17:22	54	16:48 (4)	18:17	26	17:50 (3)	20:15			21:10	46	20:33 (2)	21:54		
10	08:40		15:25 (5)	07:57		15:55 (4)	06:55		17:25 (3)	06:39			05:34		19:47 (2)	04:56		
	16:26	25	15:50 (5)	17:24	53	16:48 (4)	18:19	27	17:52 (3)	20:17			21:11	46	20:33 (2)	21:55		
11	08:40		15:26 (5)	07:55		15:55 (4)	06:53		17:26 (3)	06:37			05:33		19:48 (2)	04:56		
	16:28	26	15:52 (5)	17:26	53	16:48 (4)	18:21	28	17:54 (3)	20:19			21:13	45	20:33 (2)	21:55		
12	08:39		15:26 (5)	07:53		15:55 (4)	06:50		17:25 (3)	06:35			05:31		19:48 (2)	04:55		
	16:30	28	15:54 (5)	17:28	53	16:48 (4)	18:23	28	17:53 (3)	20:20			21:15	45	20:33 (2)	21:56		
13	08:38		15:27 (5)	07:51		15:55 (4)	06:48		17:27 (3)	06:32			05:29		19:48 (2)	04:55		
	16:31	27	15:54 (5)	17:30	52	16:47 (4)	18:25	25	17:52 (3)	20:22			21:17	44	20:32 (2)	21:57		
14	08:37		15:27 (5)	07:49		15:56 (4)	06:45		17:27 (3)	06:30			05:27		19:49 (2)	04:55		
	16:33	27	15:54 (5)	17:32	51	16:47 (4)	18:27	23	17:50 (3)	20:24			21:18	43	20:32 (2)	21:58		
15	08:36		15:28 (5)	07:47		15:56 (4)	06:43		17:29 (3)	06:28			05:26		19:49 (2)	04:55		
	16:34	26	15:54 (5)	17:34	50	16:46 (4)	18:28	19	17:48 (3)	20:26			21:20	42	20:31 (2)	21:58		
16	08:35		15:28 (5)	07:45		15:57 (4)	06:40		17:31 (3)	06:25			05:24		19:50 (2)	04:54		
	16:36	26	15:54 (5)	17:36	49	16:46 (4)	18:30	14	17:45 (3)	20:28			21:22	41	20:31 (2)	21:59		
17	08:34		15:29 (5)	07:43		15:58 (4)	06:38		17:35 (3)	06:23			05:22		19:50 (2)	04:54		
	16:38	26	16:03 (4)	17:38	47	16:45 (4)	18:32	6	17:41 (3)	20:30			21:23	40	20:30 (2)	21:59		
18	08:33		15:30 (5)	07:41		15:59 (4)	06:35			06:21			05:21		19:51 (2)	04:54		
	16:40	28	16:05 (4)	17:40	44	16:43 (4)	18:34			20:31			21:25	39	20:30 (2)	22:00		
19	08:32		15:31 (5)	07:39		16:00 (4)	06:33			06:18			05:19		19:52 (2)	04:54		
	16:41	29	16:07 (4)	17:42	43	16:43 (4)	18:36			20:33			21:27	38	20:30 (2)	22:00		
20	08:31		15:31 (5)	07:36		16:01 (4)	06:31			06:16		20:06 (2)	05:18		19:52 (2)	04:54		
	16:43	31	16:08 (4)	17:44	41	16:42 (4)	18:38			20:35	1	20:07 (2)	21:28	37	20:29 (2)	22:00		
21	08:30		15:33 (5)	07:34		16:03 (4)	06:28			06:14		20:02 (2)	05:16		19:53 (2)	04:54		
	16:45	32	16:11 (4)	17:46	38	16:41 (4)	18:40			20:37	6	20:08 (2)	21:30	36	20:29 (2)	22:01		
22	08:29		15:34 (5)	07:32		16:04 (4)	06:26			06:12		20:00 (2)	05:15		19:54 (2)	04:55		
	16:47	32	16:12 (4)	17:48	34	16:38 (4)	18:42			20:39	10	20:10 (2)	21:31	34	20:28 (2)	22:01		
23	08:27		15:36 (5)	07:30		16:06 (4)	06:23			06:09		19:58 (2)	05:13		19:54 (2)	04:55		
	16:49	32	16:15 (4)	17:50	31	16:37 (4)	18:43			20:41	14	20:12 (2)	21:33	33	20:27 (2)	22:01		
24	08:26		15:38 (5)	07:28		16:09 (4)	06:21			06:07		19:56 (2)	05:12		19:55 (2)	04:55		
	16:50	31	16:17 (4)	17:52	25	16:34 (4)	18:45			20:43	18	20:14 (2)	21:34	31	20:26 (2)	22:01		
25	08:24		15:41 (5)	07:25		16:12 (4)	06:18			06:05		19:55 (2)	05:11		19:56 (2)	04:55		
	16:52	28	16:19 (4)	17:54	18	16:30 (4)	18:47			20:44	20	20:15 (2)	21:36	30	20:26 (2)	22:01		
26	08:23		15:56 (4)	07:23		16:18 (4)	06:16			06:03		19:54 (2)	05:09		19:58 (2)	04:56		
	16:54	25	16:21 (4)	17:56	6	16:24 (4)	18:49			20:46	23	20:17 (2)	21:37	27	20:25 (2)	22:01		
27	08:22		15:55 (4)	07:21			06:13			06:01		19:53 (2)	05:08		19:59 (2)	04:56		
	16:56	28	16:23 (4)	17:58			18:51			20:48	26	20:19 (2)	21:39	25	20:24 (2)	22:01		
28	08:20		15:56 (4)	07:18			06:11			05:58		19:52 (2)	05:07		20:00 (2)	04:57		
	16:58	30	16:26 (4)	18:00			18:53			20:50	29	20:21 (2)	21:40	23	20:23 (2)	22:01		
29	08:18		15:55 (4)				07:09			05:56		19:51 (2)	05:06		20:01 (2)	04:57		
	17:00	33	16:28 (4)				19:54			20:52	31	20:22 (2)	21:41	21	20:22 (2)	22:01		
30	08:17		15:55 (4)				07:06			05:54		19:50 (2)	05:05		20:03 (2)	04:58		
	17:02	35	16:30 (4)				19:56			20:54	34	20:24 (2)	21:43	18	20:21 (2)	22:00		
31	08:15		15:54 (4)				07:04					05:04			20:04 (2)			
	17:04	38	16:32 (4)				19:58					21:44		15	20:19 (2)			
Potential sun hours	250			273			367			420			494			510		
Total, worst case		816			1124			311			212			1139			14	
Sun reduction		0.24			0.23			0.27			0.35			0.38			0.32	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.66			0.68			0.65			0.65			0.65	
Total reduction		0.16			0.15			0.18			0.23			0.25			0.21	
Total, real		131			173			57			48			281			3	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DK - H115

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July		August		September		October		November		December					
1	04:59		05:39		19:58 (2)	06:33		07:26	18:05 (3)	07:24	15:24 (4)	08:19	15:08 (5)			
	22:00		21:25	45	20:43 (2)	20:18		19:05	26	18:31 (3)	16:54	54	16:18 (4)	16:10	26	15:34 (5)
2	04:59		05:40		19:58 (2)	06:35		07:28		18:04 (3)	07:26		15:24 (4)	08:21		15:07 (5)
	22:00		21:23	46	20:44 (2)	20:16		19:02	28	18:32 (3)	16:52	54	16:18 (4)	16:09	26	15:33 (5)
3	05:00		05:42		19:58 (2)	06:36		07:30		18:03 (3)	07:28		15:24 (4)	08:22		15:08 (5)
	21:59		21:21	45	20:43 (2)	20:13		19:00	28	18:31 (3)	16:50	54	16:18 (4)	16:08	24	15:32 (5)
4	05:01		05:44		19:58 (2)	06:38		07:31		18:02 (3)	07:30		15:24 (4)	08:24		15:09 (5)
	21:59		21:19	46	20:44 (2)	20:11		18:57	27	18:29 (3)	16:48	53	16:17 (4)	16:08	23	15:32 (5)
5	05:02		05:45		19:57 (2)	06:40		07:33		18:02 (3)	07:32		15:24 (4)	08:25		15:09 (5)
	21:58		21:17	46	20:43 (2)	20:09		18:55	24	18:26 (3)	16:46	51	16:15 (4)	16:07	21	15:30 (5)
6	05:03		05:47		19:57 (2)	06:42		07:35		18:02 (3)	07:34		15:24 (4)	08:26		15:10 (5)
	21:58		21:15	46	20:43 (2)	20:06		18:52	22	18:24 (3)	16:44	48	16:12 (4)	16:07	20	15:30 (5)
7	05:04		05:49		19:58 (2)	06:43		07:37		18:01 (3)	07:36		15:24 (4)	08:28		15:10 (5)
	21:57		21:13	45	20:43 (2)	20:04		18:50	20	18:21 (3)	16:43	46	16:10 (4)	16:06	19	15:29 (5)
8	05:05		05:51		19:57 (2)	06:45		07:39		18:01 (3)	07:38		15:24 (4)	08:29		15:10 (5)
	21:56		21:12	44	20:41 (2)	20:01		18:48	17	18:18 (3)	16:41	44	16:08 (4)	16:06	18	15:28 (5)
9	05:06		05:52		19:57 (2)	06:47		07:41		18:01 (3)	07:40		15:24 (4)	08:30		15:11 (5)
	21:55		21:10	42	20:39 (2)	19:59		18:45	15	18:16 (3)	16:39	42	16:06 (4)	16:05	17	15:28 (5)
10	05:07		05:54		19:57 (2)	06:49		07:42		18:01 (3)	07:42		15:26 (4)	08:31		15:11 (5)
	21:55		21:08	40	20:37 (2)	19:56		18:43	13	18:14 (3)	16:37	39	16:05 (4)	16:05	17	15:28 (5)
11	05:08		20:16 (2)	05:56	19:58 (2)	06:50		07:44		18:02 (3)	07:44		15:26 (4)	08:33		15:12 (5)
	21:54	8	20:24 (2)	21:05	20:35 (2)	19:54		18:40	9	18:11 (3)	16:35	37	16:03 (4)	16:05	15	15:27 (5)
12	05:09		20:14 (2)	05:57	19:58 (2)	06:52		07:46		18:03 (3)	07:45		15:26 (4)	08:34		15:12 (5)
	21:53	13	20:27 (2)	21:03	20:34 (2)	19:51		18:38	6	18:09 (3)	16:34	35	16:01 (4)	16:05	15	15:27 (5)
13	05:10		20:12 (2)	05:59	19:58 (2)	06:54		07:48		18:04 (3)	07:47		15:27 (4)	08:35		15:13 (5)
	21:52	16	20:28 (2)	21:01	20:31 (2)	19:49		18:36	3	18:07 (3)	16:32	32	15:59 (4)	16:05	14	15:27 (5)
14	05:12		20:11 (2)	06:01	19:59 (2)	06:56		07:50			07:49		15:28 (4)	08:36		15:13 (5)
	21:51	19	20:30 (2)	20:59	20:29 (2)	19:47		18:33			16:31	30	15:58 (4)	16:05	13	15:26 (5)
15	05:13		20:09 (2)	06:03	19:59 (2)	06:58		07:52			07:51		15:28 (4)	08:37		15:14 (5)
	21:50	22	20:31 (2)	20:57	20:28 (2)	19:44		18:31			16:29	28	15:56 (4)	16:05	12	15:26 (5)
16	05:14		20:08 (2)	06:05	19:59 (2)	06:59		07:54		16:47 (4)	07:53		15:29 (4)	08:38		15:14 (5)
	21:49	24	20:32 (2)	20:55	20:25 (2)	19:42		18:29	13	17:00 (4)	16:27	25	15:54 (4)	16:05	13	15:27 (5)
17	05:16		20:08 (2)	06:06	20:00 (2)	07:01		07:55		16:42 (4)	07:55		15:14 (5)	08:38		15:15 (5)
	21:47	26	20:34 (2)	20:53	20:23 (2)	19:39		18:26	22	17:04 (4)	16:26	28	15:52 (4)	16:05	12	15:27 (5)
18	05:17		20:06 (2)	06:08	20:02 (2)	07:03		07:57		16:39 (4)	07:57		15:12 (5)	08:39		15:16 (5)
	21:46	29	20:35 (2)	20:51	20:22 (2)	19:37		18:24	27	17:06 (4)	16:24	31	15:51 (4)	16:05	11	15:27 (5)
19	05:18		20:05 (2)	06:10	20:02 (2)	07:05		07:59		16:37 (4)	07:59		15:10 (5)	08:40		15:17 (5)
	21:45	30	20:35 (2)	20:48	20:19 (2)	19:34		18:22	31	17:08 (4)	16:23	32	15:49 (4)	16:05	11	15:28 (5)
20	05:20		20:05 (2)	06:12	20:04 (2)	07:06		08:01		16:35 (4)	08:00		15:09 (5)	08:41		15:16 (5)
	21:44	32	20:37 (2)	20:46	20:17 (2)	19:32		18:20	35	17:10 (4)	16:22	32	15:47 (4)	16:06	11	15:27 (5)
21	05:21		20:04 (2)	06:13	20:06 (2)	07:08		08:03		16:33 (4)	08:02		15:08 (5)	08:41		15:17 (5)
	21:42	33	20:37 (2)	20:44	20:15 (2)	19:29		18:17	38	17:11 (4)	16:20	32	15:46 (4)	16:06	11	15:28 (5)
22	05:23		20:03 (2)	06:15	20:07 (2)	07:10		08:05		16:31 (4)	08:04		15:07 (5)	08:42		15:17 (5)
	21:41	35	20:38 (2)	20:42	20:12 (2)	19:27		18:15	41	17:12 (4)	16:19	31	15:44 (4)	16:06	11	15:28 (5)
23	05:24		20:03 (2)	06:17		07:12		08:07		16:30 (4)	08:06		15:07 (5)	08:42		15:18 (5)
	21:39	36	20:39 (2)	20:39		19:24		18:13	43	17:13 (4)	16:18	29	15:43 (4)	16:07	11	15:29 (5)
24	05:26		20:02 (2)	06:19		07:13		08:09		16:29 (4)	08:08		15:07 (5)	08:43		15:19 (5)
	21:38	37	20:39 (2)	20:37		19:22		18:11	45	17:14 (4)	16:17	28	15:42 (4)	16:08	11	15:30 (5)
25	05:27		20:02 (2)	06:20		07:15		07:11		15:28 (4)	08:09		15:07 (5)	08:43		15:19 (5)
	21:36	39	20:41 (2)	20:35		19:19		17:09	47	16:15 (4)	16:16	26	15:41 (4)	16:08	11	15:30 (5)
26	05:29		20:01 (2)	06:22		07:17		07:13		15:27 (4)	08:11		15:07 (5)	08:43		15:19 (5)
	21:35	40	20:41 (2)	20:32		19:17		17:06	48	16:15 (4)	16:14	26	15:33 (5)	16:09	12	15:31 (5)
27	05:30		20:01 (2)	06:24		07:19		07:15		15:26 (4)	08:13		15:07 (5)	08:44		15:20 (5)
	21:33	41	20:42 (2)	20:30		19:14	13	18:26 (3)	50	16:16 (4)	16:13	26	15:33 (5)	16:10	12	15:32 (5)
28	05:32		20:00 (2)	06:26		07:21		18:11 (3)		16:17 (4)	07:16		15:25 (4)	08:14		15:21 (5)
	21:32	42	20:42 (2)	20:28		19:12	17	18:28 (3)	51	16:16 (4)	16:12	27	15:34 (5)	16:11	12	15:33 (5)
29	05:34		19:59 (2)	06:28		07:22		18:09 (3)		15:24 (4)	08:16		15:07 (5)	08:44		15:21 (5)
	21:30	43	20:42 (2)	20:25		19:09	21	18:30 (3)	52	16:16 (4)	16:12	27	15:34 (5)	16:11	13	15:34 (5)
30	05:35		19:59 (2)	06:29		07:24		18:06 (3)		15:24 (4)	08:18		15:07 (5)	08:44		15:20 (5)
	21:28	44	20:43 (2)	20:23		19:07	24	18:30 (3)	53	16:17 (4)	16:11	28	15:35 (5)	16:12	14	15:34 (5)
31	05:37		19:59 (2)	06:31				07:22		15:24 (4)				08:44		15:21 (5)
	21:27	44	20:43 (2)	20:21				16:56	53	16:17 (4)				16:13	14	15:35 (5)
Potential sun hours	512			460			382		328		259			233		
Total, worst case	653			723			75		887		1075			470		
Sun reduction	0.32			0.34			0.32		0.29		0.27			0.21		
Oper. time red.	1.00			1.00			1.00		1.00		1.00			1.00		
Wind dir. red.	0.65			0.65			0.68		0.66		0.66			0.66		
Total reduction	0.21			0.22			0.22		0.19		0.17			0.14		
Total, real	136			160			16		173		188			64		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DL - H116

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		15:02 (4)	08:14		16:33 (3)	07:16		17:16 (2)	07:01		05:52		05:03			
	16:15	30	15:32 (4)	17:06	1	16:34 (3)	18:02	18	17:34 (2)	20:00		20:55		21:45			
2	08:44		15:03 (4)	08:12		16:33 (3)	07:14		17:15 (2)	06:59		05:50		05:02			
	16:16	30	15:33 (4)	17:08	4	16:37 (3)	18:04	21	17:36 (2)	20:02		20:57		21:46			
3	08:44		15:03 (4)	08:10		16:32 (3)	07:12		17:14 (2)	06:56		05:48		05:01			
	16:17	29	15:32 (4)	17:10	7	16:39 (3)	18:06	24	17:38 (2)	20:04		20:59		21:48			
4	08:43		15:04 (4)	08:08		16:32 (3)	07:09		17:14 (2)	06:54		05:46		05:00			
	16:18	29	15:33 (4)	17:12	9	16:41 (3)	18:07	27	17:41 (2)	20:06		21:01		21:49			
5	08:43		15:04 (4)	08:07		16:32 (3)	07:07		17:13 (2)	06:51		05:44		04:59			
	16:19	29	15:33 (4)	17:14	11	16:43 (3)	18:09	29	17:42 (2)	20:07		21:03		21:50			
6	08:43		15:05 (4)	08:05		16:32 (3)	07:04		17:12 (2)	06:49		05:42		04:58			
	16:21	29	15:34 (4)	17:16	13	16:45 (3)	18:11	33	17:45 (2)	20:09		21:04		21:51			
7	08:42		15:05 (4)	08:03		16:32 (3)	07:02		17:12 (2)	06:47		05:40		04:58			
	16:22	28	15:33 (4)	17:18	15	16:47 (3)	18:13	34	17:46 (2)	20:11		21:06		21:52			
8	08:42		15:06 (4)	08:01		16:32 (3)	07:00		17:12 (2)	06:44		05:38		04:57			
	16:24	27	15:33 (4)	17:20	18	16:50 (3)	18:15	35	17:47 (2)	20:13		21:08		21:53			
9	08:41		15:07 (4)	07:59		16:33 (3)	06:57		17:11 (2)	06:42		05:36		04:57			
	16:25	27	15:34 (4)	17:22	19	16:52 (3)	18:17	35	17:46 (2)	20:15		21:10		21:54			
10	08:40		15:08 (4)	07:57		16:33 (3)	06:55		17:12 (2)	06:39		05:34		04:56			
	16:26	26	15:34 (4)	17:24	21	16:54 (3)	18:19	34	17:46 (2)	20:17		21:11		21:55			
11	08:40		15:09 (4)	07:55		16:34 (3)	06:52		17:12 (2)	06:37		05:33		04:56			
	16:28	25	15:34 (4)	17:26	20	16:54 (3)	18:21	34	17:46 (2)	20:19		21:13		21:55			
12	08:39		15:10 (4)	07:53		16:35 (3)	06:50		17:12 (2)	06:35		05:31		04:55			
	16:30	24	15:34 (4)	17:28	18	16:53 (3)	18:23	32	17:44 (2)	20:20		21:15		21:56			
13	08:38		15:11 (4)	07:51		16:36 (3)	06:48		17:13 (2)	06:32		05:29		04:55			
	16:31	22	15:33 (4)	17:30	15	16:51 (3)	18:25	31	17:44 (2)	20:22		21:17		21:57			
14	08:37		15:12 (4)	07:49		16:38 (3)	06:45		17:13 (2)	06:30		05:27		04:55			
	16:33	21	15:33 (4)	17:32	11	16:49 (3)	18:27	29	17:42 (2)	20:24		21:18		21:58			
15	08:36		15:14 (4)	07:47			06:43		17:15 (2)	06:28		05:26		04:54			
	16:34	18	15:32 (4)	17:34			18:28	26	17:41 (2)	20:26		21:20		21:58			
16	08:35		15:15 (4)	07:45			06:40		17:16 (2)	06:25		05:24		04:54			
	16:36	16	15:31 (4)	17:36			18:30	22	17:38 (2)	20:28		21:22		21:59			
17	08:34		15:17 (4)	07:43			06:38		17:18 (2)	06:23		05:22		04:54			
	16:38	13	15:30 (4)	17:38			18:32	18	17:36 (2)	20:30		21:23		21:59			
18	08:33		15:20 (4)	07:41			06:35		17:21 (2)	06:21		05:21		04:54			
	16:40	8	15:28 (4)	17:40			18:34	11	17:32 (2)	20:31		21:25		22:00			
19	08:32			07:39			06:33			06:18		05:19		04:54			
	16:41			17:42			18:36			20:33		21:27		22:00			
20	08:31			07:36			06:31			06:16		05:18		04:54			
	16:43			17:44			18:38			20:35		21:28		22:00			
21	08:30			07:34			06:28			06:14		05:16		04:54			
	16:45			17:46			18:40			20:37		21:30		22:01			
22	08:29			07:32			06:26			06:12		05:15		04:55			
	16:47			17:48			18:42			20:39		21:31		22:01			
23	08:27			07:30			06:23			06:09		05:13		04:55			
	16:49			17:50			18:43			20:41		21:33		22:01			
24	08:26			07:28			06:21			06:07		05:12		04:55			
	16:50			17:52			18:45			20:43		21:34		22:01			
25	08:24			07:25		17:24 (2)	06:18			06:05		05:11		04:55			
	16:52			17:54	2	17:26 (2)	18:47			20:44		21:36		22:01			
26	08:23			07:23		17:22 (2)	06:16			06:03		05:09		04:56			
	16:54			17:56	6	17:28 (2)	18:49			20:46		21:37		22:01			
27	08:22			07:21		17:20 (2)	06:13			06:00		05:08		04:56			
	16:56			17:58	11	17:31 (2)	18:51			20:48		21:39		22:01			
28	08:20			07:18		17:17 (2)	06:11			05:58		05:07		04:57			
	16:58			18:00	15	17:32 (2)	18:53			20:50		21:40		22:01			
29	08:19						07:08			05:56		05:06		04:57			
	17:00						19:54			20:52		21:41		22:01			
30	08:17						07:06			05:54		05:05		04:58			
	17:02						19:56			20:54		21:43		22:00			
31	08:15						07:04					05:04					
	17:04						19:58					21:44					
Potential sun hours	250		273		367		420		494		510						
Total, worst case	431		216		493												
Sun reduction	0.24		0.23		0.27												
Oper. time red.	1.00		1.00		1.00												
Wind dir. red.	0.65		0.66		0.68												
Total reduction	0.16		0.15		0.18												
Total, real	68		33		91												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DL - H116

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:51 (2) 18:23 (2)	07:24 16:54	16:03 (3) 16:23 (3)	08:19 16:10	14:51 (4) 15:16 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:50 (2) 18:23 (2)	07:26 16:52	16:02 (3) 16:21 (3)	08:21 16:09	14:50 (4) 15:16 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:50 (2) 18:24 (2)	07:28 16:50	16:02 (3) 16:19 (3)	08:22 16:08	14:51 (4) 15:17 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:49 (2) 18:24 (2)	07:30 16:48	16:01 (3) 16:17 (3)	08:24 16:08	14:51 (4) 15:18 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:49 (2) 18:24 (2)	07:32 16:46	16:01 (3) 16:15 (3)	08:25 16:07	14:51 (4) 15:19 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:49 (2) 18:24 (2)	07:34 16:44	16:01 (3) 16:12 (3)	08:26 16:07	14:51 (4) 15:20 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:47 (2) 18:21 (2)	07:36 16:43	16:02 (3) 16:10 (3)	08:28 16:06	14:51 (4) 15:20 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:47 (2) 18:18 (2)	07:38 16:41	16:02 (3) 16:08 (3)	08:29 16:06	14:51 (4) 15:20 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:48 (2) 18:16 (2)	07:40 16:39	16:04 (3) 16:07 (3)	08:30 16:05	14:52 (4) 15:21 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:48 (2) 18:14 (2)	07:42 16:37	16:04 (3) 16:05 (3)	08:31 16:05	14:52 (4) 15:22 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:48 (2) 18:11 (2)	07:44 16:35		08:33 16:05	14:52 (4) 15:22 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:49 (2) 18:09 (2)	07:45 16:34		08:34 16:05	14:52 (4) 15:22 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:50 (2) 18:07 (2)	07:47 16:32		08:35 16:05	14:52 (4) 15:23 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:51 (2) 18:04 (2)	07:49 16:31		08:36 16:04	14:53 (4) 15:23 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:53 (2) 18:02 (2)	07:51 16:29		08:37 16:04	14:53 (4) 15:24 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:55 (2) 17:59 (2)	07:53 16:27		08:38 16:05	14:54 (4) 15:25 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26		07:55 16:26		08:38 16:05	14:54 (4) 15:25 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24		07:57 16:24		08:39 16:05	14:55 (4) 15:26 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22		07:59 16:23		08:40 16:05	14:56 (4) 15:27 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20		08:00 16:22		08:41 16:06	14:55 (4) 15:27 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17		08:02 16:20		08:41 16:06	14:56 (4) 15:28 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:04 16:19		08:42 16:06	14:56 (4) 15:28 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13		08:06 16:18		08:42 16:07	14:57 (4) 15:29 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11		08:08 16:17	14:57 (4) 15:05 (4)	08:43 16:08	14:57 (4) 15:29 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	18:05 (2) 18:14 (2)	07:11 17:09	08:09 16:16	14:55 (4) 15:08 (4)	08:43 16:08	14:58 (4) 15:29 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	18:01 (2) 18:17 (2)	07:13 17:06	08:11 16:14	14:54 (4) 15:10 (4)	08:43 16:09	14:58 (4) 15:29 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	17:58 (2) 18:20 (2)	07:15 17:04	08:13 16:13	14:53 (4) 15:11 (4)	08:44 16:10	14:59 (4) 15:30 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	17:56 (2) 18:21 (2)	07:16 17:02	08:14 16:12	14:52 (4) 15:13 (4)	08:44 16:10	15:00 (4) 15:31 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	17:55 (2) 18:22 (2)	07:18 17:00	08:16 16:12	14:51 (4) 15:13 (4)	08:44 16:11	15:00 (4) 15:31 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:52 (2) 18:22 (2)	07:20 16:58	08:18 16:11	14:51 (4) 15:15 (4)	08:44 16:12	15:00 (4) 15:31 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	16:03 (3) 16:22 (3)			08:44 16:13	15:01 (4) 15:31 (4)
Potential sun hours	512	460	382	328		259		233	
Total, worst case			129	478		237			930
Sun reduction			0.32	0.29		0.27			0.21
Oper. time red.			1.00	1.00		1.00			1.00
Wind dir. red.			0.68	0.67		0.65			0.65
Total reduction			0.22	0.20		0.17			0.13
Total, real			28	94		41			125

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DM - H117

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		16:23 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		15:45 (2)	08:19		15:30 (3)					
	16:15		17:06	11	16:34 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	37	16:22 (2)	16:10		15:34 (3)	4				
2	08:44		08:12		16:21 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26		15:45 (2)	08:21		15:30 (3)					
	16:16		17:08	16	16:37 (2)	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02	16:52	36	16:21 (2)	16:09		15:32 (3)	2				
3	08:44		08:10		16:20 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		15:46 (2)	08:22		15:31 (3)					
	16:17		17:10	19	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	33	16:19 (2)	16:08		15:32 (3)	1				
4	08:43		08:08		16:19 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30		15:46 (2)	08:24							
	16:18		17:12	22	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	31	16:17 (2)	16:08							
5	08:43		08:07		16:18 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32		15:47 (2)	08:25							
	16:19		17:14	25	16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	27	16:14 (2)	16:07							
6	08:43		08:05		16:17 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34		15:48 (2)	08:26							
	16:21		17:16	28	16:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	24	16:12 (2)	16:07							
7	08:42		08:03		16:17 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36		15:49 (2)	08:28							
	16:22		17:18	30	16:47 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	16:10 (2)	16:06							
8	08:42		08:01		16:16 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38		15:50 (2)	08:29							
	16:24		17:20	34	16:50 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	18	16:08 (2)	16:06							
9	08:41		15:48 (3)	07:59	16:16 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		15:52 (2)	08:30							
	16:25	1	15:49 (3)	17:22	36	16:52 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	16:39	15	16:07 (2)	16:05							
10	08:40		15:48 (3)	07:57		16:15 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42		15:54 (2)	08:31							
	16:26	2	15:50 (3)	17:24	37	16:52 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	16:37	11	16:05 (2)	16:05							
11	08:40		15:48 (3)	07:55		16:15 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44		15:56 (2)	08:33							
	16:28	4	15:52 (3)	17:26		16:53 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	16:35	7	16:03 (2)	16:05							
12	08:39		15:48 (3)	07:53		16:15 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:45		15:52 (2)	08:34							
	16:30	6	15:54 (3)	17:28	38	16:53 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	16:34	9	16:01 (2)	16:05							
13	08:38		15:48 (3)	07:51		16:14 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48		15:29 (3)	08:35							
	16:31	7	15:55 (3)	17:30	38	16:52 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	16:32	12	15:41 (3)	16:05							
14	08:37		15:48 (3)	07:49		16:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		15:28 (3)	08:36							
	16:33	9	15:57 (3)	17:32	38	16:53 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	16:31	15	15:43 (3)	16:04							
15	08:36		15:48 (3)	07:47		16:15 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52		15:27 (3)	08:37							
	16:34	11	15:59 (3)	17:34	38	16:53 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	16:31	16:29	17	15:44 (3)	16:04						
16	08:35		15:48 (3)	07:45		16:15 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54		17:00 (2)	07:53							
	16:36	12	16:00 (3)	17:36	38	16:53 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	15:29	11	17:11 (2)	16:27	19	15:45 (3)	16:08				
17	08:34		15:48 (3)	07:43		16:16 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55		16:56 (2)	07:55							
	16:38	14	16:02 (3)	17:38	36	16:52 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	16:27	18	17:14 (2)	16:26	21	15:46 (3)	16:05				
18	08:33		15:49 (3)	07:41		16:16 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57		16:54 (2)	07:57							
	16:40	16	16:05 (3)	17:40	35	16:51 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	16:24	22	17:16 (2)	16:24	22	15:47 (3)	16:05				
19	08:32		15:49 (3)	07:39		16:17 (2)	06:33	06:13	05:14	04:53	05:16	06:07	07:02	07:56		16:52 (2)	08:33							
	16:41	18	16:07 (3)	17:42	34	16:51 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	16:22	26	17:18 (2)	16:23	22	15:47 (3)	16:05				
20	08:31		15:49 (3)	07:36		16:18 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		16:50 (2)	08:00							
	16:43	19	16:08 (3)	17:44	32	16:50 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	29	17:19 (2)	16:22	22	15:47 (3)	16:06				
21	08:30		15:50 (3)	07:34		16:19 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		16:49 (2)	08:02							
	16:45	21	16:11 (3)	17:46	30	16:49 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	31	17:20 (2)	16:20	21	15:46 (3)	16:06				
22	08:29		15:50 (3)	07:32		16:19 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		16:48 (2)	08:04							
	16:47	22	16:12 (3)	17:48	28	16:47 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	33	17:21 (2)	16:19	19	15:44 (3)	16:06				
23	08:27		15:51 (3)	07:30		16:21 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		16:47 (2)	08:06							
	16:49	22	16:13 (3)	17:50	25	16:46 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	34	17:21 (2)	16:18	18	15:43 (3)	16:07				
24	08:26		15:51 (3)	07:28		16:23 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09		16:46 (2)	08:08							
	16:50	22	16:13 (3)	17:52	21	16:44 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	36	17:22 (2)	16:17	16	15:42 (3)	16:08				
25	08:25		15:52 (3)	07:25		16:25 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11		15:45 (2)	08:09							
	16:52	21	16:13 (3)	17:54	16	16:41 (2)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	37	16:22 (2)	16:16	15	15:41 (3)	16:08				
26	08:23		15:53 (3)	07:23		16:30 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		15:45 (2)	08:11							
	16:54	19	16:12 (3)	17:56	6	16:36 (2)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	37	16:22 (2)	16:14	12	15:39 (3)	16:09				
27	08:22		15:54 (3)	07:21		06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	09:11		15:44 (2)	08:13							
	16:56	17	16:11 (3)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	38	16:22 (2)	16:13	11	15:38 (3)	16:10					
28	08:20		15:56 (3)	07:18		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	09:12		15:44 (2)	08:14							
	16:58	15	16:11 (3)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	38	16:22 (2)	16:12	9	15:37 (3)	16:10					
29	08:19		15:58 (3)			07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	09:14		15:44 (2)	08:16							
	17:00	11	16:09 (3)			19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	38	16:22 (2)	16:12	8	15:36 (3)	16:11					
30	08:17		16:00 (3)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	09:16		15:44 (2)	08:18							
	17:02	10	16:29 (2)			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	38	16:22 (2)	16:11	6	15:35 (3)	16:12					
31	08:15		16:24 (2)			07:04		05:04		05:37	06:31	07:22	08:18	09:14		15:44 (2)								
	17:04	7	16:31 (2)		</																			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DN - H118

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	17:06	08:50 (2)	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54
3	08:44	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26
4	16:16	17:08	08:50 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
5	08:44	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
6	16:17	17:10	08:51 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50
7	08:43	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30
8	16:18	17:12	08:51 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48
9	08:43	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32
10	16:20	17:14	08:51 (2)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46
11	08:43	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34
12	16:21	17:16	08:51 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44
13	08:42	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36
14	16:22	17:18	08:51 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43
15	08:42	08:01	08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38
16	16:24	17:20	08:51 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41
17	08:41	07:59	08:27 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40
18	16:25	17:22	08:50 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39
19	08:41	07:57	08:28 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42
20	16:27	17:24	08:50 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37
21	08:40	07:55	08:29 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44
22	16:28	17:26	08:49 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36
23	08:39	07:53	08:30 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46
24	16:30	17:28	08:48 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34
25	08:38	07:51	08:32 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48
26	16:31	17:30	08:46 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32
27	08:37	07:49	08:35 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49
28	16:33	17:32	08:42 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31
29	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	07:51
30	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:29
31	08:36	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	07:53
32	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16:28
33	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	07:55
34	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	16:26
35	08:33	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	07:57
36	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:25
37	08:32	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	07:59
38	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:23
39	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:01
40	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:22
41	08:30	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:03	08:03
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:20	16:20
43	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:04
44	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:19
45	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:06
46	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	16:18
47	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:08
48	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	16:17
49	08:25	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09	08:09
50	16:52	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:09	16:16	16:16
51	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:11
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:15	16:15
53	08:22	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13	08:13
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	16:14	16:14
55	08:20	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:15	08:15
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:13	16:13
57	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16	08:16
58	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:12	16:12
59	08:17	08:45 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	08:18
60	17:02	3 08:48 (2)	19:56	20:54	21:43	22:01	21:28	20:23	19:07	18:58	18 08:18 (2)	16:11
61	08:15	08:44 (2)	07:04		05:04		05:37	06:31		07:22	07:58 (2)	16:12
62	17:04	5 08:49 (2)	19:58		21:44		21:27	20:21		16:56	21 08:19 (2)	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	8	230								64	178	
Sun reduction	0.24	0.23								0.29	0.27	
Oper. time red.	1.00	1.00								1.00	1.00	
Wind dir. red.	0.62									0.62	0.62	
Total reduction	0.15	0.14								0.18	0.16	
Total, real	1	33								12	29	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DO - H119

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:09 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:36 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:37	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:44 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DP - H120

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	06:18 (1) 20:23 (1)	05:03 21:45	04:59 22:00	05:39 21:25	06:10 (1) 20:34 (1)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	06:16 (1) 20:24 (1)	05:02 21:47	05:00 22:00	05:40 21:23	06:11 (1) 20:35 (1)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	06:14 (1) 20:24 (1)	05:01 21:48	05:01 21:59	05:42 21:21	06:12 (1) 20:34 (1)	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	06:12 (1) 20:24 (1)	05:00 21:49	05:01 21:59	05:44 21:19	06:14 (1) 20:38 (1)	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	06:10 (1) 20:24 (1)	04:59 21:50	05:02 21:58	05:46 21:18	06:16 (1) 20:35 (1)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	06:09 (1) 20:25 (1)	04:59 21:51	05:03 21:58	05:47 21:16	06:17 (1) 20:36 (1)	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	06:07 (1) 20:25 (1)	04:58 21:52	05:04 21:57	05:49 21:14	06:19 (1) 20:35 (1)	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	06:05 (1) 20:25 (1)	04:57 21:53	05:05 21:56	05:51 21:12	06:20 (1) 20:34 (1)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	06:03 (1) 20:24 (1)	04:57 21:54	05:06 21:56	05:52 21:10	06:22 (1) 20:34 (1)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	06:02 (1) 20:25 (1)	04:56 21:55	05:07 21:55	05:54 21:08	06:24 (1) 20:33 (1)	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	06:00 (1) 20:24 (1)	04:56 21:56	05:08 21:54	05:56 21:06	06:25 (1) 20:32 (1)	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	06:00 (1) 20:23 (1)	04:56 21:56	05:10 21:53	05:58 21:04	06:27 (1) 20:31 (1)	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	06:01 (1) 20:23 (1)	04:55 21:57	05:11 21:52	05:59 21:01	06:29 (1) 20:30 (1)	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	06:02 (1) 20:22 (1)	04:55 21:58	05:12 21:51	06:01 20:59	06:30 (1) 20:29	06:54 19:47	07:49 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	06:03 (1) 20:22 (1)	04:55 21:58	05:13 21:50	06:03 20:57	06:58 20:27	07:52 18:44	07:51 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	06:03 (1) 20:21 (1)	04:55 21:59	05:15 21:49	06:05 20:55	07:00 20:25	07:54 18:29	07:53 16:28	07:53 16:05	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	06:05 (1) 20:21 (1)	04:54 21:59	05:16 21:48	06:06 20:53	07:01 20:23	07:56 18:27	07:55 16:26	07:55 16:05	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	06:06 (1) 20:18 (1)	04:54 22:00	05:17 21:46	06:08 20:51	07:03 20:25	07:58 18:24	07:57 16:25	07:57 16:05	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	06:08 (1) 20:16 (1)	04:54 22:00	05:19 21:45	06:10 20:48	07:05 20:24	07:59 18:22	07:59 16:23	07:59 16:05	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	05:20 20:46	06:12 20:46	07:07 20:25	08:01 18:20	08:01 16:22	08:01 16:06	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	05:22 20:44	06:14 20:44	07:08 20:29	08:03 18:18	08:02 16:21	08:02 16:06	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	05:23 20:42	06:15 20:42	07:10 20:27	08:05 18:15	08:04 16:19	08:04 16:07	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	05:24 20:39	06:17 20:39	07:12 20:24	08:07 18:13	08:06 16:18	08:06 16:07	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	05:26 20:37	06:19 20:37	07:14 20:28	08:09 18:11	08:08 16:17	08:08 16:08	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	05:28 20:35	06:21 20:35	07:15 20:29	07:11 18:09	07:11 16:16	07:11 16:08	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	05:29 20:33	06:22 20:33	07:17 20:29	07:13 18:07	07:13 16:15	07:13 16:09	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	05:31 20:30	06:24 20:30	07:19 20:25	07:15 18:14	07:15 16:14	07:15 16:10	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	05:32 20:28	06:26 20:28	07:21 20:22	07:17 18:12	07:17 16:13	07:17 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	05:34 20:26	06:28 20:26	07:23 20:24	07:19 18:00	07:19 16:12	07:19 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	06:20 (1) 20:22 (1)	05:05 21:43	05:36 21:28	05:36 21:23	06:29 (1) 20:23	07:24 20:23	07:21 18:00	07:21 16:13	07:21 16:13	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44	05:04 21:44	05:37 21:27	05:37 21:22	06:31 (1) 20:21	07:22 20:21	07:22 18:00	07:22 16:14	07:22 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case				2	308		124	191						
Sun reduction				0.35	0.38		0.32	0.34						
Oper. time red.				1.00	1.00		1.00	1.00						
Wind dir. red.				0.67	0.67		0.67	0.67						
Total reduction				0.24	0.26		0.22	0.23						
Total, real				0	79		27	44						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DQ - H121

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	05:34 (1)	04:59	05:32 (1)	05:39	06:33	07:26	07:24	08:19
2	08:44	08:12	07:14	06:59	05:50	05:02	05:33 (1)	05:00	05:33 (1)	05:41	06:35	07:28	07:26	08:21
3	08:44	08:10	07:12	06:57	05:48	05:01	05:32 (1)	05:01	05:34 (1)	05:42	06:37	07:30	07:28	08:22
4	08:43	08:09	07:09	06:54	05:46	05:00	05:31 (1)	05:01	05:34 (1)	05:44	06:38	07:32	07:30	08:24
5	08:43	08:07	07:07	06:52	05:44	04:59	05:31 (1)	05:02	05:35 (1)	05:46	06:40	07:33	07:32	08:25
6	08:43	08:05	07:05	06:49	05:42	04:59	05:30 (1)	05:03	05:36 (1)	05:47	06:42	07:35	07:34	08:27
7	08:42	08:03	07:02	06:47	05:40	04:58	05:30 (1)	05:04	05:37 (1)	05:49	06:44	07:37	07:36	08:28
8	08:42	08:01	07:00	06:44	05:38	04:57	05:29 (1)	05:05	05:38 (1)	05:51	06:45	07:39	07:38	08:29
9	08:41	07:59	06:58	06:42	05:36	04:57	05:29 (1)	05:06	05:39 (1)	05:52	06:47	07:41	07:40	08:30
10	08:41	07:57	06:55	06:40	05:35	04:56	05:28 (1)	05:07	05:40 (1)	05:54	06:49	07:43	07:42	08:32
11	08:40	07:55	06:53	06:37	05:33	04:56	05:28 (1)	05:08	05:41 (1)	05:56	06:51	07:44	07:44	08:33
12	08:39	07:53	06:50	06:35	05:31	04:56	05:28 (1)	05:10	05:42 (1)	05:58	06:52	07:46	07:46	08:34
13	08:38	07:51	06:48	06:33	05:29	04:55	05:27 (1)	05:11	05:43 (1)	05:59	06:54	07:48	07:48	08:35
14	08:37	07:49	06:45	06:30	05:27	04:55	05:27 (1)	05:12	05:44 (1)	06:01	06:56	07:50	07:49	08:36
15	08:36	07:47	06:43	06:28	05:26	04:55	05:27 (1)	05:13	05:45 (1)	06:03	06:58	07:52	07:51	08:37
16	08:36	07:45	06:41	06:25	05:24	04:55	05:27 (1)	05:15	05:47 (1)	06:05	07:00	07:54	07:53	08:38
17	08:35	07:43	06:38	06:23	05:22	04:54	05:27 (1)	05:16	05:48 (1)	06:06	07:01	07:56	07:55	08:39
18	08:33	07:41	06:36	06:21	05:21	04:54	05:27 (1)	05:17	05:49 (1)	06:08	07:03	07:58	07:57	08:39
19	08:32	07:39	06:33	06:19	05:19	04:54	05:27 (1)	05:19	05:51 (1)	06:10	07:05	07:59	07:59	08:40
20	08:31	07:37	06:31	06:16	05:18	04:55	05:27 (1)	05:20	05:52 (1)	06:12	07:07	08:01	08:01	08:41
21	08:30	07:34	06:28	06:14	05:16	04:55	05:28 (1)	05:22	06:14	07:08	08:03	08:02	08:41	
22	08:29	07:32	06:26	06:12	05:15	04:55	05:28 (1)	05:23	06:15	07:10	08:05	08:04	08:42	
23	08:27	07:30	06:23	06:10	05:13	04:55	05:28 (1)	05:24	06:17	07:12	08:07	08:06	08:42	
24	08:26	07:28	06:21	06:07	05:12	04:55	05:28 (1)	05:26	06:19	07:14	08:09	08:08	08:43	
25	08:25	07:26	06:19	06:05	05:11	04:56	05:29 (1)	05:28	06:21	07:15	08:11	08:09	08:43	
26	08:23	07:23	06:16	06:03	05:10	04:56	05:29 (1)	05:29	06:22	07:17	08:13	08:11	08:44	
27	08:22	07:21	06:14	06:01	05:08	04:57	05:30 (1)	05:31	06:24	07:19	08:15	08:13	08:44	
28	08:20	07:19	06:11	05:59	05:07	04:57	05:30 (1)	05:32	06:26	07:21	08:17	08:14	08:44	
29	08:19	07:18	06:10	05:58	05:06	04:58	05:31 (1)	05:33	06:28	07:23	08:19	08:16	08:44	
30	08:17	07:16	06:08	05:56	05:05	04:58	05:31 (1)	05:34	06:30	07:25	08:21	08:18	08:44	
31	08:15	07:14	06:06	05:54	05:04	04:59	05:32 (1)	05:35	06:32	07:27	08:23	08:20	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case					44	519	212							
Sun reduction					0.38	0.32	0.32							
Oper. time red.					1.00	1.00	1.00							
Wind dir. red.					0.66	0.66	0.66							
Total reduction					0.25	0.21	0.21							
Total, real					11	109	45							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DR - H122

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DS - H123

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 21:03	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:11 (5) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:08 (5) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:09 (5) 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:07 (5) 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:13 (5) 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	05:52 20:54	05:04 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			7	166	33	460
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.66	0.66
Total reduction			0.18	0.24	0.25	0.21
Total, real			1	40	8	97

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DS - H123

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 16	05:32 (3) 05:48 (3) 21:25	05:39 20:18 11	07:11 (5) 07:22 (5) 19:05	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 15	05:33 (3) 05:48 (3) 21:23	05:40 20:16 15	07:09 (5) 07:24 (5) 19:02	07:28 16:52 16:09	08:21 16:09 08:22
3	05:00 21:59 15	05:33 (3) 05:48 (3) 21:21	05:42 20:14 19	07:07 (5) 07:26 (5) 19:00	07:30 16:50 16:09	08:22 16:09 16:09
4	05:01 21:59 14	05:34 (3) 05:48 (3) 21:19	05:44 20:11 21	07:05 (5) 07:26 (5) 18:57	07:32 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 14	05:35 (3) 05:49 (3) 21:17	05:46 20:09 20	07:07 (5) 07:27 (5) 18:55	07:33 16:46 16:07	08:25 16:07 16:07
6	05:03 21:58 13	05:36 (3) 05:49 (3) 21:16	05:47 20:06 18	07:09 (5) 07:27 (5) 18:53	07:35 16:45 16:07	08:26 16:07 16:07
7	05:04 21:57 13	05:37 (3) 05:50 (3) 21:14	05:44 20:04 17	07:10 (5) 07:27 (5) 18:50	07:37 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 12	05:38 (3) 05:50 (3) 21:12	05:45 20:01 15	07:12 (5) 07:27 (5) 18:48	07:39 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 11	05:39 (3) 05:50 (3) 21:10	05:47 19:59 13	07:14 (5) 07:27 (5) 18:45	07:41 16:39 16:06	08:30 16:06 16:06
10	05:07 21:55 10	05:40 (3) 05:50 (3) 21:08	05:54 19:57 11	07:16 (5) 07:27 (5) 18:43	07:43 16:37 16:05	08:32 16:05 16:05
11	05:08 21:54 10	05:41 (3) 05:51 (3) 21:06	05:51 19:54 8	07:17 (5) 07:25 (5) 18:41	07:44 16:36 16:05	08:33 16:05 16:05
12	05:10 21:53 9	05:42 (3) 05:51 (3) 21:04	05:52 19:52 6	07:19 (5) 07:25 (5) 18:38	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 8	05:43 (3) 05:51 (3) 21:01	05:59 19:49 3	07:21 (5) 07:24 (5) 18:36	07:48 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 7	05:44 (3) 05:51 (3) 20:59	06:01 19:47 1	07:50 18:34 16:31	07:49 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 5	05:45 (3) 05:50 (3) 20:57	06:03 19:44 1	07:52 18:31 16:29	07:51 16:29 16:05	08:37 16:05 16:05
16	05:15 21:49 4	05:47 (3) 05:51 (3) 20:55	06:05 19:42 1	07:54 18:29 16:28	07:53 16:28 16:05	08:38 16:05 16:05
17	05:16 21:47 3	05:48 (3) 05:51 (3) 20:53	07:01 19:39 1	07:56 18:27 16:26	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 1	05:49 (3) 05:50 (3) 20:51	07:03 19:37 1	07:57 18:24 16:25	07:57 16:25 16:05	08:39 16:05 16:05
19	05:19 21:45 1	06:10 20:48 19:34	07:05 19:34 1	07:59 18:22 16:23	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44 1	06:12 20:46 19:32	07:07 19:32 1	08:01 18:20 16:22	08:01 16:22 16:06	08:41 16:06 16:06
21	05:21 21:42 1	06:14 20:44 19:29	07:08 19:29 1	08:03 18:18 16:21	08:02 16:21 16:06	08:41 16:06 16:06
22	05:23 21:41 1	06:15 20:42 19:27	07:10 19:27 1	08:05 18:15 16:19	08:04 16:19 16:07	08:42 16:07 16:07
23	05:24 21:39 1	06:17 20:39 19:24	07:12 19:24 1	08:07 18:13 16:18	08:06 16:18 16:07	08:42 16:07 16:07
24	05:26 21:38 1	06:19 20:37 19:22	07:14 19:22 1	08:09 18:11 16:17	08:08 16:17 16:08	08:43 16:08 16:08
25	05:28 21:36 1	06:21 20:35 19:19	07:15 19:19 1	07:11 17:09 16:16	08:09 16:16 16:08	08:43 16:08 16:08
26	05:29 21:35 1	06:22 20:33 19:17	07:17 19:17 1	07:13 17:07 16:15	08:11 16:15 16:09	08:43 16:09 16:09
27	05:31 21:33 1	06:24 20:30 19:15	07:19 19:15 1	07:15 17:05 16:14	08:13 16:14 16:10	08:44 16:10 16:10
28	05:32 21:32 1	06:26 20:28 19:12	07:21 19:12 1	07:17 17:02 16:13	08:14 16:13 16:11	08:44 16:11 16:11
29	05:34 21:30 1	06:28 20:25 19:10	07:23 19:10 1	07:19 17:00 16:12	08:16 16:12 16:12	08:44 16:12 16:12
30	05:35 21:28 1	06:29 20:23 19:07	07:24 19:07 1	07:20 16:58 16:11	08:18 16:11 16:13	08:44 16:13 16:13
31	05:37 21:27 1	06:31 20:21 19:05	07:26 19:05 1	07:22 16:56 16:10	08:19 16:10 16:12	08:44 16:12 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	180		177			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	38		38			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DT - H124

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DU - H125

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
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8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
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15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:40 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DV - H126

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	09:05 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
	16:15	17:06	3 09:08 (2)	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54
2	08:44	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26
	16:16	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
3	08:44	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
	16:17	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50
4	08:43	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30
	16:18	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48
5	08:43	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32
	16:20	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46
6	08:43	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34
	16:21	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44
7	08:42	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36
	16:22	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43
8	08:42	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38
	16:24	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41
9	08:41	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40
	16:25	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39
10	08:41	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42
	16:27	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37
11	08:40	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44
	16:28	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36
12	08:39	07:53		06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46
	16:30	17:28		18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34
13	08:38	09:10 (2)		06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48
	16:31	1 09:11 (2)		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32
14	08:37	09:09 (2)		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49
	16:33	2 09:11 (2)		18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31
15	08:37	09:08 (2)		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51
	16:34	4 09:12 (2)		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29
16	08:36	09:07 (2)		06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53
	16:36	6 09:13 (2)		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28
17	08:35	09:05 (2)		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55
	16:38	8 09:13 (2)		18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26
18	08:33	09:04 (2)		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57
	16:40	10 09:14 (2)		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25
19	08:32	09:03 (2)		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59
	16:41	12 09:15 (2)		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23
20	08:31	09:01 (2)		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01
	16:43	14 09:15 (2)		18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22
21	08:30	09:00 (2)		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02
	16:45	16 09:16 (2)		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:20
22	08:29	08:59 (2)		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04
	16:47	17 09:16 (2)		18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19
23	08:27	08:57 (2)		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06
	16:49	19 09:16 (2)		18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18
24	08:26	08:55 (2)		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08
	16:51	21 09:16 (2)		18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17
25	08:25	08:54 (2)		06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09
	16:52	22 09:16 (2)		18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16
26	08:23	08:54 (2)		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11
	16:54	22 09:16 (2)		18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15
27	08:22	08:56 (2)		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13
	16:56	20 09:16 (2)		18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	16:14
28	08:20	08:56 (2)		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:15
	16:58	19 09:15 (2)		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13
29	08:19	08:57 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16
	17:00	17 09:14 (2)		19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12
30	08:17	09:13 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18
	17:02	15 09:01 (2)		19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11
31	08:15	09:01 (2)		07:04		05:04		05:37	06:31		07:22	
	17:04	11 09:12 (2)		19:58		21:44		21:27	20:21		16:56	
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259
Total, worst case		256	3									260
Sun reduction		0.24	0.23									0.27
Oper. time red.		1.00	1.00									1.00
Wind dir. red.		0.61	0.61									0.61
Total reduction		0.15	0.14									0.16
Total, real		38	0									42

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DW - H127

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1 08:44	15:22 (5) 08:14	15:49 (4) 07:16	17:09 (3) 07:01	19:14 (2) 05:52	05:03	
16:15	15:37 (5) 17:06	16:28 (4) 18:02	17:33 (3) 20:00	19:33 (2) 20:55	21:45	
2 08:44	15:23 (5) 08:12	15:49 (4) 07:14	17:09 (3) 06:59	19:12 (2) 05:50	05:02	
16:16	15:39 (5) 17:08	16:28 (4) 18:04	17:32 (3) 20:02	19:35 (2) 20:57	21:46	
3 08:44	15:22 (5) 08:10	15:50 (4) 07:12	17:10 (3) 06:56	19:11 (2) 05:48	05:01	
16:17	15:39 (5) 17:10	16:28 (4) 18:06	17:31 (3) 20:04	19:37 (2) 20:59	21:48	
4 08:43	15:23 (5) 08:08	15:50 (4) 07:09	17:12 (3) 06:54	19:10 (2) 05:46	05:00	
16:18	15:41 (5) 17:12	16:28 (4) 18:07	17:30 (3) 20:06	19:39 (2) 21:01	21:49	
5 08:43	15:23 (5) 08:07	15:51 (4) 07:07	17:13 (3) 06:51	19:09 (2) 05:44	04:59	
16:19	15:42 (5) 17:14	16:27 (4) 18:09	17:27 (3) 20:07	19:40 (2) 21:03	21:50	
6 08:43	15:24 (5) 08:05	15:52 (4) 07:04	17:17 (3) 06:49	19:08 (2) 05:42	04:59	
16:21	15:44 (5) 17:16	16:27 (4) 18:11	17:24 (3) 20:09	19:42 (2) 21:04	21:51	
7 08:42	15:24 (5) 08:03	15:52 (4) 07:02	06:47	19:07 (2) 05:40	04:58	
16:22	15:45 (5) 17:18	16:26 (4) 18:13	20:11	19:43 (2) 21:06	21:52	
8 08:42	15:24 (5) 08:01	15:53 (4) 07:00	06:44	19:07 (2) 05:38	04:57	
16:24	15:46 (5) 17:20	16:25 (4) 18:15	20:13	19:45 (2) 21:08	21:53	
9 08:41	15:26 (5) 07:59	15:55 (4) 06:57	06:42	19:07 (2) 05:36	04:57	
16:25	15:49 (5) 17:22	16:24 (4) 18:17	20:15	19:45 (2) 21:10	21:54	
10 08:40	15:26 (5) 07:57	15:56 (4) 06:55	06:39	19:06 (2) 05:34	04:56	
16:26	15:49 (5) 17:24	16:23 (4) 18:19	20:17	19:44 (2) 21:11	21:55	
11 08:40	15:27 (5) 07:55	15:58 (4) 06:52	06:37	19:06 (2) 05:33	04:56	
16:28	15:49 (5) 17:26	16:22 (4) 18:21	20:19	19:44 (2) 21:13	21:55	
12 08:39	15:27 (5) 07:53	15:59 (4) 06:50	06:35	19:06 (2) 05:31	04:55	
16:30	15:54 (4) 17:28	16:19 (4) 18:23	20:20	19:44 (2) 21:15	21:56	
13 08:38	15:28 (5) 07:51	16:03 (4) 06:48	06:32	19:06 (2) 05:29	04:55	
16:31	15:55 (4) 17:30	16:16 (4) 18:25	20:22	19:43 (2) 21:17	21:57	
14 08:37	15:29 (5) 07:49	06:45	06:30	19:06 (2) 05:27	04:55	
16:33	15:57 (4) 17:32	18:27	20:24	19:42 (2) 21:18	21:58	
15 08:36	15:30 (5) 07:47	06:43	06:28	19:07 (2) 05:26	04:54	
16:34	15:59 (4) 17:34	18:28	20:26	19:42 (2) 21:20	21:58	
16 08:35	15:30 (5) 07:45	06:40	06:25	19:08 (2) 05:24	04:54	
16:36	16:00 (4) 17:36	18:30	20:28	19:41 (2) 21:22	21:59	
17 08:34	15:31 (5) 07:43	06:38	06:23	19:08 (2) 05:22	04:54	
16:38	16:02 (4) 17:38	18:32	20:30	19:39 (2) 21:23	21:59	
18 08:33	15:32 (5) 07:41	06:35	06:21	19:09 (2) 05:21	04:54	
16:40	16:05 (4) 17:40	18:34	20:31	19:38 (2) 21:25	22:00	
19 08:32	15:34 (5) 07:39	06:33	06:18	19:10 (2) 05:19	04:54	
16:41	16:07 (4) 17:42	18:36	20:33	19:37 (2) 21:27	22:00	
20 08:31	15:35 (5) 07:36	17:13 (3) 06:31	06:16	19:12 (2) 05:18	04:54	
16:43	16:08 (4) 17:44	17:16 (3) 18:38	20:35	19:35 (2) 21:28	22:00	
21 08:30	15:38 (5) 07:34	17:12 (3) 06:28	06:14	19:13 (2) 05:16	04:54	
16:45	16:11 (4) 17:46	17:18 (3) 18:40	20:37	19:32 (2) 21:30	22:01	
22 08:29	15:47 (4) 07:32	17:10 (3) 06:26	06:12	19:16 (2) 05:15	04:55	
16:47	16:12 (4) 17:48	17:19 (3) 18:42	20:39	19:29 (2) 21:31	22:01	
23 08:27	15:48 (4) 07:30	17:09 (3) 06:23	06:09	05:13	04:55	
16:49	16:15 (4) 17:50	17:22 (3) 18:43	20:41	21:33	22:01	
24 08:26	15:47 (4) 07:28	17:09 (3) 06:21	06:07	05:12	04:55	
16:50	16:17 (4) 17:52	17:24 (3) 18:45	20:43	21:34	22:01	
25 08:24	15:48 (4) 07:25	17:08 (3) 06:18	06:05	05:11	04:55	
16:52	16:19 (4) 17:54	17:26 (3) 18:47	20:44	21:36	22:01	
26 08:23	15:47 (4) 07:23	17:08 (3) 06:16	06:03	05:09	04:56	
16:54	16:21 (4) 17:56	17:28 (3) 18:49	20:46	21:37	22:01	
27 08:22	15:47 (4) 07:21	17:09 (3) 06:13	06:01	05:08	04:56	
16:56	16:23 (4) 17:58	17:31 (3) 18:51	20:48	21:39	22:01	
28 08:20	15:48 (4) 07:18	17:08 (3) 06:11	05:58	05:07	04:57	
16:58	16:26 (4) 18:00	17:32 (3) 18:53	20:50	21:40	22:01	
29 08:18	15:48 (4)	07:08	19:21 (2) 05:56	05:06	04:57	
17:00	16:28 (4)	19:54	19:28 (2) 20:52	21:41	22:01	
30 08:17	15:48 (4)	07:06	19:18 (2) 05:54	05:05	04:58	
17:02	16:28 (4)	19:56	19:30 (2) 20:54	21:43	22:00	
31 08:15	15:48 (4)	07:04	19:15 (2)	05:04		
17:04	16:28 (4)	19:58	19:31 (2)	21:44		
Potential sun hours	250	273	367	420	494	510
Total, worst case	853	534	142	671		
Sun reduction	0.24	0.23	0.27	0.35		
Oper. time red.	1.00	1.00	1.00	1.00		
Wind dir. red.	0.66	0.67	0.67	0.67		
Total reduction	0.16	0.15	0.18	0.24		
Total, real	137	83	26	159		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DW - H127

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:05 (2) 19:43 (2)	07:26 16:54	15:26 (4) 15:53 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	19:05 (2) 19:43 (2)	07:28 16:52	15:24 (4) 15:54 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	19:04 (2) 19:42 (2)	07:30 16:50	15:23 (4) 15:55 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	19:04 (2) 19:42 (2)	07:31 16:48	15:22 (4) 15:56 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	19:04 (2) 19:41 (2)	07:33 16:46	15:21 (4) 15:56 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	19:04 (2) 19:39 (2)	07:35 16:44	15:20 (4) 15:57 (4)
7	05:04 21:57	05:49 21:13	06:43 20:04	19:04 (2) 19:35 (2)	07:37 16:43	15:20 (4) 15:57 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	19:04 (2) 19:33 (2)	07:39 16:41	15:19 (4) 15:58 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	19:05 (2) 19:31 (2)	07:41 16:40	15:19 (4) 15:58 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	19:05 (2) 19:28 (2)	07:42 16:37	15:20 (4) 15:59 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	19:06 (2) 19:26 (2)	07:44 16:35	15:20 (4) 15:59 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	19:07 (2) 19:24 (2)	07:46 16:34	15:20 (4) 16:00 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	19:09 (2) 19:22 (2)	07:48 16:32	15:20 (4) 15:59 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	19:11 (2) 19:18 (2)	07:50 16:31	15:20 (4) 15:57 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	19:15 (2) 19:16 (2)	07:52 16:29	15:20 (4) 15:56 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	19:16 (2) 18:29	07:53 16:27	15:20 (4) 15:54 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	18:26 17:57 (3)	07:55 16:26	15:21 (4) 15:52 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	18:26 17:55 (3)	07:57 16:24	15:21 (4) 15:51 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	18:24 17:52 (3)	07:59 16:23	15:22 (4) 15:49 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	18:22 17:41 (3)	16:22	15:22 (4) 15:47 (4)
21	05:21 21:42	06:13 20:44	19:21 (2) 19:35 (2)	07:08 18:17	17:42 (3) 16:20	15:13 (5) 15:46 (4)
22	05:23 21:41	06:15 20:42	19:18 (2) 19:37 (2)	07:10 18:15	17:48 (3) 16:19	15:46 (4) 15:44 (4)
23	05:24 21:39	06:17 20:39	19:16 (2) 19:39 (2)	07:12 18:13	17:45 (3) 16:18	15:10 (5) 15:43 (4)
24	05:26 21:38	06:19 20:37	19:14 (2) 19:41 (2)	07:13 18:11	16:17	15:09 (5) 15:42 (4)
25	05:27 21:36	06:20 20:35	19:12 (2) 19:41 (2)	07:15 17:09	16:16	15:09 (5) 15:41 (4)
26	05:29 21:35	06:22 20:32	19:11 (2) 19:42 (2)	07:17 17:06	16:11	15:09 (5) 15:39 (4)
27	05:30 21:33	06:24 20:30	19:10 (2) 19:43 (2)	07:19 17:04	16:13	15:09 (5) 15:38 (4)
28	05:32 21:32	06:26 20:28	19:08 (2) 19:43 (2)	07:21 17:02	15:37 (4) 16:12	15:09 (5) 15:37 (4)
29	05:34 21:30	06:27 20:25	19:07 (2) 19:43 (2)	07:22 17:00	15:31 (4) 16:12	15:08 (5) 15:36 (4)
30	05:35 21:28	06:29 20:23	19:07 (2) 19:44 (2)	07:24 16:58	15:28 (4) 15:49 (4)	15:08 (5) 15:35 (4)
31	05:37 21:27	06:31 20:21	19:05 (2) 19:43 (2)	07:25 16:56	15:26 (4) 15:51 (4)	15:08 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		322	391	300	983	455
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.66
Total reduction		0.23	0.21	0.20	0.18	0.14
Total, real		74	84	59	172	62

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DX - H128

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		15:01 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24				06:33	07:26	07:24				08:19	14:50 (2)	
	16:15	25	15:26 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54				06:35	07:28	07:26				16:10	20	15:10 (2)
2	08:44		15:02 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26				06:35	07:28	07:26				08:21	20	14:50 (2)
	16:16	25	15:27 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				06:36	07:30	07:28				16:09	20	15:10 (2)
3	08:44		15:02 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28				06:36	07:30	07:28				08:22	24	14:50 (2)
	16:17	25	15:27 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50				06:38	07:31	07:30				16:08	22	15:12 (2)
4	08:43		15:03 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30				06:38	07:31	07:30				08:24	24	14:50 (2)
	16:18	24	15:27 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48				06:40	07:33	07:32				16:08	23	15:13 (2)
5	08:43		15:03 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32				06:40	07:33	07:32				08:25	24	14:50 (2)
	16:19	24	15:27 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46				06:42	07:35	07:34				16:07	23	15:13 (2)
6	08:43		15:04 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34				06:42	07:35	07:34				08:26	24	14:51 (2)
	16:21	24	15:28 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44				06:43	07:37	07:36				16:07	23	15:14 (2)
7	08:42		15:05 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				06:43	07:37	07:36				08:28	24	14:50 (2)
	16:22	23	15:28 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				06:45	07:39	07:38				16:06	24	15:14 (2)
8	08:42		15:05 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38				06:45	07:39	07:38				08:29	24	14:50 (2)
	16:23	23	15:28 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41				06:47	07:41	07:40				16:06	24	15:14 (2)
9	08:41		15:07 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				06:47	07:41	07:40				08:30	25	14:51 (2)
	16:25	21	15:28 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39				06:49	07:42	07:42				16:05	25	15:16 (2)
10	08:40		15:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42				06:49	07:42	07:42				08:32	25	14:51 (2)
	16:26	21	15:28 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37				06:49	07:42	07:42				16:05	25	15:16 (2)
11	08:40		15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44				06:49	07:44	07:44				08:33	25	14:51 (2)
	16:28	20	15:28 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35				06:50	07:44	07:44				16:05	25	15:16 (2)
12	08:39		15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46				06:50	07:46	07:46				08:34	26	14:51 (2)
	16:29	19	15:28 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34				06:52	07:46	07:46				16:05	26	15:17 (2)
13	08:38		15:10 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47				06:52	07:46	07:47				08:35	26	14:52 (2)
	16:31	18	15:28 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32				06:54	07:48	07:47				16:04	25	15:17 (2)
14	08:37		15:12 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				06:54	07:48	07:47				08:35	26	14:52 (2)
	16:33	15	15:27 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30				06:56	07:50	07:49				16:04	25	15:18 (2)
15	08:36		15:13 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51				06:56	07:50	07:49				08:36	26	14:53 (2)
	16:34	13	15:26 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				06:58	07:52	07:51				16:04	25	15:18 (2)
16	08:35		15:15 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53				06:58	07:54	07:53				08:38	26	14:53 (2)
	16:36	9	15:24 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27				06:59	07:54	07:53				16:05	26	15:19 (2)
17	08:34		15:18 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55				06:59	07:55	07:55				08:39	26	14:54 (2)
	16:38	4	15:22 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26				07:01	07:55	07:55				16:05	25	15:19 (2)
18	08:33		15:19 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				07:03	07:57	07:57				08:39	26	14:54 (2)
	16:39		15:23 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24				07:03	07:57	07:57				16:05	26	15:20 (2)
19	08:32		15:17 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				07:05	07:59	07:59				08:40	26	14:55 (2)
	16:41		15:25 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23				07:05	07:59	07:59				16:05	26	15:20 (2)
20	08:31		15:16 (2)	07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00				07:06	08:01	08:00				08:41	26	14:55 (2)
	16:43		15:27 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22				07:06	08:01	08:00				16:05	26	15:21 (2)
21	08:30		15:14 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				07:06	08:01	08:00				08:41	26	14:56 (2)
	16:45		15:28 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20				07:08	08:03	08:02				16:06	26	15:22 (2)
22	08:29		15:13 (2)	07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04				07:08	08:03	08:02				08:42	26	14:56 (2)
	16:47		15:30 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19				07:10	08:05	08:04				16:06	26	15:22 (2)
23	08:27		15:11 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				07:12	08:07	08:06				08:42	26	14:57 (2)
	16:49		15:32 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18				07:12	08:07	08:06				16:07	26	15:23 (2)
24	08:26		15:10 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08				07:13	08:09	08:08				08:43	26	14:57 (2)
	16:50		15:12 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17				07:13	08:09	08:08				16:07	26	15:23 (2)
25	08:25		15:09 (2)	07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	08:11	08:09				07:15	08:11	08:09				14:57 (2)	31	14:57 (2)
	16:52		15:14 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:15				07:15	08:11	08:09				16:08	26	15:23 (2)
26	08:23		15:07 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11				07:17	08:13	08:11				14:54 (2)	31	14:58 (2)
	16:54		15:16 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14				07:17	08:13	08:11				16:09	25	15:23 (2)
27	08:22		15:04 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13				07:19	08:15	08:13				14:53 (2)	31	14:59 (2)
	16:56		15:18 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13				07:19	08:15	08:13				16:10	25	15:24 (2)
28	08:20		15:02 (2)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14				07:19	08:15	08:13						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DY - H129

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DZ - H130

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EA - H131

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EB - H132

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EC - H133

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: ED - H134

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EE - H135

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EF - H136

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EG - H137

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: EH - H138

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	08:14	07:16	07:01		05:52	06:25 (5) 05:03	05:34 (4) 04:59	05:39	06:33	07:26	07:24	08:19
16:15	17:06	18:02	20:00		20:55	31 06:56 (5) 21:45	12 05:46 (4) 22:00	21:25	20:18	19:05	16:54	16:10
2 08:44	08:12	07:14	06:59		05:50	06:26 (5) 05:02	05:33 (4) 05:00	05:40	06:35	07:28	07:26	08:21
16:16	17:08	18:04	20:02		20:57	29 06:55 (5) 21:47	13 05:46 (4) 22:00	5 05:45 (4) 21:23	20:16	19:02	16:52	16:09
3 08:44	08:10	07:12	06:56		05:48	06:27 (5) 05:01	05:32 (4) 05:00	05:39	06:37	07:30	07:28	08:22
16:17	17:10	18:06	20:04		20:59	26 06:53 (5) 21:48	13 05:45 (4) 21:59	7 05:46 (4) 21:21	20:14	19:00	16:50	16:09
4 08:43	08:08	07:09	06:54		05:46	06:28 (5) 05:00	05:31 (4) 05:01	05:38	06:38	07:32	07:30	08:24
16:18	17:12	18:08	20:06		21:01	24 06:52 (5) 21:49	13 05:44 (4) 21:59	9 05:47 (4) 21:19	20:11	18:57	16:48	16:08
5 08:43	08:07	07:07	06:52		05:44	06:29 (5) 04:59	05:31 (4) 05:02	05:38	06:46	07:33	07:32	08:25
16:20	17:14	18:10	20:08		21:03	21 06:50 (5) 21:50	13 05:44 (4) 21:58	10 05:48 (4) 21:17	8 06:54 (5) 20:09	18:55	16:46	16:07
6 08:43	08:05	07:05	06:49		05:42	06:31 (5) 04:59	05:31 (4) 05:03	05:37	06:42	07:35	07:34	08:26
16:21	17:16	18:11	20:09		21:04	18 06:49 (5) 21:51	13 05:44 (4) 21:58	13 05:50 (4) 21:16	15 06:57 (5) 20:06	18:53	16:45	16:07
7 08:42	08:03	07:02	06:47		05:40	06:33 (5) 04:58	05:32 (4) 05:04	05:37	06:40	07:37	07:36	08:28
16:22	17:18	18:13	20:11		21:06	13 06:46 (5) 21:52	12 05:44 (4) 21:57	13 05:50 (4) 21:14	19 06:59 (5) 20:04	18:50	16:43	16:06
8 08:42	08:01	07:00	06:44		05:38	06:38 (5) 04:57	05:32 (4) 05:05	05:38	06:38	07:39	07:38	08:29
16:24	17:20	18:15	20:13		21:08	3 06:41 (5) 21:53	10 05:42 (4) 21:56	13 05:51 (4) 21:12	22 07:00 (5) 20:01	18:48	16:41	16:06
9 08:41	07:59	06:57	06:42		05:36	06:42 (5) 04:57	05:34 (4) 05:06	05:39	06:37	07:41	07:40	08:30
16:25	17:22	18:17	20:15		21:10	8 06:42 (4) 21:55	13 05:52 (4) 21:10	25 07:02 (5) 19:59	18:45	16:39	16:06	
10 08:40	07:57	06:55	06:40		05:35	06:43 (5) 04:56	05:35 (4) 05:07	05:40	06:36	07:43	07:42	08:32
16:27	17:24	18:19	20:17		21:12	6 05:41 (4) 21:55	13 05:53 (4) 21:08	27 07:03 (5) 19:57	18:43	16:37	16:05	
11 08:40	07:55	06:53	06:37		05:33	06:45 (5) 04:56	05:37 (4) 05:08	05:41	06:34	06:51	07:44	08:33
16:28	17:26	18:21	20:19		21:13	3 05:40 (4) 21:54	12 05:53 (4) 21:06	29 07:03 (5) 19:54	18:41	16:36	16:05	
12 08:39	07:53	06:50	06:35		05:31	06:46 (5) 04:56	05:09	05:42	06:34	06:52	07:46	08:34
16:30	17:28	18:23	20:20		21:15	12 05:54 (4) 21:03	30 07:04 (5) 19:52	18:38	16:34	16:05		
13 08:38	07:51	06:48	06:32		05:29	05:11	05:43 (4) 05:59	06:33	06:54	07:48	07:47	08:35
16:31	17:30	18:25	20:22		21:17	11 05:54 (4) 21:01	32 07:05 (5) 19:49	18:36	16:32	16:05		
14 08:37	07:49	06:45	06:30		05:27	05:12	05:44 (4) 06:01	06:32	06:56	07:50	07:49	08:36
16:33	17:32	18:27	20:24	1 06:54 (5) 21:18	21:58	11 05:55 (4) 20:59	33 07:05 (5) 19:47	18:34	16:31	16:05		
15 08:36	07:47	06:43	06:28	06:52 (5) 20:26	05:26	05:13	05:45 (4) 06:03	06:32	06:58	07:52	07:51	08:37
16:35	17:34	18:29	20:26	5 06:57 (5) 21:20	21:58	10 05:55 (4) 20:57	34 07:06 (5) 19:44	18:31	16:29	16:05		
16 08:35	07:45	06:40	06:25	06:50 (5) 20:24	05:25	05:15	05:47 (4) 06:05	06:33	06:59	07:54	07:53	08:38
16:36	17:36	18:30	20:28	8 06:58 (5) 21:22	21:59	9 05:56 (4) 20:55	32 07:05 (5) 19:42	18:29	16:28	16:05		
17 08:34	07:43	06:38	06:23	06:47 (5) 20:22	05:24	05:16	05:48 (4) 06:06	06:35	07:01	07:56	07:55	08:38
16:38	17:38	18:32	20:30	11 06:58 (5) 21:23	21:59	8 05:56 (4) 20:53	31 07:06 (5) 19:39	18:27	16:26	16:05		
18 08:33	07:41	06:36	06:21	06:45 (5) 20:21	05:24	05:17	05:49 (4) 06:08	06:37	07:03	07:57	07:57	08:39
16:40	17:40	18:34	20:32	14 06:59 (5) 21:25	22:00	7 05:56 (4) 20:51	29 07:06 (5) 19:37	18:24	16:25	16:05		
19 08:32	07:39	06:33	06:18	06:43 (5) 20:19	05:24	05:19	05:50 (4) 06:10	06:38	07:05	07:59	07:59	08:40
16:42	17:42	18:36	20:33	17 07:00 (5) 21:27	22:00	21:45	6 05:56 (4) 20:48	07:05	19:34	18:22	16:23	16:05
20 08:31	07:37	06:31	06:16	06:41 (5) 20:18	05:24	05:20	05:52 (4) 06:12	06:40	07:06	08:01	08:01	08:41
16:43	17:44	18:38	20:35	19 07:00 (5) 21:28	22:00	21:44	5 05:57 (4) 20:46	07:05	19:32	18:20	16:22	16:06
21 08:30	07:34	06:28	06:14	06:39 (5) 20:16	05:45 (4) 20:55	05:21	05:53 (4) 06:13	06:42	07:08	08:03	08:02	08:41
16:45	17:46	18:40	20:37	21 07:00 (5) 21:30	2 05:47 (4) 22:01	21:42	4 05:57 (4) 20:44	07:05	19:29	18:18	16:21	16:06
22 08:29	07:32	06:26	06:12	06:36 (5) 20:15	05:44 (4) 20:55	05:23	05:55 (4) 06:15	06:43	07:10	08:05	08:04	08:42
16:47	17:48	18:42	20:39	23 06:59 (5) 21:31	3 05:47 (4) 22:01	21:41	3 05:58 (4) 20:42	07:04	19:27	18:15	16:19	16:07
23 08:27	07:30	06:23	06:09	06:34 (5) 20:13	05:43 (4) 20:55	05:24	05:56 (4) 06:17	06:45	07:12	08:07	08:06	08:42
16:49	17:50	18:43	20:41	26 07:00 (5) 21:33	4 05:47 (4) 22:01	21:39	1 05:57 (4) 20:39	07:04	19:24	18:13	16:18	16:07
24 08:26	07:28	06:21	06:07	06:32 (5) 20:12	05:41 (4) 20:55	05:26	06:19	06:47	07:14	08:09	08:08	08:43
16:51	17:52	18:45	20:43	27 06:59 (5) 21:34	6 05:47 (4) 22:01	21:38	20:37	07:03	19:22	18:11	16:17	16:08
25 08:25	07:25	06:18	06:05	06:30 (5) 20:11	05:40 (4) 20:56	05:27	06:21	06:48	07:15	07:11	08:09	08:43
16:53	17:54	18:47	20:44	29 06:59 (5) 21:36	7 05:47 (4) 22:01	21:36	20:35	07:02	19:19	17:09	16:16	16:08
26 08:23	07:23	06:16	06:03	06:28 (5) 20:09	05:39 (4) 20:56	05:29	06:22	06:50	07:17	07:13	08:11	08:43
16:54	17:56	18:49	20:46	31 06:59 (5) 21:37	8 05:47 (4) 22:01	21:35	20:32	07:01	19:17	17:07	16:15	16:09
27 08:22	07:21	06:14	06:01	06:26 (5) 20:08	05:38 (4) 20:57	05:31	06:24	06:52	07:19	07:15	08:13	08:44
16:56	17:58	18:51	20:48	33 06:59 (5) 21:39	9 05:47 (4) 22:01	21:33	20:30	8 07:00 (5) 19:15	17:05	16:14	16:10	
28 08:20	07:19	06:11	05:59	06:24 (5) 20:07	05:37 (4) 20:57	05:32	06:26	06:54	07:21	07:17	08:14	08:44
16:58	18:00	18:53	20:50	34 06:58 (5) 21:40	10 05:47 (4) 22:01	21:32	20:28	5 06:59 (5) 19:12	17:02	16:13	16:11	
29 08:19	07:09	05:56	05:44	06:24 (5) 20:06	05:36 (4) 20:58	05:34	06:28	06:55	07:23	07:18	08:16	08:44
17:00	19:55	20:52	21:41	33 06:57 (5) 21:41	10 05:46 (4) 22:01	21:30	20:25	1 06:56 (5) 19:10	17:00	16:12	16:12	
30 08:17	07:06	05:54	05:42	06:25 (5) 20:05	05:35 (4) 20:58	05:35	06:29	07:24	07:20	08:18	08:44	
17:02	19:56	20:54	21:43	32 06:57 (5) 21:43	11 05:46 (4) 22:00	21:28	20:23	19:07	16:58	16:11	16:13	
31 08:15	07:04	05:52	05:40	06:24 (5) 20:04	05:34 (4) 20:57	05:37	06:31	07:22	07:22	08:16	08:44	
17:04	19:58	20:56	21:44	12 05:46 (4) 22:00	21:27	20:21	19:07	16:52	16:14	16:14	16:14	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				364	247	116		195	536			
Sun reduction				0.35	0.38	0.32		0.32	0.34			
Oper. time red.				1.00	1.00	1.00		1.00	1.00			
Wind dir. red.				0.68	0.67	0.66		0.66	0.68			
Total reduction				0.24	0.26	0.21		0.23				
Total, real				87	63	24	41	124				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EI - H139

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EJ - H140

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EK - H141

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EL - H142

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:54	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: EM - H143

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April		May		June	
1	08:44	08:14	07:16		07:01	07:25 (5)	05:52	06:18 (4)	05:03	05:34 (3)
	16:15	17:06	18:02		20:00	27 07:52 (5)	20:55	8 06:26 (4)	21:45	5 05:39 (3)
2	08:44	08:12	07:14		06:59	07:24 (5)	05:50	06:16 (4)	05:02	05:33 (3)
	16:16	17:08	18:04		20:02	27 07:51 (5)	20:57	10 06:26 (4)	21:47	6 05:39 (3)
3	08:44	08:10	07:12		06:56	07:24 (5)	05:48	06:14 (4)	05:01	05:32 (3)
	16:17	17:10	18:06		20:04	25 07:49 (5)	20:59	11 06:25 (4)	21:48	7 05:39 (3)
4	08:43	08:09	07:09		06:54	07:26 (5)	05:46	06:12 (4)	05:00	05:31 (3)
	16:18	17:12	18:08		20:06	22 07:48 (5)	21:01	11 06:23 (4)	21:49	8 05:39 (3)
5	08:43	08:07	07:07		06:52	07:26 (5)	05:44	06:10 (4)	04:59	05:31 (3)
	16:20	17:14	18:10		20:08	20 07:46 (5)	21:03	11 06:21 (4)	21:50	9 05:40 (3)
6	08:43	08:05	07:05		06:49	07:29 (5)	05:42	06:12 (4)	04:59	05:30 (3)
	16:21	17:16	18:11		20:09	15 07:44 (5)	21:04	8 06:20 (4)	21:51	10 05:40 (3)
7	08:42	08:03	07:02		06:47	07:32 (5)	05:40		04:58	05:30 (3)
	16:22	17:18	18:13		20:11	8 07:40 (5)	21:06		21:52	11 05:41 (3)
8	08:42	08:01	07:00		06:44		05:38		04:57	05:29 (3)
	16:24	17:20	18:15		20:13		21:08		21:53	11 05:40 (3)
9	08:41	07:59	06:57		06:42		05:36		04:57	05:29 (3)
	16:25	17:22	18:17		20:15		21:10		21:54	12 05:41 (3)
10	08:40	07:57	06:55		06:40		05:35		04:56	05:28 (3)
	16:27	17:24	18:19		20:17		21:12		21:55	13 05:41 (3)
11	08:40	07:55	06:53		06:37		05:33		04:56	05:28 (3)
	16:28	17:26	18:21		20:19		21:13		21:55	13 05:41 (3)
12	08:39	07:53	06:50		06:35		05:31		04:56	05:28 (3)
	16:30	17:28	18:23		20:20		21:15		21:56	14 05:42 (3)
13	08:38	07:51	06:48		06:32		05:29		04:55	05:27 (3)
	16:31	17:30	18:25		20:22		21:17		21:57	14 05:41 (3)
14	08:37	07:49	06:45		06:30		05:27		04:55	05:27 (3)
	16:33	17:32	18:27		20:24		21:18		21:58	15 05:42 (3)
15	08:36	07:47	06:43		06:28		05:26		04:55	05:27 (3)
	16:35	17:34	18:29		20:26		21:20		21:58	15 05:42 (3)
16	08:35	07:45	06:41		06:25		05:24		04:55	05:27 (3)
	16:36	17:36	18:30		20:28		21:22		21:59	15 05:42 (3)
17	08:34	07:43	06:38		06:23		05:22		04:54	05:27 (3)
	16:38	17:38	18:32		20:30		21:23		21:59	16 05:43 (3)
18	08:33	07:41	06:36		06:21		05:21		04:54	05:27 (3)
	16:40	17:40	18:34		20:32		21:25		22:00	16 05:43 (3)
19	08:32	07:39	06:33		06:18		05:19		04:54	05:27 (3)
	16:42	17:42	18:36		20:33		21:27		22:00	16 05:43 (3)
20	08:31	07:37	06:31		06:16		05:18		04:54	05:27 (3)
	16:43	17:44	18:38		20:35		21:28		22:00	16 05:43 (3)
21	08:30	07:34	06:28		06:14		05:16		04:55	05:27 (3)
	16:45	17:46	18:40		20:37		21:30		22:01	16 05:43 (3)
22	08:29	07:32	06:26	06:50 (5)	06:12		05:15		04:55	05:28 (3)
	16:47	17:48	18:42	3 06:53 (5)	20:39		21:31		22:01	16 05:44 (3)
23	08:27	07:30	06:23	06:47 (5)	06:09		05:13		04:55	05:28 (3)
	16:49	17:50	18:44	6 06:53 (5)	20:41		21:33		22:01	16 05:44 (3)
24	08:26	07:28	06:21	06:45 (5)	06:07		05:12		04:55	05:28 (3)
	16:51	17:52	18:45	9 06:54 (5)	20:43		21:34		22:01	16 05:44 (3)
25	08:25	07:25	06:18	06:42 (5)	06:05		05:11		04:56	05:29 (3)
	16:53	17:54	18:47	12 06:54 (5)	20:44		21:36		22:01	16 05:45 (3)
26	08:23	07:23	06:16	06:40 (5)	06:03		05:09		04:56	05:29 (3)
	16:54	17:56	18:49	15 06:55 (5)	20:46		21:37		22:01	15 05:44 (3)
27	08:22	07:21	06:14	06:37 (5)	06:01	06:26 (4)	05:08		04:57	05:30 (3)
	16:56	17:58	18:51	17 06:54 (5)	20:48	2 06:28 (4)	21:39		22:01	15 05:45 (3)
28	08:20	07:19	06:11	06:35 (5)	05:59	06:24 (4)	05:07		04:57	05:30 (3)
	16:58	18:00	18:53	20 06:55 (5)	20:50	4 06:28 (4)	21:40		22:01	15 05:45 (3)
29	08:19		07:09	07:32 (5)	05:56	06:22 (4)	05:06	05:36 (3)	04:58	05:31 (3)
	17:00		19:55	22 07:54 (5)	20:52	5 06:27 (4)	21:41	1 05:37 (3)	22:01	14 05:45 (3)
30	08:17		07:06	07:30 (5)	05:54	06:20 (4)	05:05	05:35 (3)	04:58	05:31 (3)
	17:02		19:56	24 07:54 (5)	20:54	7 06:27 (4)	21:43	2 05:37 (3)	22:00	14 05:45 (3)
31	08:15		07:04	07:27 (5)			05:04	05:34 (3)		
	17:04		19:58	25 07:52 (5)			21:44	4 05:38 (3)		
Potential sun hours	250	273	367		420		494		510	
Total, worst case			153		162		66		395	
Sun reduction			0.27		0.35		0.38		0.32	
Oper. time red.			1.00		1.00		1.00		1.00	
Wind dir. red.			0.67		0.67		0.67		0.66	
Total reduction			0.18		0.24		0.26		0.21	
Total, real			28		39		17		83	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EM - H143

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July			August			September			October		November		December	
1	04:59		05:32 (3)	05:39			06:33			07:26		07:24		08:19	
	22:00	14	05:46 (3)	21:25			20:18			19:05		16:54		16:10	
2	05:00		05:33 (3)	05:40			06:35			07:28		07:26		08:21	
	22:00	13	05:46 (3)	21:23			20:16			19:02		16:52		16:09	
3	05:00		05:33 (3)	05:42			06:37			07:30		07:28		08:22	
	21:59	12	05:45 (3)	21:21			20:14			19:00		16:50		16:09	
4	05:01		05:34 (3)	05:44			06:38			07:32		07:30		08:24	
	21:59	12	05:46 (3)	21:19			20:11			18:57		16:48		16:08	
5	05:02		05:35 (3)	05:46			06:40		07:28 (5)	07:33		07:32		08:25	
	21:58	11	05:46 (3)	21:17			20:09	8	07:36 (5)	18:55		16:46		16:07	
6	05:03		05:36 (3)	05:47		06:23 (4)	06:42		07:25 (5)	07:35		07:34		08:26	
	21:58	10	05:46 (3)	21:16	4	06:27 (4)	20:06	15	07:40 (5)	18:53		16:45		16:07	
7	05:04		05:37 (3)	05:49		06:20 (4)	06:44		07:22 (5)	07:37		07:36		08:28	
	21:57	9	05:46 (3)	21:14	10	06:30 (4)	20:04	19	07:41 (5)	18:50		16:43		16:06	
8	05:05		05:38 (3)	05:51		06:20 (4)	06:45		07:20 (5)	07:39		07:38		08:29	
	21:56	9	05:47 (3)	21:12	11	06:31 (4)	20:01	22	07:42 (5)	18:48		16:41		16:06	
9	05:06		05:39 (3)	05:52		06:22 (4)	06:47		07:19 (5)	07:41		07:40		08:30	
	21:55	8	05:47 (3)	21:10	11	06:33 (4)	19:59	25	07:44 (5)	18:45		16:39		16:06	
10	05:07		05:40 (3)	05:54		06:24 (4)	06:49		07:18 (5)	07:43		07:42		08:32	
	21:55	6	05:46 (3)	21:08	10	06:34 (4)	19:57	26	07:44 (5)	18:43		16:37		16:05	
11	05:08		05:41 (3)	05:56		06:25 (4)	06:51		07:17 (5)	07:44		07:44		08:33	
	21:54	5	05:46 (3)	21:06	9	06:34 (4)	19:54	27	07:44 (5)	18:41		16:36		16:05	
12	05:09		05:42 (3)	05:58		06:27 (4)	06:52		07:19 (5)	07:46		07:46		08:34	
	21:53	4	05:46 (3)	21:03	8	06:35 (4)	19:52	26	07:45 (5)	18:38		16:34		16:05	
13	05:11		05:43 (3)	05:59		06:29 (4)	06:54		07:21 (5)	07:48		07:47		08:35	
	21:52	3	05:46 (3)	21:01	7	06:36 (4)	19:49	24	07:45 (5)	18:36		16:32		16:05	
14	05:12		05:44 (3)	06:01		06:30 (4)	06:56		07:22 (5)	07:50		07:49		08:36	
	21:51	2	05:46 (3)	20:59	5	06:35 (4)	19:47	22	07:44 (5)	18:34		16:31		16:05	
15	05:13			06:03		06:32 (4)	06:58		07:24 (5)	07:52		07:51		08:37	
	21:50			20:57	3	06:35 (4)	19:44	20	07:44 (5)	18:31		16:29		16:05	
16	05:14			06:05		06:33 (4)	06:59		07:26 (5)	07:54		07:53		08:38	
	21:49			20:55	1	06:34 (4)	19:42	18	07:44 (5)	18:29		16:28		16:05	
17	05:16			06:06			07:01		07:28 (5)	07:56		07:55		08:39	
	21:47			20:53			19:39	15	07:43 (5)	18:27		16:26		16:05	
18	05:17			06:08			07:03		07:29 (5)	07:57		07:57		08:39	
	21:46			20:51			19:37	13	07:42 (5)	18:24		16:25		16:05	
19	05:19			06:10			07:05		07:31 (5)	07:59		07:59		08:40	
	21:45			20:48			19:34	10	07:41 (5)	18:22		16:23		16:05	
20	05:20			06:12			07:07		07:33 (5)	08:01		08:01		08:41	
	21:44			20:46			19:32	7	07:40 (5)	18:20		16:22		16:06	
21	05:21			06:13			07:08		07:35 (5)	08:03		08:02		08:41	
	21:42			20:44			19:29	4	07:39 (5)	18:18		16:21		16:06	
22	05:23			06:15			07:10			08:05		08:04		08:42	
	21:41			20:42			19:27			18:15		16:19		16:07	
23	05:24			06:17			07:12			08:07		08:06		08:42	
	21:39			20:39			19:24			18:13		16:18		16:07	
24	05:26			06:19			07:14			08:09		08:08		08:43	
	21:38			20:37			19:22			18:11		16:17		16:08	
25	05:27			06:21			07:15			07:11		08:09		08:43	
	21:36			20:35			19:19			17:09		16:16		16:08	
26	05:29			06:22			07:17			07:13		08:11		08:43	
	21:35			20:32			19:17			17:07		16:15		16:09	
27	05:31			06:24			07:19			07:15		08:13		08:44	
	21:33			20:30			19:15			17:05		16:14		16:10	
28	05:32			06:26			07:21			07:17		08:14		08:44	
	21:32			20:28			19:12			17:02		16:13		16:11	
29	05:34			06:28			07:23			07:19		08:16		08:44	
	21:30			20:25			19:10			17:00		16:12		16:12	
30	05:35			06:29			07:24			07:20		08:18		08:44	
	21:28			20:23			19:07			16:58		16:11		16:13	
31	05:37			06:31						07:22				08:44	
	21:27			20:21						16:56				16:14	
Potential sun hours	512			460			382			328		259		233	
Total, worst case		118			79			301							
Sun reduction		0.32			0.34			0.32							
Oper. time red.		1.00			1.00			1.00							
Wind dir. red.		0.66			0.67			0.67							
Total reduction		0.21			0.23			0.22							
Total, real		25			18			65							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyryne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EN - H144

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:06 (5)	08:14	15:25 (4)	07:16	17:04 (3)	07:01	05:52	19:18 (2)	05:03	
	16:15	31	15:37 (4)	17:06	43	16:08 (4)	18:02	28	17:32 (3)	20:00	
2	08:44	15:07 (5)	08:12	15:26 (4)	07:14	17:04 (3)	06:59		05:50	19:18 (2)	05:02
	16:16	32	15:39 (4)	17:08	42	16:08 (4)	18:04	27	17:31 (3)	20:02	
3	08:44	15:07 (5)	08:10	15:27 (4)	07:12	17:06 (3)	06:56		05:48	19:20 (2)	05:01
	16:17	32	15:39 (4)	17:10	40	16:07 (4)	18:06	24	17:30 (3)	20:04	
4	08:43	15:08 (5)	08:08	15:28 (4)	07:09	17:07 (3)	06:54		05:46	19:21 (2)	05:00
	16:18	33	15:41 (4)	17:12	38	16:06 (4)	18:07	22	17:29 (3)	20:06	
5	08:43	15:08 (5)	08:07	15:29 (4)	07:07	17:08 (3)	06:51	2	19:39 (2)	21:01	29
	16:19	34	15:42 (4)	17:14	36	16:05 (4)	18:09	19	17:27 (3)	20:07	8
6	08:43	15:10 (5)	08:05	15:31 (4)	07:04	17:10 (3)	06:49		05:42	19:22 (2)	05:00
	16:21	34	15:44 (4)	17:16	33	16:04 (4)	18:11	15	17:25 (3)	20:09	13
7	08:42	15:10 (5)	08:03	15:32 (4)	07:02	17:14 (3)	06:47		05:40	19:26 (2)	05:00
	16:22	35	15:45 (4)	17:18	30	16:02 (4)	18:13	6	17:20 (3)	20:11	17
8	08:42	15:11 (5)	08:01	15:34 (4)	07:00		06:44		05:38	19:24 (2)	05:00
	16:24	35	15:46 (4)	17:20	27	16:01 (4)	18:15	22	19:46 (2)	21:08	9
9	08:41	15:12 (5)	07:59	15:37 (4)	06:57		06:42		05:36	19:23 (2)	05:00
	16:25	37	15:49 (4)	17:22	22	15:59 (4)	18:17	25	19:48 (2)	21:10	
10	08:40	15:13 (5)	07:57	15:40 (4)	06:55		06:39		05:34	19:21 (2)	05:00
	16:26	37	15:50 (4)	17:24	16	15:56 (4)	18:19	28	19:49 (2)	21:11	
11	08:40	15:14 (5)	07:55		06:53		06:37		05:33	19:20 (2)	05:00
	16:28	38	15:52 (4)	17:26		18:21	20:19	31	19:51 (2)	21:13	
12	08:39	15:15 (5)	07:53		06:50		06:35		05:31	19:19 (2)	05:00
	16:30	39	15:54 (4)	17:28		18:23	20:20	34	19:53 (2)	21:15	
13	08:38	15:17 (5)	07:51		06:48		06:32		05:29	19:17 (2)	05:00
	16:31	38	15:55 (4)	17:30		18:25	20:22	37	19:54 (2)	21:17	
14	08:37	15:18 (5)	07:49		06:45		06:30		05:27	19:16 (2)	05:00
	16:33	39	15:57 (4)	17:32		18:27	20:24	40	19:56 (2)	21:18	
15	08:36	15:18 (4)	07:47		06:43		06:28		05:26	19:16 (2)	05:00
	16:34	41	15:59 (4)	17:34		18:28	20:26	42	19:58 (2)	21:20	
16	08:35	15:17 (4)	07:45		06:40		06:25		05:24	19:16 (2)	05:00
	16:36	43	16:00 (4)	17:36		18:30	20:28	44	20:00 (2)	21:22	
17	08:34	15:18 (4)	07:43		06:38		06:23		05:22	19:14 (2)	05:00
	16:38	44	16:02 (4)	17:38		18:32	20:30	47	20:01 (2)	21:23	
18	08:33	15:18 (4)	07:41	17:09 (3)	06:35		06:21		05:21	19:14 (2)	05:00
	16:40	47	16:05 (4)	17:40	2	17:11 (3)	18:34	48	20:02 (2)	21:25	
19	08:32	15:19 (4)	07:39	17:08 (3)	06:33		06:18		05:19	19:14 (2)	05:00
	16:41	48	16:07 (4)	17:42	5	17:13 (3)	18:36	48	20:02 (2)	21:27	
20	08:31	15:18 (4)	07:36	17:07 (3)	06:31		06:16		05:18	19:14 (2)	05:00
	16:43	50	16:08 (4)	17:44	9	17:16 (3)	18:38	48	20:02 (2)	21:28	
21	08:30	15:19 (4)	07:34	17:06 (3)	06:28		06:14		05:16	19:13 (2)	05:00
	16:45	49	16:08 (4)	17:46	12	17:18 (3)	18:40	48	20:01 (2)	21:30	
22	08:29	15:19 (4)	07:32	17:05 (3)	06:26		06:12		05:15	19:13 (2)	05:00
	16:47	49	16:08 (4)	17:48	14	17:19 (3)	18:42	47	20:00 (2)	21:31	
23	08:27	15:20 (4)	07:30	17:05 (3)	06:23		06:09		05:13	19:13 (2)	05:00
	16:49	49	16:09 (4)	17:50	17	17:22 (3)	18:43	47	20:00 (2)	21:33	
24	08:26	15:20 (4)	07:28	17:05 (3)	06:21		06:07		05:12	19:14 (2)	05:00
	16:50	49	16:09 (4)	17:52	19	17:24 (3)	18:45	46	20:00 (2)	21:34	
25	08:24	15:21 (4)	07:25	17:04 (3)	06:18		06:05		05:11	19:14 (2)	05:00
	16:52	48	16:09 (4)	17:54	22	17:26 (3)	18:47	45	19:59 (2)	21:36	
26	08:23	15:21 (4)	07:23	17:04 (3)	06:16		06:03		05:09	19:14 (2)	05:00
	16:54	48	16:09 (4)	17:56	24	17:28 (3)	18:49	45	19:59 (2)	21:37	
27	08:22	15:21 (4)	07:21	17:04 (3)	06:13		06:01		05:08	19:15 (2)	05:00
	16:56	48	16:09 (4)	17:58	27	17:31 (3)	18:51	43	19:58 (2)	21:39	
28	08:20	15:22 (4)	07:18	17:04 (3)	06:11		05:58		05:07	19:15 (2)	05:00
	16:58	47	16:09 (4)	18:00	28	17:32 (3)	18:53	42	19:57 (2)	21:40	
29	08:19	15:23 (4)			07:09		05:56		05:06	19:16 (2)	05:00
	17:00	46	16:09 (4)		19:54		20:52	40	19:56 (2)	21:41	
30	08:17	15:23 (4)			07:06		05:54		05:05	19:17 (2)	05:00
	17:02	45	16:08 (4)		19:56		20:54	38	19:55 (2)	21:43	
31	08:15	15:24 (4)			07:04				05:04		
	17:04	44	16:08 (4)		19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case		1289		506		141		975		206	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.66		0.67		0.66		0.66	
Total reduction		0.16		0.15		0.18		0.23		0.25	
Total, real		206		78		26		227		52	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: EN - H144

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:19 (2) 19:50 (2)	07:26 16:54	15:09 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	19:20 (2) 19:48 (2)	07:28 16:52	15:06 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	19:21 (2) 19:46 (2)	07:30 16:50	15:04 (4) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	19:21 (2) 19:43 (2)	07:31 16:48	15:02 (4) 16:08
5	05:02 21:58	05:45 21:17	19:39 (2) 19:51 (2)	06:40 20:09	18:55 16:46	15:00 (4) 16:07
6	05:03 21:58	05:47 21:15	19:36 (2) 19:55 (2)	06:42 20:06	07:35 16:44	15:34 (4) 16:07
7	05:04 21:57	05:49 21:14	19:34 (2) 19:57 (2)	06:43 20:04	17:47 (3) 17:58 (3)	14:58 (4) 16:06
8	05:05 21:56	05:51 21:12	19:31 (2) 19:58 (2)	06:45 20:01	07:39 18:01 (3)	14:57 (4) 16:06
9	05:06 21:55	05:52 21:10	19:30 (2) 20:00 (2)	06:47 19:59	07:40 18:03 (3)	14:56 (4) 16:05
10	05:07 21:55	05:54 21:08	19:28 (2) 20:01 (2)	06:49 19:56	07:42 18:04 (3)	14:56 (4) 16:05
11	05:08 21:54	05:56 21:05	19:27 (2) 20:02 (2)	06:50 19:54	07:44 18:05 (3)	14:55 (4) 16:05
12	05:09 21:53	05:57 21:03	19:26 (2) 20:03 (2)	06:52 19:51	07:45 18:05 (3)	14:54 (4) 16:05
13	05:10 21:52	05:59 21:01	19:24 (2) 20:03 (2)	06:54 19:49	07:47 18:06 (3)	14:54 (4) 16:05
14	05:12 21:51	06:01 20:59	19:23 (2) 20:04 (2)	06:56 19:47	07:49 18:04 (3)	14:54 (4) 16:04
15	05:13 21:50	06:03 20:57	19:23 (2) 20:05 (2)	06:58 19:44	07:51 18:02 (3)	14:54 (4) 16:05
16	05:14 21:49	06:04 20:55	19:21 (2) 20:05 (2)	06:59 19:42	07:53 17:59 (3)	14:54 (4) 16:05
17	05:16 21:47	06:06 20:53	19:21 (2) 20:05 (2)	07:01 19:39	07:55 17:57 (3)	14:54 (4) 16:05
18	05:17 21:46	06:08 20:51	19:20 (2) 20:06 (2)	07:03 19:37	07:57 18:24	14:54 (4) 16:05
19	05:18 21:45	06:10 20:48	19:19 (2) 20:05 (2)	07:05 19:34	07:59 18:22	14:54 (4) 16:05
20	05:20 21:44	06:12 20:46	19:19 (2) 20:06 (2)	07:06 19:32	08:01 18:20	14:54 (4) 16:06
21	05:21 21:42	06:13 20:44	19:19 (2) 20:06 (2)	07:08 19:29	08:03 18:17	14:54 (4) 16:06
22	05:23 21:41	06:15 20:42	19:18 (2) 20:05 (2)	07:10 19:27	08:05 18:15	14:55 (4) 16:06
23	05:24 21:39	06:17 20:39	19:18 (2) 20:05 (2)	07:12 19:24	08:07 18:13	14:55 (4) 16:07
24	05:26 21:38	06:19 20:37	19:18 (2) 20:05 (2)	07:13 19:22	08:09 18:11	14:55 (4) 16:08
25	05:27 21:36	06:20 20:35	19:17 (2) 20:04 (2)	07:15 19:19	1 17:41 (3)	16:17 14:56 (4)
26	05:29 21:35	06:22 20:32	19:17 (2) 20:04 (2)	07:17 19:17	08:09 17:06	16:18 14:54 (4)
27	05:30 21:33	06:24 20:30	19:17 (2) 20:02 (2)	07:19 19:14	08:13 17:04	14:57 (4) 16:10
28	05:32 21:32	06:26 20:28	19:17 (2) 19:59 (2)	07:21 19:12	08:14 16:12	14:58 (5) 16:11
29	05:34 21:30	06:28 20:25	19:17 (2) 19:57 (2)	07:22 19:09	08:16 17:00	14:57 (5) 16:11
30	05:35 21:28	06:29 20:23	19:18 (2) 19:55 (2)	07:24 19:07	08:18 16:58	14:56 (5) 16:12
31	05:37 21:27	06:31 20:21	19:18 (2) 19:52 (2)	07:25 16:56	15:15 (4) 4 15:19 (4)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		1045	149	328	1243	948
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.66	0.67	0.66	0.65
Total reduction		0.23	0.21	0.20	0.17	0.14
Total, real		235	31	65	217	129

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EO - H145

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	15:15 (3) 08:14	15:31 (2) 07:16	16:09 (2) 07:01	16:52 05:03	17:05 04:59	17:22 04:59	17:39 04:59	17:56 04:59	18:13 04:59	18:30 04:59	18:47 04:59	19:04 04:59
2 08:44	15:16 (3) 08:12	15:32 (2) 07:14	16:09 (2) 07:03	16:52 05:02	17:05 04:59	17:22 04:59	17:39 04:59	17:56 04:59	18:13 04:59	18:30 04:59	18:47 04:59	19:04 04:59
3 08:44	15:17 (3) 08:08	15:33 (2) 07:09	16:10 (2) 07:04	16:53 05:04	17:06 04:59	17:23 04:59	17:40 04:59	17:57 04:59	18:14 04:59	18:31 04:59	18:48 04:59	19:05 04:59
4 08:43	15:18 (3) 08:04	15:34 (2) 07:07	16:11 (2) 07:02	16:54 05:05	17:07 04:59	17:24 04:59	17:41 04:59	17:58 04:59	18:15 04:59	18:32 04:59	18:49 04:59	19:06 04:59
5 08:43	15:19 (3) 08:00	15:35 (2) 07:04	16:12 (2) 07:00	16:55 05:06	17:08 04:59	17:25 04:59	17:42 04:59	17:59 04:59	18:16 04:59	18:33 04:59	18:50 04:59	19:07 04:59
6 08:43	15:20 (3) 07:59	15:36 (2) 07:02	16:13 (2) 06:59	16:56 05:07	17:09 04:59	17:26 04:59	17:43 04:59	17:60 04:59	18:17 04:59	18:34 04:59	18:51 04:59	19:08 04:59
7 08:42	15:21 (3) 07:57	15:37 (2) 07:00	16:14 (2) 06:58	16:57 05:08	17:10 04:59	17:27 04:59	17:44 04:59	17:61 04:59	18:18 04:59	18:35 04:59	18:52 04:59	19:09 04:59
8 08:42	15:22 (3) 07:55	15:38 (2) 06:59	16:15 (2) 06:57	16:58 05:09	17:11 04:59	17:28 04:59	17:45 04:59	17:62 04:59	18:19 04:59	18:36 04:59	18:53 04:59	19:10 04:59
9 08:41	15:23 (3) 07:53	15:39 (2) 06:58	16:16 (2) 06:56	16:59 05:10	17:12 04:59	17:29 04:59	17:46 04:59	17:63 04:59	18:20 04:59	18:37 04:59	18:54 04:59	19:11 04:59
10 08:40	15:24 (3) 07:51	15:40 (2) 06:57	16:17 (2) 06:55	17:00 05:11	17:13 04:59	17:30 04:59	17:47 04:59	17:64 04:59	18:21 04:59	18:38 04:59	18:55 04:59	19:12 04:59
11 08:40	15:25 (3) 07:49	15:41 (2) 06:56	16:18 (2) 06:54	17:01 05:12	17:14 04:59	17:31 04:59	17:48 04:59	17:65 04:59	18:22 04:59	18:39 04:59	18:56 04:59	19:13 04:59
12 08:39	15:26 (3) 07:47	15:42 (2) 06:55	16:19 (2) 06:53	17:02 05:13	17:15 04:59	17:32 04:59	17:49 04:59	17:66 04:59	18:23 04:59	18:40 04:59	18:57 04:59	19:14 04:59
13 08:38	15:27 (3) 07:45	15:43 (2) 06:54	16:20 (2) 06:52	17:03 05:14	17:16 04:59	17:33 04:59	17:50 04:59	17:67 04:59	18:24 04:59	18:41 04:59	18:58 04:59	19:15 04:59
14 08:37	15:28 (3) 07:43	15:44 (2) 06:53	16:21 (2) 06:51	17:04 05:15	17:17 04:59	17:34 04:59	17:51 04:59	17:68 04:59	18:25 04:59	18:42 04:59	18:59 04:59	19:16 04:59
15 08:36	15:29 (3) 07:41	15:45 (2) 06:52	16:22 (2) 06:50	17:05 05:16	17:18 04:59	17:35 04:59	17:52 04:59	17:69 04:59	18:26 04:59	18:43 04:59	19:00 04:59	19:17 04:59
16 08:35	15:30 (3) 07:39	15:46 (2) 06:51	16:23 (2) 06:49	17:06 05:17	17:19 04:59	17:36 04:59	17:53 04:59	17:70 04:59	18:27 04:59	18:44 04:59	19:01 04:59	19:18 04:59
17 08:34	15:31 (3) 07:37	15:47 (2) 06:50	16:24 (2) 06:48	17:07 05:18	17:20 04:59	17:37 04:59	17:54 04:59	17:71 04:59	18:28 04:59	18:45 04:59	19:02 04:59	19:19 04:59
18 08:33	15:32 (3) 07:35	15:48 (2) 06:49	16:25 (2) 06:47	17:08 05:19	17:21 04:59	17:38 04:59	17:55 04:59	17:72 04:59	18:29 04:59	18:46 04:59	19:03 04:59	19:20 04:59
19 08:32	15:33 (3) 07:33	15:49 (2) 06:48	16:26 (2) 06:46	17:09 05:20	17:22 04:59	17:39 04:59	17:56 04:59	17:73 04:59	18:30 04:59	18:47 04:59	19:04 04:59	19:21 04:59
20 08:31	15:34 (3) 07:31	15:50 (2) 06:47	16:27 (2) 06:45	17:10 05:21	17:23 04:59	17:40 04:59	17:57 04:59	17:74 04:59	18:31 04:59	18:48 04:59	19:05 04:59	19:22 04:59
21 08:30	15:35 (3) 07:29	15:51 (2) 06:46	16:28 (2) 06:44	17:11 05:22	17:24 04:59	17:41 04:59	17:58 04:59	17:75 04:59	18:32 04:59	18:49 04:59	19:06 04:59	19:23 04:59
22 08:29	15:36 (3) 07:27	15:52 (2) 06:45	16:29 (2) 06:43	17:12 05:23	17:25 04:59	17:42 04:59	17:59 04:59	17:76 04:59	18:33 04:59	18:50 04:59	19:07 04:59	19:24 04:59
23 08:27	15:37 (3) 07:25	15:53 (2) 06:44	16:30 (2) 06:42	17:13 05:24	17:26 04:59	17:43 04:59	17:60 04:59	17:77 04:59	18:34 04:59	18:51 04:59	19:08 04:59	19:25 04:59
24 08:26	15:38 (3) 07:23	15:54 (2) 06:43	16:31 (2) 06:41	17:14 05:25	17:27 04:59	17:44 04:59	17:61 04:59	17:78 04:59	18:35 04:59	18:52 04:59	19:09 04:59	19:26 04:59
25 08:25	15:39 (3) 07:21	15:55 (2) 06:42	16:32 (2) 06:40	17:15 05:26	17:28 04:59	17:45 04:59	17:62 04:59	17:79 04:59	18:36 04:59	18:53 04:59	19:10 04:59	19:27 04:59
26 08:23	15:40 (3) 07:19	15:56 (2) 06:41	16:33 (2) 06:39	17:16 05:27	17:29 04:59	17:46 04:59	17:63 04:59	17:80 04:59	18:37 04:59	18:54 04:59	19:11 04:59	19:28 04:59
27 08:22	15:41 (3) 07:17	15:57 (2) 06:40	16:34 (2) 06:38	17:17 05:28	17:30 04:59	17:47 04:59	17:64 04:59	17:81 04:59	18:38 04:59	18:55 04:59	19:12 04:59	19:29 04:59
28 08:20	15:42 (3) 07:15	15:58 (2) 06:39	16:35 (2) 06:37	17:18 05:29	17:31 04:59	17:48 04:59	17:65 04:59	17:82 04:59	18:39 04:59	18:56 04:59	19:13 04:59	19:30 04:59
29 08:19	15:43 (3) 07:13	15:59 (2) 06:38	16:36 (2) 06:36	17:19 05:30	17:32 04:59	17:49 04:59	17:66 04:59	17:83 04:59	18:40 04:59	18:57 04:59	19:14 04:59	19:31 04:59
30 08:17	15:44 (3) 07:11	16:00 (2) 06:37	16:37 (2) 06:35	17:20 05:31	17:33 04:59	17:50 04:59	17:67 04:59	17:84 04:59	18:41 04:59	18:58 04:59	19:15 04:59	19:32 04:59
31 08:15	15:45 (3) 07:09	16:01 (2) 06:36	16:38 (2) 06:34	17:21 05:32	17:34 04:59	17:51 04:59	17:68 04:59	17:85 04:59	18:42 04:59	18:59 04:59	19:16 04:59	19:33 04:59
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	1017	336										
Sun reduction	0.24	0.23										
Oper. time red.	1.00	1.00										
Wind dir. red.	0.66	0.66										
Total reduction	0.16	0.15										
Total, real	163	52										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EP - H146

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44 16:15	15:16 (3) 15:37 (3)	08:14 17:06	15:34 (2) 16:18 (2)	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	15:07 (2) 15:45 (2)	08:19 16:10	15:03 (3) 15:34 (2)
2	08:44 16:16	15:17 (3) 15:39 (3)	08:12 17:08	15:34 (2) 16:18 (2)	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	15:06 (2) 15:46 (2)	08:21 16:09	15:03 (3) 15:32 (2)
3	08:44 16:17	15:17 (3) 15:39 (3)	08:10 17:10	15:34 (2) 16:18 (2)	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	15:05 (2) 15:46 (2)	08:22 16:08	15:03 (3) 15:29 (3)
4	08:43 16:18	15:18 (3) 15:41 (3)	08:08 17:12	15:34 (2) 16:18 (2)	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	15:05 (2) 15:47 (2)	08:24 16:08	15:04 (3) 15:30 (3)
5	08:43 16:19	15:18 (3) 15:42 (3)	08:07 17:14	15:34 (2) 16:17 (2)	07:07 18:09	06:51 20:07	05:44 21:03	05:02 21:50	05:02 21:56	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	15:04 (2) 15:47 (2)	08:24 16:07	15:04 (3) 15:29 (3)
6	08:43 16:21	15:19 (3) 15:44 (3)	08:05 17:16	15:34 (2) 16:17 (2)	07:04 18:11	06:49 20:09	05:42 21:04	05:03 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	15:04 (2) 15:47 (2)	08:26 16:07	15:05 (3) 15:30 (3)
7	08:42 16:22	15:19 (3) 15:44 (3)	08:03 17:18	15:35 (2) 16:17 (2)	07:02 18:13	06:47 20:11	05:40 21:06	05:04 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	15:04 (2) 15:47 (2)	08:28 16:06	15:05 (3) 15:29 (3)
8	08:42 16:24	15:19 (3) 15:44 (3)	08:01 17:20	15:36 (2) 16:17 (2)	07:00 18:15	06:44 20:13	05:38 21:08	05:05 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:41	07:38 16:41	15:03 (2) 15:47 (2)	08:29 16:06	15:05 (3) 15:28 (3)
9	08:41 16:25	15:20 (3) 15:45 (3)	07:59 17:22	15:36 (2) 16:16 (2)	06:57 18:17	06:42 20:15	05:36 21:10	05:07 21:54	05:06 21:55	05:52 21:10	06:47 19:59	18:48	07:40 16:39	15:04 (2) 15:48 (2)	08:30 16:05	15:06 (3) 15:28 (3)
10	08:40 16:26	15:21 (3) 15:50 (2)	07:57 17:24	15:37 (2) 16:16 (2)	06:55 18:19	06:39 20:17	05:34 21:11	05:06 21:55	05:07 21:55	05:54 21:08	06:49 19:56	18:45	07:42 16:37	15:04 (2) 15:48 (2)	08:32 16:05	15:06 (3) 15:28 (3)
11	08:40 16:28	15:21 (3) 15:52 (2)	07:55 17:26	15:38 (2) 16:15 (2)	06:53 18:21	06:37 20:19	05:33 21:13	05:08 21:55	05:08 21:54	05:56 21:05	06:50 19:54	18:40	07:44 16:35	15:05 (2) 15:48 (2)	08:33 16:05	15:06 (3) 15:27 (3)
12	08:39 16:30	15:22 (3) 15:54 (2)	07:53 17:28	15:39 (2) 16:14 (2)	06:50 18:23	06:35 20:20	05:09 21:15	05:09 21:56	05:09 21:53	05:59 21:03	07:46 19:51	18:39	07:46 16:34	15:09 (2) 15:48 (2)	08:34 16:05	15:07 (3) 15:27 (3)
13	08:38 16:31	15:23 (3) 15:55 (2)	07:51 17:30	15:40 (2) 16:12 (2)	06:48 18:25	06:32 20:22	05:29 21:17	05:05 21:57	05:10 21:52	05:59 21:01	06:54 19:49	18:38	07:47 16:32	15:05 (2) 15:48 (2)	08:35 16:05	15:07 (3) 15:26 (3)
14	08:37 16:33	15:23 (3) 15:57 (2)	07:49 17:32	15:41 (2) 16:11 (2)	06:45 18:27	06:30 20:24	05:27 21:18	05:05 21:58	05:12 21:51	06:01 20:59	06:56 19:47	18:33	07:50 16:31	15:05 (2) 15:48 (2)	08:36 16:04	15:08 (3) 15:26 (3)
15	08:36 16:34	15:24 (3) 15:59 (2)	07:47 17:34	15:43 (2) 16:12 (2)	06:43 18:28	06:28 20:26	05:26 21:20	05:03 21:58	05:13 21:50	06:03 20:57	06:58 19:44	18:31	07:52 16:29	15:06 (2) 15:48 (2)	08:37 16:04	15:08 (3) 15:26 (3)
16	08:35 16:36	15:24 (3) 16:00 (2)	07:45 17:36	15:45 (2) 16:08 (2)	06:40 18:30	06:25 20:28	05:24 21:22	05:04 21:59	05:14 21:49	06:04 20:55	06:59 19:42	18:29	07:54 16:27	15:06 (2) 15:47 (2)	08:38 16:05	15:09 (3) 15:26 (3)
17	08:34 16:38	15:26 (3) 16:02 (2)	07:43 17:38	15:46 (2) 16:09 (2)	06:38 18:32	06:23 20:30	05:22 21:23	05:04 21:59	05:16 21:47	06:06 20:53	07:01 19:39	18:25	07:55 16:26	15:07 (2) 15:47 (2)	08:38 16:05	15:09 (3) 15:27 (3)
18	08:33 16:40	15:27 (3) 16:05 (2)	07:41 17:41	15:53 (2) 16:10 (2)	06:36 18:34	06:21 20:31	05:21 21:25	05:04 22:00	05:17 21:46	06:08 20:51	07:03 19:37	18:24	07:57 16:24	15:08 (2) 15:47 (2)	08:39 16:05	15:10 (3) 15:27 (3)
19	08:32 16:41	15:28 (3) 16:07 (2)	07:39 17:42	16:03 (2) 16:16 (2)	06:34 18:36	06:16 20:33	05:22 21:27	05:05 22:00	05:19 21:45	06:10 20:48	07:07 19:34	18:22	07:59 16:23	15:09 (2) 15:46 (2)	08:40 16:05	15:11 (3) 15:28 (3)
20	08:31 16:43	15:30 (3) 16:08 (2)	07:36 17:44	16:03 (2) 16:18 (2)	06:36 18:38	06:16 20:35	05:18 21:28	05:05 22:00	05:20 21:44	06:12 20:46	07:06 19:32	18:01	08:00 16:22	15:09 (2) 15:46 (2)	08:41 16:06	15:11 (3) 15:27 (3)
21	08:30 16:45	15:33 (3) 16:10 (2)	07:34 17:46	16:06 (2) 16:20 (2)	06:34 18:40	06:14 20:37	05:16 21:30	05:04 22:01	05:21 21:42	06:13 20:44	07:08 19:29	18:03	08:02 16:20	15:08 (3) 15:45 (2)	08:41 16:06	15:12 (3) 15:28 (3)
22	08:29 16:47	15:34 (2) 16:11 (2)	07:32 17:48	16:06 (2) 16:22 (2)	06:32 18:42	06:12 20:39	05:15 21:31	05:05 22:01	05:23 21:41	06:15 20:42	07:10 19:27	18:05	08:04 16:19	15:06 (3) 15:44 (2)	08:42 16:06	15:12 (3) 15:28 (3)
23	08:27 16:49	15:34 (2) 16:12 (2)	07:30 17:50	16:09 (2) 16:23 (2)	06:30 18:43	06:09 20:41	05:13 21:33	05:05 22:01	05:24 21:39	06:17 20:39	07:12 19:24	18:07	08:06 16:18	15:05 (3) 15:43 (2)	08:42 16:07	15:13 (3) 15:29 (3)
24	08:26 16:50	15:34 (2) 16:13 (2)	07:28 17:52	16:07 (2) 16:25 (2)	06:28 18:45	06:07 20:43	05:12 21:34	05:05 22:01	05:26 21:38	06:19 20:37	07:13 19:22	18:09	08:08 16:11	15:04 (3) 15:42 (2)	08:43 16:08	15:13 (3) 15:29 (3)
25	08:25 16:52	15:34 (2) 16:14 (2)	07:25 17:54	16:08 (2) 16:26 (2)	06:25 18:47	06:05 20:44	05:11 21:36	05:05 22:01	05:27 21:36	06:20 20:35	07:15 19:19	18:07	08:09 16:13	15:04 (3) 15:43 (2)	08:43 16:08	15:13 (3) 15:30 (3)
26	08:23 16:54	15:33 (2) 16:14 (2)	07:23 17:56	16:06 (2) 16:24 (2)	06:23 18:49	06:03 20:46	05:09 21:37	05:02 22:01	05:29 21:35	06:22 20:32	07:17 19:17	18:03	08:11 16:14	15:03 (3) 15:43 (2)	08:43 16:09	15:13 (3) 15:30 (3)
27	08:22 16:56	15:33 (2) 16:15 (2)	07:21 17:58	16:06 (2) 16:24 (2)	06:21 18:51	06:01 20:48	05:08 21:39	05:00 22:01	05:30 21:33	06:24 20:30	07:19 19:14	18:02	08:13 16:14	15:12 (2) 15:43 (2)	08:44 16:10	15:15 (3) 15:32 (3)
28	08:20 16:58	15:33 (2) 16:16 (2)	07:19 18:00	16:06 (2) 16:24 (2)	06:19 18:53	05:58 20:50	05:07 21:40	05:02 22:01	05:32 21:32	06:26 20:28	07:21 19:12	18:01	08:14 16:15	15:10 (2) 15:41 (2)	08:44 16:10	15:15 (3) 15:33 (3)
29	08:19 17:00	15:33 (2) 16:16 (2)		16:06 (2) 16:24 (2)	06:18 18:55	05:56 20:52	05:06 21:41	05:03 22:01	05:34 21:30	06:27 20:25	07:22 19:09	18:00	08:18 16:16	15:09 (2) 15:42 (2)	08:44 16:11	15:15 (3) 15:34 (3)
30	08:17 17:02	15:33 (2) 16:16 (2)		16:06 (2) 16:24 (2)	06:17 18:56	05:54 20:54	05:05 21:43	05:03 22:00	05:35 21:28	06:29 20:23	07:24 19:07	18:00	08:18 16:15	15:08 (2) 15:43 (2)	08:44 16:12	15:16 (3) 15:35 (3)
31	08:15 17:04	15:33 (2) 16:16 (2)		16:06 (2) 16:24 (2)	06:16 18:58	05:54 20:54	05:04 21:44	05:03 22:00	05:37 21:27	06:31 20:21	07:22 19:07	18:00	08:18 16:15	15:08 (2) 15:45 (2)	08:44 16:13	15:16 (3) 15:35 (3)
Potential sun hours	250															
Total, worst case	1037	632														
Sun reduction	0.24	0.23														
Oper. time red.	1.00	1.00														
Wind dir. red.	0.66	0.66														
Total reduction	0.16	0.15														
Total, real	166	97														

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EQ - H147

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: ER - H148

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:09 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:36 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:37	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:06	08:11 16:14	08:44 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: ES - H149

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: ET - H150

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:26 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)										
	16:15	11	15:37 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:10	23	15:34 (1)									
2	08:44	15:27 (1)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	15:12 (1)										
	16:16	11	15:38 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09	21	15:33 (1)									
3	08:44	15:26 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	15:12 (1)										
	16:17	13	15:39 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:08	20	15:32 (1)									
4	08:43	15:27 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	15:12 (1)										
	16:18	14	15:41 (1)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08	20	15:32 (1)									
5	08:43	15:27 (1)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	15:12 (1)										
	16:19	15	15:42 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	18	15:30 (1)									
6	08:43	15:27 (1)	08:05	07:05	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:27	15:14 (1)										
	16:21	17	15:44 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	16	15:30 (1)									
7	08:42	15:27 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	15:14 (1)										
	16:22	18	15:45 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	15	15:29 (1)									
8	08:42	15:27 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	15:15 (1)										
	16:24	19	15:46 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	14	15:29 (1)									
9	08:41	15:28 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	15:15 (1)										
	16:25	21	15:49 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	13	15:28 (1)									
10	08:40	15:29 (1)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	15:16 (1)										
	16:26	21	15:50 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	12	15:28 (1)									
11	08:40	15:29 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	15:16 (1)										
	16:28	23	15:52 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:35	11	15:27 (1)									
12	08:39	15:29 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	15:16 (1)										
	16:30	23	15:52 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	11	15:27 (1)									
13	08:38	15:30 (1)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	15:18 (1)										
	16:31	23	15:53 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	9	15:27 (1)									
14	08:37	15:30 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	15:19 (1)										
	16:33	23	15:53 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	8	15:27 (1)									
15	08:36	15:31 (1)	07:47	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	08:37	15:19 (1)										
	16:34	22	15:53 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	8	15:27 (1)									
16	08:35	15:32 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38	15:19 (1)										
	16:36	22	15:54 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	7	15:26 (1)									
17	08:34	15:32 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39	15:20 (1)										
	16:38	21	15:53 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:26	16:26	7	15:27 (1)									
18	08:33	15:33 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	15:21 (1)										
	16:40	20	15:53 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:24	6	15:27 (1)									
19	08:32	15:34 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	15:21 (1)										
	16:41	19	15:53 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	7	15:28 (1)									
20	08:31	15:34 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:41	15:21 (1)										
	16:43	18	15:52 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	6	15:27 (1)									
21	08:30	15:35 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:42	15:22 (1)										
	16:45	17	15:52 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	6	15:28 (1)									
22	08:29	15:36 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:43	15:22 (1)										
	16:47	15	15:51 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	6	15:28 (1)									
23	08:27	15:38 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:44	15:23 (1)										
	16:49	13	15:51 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	6	15:29 (1)									
24	08:26	15:40 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:45	15:23 (1)										
	16:50	8	15:48 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	6	15:29 (1)									
25	08:25		07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09	08:43	15:23 (1)										
	16:52		17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	21	15:30 (1)										
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:43	15:25 (1)										
	16:54		17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	22	15:32 (1)										
27	08:22		07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13	08:44	15:25 (1)										
	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	22	15:32 (1)										
28	08:20		07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14	08:44	15:25 (1)										
	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	23	15:33 (1)										
29	08:19			07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16	08:44	15:25 (1)										
	17:00			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	23	15:33 (1)										
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	08:44	15:26 (1)										
	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	23	15:33 (1)										
31	08:15			07:04		05:04		05:37	06:31		07:22		08:44	15:25 (1)										
	17:04			19:58		21:44		21:27	20:21		16:56		16:13	10	15:35 (1)									
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	243	332										
Total, worst case	427												243	332										
Sun reduction	0.24												0.27	0.21										
Oper. time red.	1.00												1.00	1.00										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EU - H151

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	14:46 (4)	08:14	16:22 (3)	07:16	17:03 (2)	07:01	05:52	05:03		
	16:15	26	15:12 (4)	17:06	12	16:34 (3)	18:02	31	17:34 (2)	20:00	21:45
2	08:44	14:47 (4)	08:12	16:22 (3)	07:14	17:02 (2)	06:59	05:50	05:02		
	16:16	25	15:12 (4)	17:08	15	16:37 (3)	18:04	34	17:36 (2)	20:02	21:46
3	08:44	14:48 (4)	08:10	16:22 (3)	07:12	17:02 (2)	06:56	05:48	05:01		
	16:17	24	15:12 (4)	17:10	17	16:39 (3)	18:06	36	17:38 (2)	20:04	21:48
4	08:43	14:49 (4)	08:08	16:22 (3)	07:09	17:02 (2)	06:54	05:46	05:00		
	16:18	23	15:12 (4)	17:12	19	16:41 (3)	18:07	38	17:40 (2)	20:06	21:49
5	08:43	14:49 (4)	08:07	16:22 (3)	07:07	17:01 (2)	06:51	05:44	04:59		
	16:19	23	15:12 (4)	17:14	21	16:43 (3)	18:09	38	17:39 (2)	20:07	21:50
6	08:43	14:51 (4)	08:05	16:22 (3)	07:04	17:01 (2)	06:49	05:42	04:58		
	16:21	21	15:12 (4)	17:16	23	16:45 (3)	18:11	39	17:40 (2)	20:09	21:51
7	08:42	14:52 (4)	08:03	16:23 (3)	07:02	17:00 (2)	06:47	05:40	04:58		
	16:22	20	15:12 (4)	17:18	22	16:45 (3)	18:13	39	17:39 (2)	20:11	21:52
8	08:42	14:53 (4)	08:01	16:24 (3)	07:00	17:01 (2)	06:44	05:38	04:57		
	16:24	18	15:11 (4)	17:20	21	16:45 (3)	18:15	38	17:39 (2)	20:13	21:53
9	08:41	14:55 (4)	07:59	16:25 (3)	06:57	17:00 (2)	06:42	05:36	04:57		
	16:25	16	15:11 (4)	17:22	19	16:44 (3)	18:17	38	17:38 (2)	20:15	21:54
10	08:40	14:57 (4)	07:57	16:26 (3)	06:55	17:01 (2)	06:39	05:34	04:56		
	16:26	13	15:10 (4)	17:24	17	16:43 (3)	18:19	36	17:37 (2)	20:17	21:55
11	08:40	14:59 (4)	07:55	16:28 (3)	06:53	17:02 (2)	06:37	05:33	04:56		
	16:28	10	15:09 (4)	17:26	13	16:41 (3)	18:21	35	17:37 (2)	20:19	21:55
12	08:39	15:03 (4)	07:53	16:32 (3)	06:50	17:02 (2)	06:35	05:31	04:55		
	16:30	3	15:06 (4)	17:28	6	16:38 (3)	18:23	33	17:35 (2)	20:20	21:56
13	08:38		07:51		06:48	17:04 (2)	06:32	05:29	04:55		
	16:31		17:30		18:25	30	17:34 (2)	20:22	21:17	21:57	
14	08:37		07:49		06:45	17:04 (2)	06:30	05:27	04:55		
	16:33		17:32		18:27	28	17:32 (2)	20:24	21:18	21:58	
15	08:36		07:47		06:43	17:06 (2)	06:28	05:26	04:54		
	16:34		17:34		18:28	25	17:31 (2)	20:26	21:20	21:58	
16	08:35		07:45		06:40	17:08 (2)	06:25	05:24	04:54		
	16:36		17:36		18:30	20	17:28 (2)	20:28	21:22	21:59	
17	08:34		07:43		06:38	17:11 (2)	06:23	05:22	04:54		
	16:38		17:38		18:32	14	17:25 (2)	20:30	21:23	21:59	
18	08:33		07:41		06:35		06:21	05:21	04:54		
	16:40		17:40		18:34		20:31	21:25	22:00		
19	08:32		07:39		06:33		06:18	05:19	04:54		
	16:41		17:42		18:36		20:33	21:27	22:00		
20	08:31		07:36		06:31		06:16	05:18	04:54		
	16:43		17:44		18:38		20:35	21:28	22:00		
21	08:30		07:34		06:28		06:14	05:16	04:54		
	16:45		17:46		18:40		20:37	21:30	22:01		
22	08:29		07:32		17:13 (2)	06:26	06:12	05:15	04:55		
	16:47		17:48	6	17:19 (2)	18:42	20:39	21:31	22:01		
23	08:27		07:30		17:11 (2)	06:23	06:09	05:13	04:55		
	16:49		17:50	11	17:22 (2)	18:43	20:41	21:33	22:01		
24	08:26		07:28		17:09 (2)	06:21	06:07	05:12	04:55		
	16:50		17:52	15	17:24 (2)	18:45	20:43	21:34	22:01		
25	08:24		07:25		17:07 (2)	06:18	06:05	05:11	04:55		
	16:52		17:54	19	17:26 (2)	18:47	20:44	21:36	22:01		
26	08:23		07:23		17:06 (2)	06:16	06:03	05:09	04:56		
	16:54		17:56	22	17:28 (2)	18:49	20:46	21:37	22:01		
27	08:22		07:21		17:05 (2)	06:13	06:00	05:08	04:56		
	16:56		17:58	26	17:31 (2)	18:51	20:48	21:39	22:01		
28	08:20	16:23 (3)	07:18		17:04 (2)	06:11	05:58	05:07	04:57		
	16:58	3	16:26 (3)	18:00	28	17:32 (2)	18:53	20:50	21:40	22:01	
29	08:19	16:22 (3)			07:08		05:56	05:06	04:57		
	17:00	6	16:28 (3)		19:54		20:52	21:41	22:01		
30	08:17	16:22 (3)			07:06		05:54	05:05	04:58		
	17:02	7	16:29 (3)		19:56		20:54	21:43	22:00		
31	08:15	16:21 (3)			07:04			05:04			
	17:04	10	16:31 (3)		19:58			21:44			
Potential sun hours	250		273		367		420	494	510		
Total, worst case	248		332		552						
Sun reduction	0.24		0.23		0.27						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.65		0.67		0.68						
Total reduction	0.16		0.15		0.18						
Total, real	39		51		101						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: EU - H151

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:42 (2) 18:13 (2)	07:24 16:13 (3)	15:56 (3) 16:10	08:19 16:10	14:41 (4) 14:51 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:40 (2) 18:14 (2)	07:26 16:52	15:54 (3) 16:14 (3)	08:21 16:09	14:39 (4) 14:52 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:39 (2) 18:15 (2)	07:28 16:50	15:53 (3) 16:15 (3)	08:22 16:08	14:38 (4) 14:54 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:39 (2) 18:15 (2)	07:30 16:48	15:53 (3) 16:15 (3)	08:24 16:08	14:38 (4) 14:56 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:38 (2) 18:16 (2)	07:32 16:46	15:52 (3) 16:15 (3)	08:25 16:07	14:37 (4) 14:57 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:37 (2) 18:16 (2)	07:34 16:44	15:52 (3) 16:12 (3)	08:26 16:07	14:37 (4) 14:58 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:36 (2) 18:15 (2)	07:36 16:43	15:52 (3) 16:10 (3)	08:28 16:06	14:37 (4) 14:59 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:36 (2) 18:15 (2)	07:38 16:41	15:51 (3) 16:08 (3)	08:29 16:06	14:36 (4) 14:59 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:36 (2) 18:14 (2)	07:40 16:39	15:52 (3) 16:07 (3)	08:30 16:05	14:37 (4) 15:01 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:36 (2) 18:14 (2)	07:42 16:37	15:53 (3) 16:05 (3)	08:31 16:05	14:37 (4) 15:01 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:36 (2) 18:11 (2)	07:44 16:35	15:53 (3) 16:03 (3)	08:33 16:05	14:36 (4) 15:02 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:36 (2) 18:09 (2)	07:45 16:34	15:53 (3) 16:01 (3)	08:34 16:05	14:36 (4) 15:03 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:36 (2) 18:07 (2)	07:47 16:32	15:54 (3) 15:59 (3)	08:35 16:05	14:37 (4) 15:03 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:37 (2) 18:04 (2)	07:49 16:31	15:55 (3) 15:57 (3)	08:36 16:04	14:37 (4) 15:04 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:38 (2) 18:02 (2)	07:51 16:29		08:37 16:04	14:37 (4) 15:04 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:39 (2) 17:59 (2)	07:53 16:27		08:38 16:05	14:37 (4) 15:05 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:40 (2) 17:57 (2)	07:55 16:26		08:38 16:05	14:38 (4) 15:06 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:41 (2) 17:55 (2)	07:57 16:24		08:39 16:05	14:39 (4) 15:07 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:43 (2) 17:52 (2)	07:59 16:23		08:40 16:05	14:39 (4) 15:08 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:46 (2) 17:50 (2)	08:00 16:22		08:41 16:06	14:39 (4) 15:07 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17		08:02 16:20		08:41 16:06	14:40 (4) 15:08 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:04 16:19		08:42 16:06	14:40 (4) 15:08 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13		08:06 16:18		08:42 16:07	14:41 (4) 15:09 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11		08:08 16:17		08:43 16:08	14:41 (4) 15:09 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09		08:09 16:16		08:43 16:08	14:41 (4) 15:10 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	17:54 (2) 18:05 (2)	07:13 17:06	08:11 16:14		08:43 16:09	14:42 (4) 15:10 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	17:50 (2) 18:08 (2)	07:15 17:04	08:13 16:13		08:44 16:10	14:43 (4) 15:11 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	17:48 (2) 18:11 (2)	07:16 17:02	08:14 16:12		08:44 16:10	14:44 (4) 15:11 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	17:46 (2) 18:12 (2)	07:18 17:00	08:16 16:12		08:44 16:11	14:44 (4) 15:12 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:43 (2) 18:13 (2)	07:20 16:58	08:18 16:08 (3)	14:45 (4) 14:46 (4)	08:44 16:12	14:44 (4) 15:11 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	15:57 (3) 16:10 (3)	08:19 16:11	1 14:46 (4)	08:44 16:13	14:45 (4) 15:11 (4)
Potential sun hours	512	460	382	328		259		233	
Total, worst case			108	604		212			770
Sun reduction			0.32	0.29		0.27			0.21
Oper. time red.			1.00	1.00		1.00			1.00
Wind dir. red.			0.68	0.68		0.66			0.65
Total reduction			0.22	0.20		0.17			0.13
Total, real			23	119		37			103

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: EV - H152

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:08 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:53 (2)										
	16:15	27	15:35 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	30	15:23 (2)								
2	08:44	15:08 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	14:53 (2)										
	16:16	28	15:36 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	29	15:22 (2)								
3	08:44	15:08 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	14:54 (2)										
	16:17	28	15:36 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	29	15:23 (2)								
4	08:43	15:09 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	14:55 (2)										
	16:18	28	15:37 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	29	15:24 (2)								
5	08:43	15:09 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	14:55 (2)										
	16:19	28	15:37 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	29	15:24 (2)								
6	08:43	15:10 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	14:56 (2)										
	16:21	28	15:38 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:07	28	15:24 (2)								
7	08:42	15:10 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	14:56 (2)										
	16:22	29	15:39 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	28	15:24 (2)								
8	08:42	15:10 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	14:56 (2)										
	16:23	29	15:39 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	28	15:24 (2)								
9	08:41	15:11 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	14:57 (2)										
	16:25	29	15:40 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	28	15:25 (2)								
10	08:40	15:11 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	14:57 (2)										
	16:26	29	15:40 (2)	17:24	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	16:05	28	15:25 (2)								
11	08:40	15:11 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33	14:58 (2)										
	16:28	30	15:41 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05	27	15:25 (2)								
12	08:39	15:12 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	14:58 (2)										
	16:29	29	15:41 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	28	15:26 (2)								
13	08:38	15:12 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	14:59 (2)										
	16:31	29	15:41 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04	27	15:26 (2)								
14	08:37	15:13 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	15:00 (2)										
	16:33	28	15:41 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04	27	15:27 (2)								
15	08:36	15:13 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37	15:00 (2)										
	16:34	29	15:42 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	26	15:26 (2)								
16	08:35	15:13 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	15:00 (2)										
	16:36	28	15:41 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	26	15:26 (2)								
17	08:34	15:14 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	14:56 (2)	08:39	15:01 (2)									
	16:38	27	15:41 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	15:11 (2)	16:05	26	15:27 (2)							
18	08:33	15:15 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	14:55 (2)	08:39	15:02 (2)									
	16:40	27	15:42 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	15:13 (2)	16:05	25	15:27 (2)							
19	08:32	15:16 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	14:54 (2)	08:40	15:03 (2)									
	16:41	26	15:42 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	15:14 (2)	16:05	25	15:28 (2)							
20	08:31	15:16 (2)	07:36	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	14:53 (2)	08:41	15:03 (2)									
	16:43	25	15:41 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	15:15 (2)	16:06	24	15:27 (2)							
21	08:30	15:18 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	14:53 (2)	08:41	15:04 (2)									
	16:45	23	15:41 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	15:16 (2)	16:06	24	15:28 (2)							
22	08:29	15:18 (2)	07:32	06:26	06:11	05:15	04:55	05:23	06:15	07:10	08:05	08:04	14:52 (2)	08:42	15:04 (2)									
	16:47	22	15:40 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	15:17 (2)	16:06	24	15:28 (2)							
23	08:27	15:20 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	14:52 (2)	08:42	15:05 (2)									
	16:49	20	15:40 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	15:18 (2)	16:07	24	15:29 (2)							
24	08:26	15:21 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	14:52 (2)	08:43	15:05 (2)									
	16:50	18	15:39 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	15:19 (2)	16:08	24	15:29 (2)							
25	08:25	15:24 (2)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09	14:52 (2)	08:43	15:05 (2)									
	16:52	14	15:38 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:16	15:19 (2)	16:08	25	15:30 (2)							
26	08:23	15:26 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	14:52 (2)	08:43	15:05 (2)									
	16:54	10	15:36 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14	15:20 (2)	16:09	25	15:30 (2)							
27	08:22	15:27 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13	14:53 (2)	08:44	15:06 (2)									
	16:56	15:38 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	15:21 (2)	16:10	26	15:32 (2)								
28	08:20	15:28 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	14:53 (2)	08:44	15:07 (2)									
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	15:22 (2)	16:10	26	15:33 (2)									
29	08:19	15:29 (2)	07:08	05:56	05:06	04:57	05:34	06:27	07:22															

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EW - H153

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EX - H154

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	08:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EY - H155

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EZ - H156

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1 08:44	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:00 (2)	08:19
2 16:15	17:06	18:08 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	08:28 (2)	16:10
3 08:44	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:00 (2)	08:21
4 16:16	17:08	18:08 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	08:29 (2)	16:09
5 08:44	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	07:59 (2)	08:22
6 16:17	17:10	18:09 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	08:29 (2)	16:08
7 08:43	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:00 (2)	08:24
8 16:18	17:12	18:09 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	08:29 (2)	16:08
9 08:43	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:02 (2)	08:25
10 16:20	17:14	18:09 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	08:29 (2)	16:07
11 08:43	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:04 (2)	08:27
12 16:21	17:16	18:09 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	08:29 (2)	16:07
13 08:42	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:06 (2)	08:28
14 16:22	17:18	18:09 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	08:29 (2)	16:06
15 08:42	08:01	08:30 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:09 (2)	08:29
16 16:24	17:20	18:09 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	08:29 (2)	16:06
17 08:41	07:59	08:30 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:11 (2)	08:30
18 16:25	17:22	18:09 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	08:29 (2)	16:05
19 08:41	07:57	08:31 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:13 (2)	08:32
20 16:27	17:24	18:09 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	08:28 (2)	16:05
21 08:40	07:55	08:32 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:15 (2)	08:33
22 16:28	17:26	18:09 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	08:28 (2)	16:05
23 08:39	07:53	08:33 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:17 (2)	08:34
24 16:30	17:28	18:07 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	08:27 (2)	16:05
25 08:38	07:51	08:34 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:19 (2)	08:35
26 16:31	17:30	18:07 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	08:26 (2)	16:05
27 08:37	07:49	08:34 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:21 (2)	08:36
28 16:33	17:32	18:04 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	08:26 (2)	16:05
29 08:36	07:47	08:36 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:23 (2)	08:37
30 16:34	17:34	18:03 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	08:24 (2)	16:05
31 08:36	07:45	08:39 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:23 (2)	16:05
32 16:36	17:36	18:05 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	08:23 (2)	16:05
33 08:35	07:43	08:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:50	07:55	08:39	16:05
34 16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	17:15	16:26	08:39	16:05
35 08:33	07:41	08:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:51	07:57	08:39	16:05
36 16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	17:12	16:25	08:39	16:05
37 08:32	07:39	08:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:53	07:59	08:40	16:05
38 16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	17:10	16:23	08:40	16:05
39 08:31	07:37	08:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:55	08:01	08:41	16:05
40 16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	17:08	16:22	08:41	16:05
41 08:30	07:34	08:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:57	08:02	08:41	16:05
42 16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	17:05	16:20	08:42	16:05
43 08:29	07:32	08:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:59	08:04	08:42	16:05
44 16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	17:03	16:19	08:42	16:05
45 08:27	07:30	08:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	09:01	08:06	08:42	16:05
46 16:49	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	17:01	16:18	08:43	16:05
47 08:26	07:28	08:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	09:03	08:08	08:43	16:05
48 16:51	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	17:00	16:17	08:44	16:05
49 08:25	07:25	08:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10	09:04	08:09	08:43	16:05
50 16:52	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:08	17:00	16:16	08:44	16:05
51 08:23	07:23	08:16	06:03	05:09	04:56	05:29	06:22	07:17	08:12	09:06	08:11	08:44	16:05
52 16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	17:00	16:15	08:45	16:05
53 08:22	07:21	08:14	06:01	05:08	04:56	05:31	06:24	07:19	08:14	09:08	08:13	08:44	16:05
54 16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	17:00	16:14	08:45	16:05
55 08:20	07:19	08:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	09:10	08:14	08:44	16:05
56 16:58	17:59	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	17:00	16:13	08:45	16:05
57 08:19	07:18	08:10	05:56	05:06	04:58	05:34	06:28	07:23	08:18	09:12	08:16	08:44	16:05
58 17:00	17:59	18:52	20:52	21:42	22:01	21:30	20:25	19:10	18:00	17:00	16:12	08:45	16:05
59 08:17	07:16	08:08	05:54	05:05	04:58	05:35	06:29	07:24	08:19	09:13	08:18	08:44	16:05
60 17:02	17:59	18:54	20:54	21:43	22:00	21:28	20:23	19:07	18:00	17:00	16:11	08:45	16:05
61 08:15	07:14	08:06	05:52	05:04	04:57	05:33	06:27	07:22	08:17	09:11	08:16	08:44	16:05
62 17:04	17:59	18:54	20:54	21:44	22:01	21:27	20:21	19:05	18:00	17:00	16:11	08:45	16:05
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case	38	366											242
Sun reduction	0.24	0.23											0.21
Oper. time red.	1.00	1.00											1.00
Wind dir. red.	0.61	0.61											0.62
Total reduction	0.15	0.14											0.13
Total, real	6	52											31

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FA - H157

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	08:42 (2) 17:16	07:16 18:02	07:01 18:00	05:52 20:00	05:03 20:55	04:59 21:45	05:39 22:00	06:33 21:25	07:26 20:18	08:05 (2) 19:05
2	08:44 16:16	08:12 17:08	08:40 (2) 17:14	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:04 (2) 16:09
3	08:44 16:17	08:10 17:10	08:38 (2) 17:12	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	08:03 (2) 16:08
4	08:43 16:18	08:09 17:12	08:36 (2) 17:09	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:03 (2) 16:08
5	08:43 16:20	08:07 17:14	08:34 (2) 17:07	07:07 18:09	06:52 20:08	05:44 21:03	05:49 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	08:03 (2) 16:07
6	08:43 16:21	08:05 17:16	08:33 (2) 17:05	07:05 18:11	06:49 20:09	05:42 21:05	05:49 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:04 (2) 16:07
7	08:42 16:22	08:03 17:18	08:33 (2) 17:02	07:02 18:13	06:47 20:11	05:40 21:06	05:48 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:06 (2) 16:06
8	08:42 16:24	08:01 17:20	08:34 (2) 17:00	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	08:09 (2) 16:06
9	08:41 16:25	07:59 17:22	08:35 (2) 17:01	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:11 (2) 16:05
10	08:41 16:27	07:57 17:24	08:36 (2) 17:02	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:13 (2) 16:05
11	08:40 16:28	07:55 17:26	08:37 (2) 17:03	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:15 (2) 16:05
12	08:39 16:30	07:53 17:28	08:38 (2) 17:04	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:53	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:17 (2) 16:05
13	08:38 16:31	07:51 17:30	08:40 (2) 17:05	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	08:19 (2) 16:05
14	08:37 16:33	07:49 17:32	08:41 (2) 17:06	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	08:21 (2) 16:05
15	08:36 16:34	07:47 17:34	08:53 (2) 17:07	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:23 (2) 16:05
16	08:36 16:36	07:45 17:36	08:54 (2) 17:08	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	08:25 (2) 16:05
17	08:35 16:38	07:43 17:38	08:55 (2) 17:09	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	08:27 (2) 16:05
18	08:33 16:40	07:41 17:40	08:56 (2) 17:11	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	08:28 (2) 16:05
19	08:32 16:41	07:39 17:42	08:57 (2) 17:12	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	08:30 (2) 16:05
20	08:31 16:43	07:37 17:44	08:58 (2) 17:13	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:31 (2) 16:06
21	08:30 16:45	07:34 17:46	08:59 (2) 17:14	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:32 (2) 16:06
22	08:29 16:47	07:32 17:48	09:00 (2) 17:15	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:33 (2) 16:07
23	08:27 16:49	07:30 17:50	09:01 (2) 17:16	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:34 (2) 16:07
24	08:26 16:51	07:28 17:52	09:02 (2) 17:17	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:35 (2) 16:08
25	08:25 16:52	07:25 17:54	09:03 (2) 17:18	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	08:36 (2) 16:08
26	08:23 16:54	07:23 17:56	09:04 (2) 17:19	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:37 (2) 16:09
27	08:22 16:56	07:21 17:58	09:05 (2) 17:20	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:38 (2) 16:10
28	08:20 16:58	07:19 18:00	09:06 (2) 17:21	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:39 (2) 16:11
29	08:19 17:00	07:17 18:01	09:07 (2) 17:22	06:09 18:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:40 (2) 16:12
30	08:17 17:02	07:15 18:03	09:08 (2) 17:23	06:07 18:57	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:41 (2) 16:12
31	08:15 17:04	07:13 18:04	09:09 (2) 17:24	06:04 18:58	05:53 20:54	05:04 21:44	04:59 22:01	05:37 21:27	06:31 20:21	07:22 16:56	07:22 23	08:42 (2) 16:13
Potential sun hours	250	273	326	367	420	494	510	512	460	382	259	233
Total, worst case	66	326	326	367	420	494	510	512	460	382	259	233
Sun reduction	0.24	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Total reduction	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Total, real	10	46	46	46	46	46	46	46	46	46	46	46

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FB - H158

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	09:46 (3) 08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (2) 08:19
2 16:15	56 12:05 (1) 17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	2 07:56 (2) 16:10
3 08:44	09:47 (3) 08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21
4 16:16	55 12:06 (1) 17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
5 08:44	09:48 (3) 08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
6 16:17	52 12:05 (1) 17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08
7 08:43	09:50 (3) 08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24
8 16:18	49 12:05 (1) 17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
9 08:43	09:53 (3) 08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25
10 16:20	42 12:05 (1) 17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07
11 08:43	11:27 (1) 08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27
12 16:21	38 12:05 (1) 17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	16:07
13 08:42	11:27 (1) 08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28
14 16:22	38 12:05 (1) 17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06
15 08:42	11:28 (1) 08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29
16 16:24	36 12:04 (1) 17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06
17 08:41	11:30 (1) 07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
18 16:25	35 12:05 (1) 17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05
19 08:41	11:31 (1) 07:57	08:24 (2) 06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32	08:36
20 16:27	33 12:04 (1) 17:24	3 08:27 (2) 18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05	16:05
21 08:40	11:33 (1) 07:55	08:22 (2) 06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	08:36
22 16:28	30 12:03 (1) 17:26	6 08:28 (2) 18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05	16:05
23 08:39	11:34 (1) 07:53	08:20 (2) 06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	08:37
24 16:30	28 12:02 (1) 17:28	9 08:29 (2) 18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05	16:05
25 08:38	11:36 (1) 07:51	08:18 (2) 06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:35	08:36
26 16:31	25 12:01 (1) 17:30	12 08:30 (2) 18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05	16:05
27 08:37	11:38 (1) 07:49	08:15 (2) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	08:37
28 16:33	22 12:00 (1) 17:32	15 08:30 (2) 18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31	16:05	16:05
29 08:36	11:41 (1) 07:47	08:13 (2) 06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37	08:37
30 16:35	17 11:58 (1) 17:34	18 08:31 (2) 18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	2 08:49 (2) 16:29	16:05	16:05
31 08:36	11:45 (1) 07:45	08:11 (2) 06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:42 (2) 07:53	08:38	08:38
1 16:36	9 11:54 (1) 17:36	20 08:31 (2) 18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	12 08:54 (2) 16:28	16:05	16:05
2 08:35	07:43	08:09 (2) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39 (2) 07:55	08:39	08:39
3 16:38	17:38	22 08:31 (2) 18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	18 08:57 (2) 16:26	16:05	16:05
4 08:33	07:41	08:07 (2) 06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:38 (2) 07:57	08:39	08:39
5 16:40	17:40	24 08:31 (2) 18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	20 08:58 (2) 16:25	16:05	16:05
6 08:32	07:39	08:04 (2) 06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:36 (2) 07:59	08:40	08:40
7 16:41	17:42	26 08:30 (2) 18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	23 08:59 (2) 16:23	16:05	16:05
8 08:31	07:37	08:03 (2) 06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:35 (2) 08:01	08:41	08:41
9 16:43	17:44	27 08:30 (2) 18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	25 09:00 (2) 16:22	16:06	16:06
10 08:30	07:34	08:04 (2) 06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:34 (2) 08:02	08:41	08:41
11 16:45	17:46	26 08:30 (2) 18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	26 09:00 (2) 16:20	16:06	16:06
12 08:29	07:32	08:04 (2) 06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:34 (2) 08:04	08:42	08:42
13 16:47	17:48	24 08:28 (2) 18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	27 09:01 (2) 16:19	16:07	16:07
14 08:27	07:30	08:05 (2) 06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:35 (2) 08:06	08:42	08:42
15 16:49	17:50	22 08:27 (2) 18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	26 09:01 (2) 16:18	16:07	16:07
16 08:26	07:28	08:07 (2) 06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:37 (2) 08:08	08:43	08:43
17 16:51	17:52	19 08:26 (2) 18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	24 09:01 (2) 16:17	16:08	16:08
18 08:25	07:25	08:08 (2) 06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	07:39 (2) 08:09	08:43	08:43
19 16:52	17:54	16 08:24 (2) 18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	22 09:01 (2) 16:16	16:08	16:08
20 08:23	07:23	08:11 (2) 06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	07:41 (2) 08:11	11:23 (1) 08:44	09:41 (3)
21 16:54	17:56	10 08:21 (2) 18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	9 11:32 (1) 16:09	16:04	16:04
22 08:22	07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:43 (2) 08:13	11:20 (1) 08:44	09:42 (3)
23 16:56	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	17 11:37 (1) 16:10	63 12:04 (1)
24 08:20	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:45 (2) 08:14	11:18 (1) 08:44	09:42 (3)
25 16:58	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	14 11:40 (1) 16:11	64 12:05 (1)
26 08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	11:16 (1) 08:44	09:43 (3)
27 17:00			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	12 11:41 (1) 16:11	62 12:05 (1)
28 08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	11:15 (1) 08:44	09:44 (3)
29 17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	9 11:43 (1) 16:12	60 12:05 (1)
30 08:15			07:04		05:04		05:37	06:31		07:22		08:44
31 17:04			19:58		21:44		21:27	20:21		16:56	6 07:58 (2)	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	565	299								302	103	1722
Sun reduction	0.24	0.23								0.29	0.27	0.21
Oper. time red.	1.00	1.00								1.00	1.00	1.00
Wind dir. red.	0.60	0.64								0.64	0.60	0.60
Total reduction	0.15	0.15								0.19	0.16	0.12
Total, real	82	44								56	16	213

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FC - H159

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FD - H160

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FE - H161

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FF - H162

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:54	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FG - H163

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	11:47 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	
	16:15	25	12:12 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05
2	08:44	11:48 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	
	16:16	24	12:12 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
3	08:44	11:49 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	
	16:17	22	12:11 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
4	08:43	11:51 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	
	16:18	20	12:11 (1)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57
5	08:43	11:52 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	
	16:20	17	12:09 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55
6	08:43	11:55 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	
	16:21	13	12:08 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53
7	08:42	11:59 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	
	16:22	6	12:05 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
8	08:42		08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	
	16:24		17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	
9	08:41		07:59	06:42	06:57	06:42	04:57	05:06	05:52	06:47	07:41	
	16:25		17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	
10	08:41		07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	
	16:27		17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	
11	08:40		07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	
	16:28		17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	
12	08:39		07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	
	16:30		17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	
13	08:38		07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	
	16:31		17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	
14	08:37		07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	
	16:33		17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	
15	08:36		07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	
	16:35		17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	
16	08:36		07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	
	16:36		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	
17	08:35		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	
	16:38		17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	
18	08:33		07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	
	16:40		17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	
19	08:32		07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	
	16:41		17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	
20	08:31		07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	
	16:43		17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	
21	08:30		07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	
	16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	
22	08:29		07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	
	16:47		17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	
23	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	
	16:49		17:50	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	
24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	
	16:51		17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	
25	08:25		07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10	
	16:52		17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:08	
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:12	
	16:54		17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:06	
27	08:22		07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:14	
	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	
28	08:20		07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	
	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	
29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:18	
	17:00			19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:19	
	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:02	
31	08:15			07:04	05:04	05:04	05:07	06:31	07:22	08:17	09:12	
	17:04			19:58	21:44	21:44	21:27	20:21	19:16	18:02	16:56	
Potential sun hours	250		273	367	420	494	510	512	460	382	328	
Total, worst case	127		317								252	
Sun reduction	0.24		0.23								0.29	
Oper. time red.	1.00		1.00								1.00	
Wind dir. red.	0.61		0.63								0.63	
Total reduction	0.15		0.15								0.18	
Total, real	19		46								46	
											11	
												91

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FH - H164

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FI - H165

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FJ - H166

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:19 (5)	08:14	15:45 (4)	07:16	17:10 (3)	07:01	05:52	05:03		
	16:15	18	15:37 (5)	17:06	43	16:28 (4)	18:02	24	17:34 (3)	20:00	20:55
2	08:44	15:20 (5)	08:12	15:45 (4)	07:14	17:09 (3)	06:59	19:28 (2)	05:50	05:02	
	16:16	19	15:39 (5)	17:08	42	16:27 (4)	18:04	26	17:35 (3)	20:02	20:57
3	08:44	15:19 (5)	08:10	15:46 (4)	07:12	17:10 (3)	06:56	19:25 (2)	05:48	05:01	
	16:17	20	15:39 (5)	17:10	41	16:27 (4)	18:06	25	17:35 (3)	20:04	20:59
4	08:43	15:20 (5)	08:08	15:46 (4)	07:09	17:11 (3)	06:54	19:23 (2)	05:46	05:00	
	16:18	21	15:41 (5)	17:12	41	16:27 (4)	18:07	23	17:34 (3)	20:06	21:01
5	08:43	15:20 (5)	08:07	15:47 (4)	07:07	17:12 (3)	06:51	19:20 (2)	05:44	04:59	
	16:19	22	15:42 (5)	17:14	40	16:27 (4)	18:09	20	17:32 (3)	20:07	21:03
6	08:43	15:21 (5)	08:05	15:47 (4)	07:04	17:14 (3)	06:49	19:19 (2)	05:42	04:59	
	16:21	23	15:44 (5)	17:16	39	16:26 (4)	18:11	17	17:31 (3)	20:09	21:04
7	08:42	15:21 (5)	08:03	15:48 (4)	07:02	17:15 (3)	06:47	19:17 (2)	05:40	04:58	
	16:22	24	15:45 (5)	17:18	37	16:25 (4)	18:13	13	17:28 (3)	20:11	21:06
8	08:42	15:22 (5)	08:01	15:49 (4)	07:00		06:44		19:16 (2)	05:38	04:57
	16:24	24	15:46 (5)	17:20	36	16:25 (4)	18:15		20:13	30	19:46 (2)
9	08:41	15:23 (5)	07:59	15:50 (4)	06:57		06:42		19:16 (2)	05:36	04:57
	16:25	25	15:49 (4)	17:22	34	16:24 (4)	18:17		20:15	32	19:48 (2)
10	08:40	15:23 (5)	07:57	15:52 (4)	06:55		06:39		19:14 (2)	05:34	04:56
	16:26	27	15:50 (4)	17:24	31	16:23 (4)	18:19		20:17	35	19:49 (2)
11	08:40	15:24 (5)	07:55	15:53 (4)	06:52		06:37		19:14 (2)	05:33	04:56
	16:28	28	15:52 (4)	17:26	29	16:22 (4)	18:21		20:19	37	19:51 (2)
12	08:39	15:24 (5)	07:53	15:55 (4)	06:50		06:35		19:13 (2)	05:31	04:55
	16:30	30	15:54 (4)	17:28	25	16:20 (4)	18:23		20:20	40	19:53 (2)
13	08:38	15:25 (5)	07:51	15:56 (4)	06:48		06:32		19:12 (2)	05:29	04:55
	16:31	30	15:55 (4)	17:30	22	16:18 (4)	18:25		20:22	41	19:53 (2)
14	08:37	15:26 (5)	07:49	16:00 (4)	06:45		06:30		19:12 (2)	05:27	04:55
	16:33	31	15:57 (4)	17:32	15	16:15 (4)	18:27		20:24	41	19:53 (2)
15	08:36	15:27 (5)	07:47	16:07 (4)	06:43		06:28		19:12 (2)	05:26	04:54
	16:34	32	15:59 (4)	17:34	1	16:08 (4)	18:28		20:26	41	19:53 (2)
16	08:35	15:27 (5)	07:45		06:40		06:25		19:12 (2)	05:24	04:54
	16:36	33	16:00 (4)	17:36		18:30	20:28	41	19:53 (2)	21:22	21:59
17	08:34	15:28 (5)	07:43		06:38		06:23		19:12 (2)	05:22	04:54
	16:38	34	16:02 (4)	17:38		18:32	20:30	40	19:52 (2)	21:23	21:59
18	08:33	15:30 (5)	07:41		06:35		06:21		19:12 (2)	05:21	04:54
	16:40	35	16:05 (4)	17:40		18:34	20:31	40	19:52 (2)	21:25	22:00
19	08:32	15:32 (5)	07:39		06:33		06:18		19:12 (2)	05:19	04:54
	16:41	35	16:07 (4)	17:42		18:36	20:33	39	19:51 (2)	21:27	22:00
20	08:31	15:33 (5)	07:36		06:31		06:16		19:13 (2)	05:18	04:54
	16:43	35	16:08 (4)	17:44		18:38	20:35	38	19:51 (2)	21:28	22:00
21	08:30	15:37 (5)	07:34	17:14 (3)	06:28		06:14		19:12 (2)	05:16	04:54
	16:45	32	16:11 (4)	17:46	4	17:18 (3)	18:40		20:37	37	19:49 (2)
22	08:29	15:43 (4)	07:32	17:12 (3)	06:26		06:12		19:13 (2)	05:15	04:55
	16:47	29	16:12 (4)	17:48	7	17:19 (3)	18:42		20:39	35	19:48 (2)
23	08:27	15:44 (4)	07:30	17:12 (3)	06:23		06:09		19:14 (2)	05:13	04:55
	16:49	31	16:15 (4)	17:50	10	17:22 (3)	18:43		20:41	33	19:47 (2)
24	08:26	15:43 (4)	07:28	17:11 (3)	06:21		06:07		19:15 (2)	05:12	04:55
	16:50	34	16:17 (4)	17:52	13	17:24 (3)	18:45		20:43	31	19:46 (2)
25	08:24	15:44 (4)	07:25	17:10 (3)	06:18		06:05		19:16 (2)	05:11	04:55
	16:52	35	16:19 (4)	17:54	16	17:26 (3)	18:47		20:44	29	19:45 (2)
26	08:23	15:43 (4)	07:23	17:10 (3)	06:16		06:03		19:18 (2)	05:09	04:56
	16:54	38	16:21 (4)	17:56	18	17:28 (3)	18:49		20:46	25	19:43 (2)
27	08:22	15:43 (4)	07:21	17:10 (3)	06:13		06:01		19:20 (2)	05:08	04:56
	16:56	40	16:23 (4)	17:58	21	17:31 (3)	18:51		20:48	21	19:41 (2)
28	08:20	15:44 (4)	07:18	17:09 (3)	06:11		05:58		19:22 (2)	05:07	04:57
	16:58	42	16:26 (4)	18:00	23	17:32 (3)	18:53		20:50	17	19:39 (2)
29	08:18	15:44 (4)			07:08		05:56		19:26 (2)	05:06	04:57
	17:00	43	16:27 (4)		19:54		20:52	9	19:35 (2)	21:41	22:01
30	08:17	15:44 (4)			07:06		05:54			05:05	04:58
	17:02	43	16:27 (4)		19:56		20:54			21:43	22:00
31	08:15	15:44 (4)			07:04					05:04	
	17:04	43	16:27 (4)		19:58					21:44	
Potential sun hours	250		273		367		420		494		510
Total, worst case		956		588		148		836			
Sun reduction		0.24		0.23		0.27		0.35			
Oper. time red.		1.00		1.00		1.00		1.00			
Wind dir. red.		0.66		0.66		0.68		0.67			
Total reduction		0.16		0.15		0.18		0.23			
Total, real		153		91		27		196			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FJ - H166

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:13 (2) 19:50 (2)	07:26 16:54	15:21 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	19:13 (2) 19:48 (2)	07:28 16:52	15:20 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	19:13 (2) 19:45 (2)	07:30 16:50	15:19 (4) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	19:13 (2) 19:43 (2)	07:31 16:48	15:18 (4) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	19:14 (2) 19:41 (2)	07:33 16:46	15:17 (4) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	19:15 (2) 19:39 (2)	07:35 18:03 (3)	15:16 (4) 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	19:15 (2) 19:35 (2)	07:36 18:05 (3)	15:16 (4) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	19:17 (2) 19:33 (2)	07:39 18:06 (3)	15:15 (4) 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	19:19 (2) 19:31 (2)	07:41 18:08 (3)	15:15 (4) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	19:20 (2) 19:28 (2)	07:42 18:08 (3)	15:16 (4) 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	19:25 (2) 19:26 (2)	07:44 18:09 (3)	15:16 (4) 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 18:09 (3)	15:16 (4) 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 18:07 (3)	15:16 (4) 16:05
14	05:12 21:51	06:01 20:59	19:32 (2) 19:44 (2)	06:56 19:47	07:50 18:33	15:16 (4) 16:04
15	05:13 21:50	06:03 20:57	19:29 (2) 19:47 (2)	06:58 19:44	07:52 18:31	15:16 (4) 16:05
16	05:14 21:49	06:04 20:55	19:26 (2) 19:48 (2)	06:59 19:42	07:54 18:29	15:16 (4) 16:05
17	05:16 21:47	06:06 20:53	19:24 (2) 19:50 (2)	07:01 19:39	07:55 18:26	15:17 (4) 16:05
18	05:17 21:46	06:08 20:51	19:23 (2) 19:52 (2)	07:03 19:37	07:57 18:24	15:17 (4) 16:05
19	05:18 21:45	06:10 20:48	19:21 (2) 19:52 (2)	07:05 19:34	07:59 18:22	15:18 (4) 16:05
20	05:20 21:44	06:12 20:46	19:20 (2) 19:53 (2)	07:06 19:32	08:01 18:20	15:18 (4) 16:06
21	05:21 21:42	06:13 20:44	19:19 (2) 19:54 (2)	07:08 19:29	08:03 18:17	15:12 (5) 16:06
22	05:23 21:41	06:15 20:42	19:17 (2) 19:54 (2)	07:10 19:27	08:05 18:15	15:09 (5) 16:06
23	05:24 21:39	06:17 20:39	19:16 (2) 19:54 (2)	07:12 19:24	08:07 18:13	15:08 (5) 16:07
24	05:26 21:38	06:19 20:37	19:16 (2) 19:55 (2)	07:13 19:22	08:09 18:11	15:07 (5) 16:08
25	05:27 21:36	06:20 20:35	19:15 (2) 19:54 (2)	07:15 19:19	08:09 17:09	15:06 (5) 16:08
26	05:29 21:35	06:22 20:32	19:14 (2) 19:55 (2)	07:17 19:17	08:11 17:06	15:06 (5) 16:09
27	05:30 21:33	06:24 20:30	19:14 (2) 19:55 (2)	07:19 19:14	08:13 17:04	15:06 (5) 16:10
28	05:32 21:32	06:26 20:28	19:13 (2) 19:54 (2)	07:21 19:12	08:14 17:02	15:06 (5) 16:11
29	05:34 21:30	06:27 20:25	19:13 (2) 19:54 (2)	07:22 19:09	08:16 17:00	15:05 (5) 16:11
30	05:35 21:28	06:29 20:23	19:13 (2) 19:54 (2)	07:24 19:07	08:18 16:58	15:06 (5) 16:12
31	05:37 21:27	06:31 20:21	19:12 (2) 19:52 (2)	07:22 16:56	15:21 (4) 15:51 (4)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		604	242	370	1089	555
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.66
Total reduction		0.23	0.21	0.20	0.18	0.14
Total, real		137	52	73	191	75

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FK - H167

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44		14:39 (4)	08:14		16:16 (3)	07:16		16:54 (2)	07:01		05:52			05:03		
	16:15	21	15:00 (4)	17:06	18	16:34 (3)	18:02	40	17:34 (2)	20:00		20:55			21:45		
2	08:44		14:41 (4)	08:12		16:16 (3)	07:14		16:53 (2)	06:59		05:50			05:02		
	16:16	19	15:00 (4)	17:08	21	16:37 (3)	18:04	41	17:34 (2)	20:02		20:57			21:46		
3	08:44		14:41 (4)	08:10		16:16 (3)	07:12		16:53 (2)	06:56		05:48			05:01		
	16:17	18	14:59 (4)	17:10	23	16:39 (3)	18:06	41	17:34 (2)	20:04		20:59			21:48		
4	08:43		14:43 (4)	08:08		16:16 (3)	07:09		16:54 (2)	06:54		05:46			05:00		
	16:18	17	15:00 (4)	17:12	24	16:40 (3)	18:07	40	17:34 (2)	20:06		21:01			21:49		
5	08:43		14:44 (4)	08:07		16:17 (3)	07:07		16:53 (2)	06:51		05:44			04:59		
	16:19	15	14:59 (4)	17:14	23	16:40 (3)	18:09	40	17:33 (2)	20:07		21:03			21:50		
6	08:43		14:46 (4)	08:05		16:18 (3)	07:04		16:53 (2)	06:49		05:42			04:58		
	16:21	13	14:59 (4)	17:16	22	16:40 (3)	18:11	40	17:33 (2)	20:09		21:04			21:51		
7	08:42		14:47 (4)	08:03		16:19 (3)	07:02		16:53 (2)	06:47		05:40			04:58		
	16:22	10	14:57 (4)	17:18	20	16:39 (3)	18:13	39	17:32 (2)	20:11		21:06			21:52		
8	08:42		14:50 (4)	08:01		16:20 (3)	07:00		16:54 (2)	06:44		05:38			04:57		
	16:24	5	14:55 (4)	17:20	18	16:38 (3)	18:15	38	17:32 (2)	20:13		21:08			21:53		
9	08:41			07:59		16:22 (3)	06:57		16:53 (2)	06:42		05:36			04:57		
	16:25			17:22	14	16:36 (3)	18:17	38	17:31 (2)	20:15		21:10			21:54		
10	08:40			07:57		16:24 (3)	06:55		16:54 (2)	06:39		05:34			04:56		
	16:26			17:24	10	16:34 (3)	18:19	36	17:30 (2)	20:17		21:11			21:55		
11	08:40			07:55			06:53		16:56 (2)	06:37		05:33			04:56		
	16:28			17:26			18:21	33	17:29 (2)	20:19		21:13			21:55		
12	08:39			07:53			06:50		16:56 (2)	06:35		05:31			04:55		
	16:30			17:28			18:23	31	17:27 (2)	20:20		21:15			21:56		
13	08:38			07:51			06:48		16:58 (2)	06:32		05:29			04:55		
	16:31			17:30			18:25	28	17:26 (2)	20:22		21:17			21:57		
14	08:37			07:49			06:45		16:59 (2)	06:30		05:27			04:55		
	16:33			17:32			18:27	25	17:24 (2)	20:24		21:18			21:58		
15	08:36			07:47			06:43		17:01 (2)	06:28		05:26			04:54		
	16:34			17:34			18:28	21	17:22 (2)	20:26		21:20			21:58		
16	08:35			07:45			06:40		17:04 (2)	06:25		05:24			04:54		
	16:36			17:36			18:30	14	17:18 (2)	20:28		21:22			21:59		
17	08:34			07:43			06:38			06:23		05:22			04:54		
	16:38			17:38			18:32			20:30		21:23			21:59		
18	08:33			07:41			06:35			06:21		05:21			04:54		
	16:40			17:40			18:34			20:31		21:25			22:00		
19	08:32			07:39		17:09 (2)	06:33			06:18		05:19			04:54		
	16:41			17:42	4	17:13 (2)	18:36			20:33		21:27			22:00		
20	08:31			07:36		17:06 (2)	06:31			06:16		05:18			04:54		
	16:43			17:44	10	17:16 (2)	18:38			20:35		21:28			22:00		
21	08:30			07:34		17:04 (2)	06:28			06:14		05:16			04:54		
	16:45			17:46	14	17:18 (2)	18:40			20:37		21:30			22:01		
22	08:29			07:32		17:01 (2)	06:26			06:12		05:15			04:55		
	16:47			17:48	18	17:19 (2)	18:42			20:39		21:31			22:01		
23	08:27			07:30		17:00 (2)	06:23			06:09		05:13			04:55		
	16:49			17:50	22	17:22 (2)	18:43			20:41		21:33			22:01		
24	08:26			07:28		16:59 (2)	06:21			06:07		05:12			04:55		
	16:50			17:52	25	17:24 (2)	18:45			20:43		21:34			22:01		
25	08:24		16:17 (3)	07:25		16:57 (2)	06:18			06:05		05:11			04:55		
	16:52	2	16:19 (3)	17:54	29	17:26 (2)	18:47			20:44		21:36			22:01		
26	08:23		16:16 (3)	07:23		16:56 (2)	06:16			06:03		05:09			04:56		
	16:54	5	16:21 (3)	17:56	32	17:28 (2)	18:49			20:46		21:37			22:01		
27	08:22		16:15 (3)	07:21		16:56 (2)	06:13			06:01		05:08			04:56		
	16:56	8	16:23 (3)	17:58	35	17:31 (2)	18:51			20:48		21:39			22:01		
28	08:20		16:16 (3)	07:18		16:55 (2)	06:11			05:58		05:07			04:57		
	16:58	10	16:26 (3)	18:00	37	17:32 (2)	18:53			20:50		21:40			22:01		
29	08:19		16:15 (3)				07:08			05:56		05:06			04:57		
	17:00	13	16:28 (3)				19:54			20:52		21:41			22:01		
30	08:17		16:15 (3)				07:06			05:54		05:05			04:58		
	17:02	14	16:29 (3)				19:56			20:54		21:43			22:00		
31	08:15		16:15 (3)				07:04					05:04					
	17:04	16	16:31 (3)				19:58					21:44					
Potential sun hours		250			273		367			420		494			510		
Total, worst case		186			419		545										
Sun reduction		0.24			0.23		0.27										
Oper. time red.		1.00			1.00		1.00										
Wind dir. red.		0.65			0.67		0.68										
Total reduction		0.16			0.16		0.18										
Total, real		30			65		100										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FK - H167

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:35 (2) 18:06 (2)	07:24 16:54	15:53 (3) 16:04 (3)	08:19 16:10	
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:34 (2) 18:07 (2)	07:26 16:52	15:51 (3) 16:06 (3)	08:21 16:09	
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:33 (2) 18:08 (2)	07:28 16:50	15:49 (3) 16:08 (3)	08:22 16:08	
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:32 (2) 18:08 (2)	07:30 16:48	15:48 (3) 16:09 (3)	08:24 16:08	14:36 (4) 14:39 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:31 (2) 18:09 (2)	07:32 16:46	15:47 (3) 16:09 (3)	08:25 16:07	14:33 (4) 14:42 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:30 (2) 18:09 (2)	07:34 16:44	15:47 (3) 16:10 (3)	08:26 16:07	14:32 (4) 14:45 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:29 (2) 18:08 (2)	07:36 16:43	15:46 (3) 16:10 (3)	08:28 16:06	14:31 (4) 14:46 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:28 (2) 18:08 (2)	07:38 16:41	15:46 (3) 16:08 (3)	08:29 16:06	14:30 (4) 14:47 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:28 (2) 18:08 (2)	07:40 16:39	15:47 (3) 16:07 (3)	08:30 16:05	14:30 (4) 14:48 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:28 (2) 18:08 (2)	07:42 16:37	15:47 (3) 16:05 (3)	08:31 16:05	14:30 (4) 14:49 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:27 (2) 18:08 (2)	07:44 16:35	15:47 (3) 16:03 (3)	08:33 16:05	14:29 (4) 14:50 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:27 (2) 18:07 (2)	07:45 16:34	15:47 (3) 16:01 (3)	08:34 16:05	14:29 (4) 14:51 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:28 (2) 18:07 (2)	07:47 16:32	15:47 (3) 15:59 (3)	08:35 16:05	14:29 (4) 14:51 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:28 (2) 18:04 (2)	07:49 16:31	15:48 (3) 15:57 (3)	08:36 16:04	14:29 (4) 14:52 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:28 (2) 18:02 (2)	07:51 16:29	15:48 (3) 15:56 (3)	08:37 16:04	14:30 (4) 14:53 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:29 (2) 17:59 (2)	07:53 16:27	15:49 (3) 15:54 (3)	08:38 16:05	14:30 (4) 14:54 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:30 (2) 17:57 (2)	07:55 16:26	15:50 (3) 15:52 (3)	08:38 16:05	14:30 (4) 14:54 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:31 (2) 17:55 (2)	07:57 16:24	15:51 (3) 16:05	08:39 16:05	14:31 (4) 14:55 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:32 (2) 17:52 (2)	07:59 16:23	15:52 (3) 16:05	08:40 16:05	14:32 (4) 14:56 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:33 (2) 17:50 (2)	08:00 16:22	15:53 (3) 16:06	08:41 16:06	14:31 (4) 14:56 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:35 (2) 17:48 (2)	08:02 16:20	15:54 (3) 16:06	08:41 16:06	14:32 (4) 14:57 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:37 (2) 17:45 (2)	08:04 16:19	15:55 (3) 16:06	08:42 16:06	14:32 (4) 14:57 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:41 (2) 17:43 (2)	08:06 16:18	15:56 (3) 16:07	08:42 16:07	14:33 (4) 14:58 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:42 (2) 17:44 (2)	08:08 16:17	15:57 (3) 16:08	08:43 16:08	14:33 (4) 14:58 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	17:45 (2) 17:47 (2)	08:09 16:16	15:58 (3) 16:08	08:43 16:08	14:34 (4) 14:58 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	17:48 (2) 17:50 (2)	08:11 16:14	15:59 (3) 16:09	08:43 16:09	14:34 (4) 14:58 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	17:49 (2) 17:51 (2)	08:13 16:13	16:00 16:10	08:44 16:10	14:36 (4) 15:00 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	17:52 (2) 17:54 (2)	08:14 16:12	16:01 16:11	08:44 16:11	14:36 (4) 15:00 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 18:04 (2)	17:55 (2) 17:57 (2)	08:16 16:12	16:02 16:11	08:44 16:11	14:37 (4) 15:00 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 18:04 (2)	17:58 (2) 18:00 (2)	08:18 16:11	16:03 16:12	08:44 16:12	14:37 (4) 14:59 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	15:57 (3) 15:59 (3)	08:19 16:13	16:04 16:13	08:44 16:13	14:38 (4) 15:00 (4)
Potential sun hours	512	460	382	328	259	233			
Total, worst case			79	704	261	589			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.68	0.68	0.66	0.65			
Total reduction			0.22	0.20	0.18	0.13			
Total, real			17	139	46	79			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FL - H168

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		08:14		15:43 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24					08:19			15:21 (2)			
	16:15		17:06	26	16:09 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54					16:10	13		15:34 (2)			
2	08:44		08:12		15:44 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26					08:21			15:22 (2)			
	16:16		17:08	24	16:08 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52					16:09	10		15:32 (2)			
3	08:44		08:10		15:45 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28					08:22			15:23 (2)			
	16:17		17:10	22	16:07 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50					16:08	9		15:32 (2)			
4	08:43		08:08		15:46 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30					08:24			15:25 (2)			
	16:18		17:12	19	16:05 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48					16:08	7		15:32 (2)			
5	08:43		08:07		15:48 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32				15:21 (2)	08:25			15:26 (2)			
	16:19		17:14	16	16:04 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46				15:31 (2)	16:07	4		15:30 (2)			
6	08:43		08:05		15:51 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34				15:18 (2)	08:26			15:28 (2)			
	16:21	2	15:42 (2)		15:44 (2)	17:16	10	16:01 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06			15:34 (2)	16:07		2	15:30 (2)			
7	08:42		08:03		15:41 (2)	07:18		07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37			15:16 (2)	08:28			15:26 (2)			
	16:22	4	15:45 (2)		15:46 (2)	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43		19	15:35 (2)	16:06			15:32 (2)		
8	08:42		08:01		15:40 (2)	07:12		07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39			15:14 (2)	08:29			15:28 (2)			
	16:23	6	15:46 (2)		15:47 (2)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41		23	15:37 (2)	16:06			15:32 (2)		
9	08:41		07:59		15:40 (2)	07:09		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		15:14 (2)	08:30			15:26 (2)			
	16:25	9	15:49 (2)		15:50 (2)	17:22		18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39		25	15:39 (2)	16:05			15:32 (2)		
10	08:40		07:57		15:39 (2)	07:07		06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42		15:13 (2)	08:32			15:28 (2)			
	16:26	11	15:50 (2)		15:51 (2)	17:24		18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37		26	15:39 (2)	16:05			15:32 (2)		
11	08:40		07:55		15:39 (2)	07:05		06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44		15:13 (2)	08:33			15:28 (2)			
	16:28	13	15:52 (2)		15:53 (2)	17:26		18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35		27	15:40 (2)	16:05			15:32 (2)		
12	08:39		07:53		15:39 (2)	07:03		06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46		15:12 (2)	08:34			15:28 (2)			
	16:29	15	15:54 (2)		15:55 (2)	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34		29	15:41 (2)	16:05			15:32 (2)		
13	08:38		07:51		15:38 (2)	07:01		06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47		15:12 (2)	08:35			15:28 (2)			
	16:31	17	15:55 (2)		15:56 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32		29	15:41 (2)	16:04			15:32 (2)		
14	08:37		07:49		15:38 (2)	07:04		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49		15:12 (2)	08:36			15:28 (2)			
	16:33	19	15:57 (2)		15:58 (2)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31		30	15:42 (2)	16:04			15:32 (2)		
15	08:36		07:47		15:38 (2)	07:04		06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51		15:11 (2)	08:37			15:28 (2)			
	16:34	21	15:59 (2)		15:59 (2)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29		31	15:42 (2)	16:04			15:32 (2)		
16	08:35		07:45		15:37 (2)	07:05		06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53		15:11 (2)	08:38			15:28 (2)			
	16:36	23	16:00 (2)		15:59 (2)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27		31	15:42 (2)	16:05			15:32 (2)		
17	08:34		07:43		15:37 (2)	07:03		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55		15:11 (2)	08:38			15:28 (2)			
	16:38	25	16:02 (2)		15:59 (2)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26		31	15:42 (2)	16:05			15:32 (2)		
18	08:33		07:41		15:38 (2)	07:01		06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57		15:12 (2)	08:39			15:28 (2)			
	16:40	27	16:05 (2)		15:58 (2)	17:40		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24		31	15:43 (2)	16:05			15:32 (2)		
19	08:32		07:39		15:38 (2)	07:03		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59		15:12 (2)	08:40			15:28 (2)			
	16:41	29	16:07 (2)		15:57 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23		31	15:43 (2)	16:05			15:32 (2)		
20	08:31		07:36		15:37 (2)	07:04		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00		15:12 (2)	08:41			15:28 (2)			
	16:43	30	16:07 (2)		15:58 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22		31	15:43 (2)	16:06			15:32 (2)		
21	08:30		07:34		15:38 (2)	07:03		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02		15:13 (2)	08:41			15:28 (2)			
	16:45	30	16:08 (2)		15:59 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20		30	15:43 (2)	16:06			15:32 (2)		
22	08:29		07:32		15:37 (2)	07:02		06:26	06:11	05:15	04:55	05:23	06:15	07:10	08:05	08:04		15:13 (2)	08:42			15:28 (2)			
	16:47	31	16:08 (2)		15:59 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19		30	15:43 (2)	16:06			15:32 (2)		
23	08:27		07:30		15:38 (2)	07:03		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		15:14 (2)	08:42			15:28 (2)			
	16:49	31	16:09 (2)		15:59 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18		29	15:43 (2)	16:07			15:32 (2)		
24	08:26		07:28		15:38 (2)	07:02		06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08		15:15 (2)	08:43			15:28 (2)			
	16:50	31	16:09 (2)		15:59 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17		27	15:42 (2)	16:08			15:32 (2)		
25	08:25		07:25		15:39 (2)	07:05		06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09		15:15 (2)	08:43			15:28 (2)			
	16:52	30	16:09 (2)		15:59 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:16		26	15:41 (2)	16:08			15:32 (2)		
26	08:23		07:23		15:38 (2)	07:03		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11		15:16 (2)	08:43			15:28 (2)			
	16:54	31	16:09 (2)		15:59 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14		23	15:39 (2)	16:09			15:32 (2)		
27	08:22		07:21		15:39 (2)	07:21		06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13		15:17 (2)	08:44			15:28 (2)			
	16:56	30	16:09 (2)		15:59 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13		21	15:38 (2)	16:10			15:32 (2)		
28	08:20		07:18		15:40 (2)	07:18		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14		15:18 (2)	08:44			15:28 (2)			
	16:58	30	16:10 (2)		16:00	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12		19	15:37 (2)	16:10			15:32 (2)		
29	08:19		07:12		15:40 (2)	07:02		07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16		15:18 (2)	08:44			15:28 (2)			
	17:00	29	16:09 (2)		15:40 (2)	07:02		19:54	20:52	21:41	22:01	21:30	20:25	19:09	18:00	16:11		17	15:35 (2)	16:11			15:32 (2)		
30	08:17		07:12		15:40 (2)	07:02		07:06	05:5																

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FM - H169

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44		10:01 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24									08:19	09:50 (2)			
	16:15	78	15:22 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54									16:10	72	15:08 (1)		
2	08:44		10:02 (2)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26									08:21		09:50 (2)		
	16:16	78	15:23 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52									16:09	73	15:09 (1)		
3	08:44		10:02 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28									08:22		09:50 (2)		
	16:17	78	15:23 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50									16:08	74	15:09 (1)		
4	08:43		10:03 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30									08:24		09:50 (2)		
	16:18	77	15:24 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48									16:08	76	15:10 (1)		
5	08:43		10:03 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32									08:25		09:50 (2)		
	16:20	78	15:24 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46									16:07	76	15:10 (1)		
6	08:43		10:04 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34									08:27		09:50 (2)		
	16:21	77	15:25 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44									16:07	77	15:11 (1)		
7	08:42		10:05 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36									08:28		09:50 (2)		
	16:22	76	15:25 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43									16:06	77	15:11 (1)		
8	08:42		10:05 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38									08:29		09:51 (2)		
	16:24	76	15:25 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41									16:06	77	15:12 (1)		
9	08:41		10:07 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40									08:30		09:51 (2)		
	16:25	74	15:26 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39									16:05	78	15:12 (1)		
10	08:40		10:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42									08:32		09:51 (2)		
	16:27	73	15:26 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37									16:05	78	15:12 (1)		
11	08:40		10:08 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44									08:33		09:51 (2)		
	16:28	72	15:26 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36									16:05	78	15:12 (1)		
12	08:39		10:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46									08:34		09:51 (2)		
	16:30	70	15:26 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34									16:05	79	15:12 (1)		
13	08:38		10:10 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47									08:35		09:53 (2)		
	16:31	69	15:26 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32									16:05	78	15:14 (1)		
14	08:37		10:11 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49									08:36		09:53 (2)		
	16:33	68	15:27 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31									16:05	79	15:14 (1)		
15	08:36		10:12 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51									08:37		09:53 (2)		
	16:34	65	15:27 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29									16:05	79	15:15 (1)		
16	08:35		10:13 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53									8	14:42 (1)	08:38	09:53 (2)	
	16:36	63	15:27 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27									8	14:50 (1)	16:05	79	15:14 (1)
17	08:34		10:14 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55									14:39 (1)	08:39		09:53 (2)	
	16:38	60	15:26 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26									15	14:54 (1)	16:05	80	15:15 (1)
18	08:33		10:15 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57									14:37 (1)	08:39		09:54 (2)	
	16:40	57	15:26 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25									19	14:56 (1)	16:05	78	15:15 (1)
19	08:32		10:17 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59									14:36 (1)	08:40		09:55 (2)	
	16:41	53	15:26 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23									21	14:57 (1)	16:05	78	15:16 (1)
20	08:31		10:18 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01									09:59 (2)	08:41		09:55 (2)	
	16:43	49	15:25 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22									35	14:59 (1)	16:06	79	15:16 (1)
21	08:30		10:21 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02									09:56 (2)	08:41		09:56 (2)	
	16:45	43	15:25 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20									43	15:00 (1)	16:06	79	15:17 (1)
22	08:29		10:24 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04									09:55 (2)	08:42		09:56 (2)	
	16:47	35	15:24 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19									47	15:01 (1)	16:06	79	15:17 (1)
23	08:27		15:02 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06									09:53 (2)	08:42		09:57 (2)	
	16:49	21	15:23 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18									53	15:02 (1)	16:07	79	15:18 (1)
24	08:26		15:03 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08									09:52 (2)	08:43		09:57 (2)	
	16:51	19	15:22 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17									57	15:03 (1)	16:08	79	15:18 (1)
25	08:25		15:06 (1)	07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09									09:52 (2)	08:43		09:57 (2)	
	16:52	15	15:21 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16									60	15:04 (1)	16:08	78	15:18 (1)
26	08:23		15:09 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11									09:51 (2)	08:43		09:58 (2)	
	16:54	8	15:17 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15									63	15:05 (1)	16:09	79	15:20 (1)
27	08:22			07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13									09:51 (2)	08:44		09:59 (2)	
	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13									65	15:06 (1)	16:10	79	15:20 (1)
28	08:20			07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14									09:51 (2)	08:44		09:59 (2)	
	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12									68	15:07 (1)	16:11	78	15:20 (1)
29	08:19				07:09	05:56	05:06	04:57	05:34	06:28	07:22	07:18	08:16									09:50 (2)	08:44		10:00 (2)	
	17:00				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12									69	15:06 (1)	16:11	79	15:21 (1)
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18									09:50 (2)	08:44		10:00 (2)	
	17:02				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11									70	15:07 (1)	16:12	79	15:22 (1)
31	08:15				07:04		05:04		05:37	06:31		07:22														

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FN - H170

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	15:19 (2) 15:37 (2)	08:14 17:06	15:27 (2) 18:02	07:16 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10	15:01 (2) 15:33 (2)
2	08:44 16:16	15:19 (2) 15:39 (2)	08:12 17:08	15:28 (2) 15:55 (2)	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	06:35 21:23	07:28 20:16	07:26 19:02	08:21 16:52	15:01 (2) 15:32 (2)
3	08:44 16:17	15:19 (2) 15:39 (2)	08:10 17:10	15:30 (2) 15:54 (2)	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	15:02 (2) 15:32 (2)
4	08:43 16:18	15:19 (2) 15:41 (2)	08:08 17:12	15:32 (2) 15:52 (2)	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	15:04 (2) 15:32 (2)
5	08:43 16:19	15:19 (2) 15:42 (2)	08:07 17:14	15:34 (2) 15:50 (2)	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	15:04 (2) 15:30 (2)
6	08:43 16:21	15:19 (2) 15:44 (2)	08:05 17:16	15:37 (2) 15:47 (2)	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	15:05 (2) 15:30 (2)
7	08:42 16:22	15:19 (2) 15:45 (2)	08:03 17:18		07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	15:01 (2) 15:22 (2)
8	08:42 16:24	15:19 (2) 15:46 (2)	08:01 17:20		07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	15:02 (2) 15:28 (2)
9	08:41 16:25	15:19 (2) 15:49 (2)	07:59 17:22		06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	15:03 (2) 15:26 (2)
10	08:40 16:26	15:19 (2) 15:50 (2)	07:57 17:24		06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	15:08 (2) 15:27 (2)
11	08:40 16:28	15:19 (2) 15:51 (2)	07:55 17:26		06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:35	15:09 (2) 15:27 (2)
12	08:39 16:30	15:19 (2) 15:52 (2)	07:53 17:28		06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	15:10 (2) 15:27 (2)
13	08:38 16:31	15:19 (2) 15:53 (2)	07:51 17:30		06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	15:11 (2) 15:26 (2)
14	08:37 16:33	15:19 (2) 15:53 (2)	07:49 17:32		06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	15:12 (2) 15:27 (2)
15	08:36 16:34	15:20 (2) 15:54 (2)	07:47 17:34		06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	15:13 (2) 15:26 (2)
16	08:35 16:36	15:19 (2) 15:54 (2)	07:45 17:36		06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	15:13 (2) 15:26 (2)
17	08:34 16:38	15:19 (2) 15:55 (2)	07:43 17:38		06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	15:14 (2) 15:27 (2)
18	08:33 16:40	15:20 (2) 15:55 (2)	07:41 17:40		06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	15:15 (2) 15:27 (2)
19	08:32 16:41	15:20 (2) 15:56 (2)	07:39 17:42		06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	15:16 (2) 15:28 (2)
20	08:31 16:43	15:20 (2) 15:56 (2)	07:36 17:44		06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	15:17 (2) 15:27 (2)
21	08:30 16:45	15:20 (2) 15:57 (2)	07:34 17:46		06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	15:17 (2) 15:28 (2)
22	08:29 16:47	15:20 (2) 15:57 (2)	07:32 17:48		06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	15:17 (2) 15:28 (2)
23	08:27 16:49	15:21 (2) 15:57 (2)	07:30 17:50		06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	15:18 (2) 15:29 (2)
24	08:26 16:50	15:21 (2) 15:57 (2)	07:28 17:52		06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	15:18 (2) 15:29 (2)
25	08:25 16:52	15:22 (2) 15:58 (2)	07:25 17:54		06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	15:19 (2) 15:30 (2)
26	08:23 16:54	15:22 (2) 15:57 (2)	07:23 17:56		06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	15:20 (2) 15:30 (2)
27	08:22 16:56	15:22 (2) 15:57 (2)	07:21 17:58		06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	15:21 (2) 15:32 (2)
28	08:20 16:58	15:24 (2) 15:57 (2)	07:19 18:00		06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	15:22 (2) 15:33 (2)
29	08:19 17:00	15:24 (2) 15:57 (2)			06:09 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	15:23 (2) 15:34 (2)
30	08:17 17:02	15:25 (2) 15:56 (2)			07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	15:24 (2) 15:33 (2)
31	08:15 17:04	15:25 (2) 15:56 (2)			07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21	07:22 16:56			15:25 (2) 15:35 (2)
Potential sun hours	250	273		367	420	494	510	512	460	382	259	821	233	540
Total, worst case	967	126		0.23								0.27		0.21
Sun reduction	0.24	0.23										1.00		0.21
Oper. time red.	1.00	1.00										0.66		0.66
Wind dir. red.	0.66	0.66										0.16		0.66
Total reduction	0.16	0.15										0.17		0.14
Total, real	155	19										143		74

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FO - H171

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
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12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:11 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FP - H172

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FQ - H173

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:11 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FR - H174

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FS - H175

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	17:02 (4) 20:00	05:52 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	17:03 (4) 20:02	06:59 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:11 18:05	17:06 (4) 20:04	06:56 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	17:17 (4) 20:06	06:54 20:59	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	20:07	19:28 (2) 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	19:28 (2) 21:04	04:58 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	19:26 (2) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	19:26 (2) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	19:26 (2) 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	19:25 (2) 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	19:26 (2) 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	19:26 (2) 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:26 (2) 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:27 (2) 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	17:04 (4) 18:28	06:28 20:26	19:28 (2) 21:20	04:54 21:58
16	08:35 16:36	07:45 17:36	17:03 (4) 18:30	06:25 20:28	19:29 (2) 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	17:02 (4) 18:32	06:23 20:30	19:31 (2) 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	17:00 (4) 18:34	06:21 20:31	19:41 (2) 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	17:00 (4) 18:36	06:18 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	16:59 (4) 18:38	06:16 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	16:59 (4) 18:40	06:14 20:37	05:16 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	16:58 (4) 18:41	06:11 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	16:59 (4) 18:43	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	16:59 (4) 18:45	06:07 20:42	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	16:58 (4) 18:47	06:05 20:44	05:11 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	17:25 (4) 18:49	06:03 20:46	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	17:00 (4) 18:51	06:00 20:48	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	17:00 (4) 18:53	05:58 20:50	05:07 21:40	04:57 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:01
31	08:15 17:04		07:04 19:58		05:04 21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case		242	47	258		
Sun reduction		0.23	0.27	0.35		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.67	0.67	0.67		
Total reduction		0.16	0.18	0.23		
Total, real		38	9	61		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FS - H175

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:24 (2) 19:49 (2)	07:26 19:05	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	19:24 (2) 19:48 (2)	07:28 19:02	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	19:23 (2) 19:45 (2)	07:30 19:00	07:28 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	19:23 (2) 19:43 (2)	07:31 18:57	07:30 16:48
5	05:02 21:58	05:45 21:17	06:40 20:09	19:23 (2) 19:41 (2)	07:33 18:55	07:32 16:46
6	05:03 21:58	05:47 21:15	06:42 20:06	19:24 (2) 19:39 (2)	07:35 18:52	07:34 16:44
7	05:04 21:57	05:49 21:13	06:43 20:04	19:23 (2) 19:35 (2)	07:37 18:50	07:36 16:43
8	05:05 21:56	05:50 21:11	06:45 20:01	19:24 (2) 19:33 (2)	07:39 18:48	07:38 16:41
9	05:06 21:55	05:52 21:09	06:47 19:59	19:26 (2) 19:31 (2)	07:41 18:45	07:40 16:39
10	05:07 21:55	05:54 21:07	06:49 19:56	19:26 (2) 19:28 (2)	07:42 18:43	07:42 16:37
11	05:08 21:54	05:56 21:05	06:50 19:54	18:44 18:40	17:43 (4) 17:39 (4)	08:31 07:44
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:52 (4) 17:54 (4)	16:35 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:34 (4) 17:55 (4)	07:47 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:33 (4) 17:56 (4)	07:49 16:31
15	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	17:32 (4) 17:57 (4)	07:51 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:31 (4) 17:57 (4)	07:53 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:31 (4) 17:57 (4)	07:55 16:26
18	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	17:30 (4) 17:55 (4)	07:57 16:24
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:30 (4) 17:52 (4)	07:59 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:30 (4) 17:50 (4)	08:00 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:30 (4) 17:48 (4)	08:02 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:30 (4) 17:45 (4)	08:04 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:30 (4) 17:43 (4)	08:06 16:18
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:31 (4) 17:41 (4)	08:08 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	16:32 (4) 16:38 (4)	08:09 16:16
26	05:29 21:35	06:22 20:32	19:34 (2) 19:44 (2)	07:17 17:13	16:33 (4) 16:36 (4)	08:11 16:14
27	05:30 21:33	06:24 20:30	19:31 (2) 19:47 (2)	07:14 17:04	16:13 16:13	08:13 16:10
28	05:32 21:32	06:26 20:28	19:29 (2) 19:47 (2)	07:16 17:02	16:14 16:12	08:14 16:10
29	05:34 21:30	06:27 20:25	19:27 (2) 19:48 (2)	07:18 17:00	16:16 16:11	08:16 16:11
30	05:35 21:28	06:29 20:23	19:27 (2) 19:49 (2)	07:20 16:58	16:18 16:11	08:18 16:12
31	05:37 21:26	06:31 20:21	19:25 (2) 19:49 (2)	07:22 16:56	16:11 16:13	08:19 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		111	152	289		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.67	0.67	0.67		
Total reduction		0.23	0.21	0.20		
Total, real		25	32	57		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FT - H176

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:15 (5)	08:14	15:39 (4)	07:16	17:05 (3)	07:01	19:02 (2)	05:52	05:03	
	16:15	22	15:37 (5)	17:06	36	16:15 (4)	18:02	19:33 (2)	20:55	21:45	
2	08:44		15:16 (5)	08:12		15:40 (4)	07:14	19:01 (2)	05:50	05:02	
	16:16	23	15:39 (5)	17:08	34	16:14 (4)	18:04	19:35 (2)	20:57	21:46	
3	08:44		15:16 (5)	08:10		15:41 (4)	07:12	19:01 (2)	05:48	05:01	
	16:17	23	15:39 (5)	17:10	32	16:13 (4)	18:06	19:37 (2)	20:59	21:48	
4	08:43		15:17 (5)	08:08		15:42 (4)	07:09	19:00 (2)	05:46	05:00	
	16:18	24	15:41 (4)	17:12	30	16:12 (4)	18:07	19:39 (2)	21:01	21:49	
5	08:43		15:17 (5)	08:07		15:43 (4)	07:07	18:59 (2)	05:44	04:59	
	16:19	25	15:42 (4)	17:14	28	16:11 (4)	18:09	19:39 (2)	21:03	21:50	
6	08:43		15:18 (5)	08:05		15:45 (4)	07:04	18:59 (2)	05:42	04:59	
	16:21	26	15:44 (4)	17:16	25	16:10 (4)	18:11	19:39 (2)	21:04	21:51	
7	08:42		15:18 (5)	08:03		15:47 (4)	07:02	18:58 (2)	05:40	04:58	
	16:22	27	15:45 (4)	17:18	21	16:08 (4)	18:13	19:38 (2)	21:06	21:52	
8	08:42		15:18 (5)	08:01		15:50 (4)	07:00	18:59 (2)	05:38	04:57	
	16:24	28	15:46 (4)	17:20	16	16:06 (4)	18:15	19:38 (2)	21:08	21:53	
9	08:41		15:20 (5)	07:59		15:54 (4)	06:57	18:59 (2)	05:36	04:57	
	16:25	29	15:49 (4)	17:22	8	16:02 (4)	18:17	19:38 (2)	21:10	21:54	
10	08:40		15:20 (5)	07:57		06:55	06:55	18:58 (2)	05:34	04:56	
	16:26	30	15:50 (4)	17:24		18:19	20:17	19:37 (2)	21:11	21:55	
11	08:40		15:21 (5)	07:55		06:52	06:37	18:59 (2)	05:33	04:56	
	16:28	31	15:52 (4)	17:26		18:21	20:19	19:36 (2)	21:13	21:55	
12	08:39		15:22 (5)	07:53		06:50	06:35	19:00 (2)	05:31	04:55	
	16:30	32	15:54 (4)	17:28		18:23	20:20	19:36 (2)	21:15	21:56	
13	08:38		15:23 (5)	07:51		06:48	06:32	18:59 (2)	05:29	04:55	
	16:31	32	15:55 (4)	17:30		18:25	20:22	19:34 (2)	21:17	21:57	
14	08:37		15:24 (5)	07:49		06:45	06:30	19:00 (2)	05:27	04:55	
	16:33	33	15:57 (4)	17:32		18:27	20:24	19:33 (2)	21:18	21:58	
15	08:36		15:26 (5)	07:47		06:43	06:28	19:02 (2)	05:26	04:54	
	16:34	33	15:59 (4)	17:34		18:28	20:26	19:32 (2)	21:20	21:58	
16	08:35		15:27 (5)	07:45		06:40	06:25	19:03 (2)	05:24	04:54	
	16:36	33	16:00 (4)	17:36		18:30	20:28	19:31 (2)	21:22	21:59	
17	08:34		15:29 (5)	07:43		17:06 (3)	06:38	19:04 (2)	05:22	04:54	
	16:38	33	16:02 (4)	17:38	3	17:09 (3)	18:32	19:28 (2)	21:23	21:59	
18	08:33		15:34 (4)	07:41		17:04 (3)	06:35	19:06 (2)	05:21	04:54	
	16:40	31	16:05 (4)	17:40	7	17:11 (3)	18:34	19:26 (2)	21:25	22:00	
19	08:32		15:34 (4)	07:39		17:03 (3)	06:33	19:09 (2)	05:19	04:54	
	16:41	33	16:07 (4)	17:42	10	17:13 (3)	18:36	19:23 (2)	21:27	22:00	
20	08:31		15:34 (4)	07:36		17:03 (3)	06:31	19:06 (2)	05:18	04:54	
	16:43	34	16:08 (4)	17:44	13	17:16 (3)	18:38	19:23 (2)	21:28	22:00	
21	08:30		15:34 (4)	07:34		17:03 (3)	06:28	19:06 (2)	05:16	04:54	
	16:45	37	16:11 (4)	17:46	15	17:18 (3)	18:40	19:23 (2)	21:30	22:01	
22	08:29		15:34 (4)	07:32		17:02 (3)	06:26	19:05 (2)	05:15	04:55	
	16:47	38	16:12 (4)	17:48	17	17:19 (3)	18:42	19:23 (2)	21:31	22:01	
23	08:27		15:35 (4)	07:30		17:02 (3)	06:23	19:05 (2)	05:13	04:55	
	16:49	40	16:15 (4)	17:50	20	17:22 (3)	18:43	19:23 (2)	21:33	22:01	
24	08:26		15:34 (4)	07:28		17:02 (3)	06:21	19:07 (2)	05:12	04:55	
	16:50	41	16:15 (4)	17:52	22	17:24 (3)	18:45	19:24 (2)	21:34	22:01	
25	08:24		15:35 (4)	07:25		17:02 (3)	06:18	18:17 (2)	06:05	05:11	04:55
	16:52	41	16:16 (4)	17:54	24	17:26 (3)	18:47	18:21 (2)	20:44	21:36	22:01
26	08:23		15:35 (4)	07:23		17:02 (3)	06:16	18:13 (2)	06:03	05:09	04:56
	16:54	40	16:15 (4)	17:56	25	17:27 (3)	18:49	18:23 (2)	20:46	21:37	22:01
27	08:22		15:35 (4)	07:21		17:03 (3)	06:13	18:10 (2)	06:01	05:08	04:56
	16:56	40	16:15 (4)	17:58	23	17:26 (3)	18:51	18:24 (2)	20:48	21:39	22:01
28	08:20		15:37 (4)	07:18		17:03 (3)	06:11	18:08 (2)	05:58	05:07	04:57
	16:58	39	16:16 (4)	18:00	22	17:25 (3)	18:53	18:26 (2)	20:50	21:40	22:01
29	08:18		15:37 (4)			07:08	19:06 (2)	19:06 (2)	05:56	05:06	04:57
	17:00	38	16:15 (4)			19:54	22	19:28 (2)	20:52	21:41	22:01
30	08:17		15:37 (4)			07:06	19:05 (2)	19:05 (2)	05:54	05:05	04:58
	17:02	38	16:15 (4)			19:56	25	19:30 (2)	20:54	21:43	22:00
31	08:15		15:38 (4)			07:04	19:03 (2)	19:03 (2)	05:54	05:04	
	17:04	36	16:14 (4)			19:58	28	19:31 (2)	21:44	21:44	
Potential sun hours	250			273		367		420		494	510
Total, worst case		1010		431		165		634			
Sun reduction		0.24		0.23		0.27		0.35			
Oper. time red.		1.00		1.00		1.00		1.00			
Wind dir. red.		0.66		0.67		0.67		0.67			
Total reduction		0.16		0.16		0.18		0.24			
Total, real		162		67		30		151			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FT - H176

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:58 (2) 19:35 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:57 (2) 19:36 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:56 (2) 19:35 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:56 (2) 19:35 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:55 (2) 19:35 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:55 (2) 19:35 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:54 (2) 19:34 (2)	07:37 16:43	08:28 16:06
8	05:05 21:56	05:50 21:12	06:45 20:01	18:54 (2) 19:33 (2)	07:39 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	18:55 (2) 19:31 (2)	07:41 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:54 (2) 19:28 (2)	07:42 17:49 (3)	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:55 (2) 19:26 (2)	07:44 17:42 (3)	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:55 (2) 19:24 (2)	07:45 17:56 (3)	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:56 (2) 19:22 (2)	07:47 17:57 (3)	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:56 (2) 19:18 (2)	07:49 17:58 (3)	08:36 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	18:57 (2) 19:16 (2)	07:51 17:59 (3)	08:37 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	18:59 (2) 19:14 (2)	07:53 17:59 (3)	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	19:00 (2) 19:11 (2)	07:55 17:57 (3)	08:38 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	19:03 (2) 19:08 (2)	07:57 17:55 (3)	08:39 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	19:07 (2) 18:22	07:59 17:52 (3)	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	18:20 18:20	08:00 17:50 (3)	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	18:03 18:17	08:02 17:48 (3)	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	18:05 18:15	08:04 17:45 (3)	08:42 16:06
23	05:24 21:39	06:17 20:39	07:12 19:22 (2)	18:07 18:13	08:06 17:43 (3)	08:42 16:07
24	05:26 21:38	06:19 20:37	07:13 19:22 (2)	18:09 18:11	08:08 17:41 (3)	08:43 16:08
25	05:27 21:36	06:20 20:35	07:15 19:29 (2)	16:36 (3) 16:38 (3)	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:31 (2)	17:03 17:06	08:11 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:05 (2)	17:15 17:04	08:13 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:33 (2)	17:16 17:02	08:14 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:34 (2)	17:18 17:00	08:16 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:35 (2)	17:20 16:58	08:18 16:11	08:44 16:12
31	05:37 21:27	06:31 20:21	18:59 (2) 19:35 (2)	07:22 16:56	08:44 16:13	15:14 (5) 15:35 (5)
Potential sun hours	512	460	382	328	259	233
Total, worst case		229	541	247	959	678
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.66
Total reduction		0.23	0.22	0.20	0.18	0.14
Total, real		53	117	49	168	92

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FU - H177

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:09 (5)	08:14	15:33 (4)	07:16	17:04 (3)	07:01	18:58 (2)	05:52	05:03	
	16:15	28 15:37 (4)	17:06	30 16:03 (4)	18:02	12 17:16 (3)	20:00	35 19:33 (2)	20:55	21:45	
2	08:44	15:10 (5)	08:12	15:34 (4)	07:14	17:08 (3)	06:59	18:56 (2)	05:50	05:02	
	16:16	29 15:39 (4)	17:08	27 16:01 (4)	18:04	2 17:10 (3)	20:02	39 19:35 (2)	20:57	21:46	
3	08:44	15:10 (5)	08:10	15:36 (4)	07:12		06:56	18:56 (2)	05:48	05:01	
	16:17	29 15:39 (4)	17:10	24 16:00 (4)	18:06		20:04	41 19:37 (2)	20:59	21:48	
4	08:43	15:11 (5)	08:08	15:38 (4)	07:09		06:54	18:56 (2)	05:46	05:00	
	16:18	30 15:41 (4)	17:12	20 15:58 (4)	18:07		20:06	42 19:38 (2)	21:01	21:49	
5	08:43	15:12 (5)	08:07	15:40 (4)	07:07		06:51	18:55 (2)	05:44	04:59	
	16:19	30 15:42 (4)	17:14	16 15:56 (4)	18:09		20:07	42 19:37 (2)	21:03	21:50	
6	08:43	15:13 (5)	08:05	15:45 (4)	07:04		06:49	18:55 (2)	05:42	04:59	
	16:21	31 15:44 (4)	17:16	6 15:51 (4)	18:11		20:09	42 19:37 (2)	21:04	21:51	
7	08:42	15:13 (5)	08:03		07:02		06:47	18:54 (2)	05:40	04:58	
	16:22	32 15:45 (4)	17:18		18:13		20:11	42 19:36 (2)	21:06	21:52	
8	08:42	15:14 (5)	08:01		07:00		06:44	18:55 (2)	05:38	04:57	
	16:24	32 15:46 (4)	17:20		18:15		20:13	41 19:36 (2)	21:08	21:53	
9	08:41	15:16 (5)	07:59		06:57		06:42	18:55 (2)	05:36	04:57	
	16:25	33 15:49 (4)	17:22		18:17		20:15	41 19:36 (2)	21:10	21:54	
10	08:40	15:17 (5)	07:57		06:55		06:39	18:55 (2)	05:34	04:56	
	16:26	33 15:50 (4)	17:24		18:19		20:17	39 19:34 (2)	21:11	21:55	
11	08:40	15:18 (5)	07:55		06:53		06:37	18:55 (2)	05:33	04:56	
	16:28	34 15:52 (4)	17:26		18:21		20:19	39 19:34 (2)	21:13	21:55	
12	08:39	15:19 (5)	07:53		06:50		06:35	18:56 (2)	05:31	04:55	
	16:30	35 15:54 (4)	17:28		18:23		20:20	37 19:33 (2)	21:15	21:56	
13	08:38	15:21 (5)	07:51		06:48		06:32	18:56 (2)	05:29	04:55	
	16:31	34 15:55 (4)	17:30		18:25		20:22	35 19:31 (2)	21:17	21:57	
14	08:37	15:22 (4)	07:49		06:45		06:30	18:57 (2)	05:27	04:55	
	16:33	35 15:57 (4)	17:32		18:27		20:24	33 19:30 (2)	21:18	21:58	
15	08:36	15:22 (4)	07:47	17:01 (3)	06:43		06:28	18:58 (2)	05:26	04:54	
	16:34	37 15:59 (4)	17:34	4 17:05 (3)	18:28		20:26	31 19:29 (2)	21:20	21:58	
16	08:35	15:22 (4)	07:45	17:00 (3)	06:40		06:25	19:00 (2)	05:24	04:54	
	16:36	38 16:00 (4)	17:36	7 17:07 (3)	18:30		20:28	28 19:28 (2)	21:22	21:59	
17	08:34	15:22 (4)	07:43	16:59 (3)	06:38		06:23	19:01 (2)	05:22	04:54	
	16:38	40 16:02 (4)	17:38	10 17:09 (3)	18:32		20:30	24 19:25 (2)	21:23	21:59	
18	08:33	15:23 (4)	07:41	16:58 (3)	06:35		06:21	19:03 (2)	05:21	04:54	
	16:40	41 16:04 (4)	17:40	13 17:11 (3)	18:34		20:31	20 19:23 (2)	21:25	22:00	
19	08:32	15:23 (4)	07:39	16:58 (3)	06:33		06:18	19:06 (2)	05:19	04:54	
	16:41	42 16:05 (4)	17:42	15 17:13 (3)	18:36		20:33	14 19:20 (2)	21:27	22:00	
20	08:31	15:23 (4)	07:36	16:58 (3)	06:31		06:16		05:18	04:54	
	16:43	42 16:05 (4)	17:44	18 17:16 (3)	18:38		20:35		21:28	22:00	
21	08:30	15:24 (4)	07:34	16:58 (3)	06:28		06:14		05:16	04:54	
	16:45	41 16:05 (4)	17:46	20 17:18 (3)	18:40		20:37		21:30	22:01	
22	08:29	15:24 (4)	07:32	16:57 (3)	06:26		06:12		05:15	04:55	
	16:47	41 16:05 (4)	17:48	22 17:19 (3)	18:42		20:39		21:31	22:01	
23	08:27	15:25 (4)	07:30	16:57 (3)	06:23		06:09		05:13	04:55	
	16:49	41 16:06 (4)	17:50	25 17:22 (3)	18:43		20:41		21:33	22:01	
24	08:26	15:25 (4)	07:28	16:58 (3)	06:21	18:11 (2)	06:07		05:12	04:55	
	16:50	40 16:05 (4)	17:52	26 17:24 (3)	18:45	7 18:18 (2)	20:43		21:34	22:01	
25	08:24	15:26 (4)	07:25	16:58 (3)	06:18	18:08 (2)	06:05		05:11	04:55	
	16:52	40 16:06 (4)	17:54	24 17:22 (3)	18:47	13 18:21 (2)	20:44		21:36	22:01	
26	08:23	15:26 (4)	07:23	16:59 (3)	06:16	18:06 (2)	06:03		05:09	04:56	
	16:54	39 16:05 (4)	17:56	23 17:22 (3)	18:49	17 18:23 (2)	20:46		21:37	22:01	
27	08:22	15:27 (4)	07:21	17:00 (3)	06:13	18:04 (2)	06:01		05:08	04:56	
	16:56	38 16:05 (4)	17:58	21 17:21 (3)	18:51	20 18:24 (2)	20:48		21:39	22:01	
28	08:20	15:28 (4)	07:18	17:01 (3)	06:11	18:03 (2)	05:58		05:07	04:57	
	16:58	37 16:05 (4)	18:00	17 17:18 (3)	18:53	23 18:26 (2)	20:50		21:40	22:01	
29	08:19	15:29 (4)			07:09	19:01 (2)	05:56		05:06	04:57	
	17:00	35 16:04 (4)			19:54	27 19:28 (2)	20:52		21:41	22:01	
30	08:17	15:30 (4)			07:06	19:00 (2)	05:54		05:05	04:58	
	17:02	33 16:03 (4)			19:56	30 19:30 (2)	20:54		21:43	22:00	
31	08:15	15:31 (4)			07:04	18:58 (2)			05:04		
	17:04	32 16:03 (4)			19:58	33 19:31 (2)			21:44		
Potential sun hours	250		273		367		420		494	510	
Total, worst case	1102		368		184		665				
Sun reduction	0.24		0.23		0.27		0.35				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.66		0.67		0.67		0.67				
Total reduction	0.16		0.16		0.18		0.24				
Total, real	176		57		34		158				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FU - H177

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:54 (2) 19:33 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:54 (2) 19:33 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:52 (2) 19:33 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:52 (2) 19:33 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:51 (2) 19:33 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:51 (2) 19:33 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:50 (2) 19:32 (2)	07:37 16:43	08:28 16:06
8	05:05 21:56	05:50 21:12	06:45 20:01	18:50 (2) 19:32 (2)	07:39 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	18:50 (2) 19:31 (2)	07:40 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:49 (2) 19:28 (2)	07:42 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:50 (2) 19:26 (2)	07:44 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:50 (2) 19:24 (2)	07:45 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:51 (2) 19:22 (2)	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:51 (2) 19:18 (2)	07:49 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	18:52 (2) 19:16 (2)	07:51 16:29	08:37 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	18:53 (2) 19:14 (2)	07:53 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	18:53 (2) 19:11 (2)	07:55 16:26	08:38 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	18:55 (2) 19:08 (2)	07:57 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	18:58 (2) 19:06 (2)	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	19:02 (2) 19:04 (2)	08:00 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	18:20 18:03	16:22 16:20	16:06 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	18:05 18:15	16:20 16:19	16:06 16:06
23	05:24 21:39	06:17 20:39	07:12 19:24	18:07 18:13	16:19 16:18	16:06 16:07
24	05:26 21:38	06:19 20:37	19:10 (2) 19:24 (2)	07:13 19:22	16:18 16:17	16:07 16:08
25	05:27 21:36	06:20 20:35	19:06 (2) 19:26 (2)	07:15 19:19	16:17 16:16	16:08 16:08
26	05:29 21:35	06:22 20:32	19:03 (2) 19:28 (2)	07:17 19:17	16:16 16:14	16:08 16:09
27	05:30 21:33	06:24 20:30	19:02 (2) 19:30 (2)	07:19 19:14	16:13 16:13	16:09 16:10
28	05:32 21:32	06:26 20:28	18:59 (2) 19:30 (2)	07:21 19:12	16:12 16:12	16:11 16:11
29	05:34 21:30	06:27 20:25	18:58 (2) 19:31 (2)	07:22 19:09	16:12 16:12	16:11 16:11
30	05:35 21:28	06:29 20:23	18:57 (2) 19:32 (2)	07:24 19:07	16:11 16:11	16:11 16:12
31	05:37 21:27	06:31 20:21	18:55 (2) 19:32 (2)	07:22 16:56	16:11 16:13	16:12 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		223	622	265	892	844
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.65
Total reduction		0.23	0.22	0.20	0.17	0.14
Total, real		51	134	52	156	115

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FV - H178
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		15:07 (5)	08:14		15:30 (4)	07:16		07:01		18:53 (2)	05:52		05:03			
	16:15	30	15:37 (4)	17:06	24	15:54 (4)	18:02		20:00	40	19:33 (2)	20:55		21:45			
2	08:44		15:08 (5)	08:12		15:32 (4)	07:14		06:59		18:52 (2)	05:50		05:02			
	16:16	31	15:39 (4)	17:08	20	15:52 (4)	18:04		20:02	43	19:35 (2)	20:57		21:46			
3	08:44		15:08 (5)	08:10		15:35 (4)	07:12		06:56		18:52 (2)	05:48		05:01			
	16:17	31	15:39 (4)	17:10	14	15:49 (4)	18:06		20:04	43	19:35 (2)	20:59		21:48			
4	08:43		15:09 (5)	08:08		15:41 (4)	07:09		06:54		18:52 (2)	05:46		05:00			
	16:18	32	15:41 (4)	17:12	2	15:43 (4)	18:07		20:06	43	19:35 (2)	21:01		21:49			
5	08:43		15:09 (5)	08:07			07:07		06:51		18:51 (2)	05:44		04:59			
	16:19	33	15:42 (4)	17:14			18:09		20:07	43	19:34 (2)	21:03		21:50			
6	08:43		15:11 (5)	08:05			07:04		06:49		18:51 (2)	05:42		04:59			
	16:21	33	15:44 (4)	17:16			18:11		20:09	43	19:34 (2)	21:04		21:51			
7	08:42		15:11 (5)	08:03			07:02		06:47		18:51 (2)	05:40		04:58			
	16:22	34	15:45 (4)	17:18			18:13		20:11	42	19:33 (2)	21:06		21:52			
8	08:42		15:12 (5)	08:01			07:00		06:44		18:51 (2)	05:38		04:57			
	16:24	34	15:46 (4)	17:20			18:15		20:13	42	19:33 (2)	21:08		21:53			
9	08:41		15:14 (5)	07:59			06:57		06:42		18:52 (2)	05:36		04:57			
	16:25	35	15:49 (4)	17:22			18:17		20:15	40	19:32 (2)	21:10		21:54			
10	08:40		15:14 (4)	07:57			06:55		06:39		18:51 (2)	05:34		04:56			
	16:26	36	15:50 (4)	17:24			18:19		20:17	40	19:31 (2)	21:11		21:55			
11	08:40		15:14 (4)	07:55			06:53		06:37		18:52 (2)	05:33		04:56			
	16:28	38	15:52 (4)	17:26			18:21		20:19	38	19:30 (2)	21:13		21:55			
12	08:39		15:15 (4)	07:53			06:50		06:35		18:53 (2)	05:31		04:55			
	16:30	39	15:54 (4)	17:28			18:23		20:20	36	19:29 (2)	21:15		21:56			
13	08:38		15:15 (4)	07:51		16:58 (3)	06:48		06:32		18:53 (2)	05:29		04:55			
	16:31	40	15:55 (4)	17:30	2	17:00 (3)	18:25		20:22	34	19:27 (2)	21:17		21:57			
14	08:37		15:15 (4)	07:49			06:45		06:30		18:55 (2)	05:27		04:55			
	16:33	42	15:57 (4)	17:32	5	17:02 (3)	18:27		20:24	31	19:26 (2)	21:18		21:58			
15	08:36		15:16 (4)	07:47			06:43		06:28		18:56 (2)	05:26		04:54			
	16:34	42	15:58 (4)	17:34	9	17:05 (3)	18:28		20:26	29	19:25 (2)	21:20		21:58			
16	08:35		15:15 (4)	07:45			06:40		06:25		18:58 (2)	05:24		04:54			
	16:36	42	15:57 (4)	17:36	12	17:07 (3)	18:30		20:28	25	19:23 (2)	21:22		21:59			
17	08:34		15:16 (4)	07:43			06:38		06:23		18:59 (2)	05:22		04:54			
	16:38	42	15:58 (4)	17:38	14	17:09 (3)	18:32		20:30	21	19:20 (2)	21:23		21:59			
18	08:33		15:17 (4)	07:41			06:35		06:21		19:02 (2)	05:21		04:54			
	16:40	41	15:58 (4)	17:40	17	17:11 (3)	18:34		20:31	15	19:17 (2)	21:25		22:00			
19	08:32		15:18 (4)	07:39			06:33		06:18			05:19		04:54			
	16:41	41	15:59 (4)	17:42	19	17:13 (3)	18:36		20:33			21:27		22:00			
20	08:31		15:17 (4)	07:36			06:31		06:16			05:18		04:54			
	16:43	41	15:58 (4)	17:44	22	17:16 (3)	18:38		20:35			21:28		22:00			
21	08:30		15:18 (4)	07:34			06:28		06:14			05:16		04:54			
	16:45	41	15:59 (4)	17:46	24	17:18 (3)	18:40		20:37			21:30		22:01			
22	08:29		15:18 (4)	07:32			06:26		18:11 (2)			05:15		04:55			
	16:47	40	15:58 (4)	17:48	25	17:19 (3)	18:42	4	18:15 (2)			20:39		22:01			
23	08:27		15:20 (4)	07:30			06:23		18:07 (2)			05:13		04:55			
	16:49	39	15:59 (4)	17:50	25	17:20 (3)	18:43	10	18:17 (2)			20:41		22:01			
24	08:26		15:20 (4)	07:28			06:21		18:04 (2)			05:12		04:55			
	16:50	38	15:58 (4)	17:52	24	17:20 (3)	18:45	14	18:18 (2)			20:43		22:01			
25	08:24		15:21 (4)	07:25			06:18		18:02 (2)			05:11		04:55			
	16:52	38	15:59 (4)	17:54	22	17:18 (3)	18:47	19	18:21 (2)			20:44		22:01			
26	08:23		15:22 (4)	07:23			06:16		18:00 (2)			05:09		04:56			
	16:54	36	15:58 (4)	17:56	20	17:17 (3)	18:49	23	18:23 (2)			20:46		22:01			
27	08:22		15:22 (4)	07:21			06:13		17:58 (2)			05:08		04:56			
	16:56	35	15:57 (4)	17:58	17	17:16 (3)	18:51	26	18:24 (2)			20:48		22:01			
28	08:20		15:24 (4)	07:18			06:11		17:57 (2)			05:07		04:57			
	16:58	33	15:57 (4)	18:00	11	17:12 (3)	18:53	29	18:26 (2)			20:50		22:01			
29	08:19		15:25 (4)				07:09		18:56 (2)			05:06		04:57			
	17:00	31	15:56 (4)				19:54	32	19:28 (2)			20:52		22:01			
30	08:17		15:26 (4)				07:06		18:55 (2)			05:05		04:58			
	17:02	29	15:55 (4)				19:56	35	19:30 (2)			20:54		22:01			
31	08:15		15:27 (4)				07:04		18:53 (2)			05:04					
	17:04	27	15:54 (4)				19:58	38	19:31 (2)			21:44					
Potential sun hours	250			273			367			420			494			510	
Total, worst case	1124			328			230			648							
Sun reduction	0.24			0.23			0.27			0.35							
Oper. time red.	1.00			1.00			1.00			1.00							
Wind dir. red.	0.66			0.67			0.67			0.67							
Total reduction	0.16			0.16			0.18			0.24							
Total, real	179			51			42			154							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FV - H178

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:51 (2) 19:29 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:50 (2) 19:30 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:49 (2) 19:29 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:48 (2) 19:30 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:48 (2) 19:30 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:47 (2) 19:30 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:46 (2) 19:29 (2)	07:37 16:43	08:28 15:15 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	18:45 (2) 19:29 (2)	07:39 16:41	08:29 15:19 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	18:46 (2) 19:29 (2)	07:41 16:39	08:30 15:22 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	18:45 (2) 19:28 (2)	07:42 16:37	08:31 15:25 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	18:45 (2) 19:26 (2)	07:44 16:35	08:33 15:26 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	18:46 (2) 19:24 (2)	07:46 16:34	08:34 15:27 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	18:46 (2) 19:22 (2)	07:48 16:32	08:35 15:28 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	18:46 (2) 19:18 (2)	07:50 16:31	08:36 15:29 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	18:46 (2) 19:16 (2)	07:51 16:29	08:37 15:30 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	18:47 (2) 19:14 (2)	07:53 16:27	08:38 15:31 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	18:48 (2) 19:11 (2)	07:55 16:26	08:38 15:32 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	18:49 (2) 19:08 (2)	07:57 16:24	08:39 15:32 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	18:51 (2) 19:06 (2)	07:59 16:23	08:40 15:33 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	18:53 (2) 19:04 (2)	08:00 16:22	08:41 15:33 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	18:55 (2) 19:01 (2)	08:02 16:20	08:41 15:34 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	18:05 18:15	08:04 16:19	08:42 15:34 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 15:35 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 15:35 (4)
25	05:27 21:36	06:20 20:35	19:05 (2) 19:20 (2)	07:15 17:09	08:09 16:16	08:43 15:36 (4)
26	05:29 21:35	06:22 20:32	19:02 (2) 19:23 (2)	07:17 17:06	08:11 16:14	08:43 15:36 (4)
27	05:30 21:33	06:24 20:30	19:00 (2) 19:25 (2)	07:19 17:04	08:13 16:13	08:44 15:37 (4)
28	05:32 21:32	06:26 20:28	18:57 (2) 19:26 (2)	07:21 17:02	08:14 16:12	08:44 15:37 (4)
29	05:34 21:30	06:27 20:25	18:55 (2) 19:27 (2)	07:22 17:00	08:16 16:12	08:44 15:36 (4)
30	05:35 21:28	06:29 20:23	18:54 (2) 19:28 (2)	07:24 16:58	08:18 16:11	08:44 15:35 (4)
31	05:37 21:27	06:31 20:21	18:52 (2) 19:28 (2)	07:22 16:56	08:19 16:13	08:44 15:35 (4)
Potential sun hours	512	460	382	328	259	233
Total, worst case		192	695	278	823	934
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.65
Total reduction		0.23	0.22	0.20	0.17	0.14
Total, real		44	150	54	143	127

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FW - H179

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44		14:40 (4)	08:14			07:16			07:01		18:31 (2)	05:52			05:03		
	16:15	42	15:22 (4)	17:06			18:02			20:00	47	19:18 (2)	20:55			21:45		
2	08:44		14:41 (4)	08:12			07:14			06:59		18:31 (2)	05:50			05:02		
	16:16	42	15:23 (4)	17:08			18:04			20:02	46	19:17 (2)	20:57			21:46		
3	08:44		14:41 (4)	08:10			07:12			06:56		18:32 (2)	05:48			05:01		
	16:17	41	15:22 (4)	17:10			18:06			20:04	44	19:16 (2)	20:59			21:48		
4	08:43		14:42 (4)	08:08			07:09			06:54		18:33 (2)	05:46			05:00		
	16:18	41	15:23 (4)	17:12			18:07			20:06	43	19:16 (2)	21:01			21:49		
5	08:43		14:42 (4)	08:07		16:40 (3)	07:07			06:51		18:32 (2)	05:44			04:59		
	16:19	41	15:23 (4)	17:14	3	16:43 (3)	18:09			20:07	42	19:14 (2)	21:03			21:50		
6	08:43		14:44 (4)	08:05			16:39 (3)	07:04		06:49		18:34 (2)	05:42			04:59		
	16:21	40	15:24 (4)	17:16	6	16:45 (3)	18:11			20:09	39	19:13 (2)	21:04			21:51		
7	08:42		14:44 (4)	08:03			16:39 (3)	07:02		06:47		18:34 (2)	05:40			04:58		
	16:22	39	15:23 (4)	17:18	8	16:47 (3)	18:13			20:11	37	19:11 (2)	21:06			21:52		
8	08:42		14:44 (4)	08:01			16:38 (3)	07:00		06:44		18:35 (2)	05:38			04:57		
	16:24	39	15:23 (4)	17:20	12	16:50 (3)	18:15			20:13	35	19:10 (2)	21:08			21:53		
9	08:41		14:46 (4)	07:59			16:38 (3)	06:57		06:42		18:37 (2)	05:36			04:57		
	16:25	38	15:24 (4)	17:22	14	16:52 (3)	18:17			20:15	31	19:08 (2)	21:10			21:54		
10	08:40		14:46 (4)	07:57			16:37 (3)	06:55		06:39		18:38 (2)	05:34			04:56		
	16:26	38	15:24 (4)	17:24	17	16:54 (3)	18:19			20:17	28	19:06 (2)	21:11			21:55		
11	08:40		14:47 (4)	07:55			16:37 (3)	06:53		06:37		18:41 (2)	05:33			04:56		
	16:28	37	15:24 (4)	17:26	19	16:56 (3)	18:21			20:19	22	19:03 (2)	21:13			21:55		
12	08:39		14:48 (4)	07:53			16:37 (3)	06:50		06:35		18:44 (2)	05:31			04:55		
	16:30	36	15:24 (4)	17:28	22	16:59 (3)	18:23			20:20	16	19:00 (2)	21:15			21:56		
13	08:38		14:49 (4)	07:51			16:37 (3)	06:48	17:57 (2)	06:32			05:29			04:55		
	16:31	35	15:24 (4)	17:30	23	17:00 (3)	18:25	1	17:58 (2)	20:22			21:17			21:57		
14	08:37		14:50 (4)	07:49			16:37 (3)	06:45	17:50 (2)	06:30			05:27			04:55		
	16:33	34	15:24 (4)	17:32	25	17:02 (3)	18:27	10	18:00 (2)	20:24			21:18			21:58		
15	08:36		14:51 (4)	07:47			16:37 (3)	06:43	17:48 (2)	06:28			05:26			04:54		
	16:34	33	15:24 (4)	17:34	28	17:05 (3)	18:28	14	18:02 (2)	20:26			21:20			21:58		
16	08:35		14:51 (4)	07:45			16:38 (3)	06:40	17:44 (2)	06:25			05:24			04:54		
	16:36	32	15:23 (4)	17:36	27	17:05 (3)	18:30	20	18:04 (2)	20:28			21:22			21:59		
17	08:34		14:52 (4)	07:43			16:39 (3)	06:38	17:43 (2)	06:23			05:22			04:54		
	16:38	30	15:22 (4)	17:38	26	17:05 (3)	18:32	23	18:06 (2)	20:30			21:23			21:59		
18	08:33		14:54 (4)	07:41			16:39 (3)	06:35	17:40 (2)	06:21			05:21			04:54		
	16:40	28	15:22 (4)	17:40	24	17:03 (3)	18:34	27	18:07 (2)	20:31			21:25			22:00		
19	08:32		14:56 (4)	07:39			16:40 (3)	06:33	17:39 (2)	06:18			05:19			04:54		
	16:41	26	15:22 (4)	17:42	22	17:02 (3)	18:36	31	18:10 (2)	20:33			21:27			22:00		
20	08:31		14:57 (4)	07:36			16:42 (3)	06:31	17:37 (2)	06:16			05:18			04:54		
	16:43	23	15:20 (4)	17:44	19	17:01 (3)	18:38	34	18:11 (2)	20:35			21:28			22:00		
21	08:30		14:59 (4)	07:34			16:44 (3)	06:28	17:37 (2)	06:14			05:16			04:54		
	16:45	20	15:19 (4)	17:46	15	16:59 (3)	18:40	36	18:13 (2)	20:37			21:30			22:01		
22	08:29		15:01 (4)	07:32			16:46 (3)	06:26	17:35 (2)	06:12			05:15			04:55		
	16:47	16	15:17 (4)	17:48	9	16:55 (3)	18:42	40	18:15 (2)	20:39			21:31			22:01		
23	08:27		15:05 (4)	07:30			06:23		17:35 (2)	06:09			05:13			04:55		
	16:49	10	15:15 (4)	17:50			18:43	42	18:17 (2)	20:41			21:33			22:01		
24	08:26			07:28			06:21		17:33 (2)	06:07			05:12			04:55		
	16:50			17:52			18:45	45	18:18 (2)	20:43			21:34			22:01		
25	08:24			07:25			06:18		17:33 (2)	06:05			05:11			04:55		
	16:52			17:54			18:47	47	18:20 (2)	20:44			21:36			22:01		
26	08:23			07:23			06:16		17:33 (2)	06:03			05:09			04:56		
	16:54			17:56			18:49	48	18:21 (2)	20:46			21:37			22:01		
27	08:22			07:21			06:13		17:32 (2)	06:01			05:08			04:56		
	16:56			17:58			18:51	48	18:20 (2)	20:48			21:39			22:01		
28	08:20			07:18			06:11		17:32 (2)	05:58			05:07			04:57		
	16:58			18:00			18:53	48	18:20 (2)	20:50			21:40			22:01		
29	08:19						07:09		18:31 (2)	05:56			05:06			04:57		
	17:00						19:55	48	19:19 (2)	20:52			21:41			22:01		
30	08:17						07:06		18:31 (2)	05:54			05:05			04:58		
	17:02						19:56	48	19:19 (2)	20:54			21:43			22:00		
31	08:15						07:04		18:31 (2)				05:04					
	17:04						19:58	47	19:18 (2)				21:44					
Potential sun hours	250			273			367			420			494			510		
Total, worst case	761			319			657			430								
Sun reduction	0.24			0.23			0.27			0.35								
Oper. time red.	1.00			1.00			1.00			1.00								
Wind dir. red.	0.65			0.66			0.68			0.68								
Total reduction	0.16			0.15			0.18			0.24								
Total, real	120			49			120			102								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FW - H179

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:40 (2) 19:02 (2)	07:26 16:54	16:07 (3) 16:23 (3)
2	04:59 22:00	05:40 21:23	06:35 20:16	18:37 (2) 19:05 (2)	07:28 16:52	16:07 (3) 16:21 (3)
3	05:00 21:59	05:42 21:21	06:36 20:13	18:35 (2) 19:06 (2)	07:30 16:50	16:08 (3) 16:19 (3)
4	05:01 21:59	05:44 21:19	06:38 20:11	18:32 (2) 19:07 (2)	07:31 16:48	16:09 (3) 16:17 (3)
5	05:02 21:58	05:45 21:17	06:40 20:09	18:31 (2) 19:08 (2)	07:33 16:46	16:09 (3) 16:15 (3)
6	05:03 21:58	05:47 21:15	06:42 20:06	18:30 (2) 19:09 (2)	07:35 16:44	16:10 (3) 16:12 (3)
7	05:04 21:57	05:49 21:14	06:43 20:04	18:28 (2) 19:09 (2)	07:37 16:43	16:08 (3) 16:06 (3)
8	05:05 21:56	05:51 21:12	06:45 20:01	18:27 (2) 19:10 (2)	07:39 16:41	16:07 (3) 16:06 (3)
9	05:06 21:55	05:52 21:10	06:47 19:59	18:26 (2) 19:10 (2)	07:41 16:39	16:05 (3) 16:05 (3)
10	05:07 21:55	05:54 21:08	06:49 19:56	18:24 (2) 19:10 (2)	07:42 16:37	16:04 (3) 16:05 (3)
11	05:08 21:54	05:56 21:05	06:50 19:54	18:24 (2) 19:10 (2)	07:44 16:35	16:03 (3) 16:05 (3)
12	05:09 21:53	05:57 21:03	06:52 19:51	18:23 (2) 19:11 (2)	07:46 16:34	16:04 (3) 16:05 (3)
13	05:10 21:52	05:59 21:01	06:54 19:49	18:23 (2) 19:11 (2)	07:48 16:32	16:05 (3) 16:05 (3)
14	05:12 21:51	06:01 20:59	06:56 19:47	18:22 (2) 19:10 (2)	07:50 16:31	16:04 (3) 16:04 (3)
15	05:13 21:50	06:03 20:57	06:58 19:44	18:21 (2) 19:10 (2)	07:52 16:29	16:03 (3) 16:05 (3)
16	05:14 21:49	06:04 20:55	06:59 19:42	18:21 (2) 19:10 (2)	07:54 16:27	16:03 (3) 16:05 (3)
17	05:16 21:47	06:06 20:53	07:01 19:39	18:20 (2) 19:08 (2)	07:55 16:26	16:03 (3) 16:05 (3)
18	05:17 21:46	06:08 20:51	07:03 19:37	18:20 (2) 19:08 (2)	07:57 16:24	16:03 (3) 16:05 (3)
19	05:18 21:45	06:10 20:48	07:05 19:34	18:21 (2) 19:06 (2)	07:59 16:23	16:04 (3) 16:05 (3)
20	05:20 21:44	06:12 20:46	07:06 19:32	18:21 (2) 19:04 (2)	08:00 16:22	16:04 (3) 16:05 (3)
21	05:21 21:42	06:13 20:44	07:08 19:29	18:20 (2) 19:01 (2)	08:03 17:30 (3)	16:04 (3) 16:20 (3)
22	05:23 21:41	06:15 20:42	07:10 19:27	18:21 (2) 18:58 (2)	08:05 17:32 (3)	16:04 (3) 16:19 (3)
23	05:24 21:39	06:17 20:39	07:12 19:24	18:22 (2) 18:56 (2)	08:07 17:33 (3)	16:06 (3) 16:18 (3)
24	05:26 21:38	06:19 20:37	07:13 19:22	18:23 (2) 18:54 (2)	08:09 17:34 (3)	16:08 (3) 16:17 (3)
25	05:27 21:36	06:20 20:35	07:15 19:19	18:23 (2) 18:51 (2)	08:09 16:34 (3)	16:08 (3) 16:16 (3)
26	05:29 21:35	06:22 20:32	07:17 19:17	18:24 (2) 18:48 (2)	08:11 16:35 (3)	16:08 (3) 16:14 (3)
27	05:30 21:33	06:24 20:30	07:19 19:14	18:26 (2) 18:46 (2)	08:13 16:34 (3)	16:08 (3) 16:13 (3)
28	05:32 21:32	06:26 20:28	07:21 19:12	18:27 (2) 18:44 (2)	08:14 16:31 (3)	16:08 (3) 16:12 (3)
29	05:34 21:30	06:28 20:25	07:22 19:09	18:30 (2) 18:41 (2)	08:16 16:29 (3)	16:08 (3) 16:12 (3)
30	05:35 21:28	06:29 20:23	07:24 19:07	18:33 (2) 18:38 (2)	08:18 16:27 (3)	16:08 (3) 16:11 (3)
31	05:37 21:27	06:31 20:21	18:51 (2) 18:59 (2)	07:24 16:56	07:20 16:25 (3)	16:11 (3) 16:13 (3)
Potential sun hours	512	460	382	328	259	233
Total, worst case		18	1086	265	380	1282
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.68	0.68	0.66	0.65	0.65
Total reduction		0.23	0.22	0.19	0.17	0.13
Total, real		4	235	51	65	172

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FX - H180

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		14:41 (4)	08:14		16:13 (3)	07:16		16:48 (2)	07:01		05:52			05:03		
	16:15	12	14:53 (4)	17:06	21	16:34 (3)	18:02	39	17:27 (2)	20:00		20:55			21:45		
2	08:44		14:43 (4)	08:12		16:13 (3)	07:14		16:47 (2)	06:59		05:50			05:02		
	16:16	10	14:53 (4)	17:08	24	16:37 (3)	18:04	39	17:26 (2)	20:02		20:57			21:46		
3	08:44		14:44 (4)	08:10		16:13 (3)	07:12		16:47 (2)	06:56		05:48			05:01		
	16:17	7	14:51 (4)	17:10	23	16:36 (3)	18:06	39	17:26 (2)	20:04		20:59			21:48		
4	08:43			08:08		16:14 (3)	07:09		16:48 (2)	06:54		05:46			05:00		
	16:18			17:12	21	16:35 (3)	18:07	38	17:26 (2)	20:06		21:01			21:49		
5	08:43			08:07		16:15 (3)	07:07		16:48 (2)	06:51		05:44			04:59		
	16:19			17:14	20	16:35 (3)	18:09	37	17:25 (2)	20:07		21:03			21:50		
6	08:43			08:05		16:16 (3)	07:04		16:49 (2)	06:49		05:42			04:58		
	16:21			17:16	18	16:34 (3)	18:11	35	17:24 (2)	20:09		21:04			21:51		
7	08:42			08:03		16:18 (3)	07:02		16:49 (2)	06:47		05:40			04:58		
	16:22			17:18	14	16:32 (3)	18:13	34	17:23 (2)	20:11		21:06			21:52		
8	08:42			08:01		16:20 (3)	07:00		16:50 (2)	06:44		05:38			04:57		
	16:24			17:20	10	16:30 (3)	18:15	32	17:22 (2)	20:13		21:08			21:53		
9	08:41			07:59			06:57		16:51 (2)	06:42		05:36			04:57		
	16:25			17:22			18:17	29	17:20 (2)	20:15		21:10			21:54		
10	08:40			07:57			06:55		16:53 (2)	06:39		05:34			04:56		
	16:26			17:24			18:19	26	17:19 (2)	20:17		21:11			21:55		
11	08:40			07:55			06:53		16:55 (2)	06:37		05:33			04:56		
	16:28			17:26			18:21	22	17:17 (2)	20:19		21:13			21:55		
12	08:39			07:53			06:50		16:57 (2)	06:35		05:31			04:55		
	16:30			17:28			18:23	16	17:13 (2)	20:20		21:15			21:56		
13	08:38			07:51			06:48		17:03 (2)	06:32		05:29			04:55		
	16:31			17:30			18:25	5	17:08 (2)	20:22		21:17			21:57		
14	08:37			07:49			06:45			06:30		05:27			04:55		
	16:33			17:32			18:27			20:24		21:18			21:58		
15	08:36			07:47			06:43			06:28		05:26			04:54		
	16:34			17:34			18:28			20:26		21:20			21:58		
16	08:35			07:45		17:01 (2)	06:40			06:25		05:24			04:54		
	16:36			17:36	6	17:07 (2)	18:30			20:28		21:22			21:59		
17	08:34			07:43		16:58 (2)	06:38			06:23		05:22			04:54		
	16:38			17:38	11	17:09 (2)	18:32			20:30		21:23			21:59		
18	08:33			07:41		16:56 (2)	06:35			06:21		05:21			04:54		
	16:40			17:40	15	17:11 (2)	18:34			20:31		21:25			22:00		
19	08:32			07:39		16:54 (2)	06:33			06:18		05:19			04:54		
	16:41			17:42	19	17:13 (2)	18:36			20:33		21:27			22:00		
20	08:31			07:36		16:53 (2)	06:31			06:16		05:18			04:54		
	16:43			17:44	23	17:16 (2)	18:38			20:35		21:28			22:00		
21	08:30			07:34		16:52 (2)	06:28			06:14		05:16			04:54		
	16:45			17:46	26	17:18 (2)	18:40			20:37		21:30			22:01		
22	08:29			07:32		16:51 (2)	06:26			06:12		05:15			04:55		
	16:47			17:48	28	17:19 (2)	18:42			20:39		21:31			22:01		
23	08:27		16:12 (3)	07:30		16:50 (2)	06:23			06:09		05:13			04:55		
	16:49	3	16:15 (3)	17:50	32	17:22 (2)	18:43			20:41		21:33			22:01		
24	08:26		16:12 (3)	07:28		16:50 (2)	06:21			06:07		05:12			04:55		
	16:50	5	16:17 (3)	17:52	34	17:24 (2)	18:45			20:43		21:34			22:01		
25	08:24		16:12 (3)	07:25		16:48 (2)	06:18			06:05		05:11			04:55		
	16:52	7	16:19 (3)	17:54	38	17:26 (2)	18:47			20:44		21:36			22:01		
26	08:23		16:11 (3)	07:23		16:48 (2)	06:16			06:03		05:09			04:56		
	16:54	10	16:21 (3)	17:56	39	17:27 (2)	18:49			20:46		21:37			22:01		
27	08:22		16:11 (3)	07:21		16:48 (2)	06:13			06:00		05:08			04:56		
	16:56	12	16:23 (3)	17:58	40	17:28 (2)	18:51			20:48		21:39			22:01		
28	08:20		16:12 (3)	07:18		16:47 (2)	06:11			05:58		05:07			04:57		
	16:58	14	16:26 (3)	18:00	40	17:27 (2)	18:53			20:50		21:40			22:01		
29	08:19		16:11 (3)				07:08			05:56		05:06			04:57		
	17:00	17	16:28 (3)				19:54			20:52		21:41			22:01		
30	08:17		16:11 (3)				07:06			05:54		05:05			04:58		
	17:02	18	16:29 (3)				19:56			20:54		21:43			22:00		
31	08:15		16:11 (3)				07:04					05:04					
	17:04	20	16:31 (3)				19:58					21:44					
Potential sun hours		250			273		367			420		494			510		
Total, worst case		135			502		391										
Sun reduction		0.24			0.23		0.27										
Oper. time red.		1.00			1.00		1.00										
Wind dir. red.		0.66			0.67		0.67										
Total reduction		0.16			0.16		0.18										
Total, real		22			78		71										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FX - H180
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:38 (2) 17:50 (2)	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:34 (2) 17:54 (2)	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:32 (2) 17:56 (2)	07:28 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:29 (2) 17:57 (2)	07:30 16:48
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:28 (2) 17:58 (2)	07:32 16:46
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:26 (2) 17:59 (2)	07:34 16:44
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:24 (2) 17:59 (2)	07:36 16:43
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:23 (2) 18:00 (2)	07:38 16:41
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:22 (2) 18:00 (2)	07:40 16:39
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:22 (2) 18:00 (2)	07:42 16:37
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:21 (2) 18:01 (2)	07:44 16:35
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:21 (2) 18:01 (2)	07:45 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:21 (2) 18:00 (2)	07:47 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:20 (2) 18:00 (2)	07:49 16:31
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:20 (2) 18:00 (2)	07:51 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:20 (2) 17:59 (2)	07:53 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:21 (2) 17:57 (2)	07:55 16:26
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:21 (2) 17:55 (2)	07:57 16:24
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:21 (2) 17:52 (2)	07:59 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:22 (2) 17:50 (2)	08:00 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:23 (2) 17:48 (2)	08:02 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:24 (2) 17:45 (2)	08:04 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:25 (2) 17:43 (2)	08:06 16:18
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:26 (2) 17:41 (2)	08:08 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	16:28 (2) 16:38 (2)	08:09 16:16
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	16:31 (2) 16:36 (2)	08:11 16:14
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:13 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:14 16:10
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:16 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:18 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56		08:19 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case				756	256	382
Sun reduction				0.29	0.27	0.21
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.66	0.65
Total reduction				0.20	0.18	0.13
Total, real				149	45	51

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FY - H181

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		08:14		16:04 (3)	07:16		16:33 (2)	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24				15:57 (2)	08:19			
	16:15		17:06	11	16:15 (3)	18:02	18	16:51 (2)	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	26			16:23 (2)	16:10			
2	08:44		08:12			07:14		16:36 (2)	06:59	05:50	05:02	04:59	05:40	06:35	07:28		07:26				15:57 (2)	08:21			
	16:16		17:08			18:04	11	16:47 (2)	20:02	20:57	21:46	22:00	21:23	20:16	19:02		16:52	24			16:21 (2)	16:09			
3	08:44		08:10			07:12			06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28				15:58 (2)	08:22			
	16:17		17:10			18:06			20:04	20:59	21:48	21:59	21:21	20:13	19:00		16:50	21			16:19 (2)	16:08			
4	08:43		08:08			07:09			06:54	05:46	05:00	05:01	05:44	06:38	07:31		07:30				16:00 (2)	08:24			
	16:18		17:12		5	16:41 (2)	18:07		20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	17			16:17 (2)	16:08			
5	08:43		08:07			07:07			06:51	05:44	04:59	05:02	05:45	06:40	07:33		07:32				16:01 (2)	08:25			
	16:19		17:14	10	16:43	18:09			20:07	21:03	21:50	21:58	21:17	20:09	18:55		16:46	14			16:15 (2)	16:07			
6	08:43		08:05			07:04			06:49	05:42	04:58	05:03	05:47	06:42	07:35		07:34				16:03 (2)	08:26			
	16:21		17:16	14	16:45 (2)	18:11			20:09	21:04	21:51	21:58	21:15	20:06	18:52		16:44	9			16:12 (2)	16:07			
7	08:42		08:03			07:02			06:47	05:40	04:58	05:04	05:49	06:43	07:37		07:36				16:06 (2)	08:28			
	16:22		17:18	17	16:47 (2)	18:13			20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	4			16:10 (2)	16:06			
8	08:42		08:01			07:00			06:44	05:38	04:57	05:05	05:50	06:45	07:39		07:38					08:29			
	16:24		17:20	21	16:50 (2)	18:15			20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41					16:06			
9	08:41		07:59			06:57			06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40				15:39 (3)	08:30			
	16:25		17:22	24	16:52 (2)	18:17			20:15	21:10	21:54	21:55	21:10	19:59	18:45		16:39	3			15:42 (3)	16:05			
10	08:40		07:57			06:55			06:39	05:34	04:56	05:07	05:54	06:49	07:42		07:42				15:35 (3)	08:31			
	16:26		17:24	27	16:54 (2)	18:19			20:17	21:11	21:55	21:55	21:08	19:56	18:43		16:37	11			15:46 (3)	16:05			
11	08:40		07:55			06:53			06:37	05:33	04:56	05:08	05:56	06:50	07:44		07:44				15:33 (3)	08:33			
	16:28		17:26	30	16:56 (2)	18:21			20:19	21:13	21:55	21:54	21:05	19:54	18:40		16:35	15			15:48 (3)	16:05			
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	16:30		17:28	33	16:59 (2)	18:23			20:20	21:15	21:56	21:53	21:03	19:51	18:38	15	17:23 (2)	16	34		17:29 (2)	16:34			
13	08:38		07:51			06:48			06:32	05:29	04:55	05:10	05:59	06:54	07:48		07:47			17:05 (2)	07:47				
	16:31		17:30	36	17:00 (2)	18:25			20:22	21:17	21:57	21:52	21:01	19:49	18:36	21	17:26 (2)	16	32	19	15:50 (3)	16:05			
14	08:37		15:55 (3)	07:49		06:45			06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49			17:03 (2)	07:49				
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	16:34	4	15:59 (3)	17:34	38	17:02 (2)	18:28		20:26	21:20	21:58	21:50	20:57	19:44	18:31	28	17:29 (2)	16	29	22	15:52 (3)	16:04			
16	08:35		15:54 (3)	07:45		06:40			06:25	05:24	04:54	05:14	06:04	06:59	07:54		07:53			16:59 (2)	07:53				
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17	08:34		15:54 (3)	07:43		06:38			06:23	05:22	04:54	05:16	06:06	07:01	07:55		07:55			16:58 (2)	07:55				
	16:38	8	16:02 (3)	17:38	39	17:03 (2)	18:32		20:30	21:23	21:59	21:47	20:53	19:39	18:26	33	17:31 (2)	16	26	23	15:52 (3)	16:05			
18	08:33		15:54 (3)	07:41		06:35			06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57			16:57 (2)	07:57				
	16:40	11	16:05 (3)	17:40	39	17:02 (2)	18:34		20:31	21:25	22:00	21:46	20:51	19:37	18:24	34	17:31 (2)	16	24	21	15:50 (3)	16:05			
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	16:41	13	16:07 (3)	17:42	39	17:02 (2)	18:36		20:33	21:27	22:00	21:45	20:48	19:34	18:22	36	17:32 (2)	16	23	20	15:49 (3)	16:05			
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	16:52	23	16:19 (3)	17:54	32	16:58 (2)	18:47		20:44	21:36	22:01	21:36	20:35	19:19	17:09	39	16:32 (2)	16	9		15:41 (3)	16:08			
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	16:58	21	16:19 (3)	18:00	24	16:54 (2)	18:53		20:50	21:40	22:01	21:32	20:28	19:12	17:02	37	16:31 (2)	16	12	2	15:37 (3)	16:10			
29	08:19		15:59 (3)			07:09			05:56	05:06	04:57	05:34	06:27	07:22	07:18		07:18			15:54 (2)	08:16				
	17:00	19	16:18 (3)			19:54			20:52	21:41	22:01	21:30	20:25	19:09	17:00	35	16:29 (2)	16	12	1	15:36 (3)	16:11			
30	08:17		16:00 (3)			07:06			05:54	05:05	04:58	05:35	06:29	07:24	07:20		07:20			15:54 (2)	08:18				
	17:02	17	16:17 (3)			19:56			20:54	21:43	22:00	21:28	20:23	19:07	16:58	33	16:27 (2)	16	11			08:44			
31	08:15		16:01 (3)			07:04				05:04		05:37	06:31		07:22		07:22			15:55 (2)			08:44		
	17:04	15	16:16 (3)			19:58				21:44		21:27	20:21												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FZ - H182

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44	15:10 (3)	08:14	15:24 (2)	07:16	15:59 (2)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24									08:19	14:59 (3)	
	16:15	27	15:37 (2)	17:06	35	15:59 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54								16:10	35	15:34 (2)
2	08:44	15:11 (3)	08:12	15:25 (2)	07:14	15:58 (2)	07:02	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26			15:08 (2)	08:21						14:58 (3)
	16:16	28	15:39 (2)	17:08	33	15:58 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	8		15:16 (2)	16:09	34					15:32 (2)
3	08:44	15:11 (3)	08:10	15:26 (2)	07:12	15:56 (2)	07:02	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			15:04 (2)	08:22						14:59 (3)
	16:17	28	15:39 (2)	17:10	31	15:57 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16		15:20 (2)	16:08	33					15:32 (2)
4	08:43	15:12 (3)	08:08	15:27 (2)	07:09	15:57 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30			15:01 (2)	08:24						14:59 (3)
	16:18	29	15:41 (2)	17:12	29	15:56 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	21		15:22 (2)	16:08	33					15:32 (2)
5	08:43	15:12 (3)	08:07	15:28 (2)	07:07	15:58 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32			14:59 (2)	08:25						14:59 (3)
	16:19	30	15:42 (2)	17:14	27	15:55 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	25		15:24 (2)	16:07	31					15:30 (2)
6	08:43	15:13 (3)	08:05	15:30 (2)	07:04	15:54 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34			14:58 (2)	08:26						14:59 (3)
	16:21	31	15:44 (2)	17:16	24	15:54 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	27		15:25 (2)	16:07	31					15:30 (2)
7	08:42	15:13 (3)	08:03	15:32 (2)	07:02	15:52 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36			14:56 (2)	08:28						14:59 (3)
	16:22	32	15:45 (2)	17:18	20	15:52 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	30		15:26 (2)	16:06	30					15:29 (2)
8	08:42	15:14 (3)	08:01	15:35 (2)	07:00	15:53 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38			14:55 (2)	08:29						14:59 (3)
	16:24	32	15:46 (2)	17:20	15	15:50 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	32		15:27 (2)	16:06	29					15:28 (2)
9	08:41	15:15 (3)	07:59	15:39 (2)	06:57	15:46 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			14:56 (2)	08:30						15:00 (3)
	16:25	34	15:45 (2)	17:22	7	15:46 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	33		15:29 (2)	16:05	28					15:28 (2)
10	08:40	15:16 (3)	07:57	15:40 (2)	06:55	15:46 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42			14:55 (2)	08:32						15:00 (3)
	16:26	34	15:50 (2)	17:24	18:19	15:46 (2)	17:24	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	35		15:30 (2)	16:05	28					15:28 (2)
11	08:40	15:17 (3)	07:55	15:41 (2)	06:53	15:46 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44			14:54 (2)	08:33						15:00 (3)
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12	08:39	15:18 (3)	07:53	15:42 (2)	06:50	15:46 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46			14:54 (2)	08:34						15:00 (3)
	16:30	34	15:52 (2)	17:28	18:23	15:46 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	37		15:31 (2)	16:05	27					15:27 (2)
13	08:38	15:19 (3)	07:51	15:43 (2)	06:48	15:46 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48			14:53 (2)	08:35						15:00 (3)
	16:31	34	15:53 (2)	17:30	18:25	15:46 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	38		15:31 (2)	16:05	26					15:26 (2)
14	08:37	15:19 (2)	07:49	15:44 (2)	06:45	15:46 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50			14:53 (2)	08:36						15:02 (3)
	16:33	35	15:54 (2)	17:32	18:27	15:46 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	38		15:31 (2)	16:04	25					15:27 (2)
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16	08:35	15:18 (2)	07:45	15:43 (2)	06:40	15:46 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54			14:53 (2)	08:38						15:02 (3)
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	16:49	40	15:59 (2)	17:50	18:43	15:46 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	38		15:33 (2)	16:07	23					15:29 (3)
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	16:50	40	15:59 (2)	17:52	18:45	15:46 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	37		15:33 (2)	16:08	23					15:29 (3)
25	08:25	15:20 (2)	07:25	15:41 (2)	06:18	15:46 (2)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11			14:56 (2)	08:43						15:06 (3)
	16:52	39	15:59 (2)	17:54	18:47	15:46 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	38		15:34 (2)	16:08	24					15:30 (3)
26	08:23	15:20 (2)	07:23	15:41 (2)	06:16	15:46 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13			14:57 (2)	08:43						15:06 (3)
	16:54	39	15:59 (2)	17:56	18:49	15:46 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	37		15:34 (2)	16:09	24					15:30 (3)
27	08:22	15:20 (2)	07:21	15:41 (2)	06:13	15:46 (2)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15			14:58 (2)	08:44						15:08 (3)
	16:56	39	15:59 (2)	17:58	18:51	15:46 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	36		15:34 (2)	16:10	24					15:32 (2)
28	08:20																								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GA - H183

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:07 (3)	08:14		15:19 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24						08:19			14:54 (2)
	16:15	30	15:37 (2)	17:06	35	15:54 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54						16:10	36		15:30 (2)
2	08:44		15:08 (3)	08:12		15:20 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26						08:21			14:55 (2)
	16:16	31	15:39 (2)	17:08	33	15:53 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52						16:09	35		15:30 (2)
3	08:44		15:08 (3)	08:10		15:21 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28					15:01 (2)	08:22			14:56 (3)
	16:17	31	15:39 (2)	17:10	31	15:52 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50		12			15:13 (2)	16:08	34		15:30 (2)
4	08:43		15:09 (3)	08:08		15:23 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30					14:58 (2)	08:24			14:57 (3)
	16:18	32	15:41 (2)	17:12	28	15:51 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48		18			15:16 (2)	16:08	33		15:30 (2)
5	08:43		15:09 (3)	08:07		15:24 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32					14:56 (2)	08:25			14:56 (3)
	16:19	33	15:42 (2)	17:14	26	15:50 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46		22			15:18 (2)	16:07	34		15:30 (2)
6	08:43		15:10 (3)	08:05		15:26 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34					14:54 (2)	08:26			14:57 (3)
	16:21	34	15:44 (2)	17:16	22	15:48 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44		26			15:20 (2)	16:07	33		15:30 (2)
7	08:42		15:11 (3)	08:03		15:29 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36					14:52 (2)	08:28			14:56 (3)
	16:22	34	15:45 (2)	17:18	17	15:46 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43		29			15:21 (2)	16:06	33		15:29 (2)
8	08:42		15:11 (3)	08:01		15:32 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38					14:51 (2)	08:29			14:56 (3)
	16:24	34	15:45 (2)	17:20	11	15:43 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41		31			15:22 (2)	16:06	32		15:28 (2)
9	08:41		15:13 (3)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40					14:51 (2)	08:30			14:57 (3)
	16:25	34	15:47 (2)	17:22			18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39		33			15:24 (2)	16:05	31		15:28 (2)
10	08:40		15:12 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42					14:50 (2)	08:32			14:57 (3)
	16:26	36	15:48 (2)	17:24			18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37		35			15:25 (2)	16:05	31		15:28 (2)
11	08:40		15:12 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44					14:50 (2)	08:33			14:57 (3)
	16:28	36	15:48 (2)	17:26			18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35		35			15:25 (2)	16:05	30		15:27 (2)
12	08:39		15:12 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46					14:49 (2)	08:34			14:57 (3)
	16:30	37	15:49 (2)	17:28			18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34		37			15:26 (2)	16:05	30		15:27 (2)
13	08:38		15:12 (2)	07:51			06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47					14:49 (2)	08:35			14:57 (3)
	16:31	38	15:50 (2)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32		37			15:26 (2)	16:05	29		15:26 (2)
14	08:37		15:13 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49					14:48 (2)	08:36			14:59 (3)
	16:33	37	15:50 (2)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31		39			15:27 (2)	16:04	28		15:27 (2)
15	08:36		15:13 (2)	07:47			06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51					14:48 (2)	08:37			14:58 (3)
	16:34	38	15:51 (2)	17:34			18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29		39			15:27 (2)	16:04	28		15:26 (2)
16	08:35		15:12 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53					14:48 (2)	08:38			14:59 (3)
	16:36	39	15:51 (2)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27		40			15:28 (2)	16:05	27		15:26 (2)
17	08:34		15:12 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55					14:48 (2)	08:39			14:59 (3)
	16:38	40	15:52 (2)	17:38			18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26		40			15:28 (2)	16:05	28		15:27 (2)
18	08:33		15:13 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57					14:48 (2)	08:39			15:00 (3)
	16:40	39	15:52 (2)	17:40			18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24		40			15:28 (2)	16:05	27		15:27 (2)
19	08:32		15:13 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59					14:48 (2)	08:40			15:01 (3)
	16:41	40	15:53 (2)	17:42			06:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23		40			15:28 (2)	16:05	27		15:28 (2)
20	08:31		15:13 (2)	07:36			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00					14:48 (2)	08:41			15:01 (3)
	16:43	40	15:53 (2)	17:44			06:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22		41			15:29 (2)	16:06	26		15:27 (2)
21	08:30		15:14 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02					14:49 (2)	08:41			15:01 (3)
	16:45	40	15:54 (2)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20		40			15:29 (2)	16:06			15:28 (2)
22	08:29		15:13 (2)	07:32			06:25	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04					14:49 (2)	08:42			15:01 (3)
	16:47	41	15:54 (2)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19		40			15:29 (2)	16:06		27	15:28 (2)
23	08:27		15:14 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06					14:49 (2)	08:42			15:03 (3)
	16:49	40	15:54 (2)	17:50			18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18		40			15:29 (2)	16:07	26		15:29 (2)
24	08:26		15:14 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08					14:50 (2)	08:43			15:03 (3)
	16:50	40	15:54 (2)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17		40			15:30 (2)	16:08	26		15:29 (2)
25	08:25		15:15 (2)	07:25			06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09					14:50 (2)	08:43			15:03 (3)
	16:52	40	15:55 (2)	17:54			18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16		40			15:30 (2)	16:08		27	15:30 (2)
26	08:23		15:15 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11					14:51 (2)	08:43			15:03 (3)
	16:54	40	15:55 (2)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14		39			15:30 (2)	16:09		27	15:30 (2)
27	08:22		15:15 (2)	07:21			06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13					14:52 (2)	08:44			15:05 (3)
	16:56	39	15:54 (2)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13		38			15:30 (2)	16:10		27	15:32 (2)
28	08:20		15:16 (2)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14					14:53 (2)	08:44			15:05 (3)
	16:58	39	15:55 (2)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12		37			15:30 (2)	16:10		28	15:33 (2)
29	08:19		15:17 (2)				07:09	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GB - H184

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:06 (3)	08:14	15:18 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24									08:19		14:52 (2)
	16:15	15:37 (2)	17:06	15:52 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54									16:10	37	15:29 (2)
2	08:44	15:07 (3)	08:12	15:19 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26									08:21		14:52 (2)
	16:16	15:39 (2)	17:08	15:51 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52									16:09	36	15:28 (2)
3	08:44	15:07 (3)	08:10	15:20 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28							15:01 (2)	08:22		14:53 (2)	
	16:17	15:39 (2)	17:10	15:50 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50							9	15:10 (2)	16:08	36	15:29 (2)
4	08:43	15:08 (3)	08:08	15:21 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30									14:57 (2)	08:24	14:54 (2)
	16:18	15:41 (2)	17:12	15:49 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48							17	15:14 (2)	16:08	35	15:29 (2)
5	08:43	15:08 (3)	08:07	15:23 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32									14:54 (2)	08:25	14:55 (3)
	16:19	15:42 (2)	17:14	15:48 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46							22	15:16 (2)	16:07	34	15:29 (2)
6	08:43	15:09 (3)	08:05	15:25 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34									14:52 (2)	08:26	14:56 (3)
	16:21	15:43 (2)	17:16	15:46 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44							26	15:18 (2)	16:07	33	15:29 (2)
7	08:42	15:09 (2)	08:03	15:28 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36									14:51 (2)	08:28	14:55 (3)
	16:22	15:43 (2)	17:18	15:44 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43							28	15:19 (2)	16:06	34	15:29 (2)
8	08:42	15:09 (2)	08:01	15:32 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38									14:49 (2)	08:29	14:55 (3)
	16:24	15:44 (2)	17:20	15:39 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41							31	15:20 (2)	16:06	33	15:28 (2)
9	08:41	15:10 (2)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40									14:49 (2)	08:30	14:56 (3)
	16:25	15:46 (2)	17:22		18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39							33	15:22 (2)	16:05	32	15:28 (2)
10	08:40	15:10 (2)	07:57		06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42									14:48 (2)	08:32	14:56 (3)
	16:26	15:46 (2)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37							35	15:23 (2)	16:05	32	15:28 (2)
11	08:40	15:10 (2)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44									14:48 (2)	08:33	14:56 (3)
	16:28	15:47 (2)	17:26		18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35							35	15:23 (2)	16:05	31	15:27 (2)
12	08:39	15:10 (2)	07:53		06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46									14:47 (2)	08:34	14:56 (3)
	16:30	15:47 (2)	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34							37	15:24 (2)	16:05	31	15:27 (2)
13	08:38	15:10 (2)	07:51		06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47									14:47 (2)	08:35	14:56 (3)
	16:31	15:48 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32							38	15:25 (2)	16:05	30	15:26 (2)
14	08:37	15:10 (2)	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49									14:46 (2)	08:36	14:58 (3)
	16:33	15:49 (2)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31							39	15:25 (2)	16:04	29	15:27 (2)
15	08:36	15:10 (2)	07:47		06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51									14:46 (2)	08:37	14:57 (3)
	16:34	15:50 (2)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29							39	15:25 (2)	16:04	29	15:26 (2)
16	08:35	15:10 (2)	07:45		06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53									14:46 (2)	08:38	14:58 (3)
	16:36	15:49 (2)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27							40	15:26 (2)	16:05	28	15:26 (2)
17	08:34	15:10 (2)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55									14:46 (2)	08:39	14:58 (3)
	16:38	15:50 (2)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26							40	15:26 (2)	16:05	29	15:27 (2)
18	08:33	15:11 (2)	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57									14:46 (2)	08:39	14:59 (3)
	16:40	15:51 (2)	17:40		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24							40	15:26 (2)	16:05	28	15:27 (2)
19	08:32	15:11 (2)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59									14:46 (2)	08:40	15:00 (3)
	16:41	15:52 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23							41	15:27 (2)	16:05	28	15:28 (2)
20	08:31	15:11 (2)	07:36		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00									14:46 (2)	08:41	14:59 (3)
	16:43	15:51 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22							41	15:27 (2)	16:06	28	15:27 (2)
21	08:30	15:11 (2)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02									14:46 (2)	08:41	15:00 (3)
	16:45	15:52 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20							41	15:27 (2)	16:06	28	15:28 (2)
22	08:29	15:12 (2)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04									14:47 (2)	08:42	15:00 (3)
	16:47	15:52 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19							40	15:27 (2)	16:06	28	15:28 (2)
23	08:27	15:12 (2)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06									14:47 (2)	08:42	15:01 (3)
	16:49	15:53 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18							41	15:28 (2)	16:07	28	15:29 (2)
24	08:26	15:12 (2)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08									14:48 (2)	08:43	15:01 (3)
	16:50	15:52 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17							40	15:28 (2)	16:08	28	15:29 (2)
25	08:25	15:13 (2)	07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09									14:48 (2)	08:43	15:02 (3)
	16:52	15:53 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16							40	15:28 (2)	16:08	28	15:30 (2)
26	08:23	15:13 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11									14:49 (2)	08:43	15:02 (3)
	16:54	15:53 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14							39	15:28 (2)	16:09	28	15:30 (2)
27	08:22	15:13 (2)	07:21		06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13									14:50 (2)	08:44	15:03 (3)
	16:56	15:52 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13							39	15:29 (2)	16:10	29	15:32 (2)
28	08:20	15:14 (2)	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14									14:50 (2)		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GC - H185

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:09	08:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GD - H186

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	10:59 (2) 08:14	15:41 (1) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	10:50 (2)
2	16:15	11:42 (2) 17:06	16:09 (1) 18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	15:34 (1)
3	08:44	11:00 (2) 08:12	15:42 (1) 07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	10:50 (2)
4	16:16	11:42 (2) 17:08	16:08 (1) 18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	15:33 (1)
5	08:44	11:00 (2) 08:10	15:43 (1) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	10:49 (2)
6	16:17	11:42 (2) 17:10	16:07 (1) 18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08	15:32 (1)
7	08:43	11:01 (2) 08:09	15:44 (1) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	10:49 (2)
8	16:18	11:42 (2) 17:12	16:06 (1) 18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	15:32 (1)
9	08:43	11:01 (2) 08:07	15:46 (1) 07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	10:49 (2)
10	16:20	11:42 (2) 17:14	16:05 (1) 18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	15:30 (1)
11	08:43	11:03 (2) 08:05	15:48 (1) 07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:34	07:34	08:26	10:49 (2)
12	16:21	11:44 (1) 17:16	16:03 (1) 18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	16:07	15:30 (1)
13	08:42	11:03 (2) 08:03	15:51 (1) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	10:49 (2)
14	16:22	11:44 (1) 17:18	16:00 (1) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	15:29 (2)
15	08:42	11:04 (2) 08:01	15:46 (1) 07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	10:49 (2)
16	16:24	11:46 (1) 17:20	16:02 (1) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	15:28 (2)
17	08:41	11:06 (2) 07:59	15:49 (1) 07:01	06:57	05:42	04:57	05:06	05:52	06:47	07:41	07:40	08:30	10:49 (2)
18	16:25	11:49 (1) 17:22	16:04 (1) 18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	15:27 (2)
19	08:40	11:07 (2) 07:57	15:45 (1) 06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32	10:49 (2)
20	16:26	11:50 (1) 17:24	16:06 (1) 18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	15:26 (2)
21	08:40	11:08 (2) 07:55	15:43 (1) 06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	10:49 (2)
22	16:28	11:52 (1) 17:26	16:08 (1) 18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36	16:04	15:25 (2)
23	08:39	11:09 (2) 07:53	15:40 (1) 06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	10:49 (2)
24	16:30	11:54 (1) 17:28	16:10 (1) 18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	16:05	15:23 (2)
25	08:38	11:11 (2) 07:51	15:39 (1) 06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47	08:35	10:50 (2)
26	16:31	11:55 (1) 17:30	16:12 (1) 18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04	15:21 (2)
27	08:37	11:12 (2) 07:49	15:37 (1) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	10:50 (2)
28	16:33	11:57 (1) 17:32	16:14 (1) 18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:02	15:19 (2)
29	08:36	11:14 (2) 07:47	15:34 (1) 06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37	10:51 (2)
30	16:34	11:59 (1) 17:34	16:16 (1) 18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05	15:17 (2)
31	08:35	11:17 (2) 07:45	15:31 (1) 06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38	10:50 (2)
32	16:36	12:01 (1) 17:36	16:18 (1) 18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	15:15 (2)
33	08:34	11:19 (2) 07:43	15:29 (1) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39	10:51 (2)
34	16:38	12:02 (1) 17:38	16:20 (1) 18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05	15:13 (2)
35	08:33	11:24 (2) 07:41	15:26 (1) 06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	10:51 (2)
36	16:40	12:05 (1) 17:40	16:22 (1) 18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:05	15:11 (2)
37	08:32	11:37 (1) 07:39	15:23 (1) 06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	10:52 (2)
38	16:41	12:07 (1) 17:42	16:24 (1) 18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	15:10 (2)
39	08:31	11:36 (1) 07:37	15:21 (1) 06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:41	10:52 (2)
40	16:43	12:07 (1) 17:44	16:26 (1) 18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05	15:10 (2)
41	08:30	11:37 (1) 07:34	15:20 (1) 06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	10:53 (2)
42	16:45	12:08 (1) 17:46	16:28 (1) 18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	15:12 (2)
43	08:29	11:36 (1) 07:32	15:18 (1) 06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42	10:53 (2)
44	16:47	12:09 (1) 17:48	16:30 (1) 18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06	15:12 (2)
45	08:27	11:37 (1) 07:30	15:15 (1) 06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	10:54 (2)
46	16:49	12:10 (1) 17:50	16:32 (1) 18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	16:07	15:13 (2)
47	08:26	11:36 (1) 07:28	15:14 (1) 06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43	10:54 (2)
48	16:51	12:11 (1) 17:52	16:34 (1) 18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:08	15:13 (2)
49	08:25	11:37 (1) 07:25	15:12 (1) 06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09	08:43	10:54 (2)
50	16:52	12:12 (1) 17:54	16:35 (1) 18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:07	16:16	16:08	15:14 (2)
51	08:23	11:37 (1) 07:23	15:10 (1) 06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:43	10:55 (2)
52	16:54	12:13 (1) 17:56	16:36 (1) 18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:07	16:15	16:09	15:15 (2)
53	08:22	11:37 (1) 07:21	15:08 (1) 06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13	08:44	10:56 (2)
54	16:56	12:14 (1) 17:58	16:38 (1) 18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	16:10	15:16 (2)
55	08:20	11:38 (1) 07:19	15:06 (1) 06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14	08:44	10:56 (2)
56	16:58	12:15 (1) 18:00	16:40 (1) 18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	16:11	15:17 (2)
57	08:19	11:39 (1) 07:14	15:04 (1) 06:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16	08:44	10:57 (2)
58	17:00	12:16 (1) 17:59	16:42 (1) 18:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:12	16:11	15:18 (2)
59	08:17	11:39 (1) 07:10	15:02 (1) 06:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	08:44	10:58 (2)
60	17:02	12:17 (1) 17:59	16:44 (1) 18:57	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	16:12	15:19 (2)
61	08:15	11:39 (1) 07:05	15:00 (1) 06:04	07:04	05:04	05:07	05:37	06:31	07:22	08:18	08:16	08:44	10:58 (2)
62	17:04	12:18 (1) 18:00	16:46 (1) 18:59	20:56	21:44	22:01	21:27	20:21	19:05	18:00	16:12	16:13	15:20 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	1377
Total, worst case	1189										856		1377
Sun reduction	0.24										0.27		0.21
Oper. time red.	1.00										1.00		1.00
Wind dir. red.	0.63										0.65		0.60
Total reduction	0.15										0.17		0.13
Total, real	183	22									148		172

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GE - H187

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		[January		[February		[March		[April		[May		[June		[July		[August		[September		[October		[November		[December	
1	08:44		09:22 (2)	08:14		09:40 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19		09:08 (2)						
	16:15	85	15:19 (1)	17:06	28	10:08 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10	86	15:05 (1)						
2	08:44		09:23 (2)	08:12		09:42 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26		08:21		09:08 (2)						
	16:16	84	15:19 (1)	17:08	24	10:06 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09	87	15:06 (1)						
3	08:44		09:23 (2)	08:10		09:44 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22		09:08 (2)						
	16:17	84	15:19 (1)	17:10	19	10:03 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50		16:08	87	15:06 (1)						
4	08:43		09:23 (2)	08:09		09:48 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24		09:09 (2)						
	16:18	85	15:20 (1)	17:12	12	10:00 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48		16:08	86	15:06 (1)						
5	08:43		09:23 (2)	08:07			07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25		09:09 (2)						
	16:20	85	15:20 (1)	17:14			18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46		16:07	85	15:06 (1)						
6	08:43		09:24 (2)	08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:27		09:10 (2)						
	16:21	85	15:21 (1)	17:16			18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44		16:07	85	15:07 (1)						
7	08:42		09:24 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36		08:28		09:10 (2)						
	16:22	85	15:21 (1)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	13	09:17 (2)		15:07 (1)						
8	08:42		09:24 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38		08:29		09:11 (2)						
	16:24	86	15:21 (1)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	19	09:33 (2)	16:06	15:08 (1)						
9	08:41		09:25 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:30		09:12 (2)						
	16:25	86	15:22 (1)	17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	24	09:37 (2)	16:05	15:08 (1)						
10	08:40		09:25 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42		08:32		09:12 (2)						
	16:27	87	15:23 (1)	17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	28	09:39 (2)	16:05	15:09 (1)						
11	08:40		09:26 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44		08:33		09:12 (2)						
	16:28	86	15:23 (1)	17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	30	09:40 (2)	16:05	15:09 (1)						
12	08:39		09:26 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46		08:34		09:13 (2)						
	16:30	86	15:23 (1)	17:28			18:23	20:20	21:15	21:56	21:53	21:04	19:52	18:38	16:34	32	09:41 (2)	16:05	15:09 (1)						
13	08:38		09:26 (2)	07:51			06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47		08:35		09:14 (2)						
	16:31	85	15:23 (1)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	44	09:45 (1)	16:05	15:10 (1)						
14	08:37		09:27 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49		08:36		09:15 (2)						
	16:33	86	15:24 (1)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	52	09:48 (1)	16:05	15:11 (1)						
15	08:36		09:27 (2)	07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51		08:37		09:15 (2)						
	16:34	85	15:24 (1)	17:34			18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	59	09:51 (1)	16:05	15:11 (1)						
16	08:35		09:28 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53		08:38		09:15 (2)						
	16:36	84	15:24 (1)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	63	09:56 (2)	16:05	15:11 (1)						
17	08:34		09:27 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55		08:39		09:16 (2)						
	16:38	83	15:23 (1)	17:38			18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	68	09:54 (1)	16:05	15:11 (1)						
18	08:33		09:28 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57		08:39		09:16 (2)						
	16:40	82	15:23 (1)	17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	71	09:55 (2)	16:05	15:12 (1)						
19	08:32		09:29 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59		08:40		09:17 (2)						
	16:41	81	15:24 (1)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	73	09:56 (2)	16:05	15:13 (1)						
20	08:31		09:29 (2)	07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01		08:41		09:17 (2)						
	16:43	80	15:23 (1)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	76	09:57 (1)	16:06	15:13 (1)						
21	08:30		09:30 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02		08:42		09:18 (2)						
	16:45	77	15:23 (1)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	77	09:58 (1)	16:06	15:13 (1)						
22	08:29		09:30 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		08:42		09:18 (2)						
	16:47	76	15:22 (1)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	80	09:59 (1)	16:06	15:13 (1)						
23	08:27		09:31 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		08:42		09:19 (2)						
	16:49	73	15:22 (1)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	81	09:59 (1)	16:07	15:15 (1)						
24	08:26		09:31 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08		08:43		09:19 (2)						
	16:51	71	15:21 (1)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	83	09:59 (1)	16:08	15:15 (1)						
25	08:25		09:33 (2)	07:25			06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09		08:43		09:19 (2)						
	16:52	67	15:21 (1)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	83	09:59 (1)	16:08	15:15 (1)						
26	08:23		09:33 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11		08:43		09:21 (2)						
	16:54	63	15:19 (1)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15	84	09:59 (1)	16:09	15:16 (1)						
27	08:22		09:34 (2)	07:21			06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13		08:44		09:21 (2)						
	16:56	59	15:19 (1)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	85	09:59 (1)	16:10	15:17 (1)						
28	08:20		09:35 (2)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14		08:44		09:21 (2)						
	16:58	52	15:16 (1)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	85	09:59 (1)	16:11	15:17 (1)						
29	08:19		09:36 (2)				07:09	05:56	05:06	04:57	05:34	06:28	07:23	07:18	08:16		08:44		09:22 (2)						
	17:00	45	15:13 (1)			</																			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last	

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GF - H188

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44		10:59 (2)	08:14		15:37 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24						08:19		10:56 (2)			
	16:15	50	15:37 (1)	17:06	10	15:47 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54						16:10	41	15:33 (1)			
2	08:44		11:00 (2)	08:12			07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26						08:21		10:54 (2)			
	16:16	49	15:38 (1)	17:08			18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52						16:09	45	15:33 (1)			
3	08:44		11:00 (2)	08:10			07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28						08:22		10:52 (2)			
	16:17	51	15:39 (1)	17:10			18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50						16:08	47	15:32 (1)			
4	08:43		11:02 (2)	08:09			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30						08:24		10:52 (2)			
	16:18	50	15:41 (1)	17:12			18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48						16:08	49	15:32 (1)			
5	08:43		11:03 (2)	08:07			07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32						08:25		10:50 (2)			
	16:20	50	15:42 (1)	17:14			18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46						16:07	50	15:30 (1)			
6	08:43		11:04 (2)	08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34						08:27		10:51 (2)			
	16:21	51	15:44 (1)	17:16			18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44						16:07	50	15:30 (1)			
7	08:42		11:05 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36						08:28		10:50 (2)			
	16:22	50	15:45 (1)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43						16:06	49	15:29 (1)			
8	08:42		11:06 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38						08:29		10:50 (2)			
	16:24	49	15:46 (1)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41						16:06	50	15:29 (1)			
9	08:41		11:09 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40						08:30		10:50 (2)			
	16:25	48	15:49 (1)	17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39						16:05	50	15:28 (1)			
10	08:40		11:11 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42						15:08 (1)		08:32			
	16:26	45	15:50 (1)	17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37						15:18 (1)	16:05	50	15:28 (1)		
11	08:40		11:13 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44						15:05 (1)		08:33			
	16:28	42	15:51 (1)	17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36						15:21 (1)	16:05	50	15:27 (1)		
12	08:39		15:21 (1)	07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46						15:04 (1)		08:34			
	16:30	30	15:51 (1)	17:28			18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34						19	15:23 (1)	16:05	50	15:27 (1)	
13	08:38		15:21 (1)	07:51			06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47						15:02 (1)		08:35			
	16:31	31	15:52 (1)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32						22	15:24 (1)	16:05	49	15:27 (1)	
14	08:37		15:21 (1)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49						15:01 (1)		08:36			
	16:33	31	15:52 (1)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31						24	15:25 (1)	16:05	49	15:27 (1)	
15	08:36		15:22 (1)	07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51						15:00 (1)		08:37			
	16:34	31	15:53 (1)	17:34			18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29						26	15:26 (1)	16:05	49	15:27 (1)	
16	08:35		15:22 (1)	07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53						15:00 (1)		08:38			
	16:36	32	15:54 (1)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27						27	15:27 (1)	16:05	48	15:26 (1)	
17	08:34		15:22 (1)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55						14:59 (1)		08:39			
	16:38	31	15:53 (1)	17:38			18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:26	16:26						28	15:27 (1)	16:05	49	15:27 (1)	
18	08:33		15:22 (1)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57						14:59 (1)		08:39			
	16:40	32	15:54 (1)	17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25						29	15:28 (1)	16:05	48	15:27 (1)	
19	08:32		15:23 (1)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59						14:59 (1)		08:40			
	16:41	32	15:55 (1)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23						30	15:29 (1)	16:05	49	15:28 (1)	
20	08:31		15:23 (1)	07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01						14:59 (1)		08:41			
	16:43	31	15:54 (1)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22						30	15:29 (1)	16:06	48	15:27 (1)	
21	08:30		15:24 (1)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02						14:59 (1)		08:41			
	16:45	31	15:55 (1)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20						31	15:30 (1)	16:06	48	15:28 (1)	
22	08:29		15:24 (1)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04						14:59 (1)		08:42			
	16:47	30	15:54 (1)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19						31	15:30 (1)	16:06	48	15:28 (1)	
23	08:27		15:25 (1)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06						14:59 (1)		08:42			
	16:49	30	15:55 (1)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18						32	15:31 (1)	16:07	48	15:29 (1)	
24	08:26		15:25 (1)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08						14:59 (1)		08:43			
	16:51	29	15:54 (1)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17						32	15:31 (1)	16:08	48	15:29 (1)	
25	08:25		15:26 (1)	07:25			06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09						15:00 (1)		08:43			
	16:52	29	15:55 (1)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16						31	15:31 (1)	16:08	48	15:30 (1)	
26	08:23		15:27 (1)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11						15:00 (1)		08:43			
	16:54	27	15:54 (1)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15						32	15:32 (1)	16:09	48	15:31 (1)	
27	08:22		15:27 (1)	07:21			06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13						15:01 (1)		08:44			
	16:56	26	15:53 (1)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13						31	15:32 (1)	16:10	49	15:32 (1)	
28	08:20		15:29 (1)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14						15:01 (1)		08:44			
	16:58	24	15:53 (1)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12						32	15:33 (1)	16:11	49	15:33 (1)	
29	08:19		15:30 (1)				07:09	05:56	05:06	04:57	05:34	06:28	07:22	07:18	08:16						15:01 (1)		08:44			
	17:00	22	15:52 (1)				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12						31	15:32 (1)	16:11	49	15:34 (1)	
30	08:17		15:32 (1)				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18						15:02 (1)		08:44			
	17:02	19	15:51 (1)				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11						30	15:32 (1)	16:12	49	15:35 (1)	
31	08:15		15:34 (1)				07:04		05:04																	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GG - H189

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	11:35 (2)	08:14	15:48 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24									08:19		15:30 (1)
	16:15	12:06 (2)	17:06	16:14 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54									16:10	4	15:34 (1)
2	08:44	11:36 (2)	08:12	15:49 (1)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26									08:21		11:33 (2)
	16:16	12:06 (2)	17:08	16:13 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52									16:09	10	15:33 (1)
3	08:44	11:37 (2)	08:10	15:50 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28									08:22		11:30 (2)
	16:17	12:06 (2)	17:10	16:13 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50									16:08	15	11:45 (2)
4	08:43	11:38 (2)	08:09	15:51 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30									15:27 (1)		11:29 (2)
	16:18	12:06 (2)	17:12	16:12 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48									15:36 (1)		11:47 (2)
5	08:43	11:39 (2)	08:07	15:52 (1)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32									15:24 (1)		11:28 (2)
	16:19	12:05 (2)	17:14	16:10 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46									15:38 (1)		11:49 (2)
6	08:43	11:41 (2)	08:05	15:55 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34									15:22 (1)		11:27 (2)
	16:21	12:05 (2)	17:16	16:08 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44									15:40 (1)		11:47 (2)
7	08:42	11:42 (2)	08:03	15:58 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36									15:20 (1)		11:26 (2)
	16:22	12:04 (2)	17:18	16:05 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43									15:41 (1)		11:52 (2)
8	08:42	11:44 (2)	08:01	16:00	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38									15:19 (1)		11:26 (2)
	16:24	12:02 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	21:20	20:01	18:48	16:41									15:42 (1)		11:54 (2)
9	08:41	11:47 (2)	07:59	16:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	07:40									15:19 (1)		11:26 (2)
	16:25	12:02 (2)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	21:10	19:59	18:45	16:39									15:44 (1)		11:55 (2)
10	08:40	11:50 (2)	07:57	16:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	07:42									15:19 (1)		11:25 (2)
	16:26	15:50 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	21:08	19:56	18:43	16:37									15:45 (1)		11:55 (2)
11	08:40	15:48 (1)	07:55	16:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	07:44									15:18 (1)		11:25 (2)
	16:28	15:52 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	21:06	19:54	18:40	16:36									15:45 (1)		11:56 (2)
12	08:39	15:47 (1)	07:53	16:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	07:46									15:18 (1)		11:25 (2)
	16:30	15:54 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	21:03	19:52	18:38	16:34									15:46 (1)		11:57 (2)
13	08:38	15:46 (1)	07:51	16:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	07:47									15:17 (1)		11:26 (2)
	16:31	15:55 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	21:01	19:49	18:36	16:32									15:46 (1)		11:59 (2)
14	08:37	15:46 (1)	07:49	16:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	07:49									15:17 (1)		11:26 (2)
	16:33	15:57 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	20:59	19:47	18:33	16:31									15:47 (1)		11:59 (2)
15	08:36	15:45 (1)	07:47	16:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	07:51									15:17 (1)		11:26 (2)
	16:34	15:59 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	20:57	19:44	18:31	16:29									15:47 (1)		11:55 (2)
16	08:35	15:45 (1)	07:45	16:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	07:53									15:17 (1)		11:25 (2)
	16:36	16:01 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	20:55	19:42	18:29	16:27									15:47 (1)		11:55 (2)
17	08:34	15:44 (1)	07:43	16:38	06:23	05:22	04:54	05:16	06:06	06:06	07:01	07:56	07:55									15:17 (1)		11:26 (2)
	16:38	16:02 (1)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	20:53	19:39	18:26	16:26									15:47 (1)		11:55 (2)
18	08:33	15:44 (1)	07:41	16:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	07:57									15:18 (1)		11:26 (2)
	16:40	16:05 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	20:51	19:37	18:24	16:25									15:47 (1)		11:55 (2)
19	08:32	15:45 (1)	07:39	16:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	07:59									15:18 (1)		11:27 (2)
	16:41	16:07 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	20:48	19:34	18:22	16:23									15:47 (1)		11:55 (2)
20	08:31	15:44 (1)	07:37	16:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:01									15:19 (1)		11:27 (2)
	16:43	16:08 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	20:46	19:32	18:20	16:22									15:47 (1)		11:55 (2)
21	08:30	15:44 (1)	07:34	16:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:03	08:03									15:19 (1)		11:28 (2)
	16:45	16:11 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	20:44	19:29	18:17	16:20									15:46 (1)		11:56 (2)
22	08:29	15:44 (1)	07:32	16:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:04									15:20 (1)		11:28 (2)
	16:47	16:12 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	20:42	19:27	18:15	16:19									15:44 (1)		11:55 (2)
23	08:27	15:44 (1)	07:30	16:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:06									15:21 (1)		11:29 (2)
	16:49	16:13 (1)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	20:39	19:24	18:13	16:18									15:43 (1)		11:55 (2)
24	08:26	15:44 (1)	07:28	16:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:08									15:21 (1)		11:29 (2)
	16:51	16:13 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	20:37	19:22	18:11	16:17									15:42 (1)		11:55 (2)
25	08:25	15:44 (1)	07:25	16:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09	08:09									15:22 (1)		11:29 (2)
	16:52	16:14 (1)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	20:35	19:19	17:09	16:16									15:41 (1)		11:55 (2)
26	08:23	15:44 (1)	07:23	16:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:11									15:23 (1)		11:31 (2)
	16:54	16:14 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	20:32	19:17	17:07	16:14									15:39 (1)		11:55 (2)
27	08:22	15:44 (1)	07:21	16:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13	08:13									15:25 (1)		11:31 (2)
	16:56	16:14 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	20:30	19:14	17:04	16:13									15:38 (1)		11:55 (2)
28	08:20	15:45 (1)	07:19	16:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14	08:14									15:26 (1)		11:32 (2)
	16:58	16:15 (1)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	20:28	19:12	17:02	16:12									15:37 (1)		11:55 (2)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GH - H190

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:04
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:11 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:41	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GI - H191

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February	March	April	May	June	July	August	September	October	November	December			
1	08:44	15:00 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:50 (2)		
2	16:15	24	15:24 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	17	15:07 (2)
	08:44		15:01 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	18	14:49 (2)
3	16:16	23	15:24 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	18	15:07 (2)
	08:44		15:01 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	19	14:49 (2)
4	16:17	23	15:24 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	19	15:08 (2)
	08:43		15:02 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	20	14:50 (2)
5	16:18	23	15:25 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	20	15:10 (2)
	08:43		15:02 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	21	14:49 (2)
6	16:19	22	15:24 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	21	15:10 (2)
	08:43		15:03 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	22	14:50 (2)
7	16:21	22	15:25 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:07	21	15:11 (2)
	08:42		15:04 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	22	14:49 (2)
8	16:22	21	15:25 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	22	15:11 (2)
	08:42		15:04 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	23	14:49 (2)
9	16:23	21	15:25 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	23	15:12 (2)
	08:41		15:06 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	24	14:50 (2)
10	16:25	19	15:25 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	23	15:13 (2)
	08:40		15:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	24	14:50 (2)
11	16:26	18	15:25 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	23	15:13 (2)
	08:40		15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33	24	14:50 (2)
12	16:28	17	15:25 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05	24	15:14 (2)
	08:39		15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	24	14:50 (2)
13	16:29	15	15:24 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	24	15:14 (2)
	08:38		15:11 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	24	14:50 (2)
14	16:31	12	15:23 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04	25	15:15 (2)
	08:37		15:13 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	25	14:52 (2)
15	16:33	9	15:22 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04	24	15:16 (2)
	08:36		15:16 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37	25	14:51 (2)
16	16:34	4	15:20 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	25	15:16 (2)
	08:35		15:07 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	25	14:52 (2)
17	16:36		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	24	15:16 (2)	
	08:34		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39	25	14:52 (2)	
18	16:38		17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05	25	15:17 (2)	
	08:33		07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	25	14:53 (2)	
19	16:39		17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05	25	15:18 (2)	
	08:32		07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	25	14:54 (2)	
20	16:41		17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	24	15:18 (2)	
	08:31		07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00	08:41	25	14:54 (2)	
21	16:43		17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05	24	15:18 (2)	
	08:30		07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	25	14:54 (2)	
22	16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	25	15:19 (2)	
	08:29		07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42	25	14:54 (2)	
23	16:47		17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06	25	15:19 (2)	
	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	25	14:56 (2)	
24	16:49		17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07	24	15:20 (2)	
	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43	24	14:56 (2)	
25	16:50		17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07	24	15:20 (2)	
	08:25		07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	08:11	08:09	08:43	24	14:56 (2)	
26	16:52		17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:15	16:08	25	15:21 (2)	
	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:43	24	14:56 (2)	
27	16:54		17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14	16:09	25	15:21 (2)	
	08:22		07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13	14:55 (2)	25	14:58 (2)	
28	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	14:59 (2)	24	15:22 (2)	
	08:20		07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	14:53 (2)	24	14:58 (2)	
29	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	15:02 (2)	24	15:22 (2)	
	08:19		07:08	05:56	05:06	04:57	04:57	05:34	06:27	07:22	08:18	08:16	14:51 (2)	24	14:59 (2)	
30	17:00		19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	15:03 (2)	16:11	24	15:23 (2)	
	08:17		07:06	05:54	05:05	04:58	04:58	05:35	06:29	07:24	08:20	08:18	14:50 (2)	24	14:59 (2)	
31	17:02		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	15:05 (2)	16:12	24	15:23 (2)	
	08:15		07:04	05:54	05:04	04:57	04:57	05:37	06:31	07:22	08:18	08:16	14:49 (2)	24	14:59 (2)	
	17:04		19:58	20:56	21:44	22:00	21:27	20:21	19:05	16:56	16:13	15:07 (2)	16:13	24	15:23 (2)	
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	233	719		
Total, worst case	273											40		719		
Sun reduction	0.24											0.27		0.21		
Oper. time red.	1.00											1.00		1.00		
Wind dir. red.	0.65											0.65		0.65		
Total reduction	0.16											0.17		0.13		
Total, real	43											7		96		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GJ - H192

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	14:59 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	15:22 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54
3	08:44	15:00 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26
4	16:16	15:23 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
5	08:44	15:00 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
6	16:17	15:23 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50
7	08:43	15:01 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30
8	16:18	15:23 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48
9	08:43	15:02 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32
10	16:19	15:23 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46
11	08:43	15:03 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34
12	16:21	15:24 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44
13	08:42	15:04 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36
14	16:22	15:23 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:42
15	08:42	15:04 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38
16	16:23	15:23 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41
17	08:41	15:06 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40
18	16:25	15:24 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39
19	08:40	15:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42
20	16:26	15:23 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37
21	08:40	15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44
22	16:28	15:23 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35
23	08:39	15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46
24	16:29	15:22 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34
25	08:38	15:11 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47
26	16:31	15:21 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32
27	08:37	15:14 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49
28	16:33	15:19 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30
29	08:36	17:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	07:51
30	16:34	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:29
31	08:35	17:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	07:53
32	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:27
33	08:34	17:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	07:55
34	16:38	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:26
35	08:33	17:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	07:57
36	16:39	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:24
37	08:32	17:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	07:59
38	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:23
39	08:31	17:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00	08:00
40	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:22
41	08:30	17:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:02
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:20
43	08:29	17:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:04
44	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:19
45	08:27	17:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:06
46	16:49	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:18
47	08:26	17:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:08
48	16:50	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:17
49	08:25	17:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	07:11	08:09	08:09
50	16:52	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:15	16:15
51	08:23	17:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:11
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	16:14
53	08:22	17:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:13
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:13
55	08:20	17:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	08:14
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16:12
57	08:19	17:08	05:56	05:06	04:57	04:57	05:34	06:27	07:22	07:18	08:16	08:16
58	17:00	19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	15:01 (2)	16:11
59	08:17	17:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	14:51 (2)	08:44
60	17:02	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	15:03 (2)	16:12
61	08:15	17:04	07:04	06:04	05:04	05:37	06:31	07:26	07:22	08:20	14:51 (2)	08:44
62	17:04	19:58	21:44	21:44	21:44	21:27	20:21	19:05	16:56	16:13	15:04 (2)	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	248										27	695
Sun reduction	0.24										0.27	0.21
Oper. time red.	1.00										1.00	1.00
Wind dir. red.	0.65										0.65	0.65
Total reduction	0.16										0.17	0.13
Total, real	39										5	93

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GK - H193

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GL - H194

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GM - H195

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GN - H196

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March		April	May	June	July	August	September	October		November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	5	07:41 (1) 07:46 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18		08:10 (1) 08:20 (1)	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	8	07:39 (1) 07:47 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	10	08:06 (1) 08:21 (1)	07:26 16:52
3	08:44 16:17	08:10 17:10	07:12 18:06	11	07:36 (1) 07:47 (1)	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	15	08:05 (1) 08:22 (1)	07:28 16:50
4	08:43 16:18	08:09 17:12	07:09 18:08	14	07:34 (1) 07:48 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	17	08:04 (1) 08:23 (1)	07:30 16:48
5	08:43 16:20	08:07 17:14	07:07 18:10	16	07:31 (1) 07:47 (1)	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	19	08:03 (1) 08:24 (1)	07:32 16:46
6	08:43 16:21	08:05 17:16	07:05 18:12	19	07:29 (1) 07:48 (1)	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	21	08:02 (1) 08:24 (1)	07:34 16:45
7	08:42 16:22	08:03 17:18	07:02 18:13	21	07:27 (1) 07:48 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	22	08:04 (1) 08:24 (1)	07:36 16:43
8	08:42 16:24	08:01 17:20	07:00 18:15	22	07:25 (1) 07:47 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	20	08:06 (1) 08:24 (1)	07:38 16:41
9	08:41 16:25	07:59 17:22	06:58 18:17	20	07:26 (1) 07:46 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	18	08:07 (1) 08:22 (1)	07:40 16:39
10	08:41 16:27	07:57 17:24	06:55 18:19	19	07:26 (1) 07:45 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	06:49 21:08	07:43 19:57	15	08:22 (1) 08:22 (1)	07:42 16:37
11	08:40 16:28	07:55 17:26	06:53 18:21	16	07:28 (1) 07:44 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	06:51 21:06	07:45 19:54	13	08:11 (1) 08:21 (1)	07:44 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	12	07:29 (1) 07:41 (1)	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	06:52 21:04	07:46 19:52	10	08:13 (1) 08:20 (1)	07:46 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	4	07:33 (1) 07:37 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	06:54 21:02	07:48 19:49	7	08:15 (1) 08:18 (1)	07:48 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27		06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	3	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29		06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31		07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31		06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29		07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32		06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27		07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34		06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24		07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22		07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20		08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18		08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44		06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13		08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11		08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09		08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49		06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07		08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51		06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05		08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53		05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02		08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55		05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00		08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57		05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58		08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58			05:04 21:44		05:37 21:27	06:31 20:21	07:23 16:56			08:19 16:14	08:44 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328		259	233
Total, worst case			187								190			
Sun reduction			0.27								0.29			
Oper. time red.			1.00								1.00			
Wind dir. red.			0.65								0.65			
Total reduction			0.18								0.19			
Total, real			33								36			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GO - H197

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 18:00 (1)	05:52 20:00	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 18:00 (1)	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 18:00 (1)	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 17:58 (1)	05:46 20:06	05:00 21:01	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 17:57 (1)	05:44 20:08	04:59 21:03	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 17:55 (1)	05:42 20:10	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:22 (1) 16:45	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 17:53 (1)	05:40 20:11	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:18 (1) 16:43	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 18:00	05:38 20:13	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	08:22 (1) 16:41	07:38 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:32 (1) 16:39	07:40 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:58	05:54 21:08	06:49 19:57	07:43 18:43	08:33 (1) 16:37	07:42 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	08:33 (1) 16:36	07:44 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:33 (1) 16:34	07:46 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:33 (1) 16:32	07:48 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:33 (1) 16:31	07:50 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:33 (1) 16:29	07:51 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	08:33 (1) 16:28	07:53 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	08:33 (1) 16:26	07:55 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:33 (1) 16:25	07:57 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	08:33 (1) 16:23	07:59 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:33 (1) 16:22	08:01 16:06
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:15 18:02	08:33 (1) 16:13	08:15 16:11
29	08:19 17:00	07:09 18:00	06:09 18:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:16 18:00	08:33 (1) 16:12	08:16 16:12
30	08:17 17:02	07:06 18:00	06:06 18:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	08:18 18:00	08:33 (1) 16:11	08:18 16:13
31	08:16 17:04	07:04 18:00	06:04 18:58	05:54 20:58	05:04 21:44	04:57 22:01	05:37 21:27	06:31 20:21	07:23 18:56	08:19 18:00	08:33 (1) 16:10	08:19 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction		59	120							181		
Oper. time red.		0.23	0.27							0.29		
Wind dir. red.		1.00	1.00							1.00		
Total reduction		0.65	0.65							0.65		
Total, real		0.15	0.18							0.19		
		9	21							34		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GP - H198

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
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31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GQ - H199

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:40 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GR - H200

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February		March	April	May	June	July	August	September	October		November		December
1	08:44	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24	07:54 (1)	08:19
2	16:15	17:06		18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05		16:54	23 08:17 (1)	16:10
3	08:44	08:12	2	08:40 (1)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	07:56 (1)	08:21
4	16:16	17:08	2	08:42 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	21 08:17 (1)	16:09
5	08:44	08:10	5	08:38 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28	07:58 (1)	08:22
6	16:17	17:10	5	08:43 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	18 08:16 (1)	16:09
7	08:43	08:09		08:36 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:00 (1)	08:24
8	16:18	17:12	8	08:44 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16 08:16 (1)	16:08
9	08:43	08:07		08:34 (1)	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32	08:02 (1)	08:25
10	16:20	17:14	11	08:45 (1)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	13 08:15 (1)	16:07
11	08:43	08:05		08:32 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:04 (1)	08:27
12	16:21	17:16	14	08:46 (1)	18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45	11 08:15 (1)	16:07
13	08:42	08:03		08:30 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:06 (1)	08:28
14	16:22	17:18	16	08:46 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	8 08:14 (1)	16:06
15	08:42	08:01		08:28 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:09 (1)	08:29
16	16:24	17:20	19	08:47 (1)	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:41	5 08:14 (1)	16:06
17	08:41	07:59		08:26 (1)	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:11 (1)	08:31
18	16:25	17:22	21	08:47 (1)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	2 08:13 (1)	16:05
19	08:41	07:57		08:24 (1)	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42		08:32
20	16:27	17:24	23	08:47 (1)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37		16:05
21	08:40	07:55		08:22 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44		08:33
22	16:28	17:26	25	08:47 (1)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36		16:05
23	08:39	07:53		08:23 (1)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46		08:34
24	16:30	17:28	24	08:47 (1)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34		16:05
25	08:38	07:51		08:23 (1)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48		08:35
26	16:31	17:30	24	08:47 (1)	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32		16:05
27	08:37	07:49		08:23 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50		08:36
28	16:33	17:32	22	08:45 (1)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31		16:05
29	08:37	07:47		08:24 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51		08:37
30	16:35	17:34	20	08:44 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29		16:05
31	08:36	07:45		08:26 (1)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53		08:38
32	16:36	17:36	17	08:43 (1)	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28		16:05
33	08:35	07:43		08:28 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55		08:39
34	16:38	17:38	13	08:41 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26		16:05
35	08:34	07:41		08:31 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57		08:39
36	16:40	17:40	8	08:39 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25		16:05
37	08:32	07:39		06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59	07:59		08:40
38	16:41	17:42		18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22		16:23		16:05
39	08:31	07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01	08:01		08:41
40	16:43	17:44		18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20		16:22		16:06
41	08:30	07:34		06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:03	08:02		08:41
42	16:45	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18		16:21		16:06
43	08:29	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:05	08:04		08:42
44	16:47	17:48		18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15		16:19		16:07
45	08:27	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:06		08:43
46	16:49	17:50		18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13		16:18		16:07
47	08:26	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:08		08:43
48	16:51	17:52		18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	10 08:59 (1)	16:17		16:08
49	08:25	07:26		06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:10		08:10		08:43
50	16:53	17:54		18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	14 08:11 (1)	16:16		16:08
51	08:23	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		08:11		08:44
52	16:54	17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	18 08:13 (1)	16:15		16:09
53	08:22	07:21		06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15		08:13		08:44
54	16:56	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	20 08:14 (1)	16:14		16:10
55	08:20	07:19		06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17		08:15		08:44
56	16:58	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	22 08:15 (1)	16:13		16:11
57	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19		08:16		08:44
58	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	23 08:15 (1)	16:12		16:12
59	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21		08:18		08:44
60	17:02			19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	25 08:17 (1)	16:11		16:13
61	08:16			07:04		05:04		05:37	06:31		07:22		08:44		
62	17:04			19:58		21:44		21:27	20:21		16:56	25 08:17 (1)			16:14
Potential sun hours	250	273		367	420	494	510	512	460	382	328		259		233
Total, worst case			272									157	117		
Sun reduction			0.23									0.29	0.27		
Oper. time red.			1.00									1.00	1.00		
Wind dir. red.			0.62									0.62	0.62		
Total reduction			0.14									0.18	0.16		
Total, real			39									29	19		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GS - H201

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GT - H202

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GU - H203

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GV - H204

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GW - H205

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GX - H206

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GY - H207

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GZ - H208

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HA - H209

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HB - H210

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HC - H211

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HD - H212

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HE - H213

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HF - H214

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HG - H215

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HH - H216

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HI - H217

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
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5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HJ - H218

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HK - H219

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HL - H220

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:22 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HM - H221

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HN - H222

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HO - H223

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HP - H224

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Sun reduction												
Oper. time red.												
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Total reduction												
Total, real												

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Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HQ - H225

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24	16:11	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HR - H226

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December						
1	08:44	08:14	07:16	07:01	05:52	05:03	05:33 (5)	04:59	05:32 (5)	05:39	06:33	07:26	07:24	08:19				
2	16:15	17:06	18:02	20:00	20:55	21:45	26	05:59 (5)	22:00	35	06:07 (5)	21:25	20:18	19:05	16:54	16:10		
	08:44	08:12	07:14	06:59	05:50	05:02		05:33 (5)	05:00		05:33 (5)	05:40	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	21:46	27	06:00 (5)	22:00	34	06:07 (5)	21:23	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	06:56	05:48	05:01		05:32 (5)	05:00		05:33 (5)	05:42	06:36	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	21:48	28	06:00 (5)	21:59	34	06:07 (5)	21:21	20:14	19:00	16:50	16:09		
	08:43	08:08	07:09	06:54	05:46	05:00		05:31 (5)	05:01		05:34 (5)	05:44	06:38	07:32	07:30	08:24		
4	16:18	17:12	18:08	20:06	21:01	21:49	29	06:00 (5)	21:59	33	06:07 (5)	21:19	20:11	18:57	16:48	16:08		
	08:43	08:07	07:07	06:52	05:44	04:59		05:31 (5)	05:02		05:35 (5)	05:46	06:40	07:33	07:32	08:25		
	16:20	17:14	18:10	20:08	21:03	21:50	30	06:01 (5)	21:58	32	06:07 (5)	21:17	20:09	18:55	16:46	16:07		
6	08:43	08:05	07:05	06:49	05:42	04:59		05:30 (5)	05:03		05:36 (5)	05:47	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	21:51	31	06:01 (5)	21:58	31	06:07 (5)	21:15	20:06	18:53	16:45	16:07		
	08:42	08:03	07:02	06:47	05:40	04:58		05:30 (5)	05:04		05:37 (5)	05:49	06:44	07:37	07:36	08:28		
8	16:22	17:18	18:13	20:11	21:06	21:52	32	06:02 (5)	21:57	31	06:08 (5)	21:14	20:04	18:50	16:43	16:06		
	08:42	08:01	07:00	06:44	05:38	04:57		05:29 (5)	05:05		05:38 (5)	05:51	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	21:53	33	06:02 (5)	21:56	30	06:08 (5)	21:12	20:01	18:48	16:41	16:06		
9	08:41	07:59	06:57	06:42	05:36	04:57		05:29 (5)	05:06		05:39 (5)	05:52	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	21:54	33	06:02 (5)	21:55	29	06:08 (5)	21:10	19:59	18:45	16:39	16:06		
	08:40	07:57	06:55	06:40	05:35	04:56		05:28 (5)	05:07		05:40 (5)	05:54	06:49	07:43	07:42	08:31		
11	16:27	17:24	18:19	20:17	21:11	21:55	34	06:02 (5)	21:55	28	06:08 (5)	21:08	19:56	18:43	16:37	16:05		
	08:40	07:55	06:53	06:37	05:33	04:56		05:28 (5)	05:08		05:41 (5)	05:56	06:51	07:44	07:44	08:33		
	16:28	17:26	18:21	20:19	21:13	21:55	35	06:03 (5)	21:54	26	06:07 (5)	21:06	19:54	18:41	16:36	16:05		
12	08:39	07:53	06:50	06:35	05:31	04:56		05:28 (5)	05:09		05:42 (5)	05:58	06:52	07:46	07:46	08:34		
	16:30	17:28	18:23	20:20	21:15	21:56	35	06:03 (5)	21:53	25	06:07 (5)	21:03	19:52	18:38	16:34	16:05		
	08:38	07:51	06:48	06:32	05:29	04:55		05:27 (5)	05:11		05:43 (5)	05:59	06:54	07:48	07:47	08:35		
13	16:31	17:30	18:25	20:22	21:17	21:57	36	06:03 (5)	21:52	24	06:07 (5)	21:01	19:49	18:36	16:32	16:05		
	08:37	07:49	06:45	06:30	05:27	04:55		05:27 (5)	05:12		05:44 (5)	06:01	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:18	21:58	36	06:03 (5)	21:51	23	06:07 (5)	20:59	19:47	18:34	16:31	16:05		
15	08:36	07:47	06:43	06:28	05:26	04:55		05:27 (5)	05:13		05:45 (5)	06:03	06:58	07:52	07:51	08:37		
	16:35	17:34	18:29	20:26	21:20	21:58	36	06:03 (5)	21:50	21	06:06 (5)	20:57	19:44	18:31	16:29	16:05		
	08:35	07:45	06:40	06:25	05:24	04:55		05:27 (5)	05:14		05:47 (5)	06:05	06:59	07:54	07:53	08:38		
17	16:36	17:36	18:30	20:28	21:22	21:59	37	06:04 (5)	21:49	20	06:07 (5)	20:55	19:42	18:29	16:28	16:05		
	08:34	07:43	06:38	06:23	05:22	04:54		05:27 (5)	05:16		05:48 (5)	06:06	07:01	07:56	07:55	08:38		
	16:38	17:38	18:32	20:30	21:23	21:59	37	06:04 (5)	21:47	18	06:06 (5)	20:53	19:39	18:27	16:26	16:05		
18	08:33	07:41	06:36	06:21	05:21	04:54		05:27 (5)	05:17		05:49 (5)	06:08	07:03	07:57	07:57	08:39		
	16:40	17:40	18:34	20:32	21:25	22:00	37	06:04 (5)	21:46	16	06:05 (5)	20:51	19:37	18:24	16:25	16:05		
	08:32	07:39	06:33	06:18	05:19	04:54		05:27 (5)	05:19		05:50 (5)	06:10	07:05	07:59	07:59	08:40		
20	16:41	17:42	18:36	20:33	21:27	3	05:51 (5)	22:00	37	06:04 (5)	21:45	15	06:05 (5)	20:48	19:34	18:22	16:23	16:05
	08:31	07:37	06:31	06:16	05:18	04:54		05:27 (5)	05:20		05:52 (5)	06:12	07:06	08:01	08:00	08:41		
	16:43	17:44	18:38	20:35	21:28	5	05:51 (5)	22:00	37	06:04 (5)	21:44	13	06:05 (5)	20:46	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	04:55		05:27 (5)	05:21		05:53 (5)	06:13	07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	21:30	8	05:53 (5)	22:01	38	06:05 (5)	21:42	11	06:04 (5)	20:44	19:29	18:18	16:21	16:06
	08:29	07:32	06:26	06:12	05:15	04:55		05:28 (5)	05:23		05:55 (5)	06:15	07:10	08:05	08:04	08:42		
22	16:47	17:48	18:42	20:39	21:31	10	05:54 (5)	22:01	37	06:05 (5)	21:41	9	06:04 (5)	20:42	19:27	18:15	16:19	16:07
	08:27	07:30	06:23	06:09	05:13	04:53 (5)	04:55		05:28 (5)	05:24		05:56 (5)	06:17	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	21:33	12	05:55 (5)	22:01	37	06:05 (5)	21:39	7	06:03 (5)	20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	04:51 (5)	04:55		05:28 (5)	05:26		05:57 (5)	06:19	07:14	08:09	08:08	08:43	
	16:51	17:52	18:45	20:43	21:34	14	05:55 (5)	22:01	37	06:05 (5)	21:38	4	06:01 (5)	20:37	19:22	18:11	16:17	16:08
	08:25	07:25	06:18	06:05	05:11	04:50 (5)	04:56		05:29 (5)	05:27		05:59 (5)	06:21	07:15	08:11	08:09	08:43	
25	16:53	17:54	18:47	20:44	21:36	16	05:56 (5)	22:01	37	06:06 (5)	21:36	2	06:01 (5)	20:35	19:19	17:09	16:16	16:08
	08:23	07:23	06:16	06:03	05:09	04:59 (5)	04:56		05:29 (5)	05:29			06:22	07:17	08:13	08:11	08:43	
	16:54	17:56	18:49	20:46	21:37	17	05:56 (5)	22:01	37	06:06 (5)	21:35		20:32	19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08	04:58 (5)	04:57		05:30 (5)	05:31		06:24	07:19	08:15	08:13	08:44		
	16:56	17:58	18:51	20:48	21:39	19	05:57 (5)	22:01	37	06:07 (5)	21:33		20:30	19:14	17:04	16:14	16:10	
	08:20	07:19	06:11	05:59	05:07	04:57 (5)	04:57		05:30 (5)	05:32		06:26	07:21	08:17	08:14	08:44		
28	16:58	18:00	18:53	20:50	21:40	20	05:57 (5)	22:01	36	06:06 (5)	21:32		20:28	19:12	17:02	16:13	16:11	
	08:19		07:09	05:56	05:06	04:58 (5)	04:58		05:31 (5)	05:34		06:28	07:23	08:18	08:16	08:44		
	17:00		19:55	20:52	21:41	22	05:58 (5)	22:01	36	06:07 (5)	21:30		20:25	19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05	04:58 (5)	04:58		05:31 (5)	05:35		06:29	07:24	08:20	08:18	08:44		
	17:02		19:56	20:54	21:43	23	05:58 (5)	22:00	35	06:06 (5)	21:28		20:23	19:07	16:58	16:11	16:13	
	08:15		07:04		05:04	04:54 (5)				05:37		06:31		07:22	07:22	08:44		
	17:04		19:58		21:44	25	05:59 (5)			21:27		20:21		16:56		16:14		
Potential sun hours	250	273	367	420	494	510		512		460		382		328		259		233
Total, worst case					194		1033		551									
Sun reduction					0.38		0.32		0.32									
Oper. time red.					1.00		1.00		1.00									
Wind dir. red.					0.66		0.66		0.66									
Total reduction					0.25		0.21		0.21									
Total, real					49		217		117									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: HS - H227

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:57 (5) 08:01 (5)	05:52 20:55
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	13 06:31 (4) 05:02
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	14 06:30 (4) 05:01
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	15 06:29 (4) 21:48
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	16 06:28 (4) 21:49
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	1 05:32 (3) 05:31 (3)
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	3 05:34 (3) 05:30 (3)
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	4 05:34 (3) 05:29 (3)
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	5 05:34 (3) 05:29 (3)
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	6 05:35 (3) 05:28 (3)
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	7 05:35 (3) 05:28 (3)
12	08:39 16:30	07:53 17:28	06:50 18:23	07:14 (5) 20:20	05:31 21:15	8 05:36 (3) 05:28 (3)
13	08:38 16:31	07:51 17:30	06:48 18:25	07:12 (5) 20:22	05:29 21:17	9 05:36 (3) 05:27 (3)
14	08:37 16:33	07:49 17:32	06:45 18:27	07:09 (5) 20:24	05:27 21:18	10 05:37 (3) 05:27 (3)
15	08:36 16:35	07:47 17:34	06:43 18:29	07:07 (5) 20:26	05:26 21:20	11 05:38 (3) 05:27 (3)
16	08:35 16:36	07:45 17:36	06:40 18:30	07:04 (5) 20:28	05:24 21:22	12 05:38 (3) 05:27 (3)
17	08:34 16:38	07:43 17:38	06:38 18:32	07:02 (5) 20:30	05:22 21:23	13 05:38 (3) 05:27 (3)
18	08:33 16:40	07:41 17:40	06:36 18:34	06:59 (5) 20:32	05:21 21:25	14 05:38 (3) 05:27 (3)
19	08:32 16:41	07:39 17:42	06:33 18:36	06:57 (5) 20:33	05:19 21:27	15 05:38 (3) 05:27 (3)
20	08:31 16:43	07:37 17:44	06:31 18:38	06:54 (5) 20:35	05:18 21:28	16 05:38 (3) 05:27 (3)
21	08:30 16:45	07:34 17:46	06:28 18:40	06:52 (5) 20:37	05:16 21:30	17 05:38 (3) 05:27 (3)
22	08:29 16:47	07:32 17:48	06:26 18:42	06:50 (5) 20:39	05:15 21:31	18 05:38 (3) 05:27 (3)
23	08:27 16:49	07:30 17:50	06:23 18:43	06:47 (5) 20:41	05:13 21:33	19 05:38 (3) 05:27 (3)
24	08:26 16:51	07:28 17:52	06:21 18:45	06:45 (5) 20:43	05:12 21:34	20 05:38 (3) 05:27 (3)
25	08:25 16:53	07:25 17:54	06:18 18:47	06:44 (5) 20:44	05:11 21:36	21 05:38 (3) 05:27 (3)
26	08:23 16:54	07:23 17:56	06:16 18:49	06:45 (5) 20:46	05:09 21:37	22 05:38 (3) 05:27 (3)
27	08:22 16:56	07:21 17:58	06:14 18:51	06:45 (5) 20:48	05:08 21:39	23 05:38 (3) 05:27 (3)
28	08:20 16:58	07:19 18:00	06:11 18:53	06:47 (5) 20:50	05:07 21:40	24 05:38 (3) 05:27 (3)
29	08:19 17:00		07:09 19:55	07:47 (5) 20:52	05:06 21:41	25 05:38 (3) 05:27 (3)
30	08:17 17:02		07:06 19:56	07:49 (5) 20:54	05:05 21:43	26 05:38 (3) 05:27 (3)
31	08:15 17:04		07:04 19:58	07:51 (5) 20:56	05:04 21:44	27 05:38 (3) 05:27 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case			464		51	232
Sun reduction			0.27		0.35	0.32
Oper. time red.			1.00		1.00	1.00
Wind dir. red.			0.67		0.68	0.66
Total reduction			0.18		0.26	0.21
Total, real			84		12	49

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HS - H227

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33	07:26	07:52 (5)	07:24	08:19			
	22:00	8 05:40 (3)	21:25	20:18	19:05	6 07:58 (5)	16:54	16:10			
2	05:00	05:33 (3)	05:40	06:35	07:28	07:54 (5)	07:26	08:21			
	22:00	7 05:40 (3)	21:23	20:16	19:02	2 07:56 (5)	16:52	16:09			
3	05:00	05:33 (3)	05:42	06:36	07:30		07:28	08:22			
	21:59	7 05:40 (3)	21:21	20:14	19:00		16:50	16:09			
4	05:01	05:34 (3)	05:44	06:38	07:32		07:30	08:24			
	21:59	6 05:40 (3)	21:19	20:11	18:57		16:48	16:08			
5	05:02	05:35 (3)	05:46	06:40	07:33		07:32	08:25			
	21:58	5 05:40 (3)	21:17	20:09	18:55		16:46	16:07			
6	05:03	05:36 (3)	05:47	06:25 (4)	06:42		07:34	08:26			
	21:58	4 05:40 (3)	21:16	7 06:32 (4)	20:06		16:45	16:07			
7	05:04	05:37 (3)	05:49	06:23 (4)	06:44		07:36	08:28			
	21:57	3 05:40 (3)	21:14	12 06:35 (4)	20:04		16:43	16:06			
8	05:05	05:38 (3)	05:51	06:20 (4)	06:45		07:38	08:29			
	21:56	2 05:40 (3)	21:12	16 06:36 (4)	20:01		16:41	16:06			
9	05:06	05:39 (3)	05:52	06:22 (4)	06:47		07:40	08:30			
	21:55	1 05:40 (3)	21:10	16 06:38 (4)	19:59		16:39	16:06			
10	05:07		05:54	06:24 (4)	06:49		07:42	08:32			
	21:55		21:08	15 06:39 (4)	19:57		16:37	16:05			
11	05:08		05:56	06:25 (4)	06:51		07:44	08:33			
	21:54		21:06	14 06:39 (4)	19:54		16:36	16:05			
12	05:09		05:58	06:27 (4)	06:52	07:44 (5)	07:46	08:34			
	21:53		21:03	13 06:40 (4)	19:52	14 07:58 (5)	18:38	16:34	16:05		
13	05:11		05:59	06:28 (4)	06:54	07:41 (5)	07:48	08:35			
	21:52		21:01	12 06:40 (4)	19:49	20 08:01 (5)	18:36	16:32	16:05		
14	05:12		06:01	06:30 (4)	06:56	07:38 (5)	07:50	08:36			
	21:51		20:59	10 06:40 (4)	19:47	24 08:02 (5)	18:34	16:31	16:05		
15	05:13		06:03	06:32 (4)	06:58	07:36 (5)	07:52	08:37			
	21:50		20:57	8 06:40 (4)	19:44	28 08:04 (5)	18:31	16:29	16:05		
16	05:14		06:05	06:33 (4)	06:59	07:35 (5)	07:54	08:38			
	21:49		20:55	7 06:40 (4)	19:42	30 08:05 (5)	18:29	16:28	16:05		
17	05:16		06:06	06:35 (4)	07:01	07:34 (5)	07:56	08:39			
	21:47		20:53	5 06:40 (4)	19:39	32 08:06 (5)	18:27	16:26	16:05		
18	05:17		06:08	06:37 (4)	07:03	07:32 (5)	07:57	08:39			
	21:46		20:51	3 06:40 (4)	19:37	34 08:06 (5)	18:24	16:25	16:05		
19	05:19		06:10		07:05	07:31 (5)	07:59	08:40			
	21:45		20:48		19:34	35 08:06 (5)	18:22	16:23	16:05		
20	05:20		06:12		07:06	07:33 (5)	08:01	08:41			
	21:44		20:46		19:32	33 08:06 (5)	18:20	16:22	16:06		
21	05:21		06:13		07:08	07:35 (5)	08:03	08:41			
	21:42		20:44		19:29	32 08:07 (5)	18:18	16:21	16:06		
22	05:23		06:15		07:10	07:36 (5)	08:05	08:42			
	21:41		20:42		19:27	30 08:06 (5)	18:15	16:19	16:07		
23	05:24		06:17		07:12	07:38 (5)	08:07	08:42			
	21:39		20:39		19:24	28 08:06 (5)	18:13	16:18	16:07		
24	05:26		06:19		07:14	07:40 (5)	08:09	08:43			
	21:38		20:37		19:22	25 08:05 (5)	18:11	16:17	16:08		
25	05:27		06:21		07:15	07:42 (5)	07:11	08:09	08:43		
	21:36		20:35		19:19	23 08:05 (5)	17:09	16:16	16:08		
26	05:29		06:22		07:17	07:43 (5)	07:13	08:11	08:43		
	21:35		20:32		19:17	21 08:04 (5)	17:07	16:15	16:09		
27	05:31		06:24		07:19	07:45 (5)	07:15	08:13	08:44		
	21:33		20:30		19:15	18 08:03 (5)	17:05	16:14	16:10		
28	05:32		06:26		07:21	07:47 (5)	07:17	08:14	08:44		
	21:32		20:28		19:12	15 08:02 (5)	17:02	16:13	16:11		
29	05:34		06:28		07:23	07:49 (5)	07:18	08:16	08:44		
	21:30		20:25		19:10	12 08:01 (5)	17:00	16:12	16:12		
30	05:35		06:29		07:24	07:51 (5)	07:20	08:18	08:44		
	21:28		20:23		19:07	9 08:00 (5)	16:58	16:11	16:13		
31	05:37		06:31				07:22		08:44		
	21:27		20:21				16:56		16:14		
Potential sun hours	512		460		382		328		259		233
Total, worst case		43		138		463					
Sun reduction		0.32		0.34		0.32		0.29			
Oper. time red.		1.00		1.00		1.00		1.00			
Wind dir. red.		0.66		0.68		0.67		0.67			
Total reduction		0.21		0.23		0.21		0.20			
Total, real		9		32		99		2			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: HT - H228

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16	07:01	07:25 (5)	05:52	05:03	05:34 (3)	07:01	07:25 (5)	05:52	05:03	05:34 (3)		05:03	05:34 (3)	
	16:15	17:06	18:02	20:00	5	07:30 (5)	20:55	21:45	20:00	5	07:30 (5)	20:55	21:45	7	05:41 (3)	05:41 (3)	
2	08:44	08:12	07:14	06:59	07:23 (5)	05:50	05:33 (3)	05:33 (3)	06:59	07:23 (5)	05:50	05:33 (3)	05:33 (3)		05:02	05:33 (3)	
	16:16	17:08	18:04	20:02	7	07:30 (5)	20:57	21:47	20:02	7	07:30 (5)	20:57	21:47	8	05:41 (3)	05:41 (3)	
3	08:44	08:10	07:12	06:56	07:20 (5)	05:48	05:32 (3)	05:32 (3)	06:56	07:20 (5)	05:48	05:32 (3)	05:32 (3)		05:01	05:32 (3)	
	16:17	17:10	18:06	20:04	10	07:30 (5)	20:59	21:48	20:04	10	07:30 (5)	20:59	21:48	8	05:40 (3)	05:40 (3)	
4	08:43	08:09	07:09	06:54	07:18 (5)	05:46	05:31 (3)	05:31 (3)	06:54	07:18 (5)	05:46	05:31 (3)	05:31 (3)		05:00	05:31 (3)	
	16:18	17:12	18:08	20:06	12	07:30 (5)	21:01	21:49	20:06	12	07:30 (5)	21:01	21:49	9	05:40 (3)	05:40 (3)	
5	08:43	08:07	07:07	06:52	07:15 (5)	05:44	05:31 (3)	05:31 (3)	06:52	07:15 (5)	05:44	05:31 (3)	05:31 (3)		04:59	05:31 (3)	
	16:20	17:14	18:10	20:08	14	07:29 (5)	21:03	21:50	20:08	14	07:29 (5)	21:03	21:50	10	05:41 (3)	05:41 (3)	
6	08:43	08:05	07:05	06:49	07:13 (5)	05:42	05:30 (3)	05:30 (3)	06:49	07:13 (5)	05:42	05:30 (3)	05:30 (3)		04:59	05:30 (3)	
	16:21	17:16	18:11	20:09	16	07:29 (5)	21:04	21:51	20:09	16	07:29 (5)	21:04	21:51	11	05:41 (3)	05:41 (3)	
7	08:42	08:03	07:02	06:47	07:11 (5)	05:40	05:30 (3)	05:30 (3)	06:47	07:11 (5)	05:40	05:30 (3)	05:30 (3)		04:58	05:30 (3)	
	16:22	17:18	18:13	20:11	18	07:29 (5)	21:06	21:52	20:11	18	07:29 (5)	21:06	21:52	11	05:41 (3)	05:41 (3)	
8	08:42	08:01	07:00	06:44	07:08 (5)	05:38	05:29 (3)	05:29 (3)	06:44	07:08 (5)	05:38	05:29 (3)	05:29 (3)		04:57	05:29 (3)	
	16:24	17:20	18:15	20:13	19	07:27 (5)	21:08	21:53	20:13	19	07:27 (5)	21:08	21:53	12	05:41 (3)	05:41 (3)	
9	08:41	07:59	06:57	06:42	07:06 (5)	05:36	05:29 (3)	05:29 (3)	06:42	07:06 (5)	05:36	05:29 (3)	05:29 (3)		04:57	05:29 (3)	
	16:25	17:22	18:17	20:15	21	07:27 (5)	21:10	21:54	20:15	21	07:27 (5)	21:10	21:54	13	05:42 (3)	05:42 (3)	
10	08:40	07:57	06:55	06:40	07:05 (5)	05:35	05:28 (3)	05:28 (3)	06:40	07:05 (5)	05:35	05:28 (3)	05:28 (3)		04:56	05:28 (3)	
	16:27	17:24	18:19	20:17	19	07:24 (5)	21:12	21:55	20:17	19	07:24 (5)	21:12	21:55	13	05:41 (3)	05:41 (3)	
11	08:40	07:55	06:53	06:37	07:07 (5)	05:33	05:28 (3)	05:28 (3)	06:37	07:07 (5)	05:33	05:28 (3)	05:28 (3)		04:56	05:28 (3)	
	16:28	17:26	18:21	20:19	16	07:23 (5)	21:13	21:55	20:19	16	07:23 (5)	21:13	21:55	13	05:41 (3)	05:41 (3)	
12	08:39	07:53	06:50	06:35	07:09 (5)	05:31	05:28 (3)	05:28 (3)	06:35	07:09 (5)	05:31	05:28 (3)	05:28 (3)		04:56	05:28 (3)	
	16:30	17:28	18:23	20:21	12	07:21 (5)	21:15	21:56	20:21	12	07:21 (5)	21:15	21:56	14	05:42 (3)	05:42 (3)	
13	08:38	07:51	06:48	06:32		05:29	05:27 (3)	05:27 (3)	06:32		05:29	05:27 (3)	05:27 (3)		04:55	05:27 (3)	
	16:31	17:30	18:25	20:22		21:17	21:57	21:57	20:22		21:17	21:57	21:57	14	05:41 (3)	05:41 (3)	
14	08:37	07:49	06:45	06:30		05:27	05:27 (3)	05:27 (3)	06:30		05:27	05:27 (3)	05:27 (3)		04:55	05:27 (3)	
	16:33	17:32	18:27	20:24		21:18	21:58	21:58	20:24		21:18	21:58	21:58	15	05:42 (3)	05:42 (3)	
15	08:36	07:47	06:43	06:28		05:26	05:27 (3)	05:27 (3)	06:28		05:26	05:27 (3)	05:27 (3)		04:55	05:27 (3)	
	16:35	17:34	18:29	20:26		21:20	21:58	21:58	20:26		21:20	21:58	21:58	15	05:42 (3)	05:42 (3)	
16	08:35	07:45	06:41	06:25		05:24	05:27 (3)	05:27 (3)	06:25		05:24	05:27 (3)	05:27 (3)		04:55	05:27 (3)	
	16:36	17:36	18:30	20:28		21:22	21:59	21:59	20:28		21:22	21:59	21:59	15	05:42 (3)	05:42 (3)	
17	08:34	07:43	06:38	06:23		05:22	05:27 (3)	05:27 (3)	06:23		05:22	05:27 (3)	05:27 (3)		04:54	05:27 (3)	
	16:38	17:38	18:32	20:30		21:23	21:59	21:59	20:30		21:23	21:59	21:59	15	05:42 (3)	05:42 (3)	
18	08:33	07:41	06:36	06:21		05:21	05:27 (3)	05:27 (3)	06:21		05:21	05:27 (3)	05:27 (3)		04:54	05:27 (3)	
	16:40	17:40	18:34	20:32		21:25	22:00	22:00	20:32		21:25	22:00	22:00	15	05:42 (3)	05:42 (3)	
19	08:32	07:39	06:33	06:19		05:19	05:27 (3)	05:27 (3)	06:19		05:19	05:27 (3)	05:27 (3)		04:54	05:27 (3)	
	16:42	17:42	18:36	20:33		21:27	22:00	22:00	20:33		21:27	22:00	22:00	15	05:42 (3)	05:42 (3)	
20	08:31	07:37	06:31	06:16		05:18	05:27 (3)	05:27 (3)	06:16		05:18	05:27 (3)	05:27 (3)		04:55	05:27 (3)	
	16:43	17:44	18:38	20:35		21:28	22:00	22:00	20:35		21:28	22:00	22:00	16	05:43 (3)	05:43 (3)	
21	08:30	07:34	06:28	06:14		05:16	05:28 (3)	05:28 (3)	06:14		05:16	05:28 (3)	05:28 (3)		04:55	05:28 (3)	
	16:45	17:46	18:40	20:37		21:30	22:01	22:01	20:37		21:30	22:01	22:01	16	05:44 (3)	05:44 (3)	
22	08:29	07:32	06:26	06:12		05:15	05:28 (3)	05:28 (3)	06:12		05:15	05:28 (3)	05:28 (3)		04:55	05:28 (3)	
	16:47	17:48	18:42	20:39		21:31	22:01	22:01	20:39		21:31	22:01	22:01	16	05:44 (3)	05:44 (3)	
23	08:27	07:30	06:23	06:09		05:13	05:28 (3)	05:28 (3)	06:09		05:13	05:28 (3)	05:28 (3)		04:55	05:28 (3)	
	16:49	17:50	18:44	20:41		21:33	22:01	22:01	20:41		21:33	22:01	22:01	15	05:43 (3)	05:43 (3)	
24	08:26	07:28	06:21	06:07		05:12	05:28 (3)	05:28 (3)	06:07		05:12	05:28 (3)	05:28 (3)		04:55	05:28 (3)	
	16:51	17:52	18:45	20:43		21:34	22:01	22:01	20:43		21:34	22:01	22:01	15	05:43 (3)	05:43 (3)	
25	08:25	07:25	06:18	06:05		05:11	05:29 (3)	05:29 (3)	06:05		05:11	05:29 (3)	05:29 (3)		04:56	05:29 (3)	
	16:53	17:54	18:47	20:44		21:36	22:01	22:01	20:44		21:36	22:01	22:01	15	05:44 (3)	05:44 (3)	
26	08:23	07:23	06:16	06:03		05:10	05:29 (3)	05:29 (3)	06:03		05:10	05:29 (3)	05:29 (3)		04:56	05:29 (3)	
	16:54	17:56	18:49	20:46		21:37	22:01	22:01	20:46		21:37	22:01	22:01	15	05:44 (3)	05:44 (3)	
27	08:22	07:21	06:14	06:01		05:08	05:34 (3)	05:34 (3)	06:01		05:08	05:34 (3)	05:34 (3)		04:57	05:34 (3)	
	16:56	17:58	18:51	20:48		21:39	22:01	22:01	20:48		21:39	22:01	22:01	15	05:45 (3)	05:45 (3)	
28	08:20	07:19	06:11	05:59		05:07	05:33 (3)	05:33 (3)	06:11		05:07	05:33 (3)	05:33 (3)		04:57	05:33 (3)	
	16:58	18:00	18:53	20:50		21:40	22:01	22:01	20:50		21:40	22:01	22:01	15	05:45 (3)	05:45 (3)	
29	08:19		07:09	05:56		05:06	05:36 (3)	05:36 (3)	07:09		05:06	05:36 (3)	05:36 (3)		04:58	05:36 (3)	
	17:00		19:55	20:52		21:41	22:01	22:01	19:55		21:41	22:01	22:01	14	05:45 (3)	05:45 (3)	
30	08:17		07:06	05:54		05:05	05:35 (3)	05:35 (3)	07:06		05:05	05:35 (3)	05:35 (3)		04:58	05:35 (3)	
	17:02		19:56	20:54		21:43	22:00	22:00	17:02		21:43	22:00	22:00	14	05:45 (3)	05:45 (3)	
31	08:15		07:04	07:27 (5)		05:04	05:34 (3)	05:34 (3)	07:04		05:04	05:34 (3)	05:34 (3)				
	17:04		19:58	2	07:29 (5)	21:44	6	05:40 (3)	17:04		21:44	6	05:40 (3)				
Potential sun hours	250	273	367	420		494	510		250		494	510					
Total, worst case			2	169		16	399										
Sun reduction			0.27	0.35		0.38	0.32										
Oper. time red.			1.00	1.00		1.00	1.00										
Wind dir. red.			0.67	0.67		0.66	0.66										
Total reduction			0.18	0.24		0.25	0.21										
Total, real			0	40		4	84										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: HT - H228

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 14	05:32 (3) 05:46 (3) 21:25	05:39 20:18 16	07:06 (5) 07:22 (5) 19:05	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 13	05:33 (3) 05:46 (3) 21:23	05:40 20:16 19	07:04 (5) 07:23 (5) 19:02	07:28 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 13	05:33 (3) 05:46 (3) 21:21	05:42 20:14 21	07:04 (5) 07:25 (5) 19:00	07:30 16:50 16:09	08:22 16:09 16:09
4	05:01 21:59 12	05:34 (3) 05:46 (3) 21:19	05:44 20:11 19	07:05 (5) 07:24 (5) 18:57	07:30 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 12	05:35 (3) 05:47 (3) 21:17	05:46 20:09 18	07:07 (5) 07:25 (5) 18:55	07:32 16:46 16:07	08:25 16:07 16:07
6	05:03 21:58 11	05:36 (3) 05:47 (3) 21:16	05:47 20:06 16	07:09 (5) 07:25 (5) 18:53	07:34 16:45 16:07	08:26 16:07 16:07
7	05:04 21:57 10	05:37 (3) 05:47 (3) 21:14	05:49 20:04 14	07:10 (5) 07:24 (5) 18:50	07:36 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 10	05:38 (3) 05:48 (3) 21:12	05:51 20:01 12	07:12 (5) 07:24 (5) 18:48	07:38 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 9	05:39 (3) 05:48 (3) 21:10	05:52 19:59 10	07:14 (5) 07:24 (5) 18:45	07:40 16:39 16:06	08:30 16:06 16:06
10	05:07 21:55 8	05:40 (3) 05:48 (3) 21:08	05:54 19:57 8	07:16 (5) 07:24 (5) 18:43	07:42 16:37 16:05	08:32 16:05 16:05
11	05:08 21:54 7	05:41 (3) 05:48 (3) 21:06	05:56 19:54 5	07:17 (5) 07:22 (5) 18:41	07:44 16:36 16:05	08:33 16:05 16:05
12	05:10 21:53 6	05:42 (3) 05:48 (3) 21:03	05:58 19:52 2	07:19 (5) 07:21 (5) 18:38	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 5	05:43 (3) 05:48 (3) 21:01	06:00 19:49 1	07:21 (5) 18:36 16:32	07:47 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 4	05:44 (3) 05:48 (3) 20:59	06:01 19:47 1	07:22 (5) 18:34 16:31	07:49 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 3	05:45 (3) 05:48 (3) 20:57	06:03 19:44 1	07:23 (5) 18:31 16:29	07:51 16:29 16:05	08:37 16:05 16:05
16	05:15 21:49 1	05:47 (3) 05:48 (3) 20:55	06:05 19:42 1	07:24 (5) 18:29 16:28	07:53 16:28 16:05	08:38 16:05 16:05
17	05:16 21:47 1	06:06 20:53 1	07:01 19:39 1	07:56 18:27 16:26	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 1	06:08 20:51 1	07:03 19:37 1	07:57 18:24 16:25	07:57 16:25 16:05	08:39 16:05 16:05
19	05:19 21:45 1	06:10 20:48 1	07:05 19:34 1	07:59 18:22 16:23	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44 1	06:12 20:46 1	07:07 19:32 1	08:01 18:20 16:22	08:01 16:22 16:06	08:41 16:06 16:06
21	05:21 21:42 1	06:14 20:44 1	07:08 19:29 1	08:03 18:18 16:21	08:02 16:21 16:06	08:41 16:06 16:06
22	05:23 21:41 1	06:15 20:42 1	07:10 19:27 1	08:05 18:15 16:19	08:04 16:19 16:07	08:42 16:07 16:07
23	05:24 21:39 1	06:17 20:39 1	07:12 19:24 1	08:07 18:13 16:18	08:06 16:18 16:07	08:42 16:07 16:07
24	05:26 21:38 1	06:19 20:37 1	07:14 19:22 1	08:09 18:11 16:17	08:08 16:17 16:08	08:43 16:08 16:08
25	05:28 21:36 1	06:21 20:35 1	07:15 19:19 1	07:11 17:09 16:16	08:09 16:16 16:08	08:43 16:08 16:08
26	05:29 21:35 1	06:22 20:33 1	07:17 19:17 1	07:13 17:07 16:15	08:11 16:15 16:09	08:43 16:09 16:09
27	05:31 21:33 1	06:24 20:30 1	07:19 19:15 1	07:15 17:05 16:14	08:13 16:14 16:10	08:44 16:10 16:10
28	05:32 21:32 1	06:26 20:28 1	07:21 19:12 1	07:17 17:02 16:13	08:14 16:13 16:11	08:44 16:11 16:11
29	05:34 21:30 1	06:28 20:25 1	07:23 19:10 1	07:19 17:00 16:12	08:16 16:12 16:12	08:44 16:12 16:12
30	05:35 21:28 1	06:29 20:23 1	07:24 19:07 1	07:20 16:58 16:11	08:18 16:11 16:13	08:44 16:13 16:13
31	05:37 21:27 1	06:31 20:21 12	07:09 (5) 07:21 (5)	07:22 16:56 16:14	08:19 16:14 16:16	08:44 16:16 16:18
Potential sun hours	512	460	382	328	259	233
Total, worst case	138	13	160			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.67	0.67			
Total reduction	0.21	0.23	0.22			
Total, real	29	3	35			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: HU - H229

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	06:18 (1) 20:35 (1)	05:03 21:45	04:59 22:00	05:39 21:25	06:26 (1) 20:38 (1)	06:33 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	06:16 (1) 20:35 (1)	05:02 21:47	05:00 22:00	05:40 21:23	06:24 (1) 20:16	06:35 19:02	07:28 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	06:14 (1) 20:35 (1)	05:01 21:48	05:00 21:59	05:42 21:21	06:23 (1) 20:14	06:37 19:00	07:30 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	06:12 (1) 20:35 (1)	05:00 21:49	05:01 21:59	05:44 21:19	06:22 (1) 20:11	06:38 18:57	07:32 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	06:10 (1) 20:34 (1)	04:59 21:50	05:02 21:58	05:46 21:18	06:22 (1) 20:09	06:40 18:55	07:33 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	06:11 (1) 20:34 (1)	04:59 21:51	05:03 21:58	05:47 21:16	06:20 (1) 20:06	06:42 18:53	07:35 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	06:11 (1) 20:34 (1)	04:58 21:52	05:04 21:57	05:49 21:14	06:20 (1) 20:04	06:44 18:50	07:37 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	06:12 (1) 20:33 (1)	04:57 21:53	05:05 21:56	05:51 21:12	06:20 (1) 20:01	06:45 18:48	07:39 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	06:12 (1) 20:31 (1)	04:57 21:54	05:06 21:56	05:52 21:10	06:22 (1) 19:59	06:47 18:45	07:41 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	06:14 (1) 20:31 (1)	04:56 21:55	05:07 21:55	05:54 21:08	06:24 (1) 19:57	06:49 18:43	07:43 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	06:15 (1) 20:29 (1)	04:56 21:56	05:08 21:54	05:56 21:06	06:25 (1) 19:54	06:51 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	06:16 (1) 20:27 (1)	04:56 21:56	05:10 21:53	05:58 21:04	06:27 (1) 19:52	06:52 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	06:19 (1) 20:25 (1)	04:55 21:57	05:11 21:52	05:59 21:01	06:29 (1) 19:49	06:54 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	05:01 21:51	06:01 20:59	06:30 (1) 19:47	06:56 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	05:03 21:50	06:03 20:57	06:32 (1) 19:44	06:58 18:31	07:52 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	05:05 21:49	06:05 20:55	06:34 (1) 19:42	07:00 18:29	07:54 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	05:06 21:48	06:06 20:53	06:35 (1) 19:39	07:01 18:27	07:56 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	05:07 21:46	06:08 20:51	06:37 (1) 19:37	07:03 18:24	07:58 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	05:10 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	05:09 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	05:08 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	05:06 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	05:07 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	05:09 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	05:11 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	05:09 21:35	06:22 20:33	07:17 19:17	07:13 17:05	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	05:08 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	05:07 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	05:08 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	05:09 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:28 (1) 20:21	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233
Total, worst case					238			9	289				
Sun reduction				0.35	0.38			0.32	0.34				
Oper. time red.				1.00	1.00			1.00	1.00				
Wind dir. red.				0.68	0.68			0.68	0.68				
Total reduction				0.24	0.26			0.22	0.23				
Total, real				13	61			2	67				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HV - H230

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March		April		May	June	July	August		September		October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02		07:01 20:00	7	07:25 (1) 07:32 (1)	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	21	07:08 (1) 07:29 (1)	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04		06:59 20:02	10	07:23 (1) 07:33 (1)	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	22	07:07 (1) 07:29 (1)	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06		06:57 20:04	13	07:20 (1) 07:33 (1)	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	24	07:06 (1) 07:30 (1)	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08		06:54 20:06	16	07:18 (1) 07:34 (1)	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	24	07:05 (1) 07:29 (1)	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10		06:52 20:08	18	07:15 (1) 07:33 (1)	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	23	07:07 (1) 07:30 (1)	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12		06:49 20:10	20	07:13 (1) 07:33 (1)	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	21	07:09 (1) 07:30 (1)	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13		06:47 20:11	23	07:11 (1) 07:34 (1)	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	18	07:10 (1) 07:28 (1)	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15		06:44 20:13	24	07:08 (1) 07:32 (1)	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	16	07:12 (1) 07:28 (1)	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17		06:42 20:15	24	07:08 (1) 07:32 (1)	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	13	07:14 (1) 07:27 (1)	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19		06:40 20:17	22	07:09 (1) 07:31 (1)	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	11	07:16 (1) 07:27 (1)	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21		06:37 20:19	21	07:09 (1) 07:30 (1)	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	7	07:17 (1) 07:24 (1)	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23		06:35 20:21	18	07:10 (1) 07:28 (1)	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	4	07:19 (1) 07:23 (1)	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25		06:33 20:22	16	07:11 (1) 07:27 (1)	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49		07:48 18:36	07:48 16:32	08:35 16:05	
14	08:37 16:33	07:49 17:32	06:45 18:27		06:30 20:24	10	07:13 (1) 07:23 (1)	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47		07:50 18:34	07:49 16:31	08:36 16:05	
15	08:37 16:35	07:47 17:34	06:43 18:29		06:28 20:26		05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57		06:58 19:44		07:52 18:31	07:51 16:29	08:37 16:05	
16	08:36 16:36	07:45 17:36	06:41 18:31		06:25 20:28		05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55		07:00 19:42		07:54 18:29	07:53 16:28	08:38 16:05	
17	08:35 16:38	07:43 17:38	06:38 18:32		06:23 20:30		05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53		07:01 19:39		07:56 18:27	07:55 16:26	08:39 16:05	
18	08:33 16:40	07:41 17:40	06:36 18:34		06:21 20:32		05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51		07:03 19:37		07:58 18:24	07:57 16:25	08:39 16:05	
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34		05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49		07:05 19:34		07:59 18:22	07:59 16:23	08:40 16:05	
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35		05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46		07:07 19:32		08:01 18:20	08:01 16:22	08:41 16:06	
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37		05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44		07:08 19:29		08:03 18:18	08:03 16:21	08:41 16:06	
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39		05:15 21:32	04:55 22:01	05:12 21:41	06:13 20:42		07:09 19:27		08:05 18:15	08:05 16:19	08:42 16:07	
23	08:27 16:49	07:30 17:50	06:23 18:44		06:10 20:41		05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40		07:12 19:24		08:07 18:13	08:07 16:18	08:42 16:07	
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43		05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37		07:14 19:22		08:09 18:11	08:08 16:17	08:43 16:08	
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45		05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35		07:15 19:20		08:11 17:09	08:10 16:16	08:43 16:08	
26	08:23 16:54	07:23 17:56	06:16 18:49		06:03 20:46		05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33		07:17 19:17		08:13 17:07	08:12 16:15	08:44 16:09	
27	08:22 16:56	07:21 17:58	06:14 18:51		06:01 20:48		05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30		07:19 19:15		08:15 17:05	08:13 16:14	08:44 16:10	
28	08:20 16:58	07:19 18:00	06:11 18:53		05:59 20:50		05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28		07:21 19:12		08:17 17:02	08:15 16:13	08:44 16:11	
29	08:19 17:00	07:17 19:55	07:09 18:55		05:56 20:52		05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26		07:23 10 07:24 (1)		08:19 17:00	08:16 16:12	08:44 16:12	
30	08:17 17:02	07:15 19:57	07:06 18:51		05:54 20:54		05:05 21:43	04:58 22:01	05:36 21:28	06:29 20:23		07:24 16 07:27 (1)		08:21 17:05	08:18 16:14	08:44 16:10	
31	08:15 17:04	07:14 19:58	07:04 18:53	07:27 (1) 07:30 (1)	07:30 (1) 20:54		05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	07:10 (1) 18 07:28 (1)			08:22 16:56	08:19 16:11	08:44 16:14	
Potential sun hours	250	273	367		420		494	510	512	460		382		328	259	233	
Total, worst case			3		242						44	204					
Sun reduction			0.27		0.35						0.34	0.32					
Oper. time red.			1.00		1.00						1.00	1.00					
Wind dir. red.			0.68		0.68						0.68	0.68					
Total reduction			0.18		0.24						0.23	0.22					
Total, real			1		58						10	44					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HW - H231

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 18:00 (1)	05:52 20:00	05:03 20:56	04:59 21:45	05:39 22:00	06:33 21:25	07:26 20:18	07:24 19:05	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 18:01 (1)	05:50 20:02	05:02 20:57	05:00 21:47	05:40 22:00	06:35 21:23	07:28 20:16	08:20 (1) 19:02	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 18:00 (1)	05:48 20:04	05:01 20:59	05:00 21:48	05:42 21:59	06:37 21:21	07:30 20:14	08:17 (1) 19:00	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 18:01 (1)	05:46 20:06	05:00 21:01	05:01 21:49	05:44 21:59	06:38 21:19	07:32 20:11	08:15 (1) 18:57	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 18:00 (1)	05:44 20:08	05:02 21:03	05:02 21:50	05:46 21:58	06:40 21:18	07:33 20:09	08:33 (1) 18:55	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 18:00 (1)	05:42 20:10	05:03 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:34 (1) 19:22	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 17:59 (1)	05:40 20:11	05:04 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:36 (1) 19:24	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 17:58 (1)	05:38 20:13	05:05 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	08:37 (1) 19:25	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 17:57 (1)	05:36 20:15	05:06 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:38 (1) 19:25	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 17:54 (1)	05:35 20:17	05:07 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:39 (1) 19:25	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 17:52 (1)	05:33 20:19	05:08 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:40 (1) 19:26	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	05:09 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:41 (1) 19:27	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	05:11 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:42 (1) 19:28	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	05:12 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:43 (1) 19:29	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	05:13 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:44 (1) 19:30	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	05:14 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	08:45 (1) 19:31	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	05:16 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	08:46 (1) 19:32	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	05:17 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:47 (1) 19:33	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	05:19 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	08:48 (1) 19:34	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:14 22:01	05:14 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:49 (1) 19:35	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:15 22:01	05:15 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:50 (1) 19:36	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	05:15 22:01	05:15 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:51 (1) 19:37	08:43 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	05:24 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:52 (1) 19:38	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	05:26 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:53 (1) 19:39	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	05:27 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 18:09	08:54 (1) 19:40	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	05:29 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 18:07	08:55 (1) 19:41	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	05:31 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 18:05	08:56 (1) 19:42	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	05:32 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 18:02	08:57 (1) 19:43	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	05:34 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 18:00	08:58 (1) 19:44	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	05:35 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 18:00	08:59 (1) 19:45	08:44 16:13
31	08:16 17:04		07:04 19:58	05:54 21:44	05:04 21:44	05:37 21:27	05:37 20:21	06:31 19:00	07:22 18:00	07:22 17:00	09:00 (1) 19:46	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction		45		230						282		
Oper. time red.		0.23		0.27						1.00		
Wind dir. red.		1.00		1.00						0.65		
Total reduction		0.65		0.65						0.19		
Total, real		0.15		0.18						53		
		7		40								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: HX - H232

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	08:02 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04	08:03 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	07:12	07:36 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06	08:03 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
4	08:43	08:09	07:09	07:36 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08	08:03 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	08:07	07:07	07:35 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
	16:20	17:14	18:10	08:02 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05	07:05	07:35 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12	08:02 (1)	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03	07:02	07:36 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13	08:02 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01	07:00	07:35 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15	08:01 (1)	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
9	08:41	07:59	06:58	07:36 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
	16:25	17:22	18:17	08:00 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06
10	08:41	07:57	06:55	07:37 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24	18:19	07:59 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55	06:53	07:38 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
	16:28	17:26	18:21	07:57 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
12	08:39	07:53	06:50	07:39 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:34
	16:30	17:28	18:23	07:55 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
13	08:38	07:51	06:48	07:42 (1)	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
	16:31	17:30	18:25	07:52 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:05
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	06:59	07:54	08:38
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:07
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:08
25	08:25	07:26	06:19	07:50 (1)	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:43
	16:53	17:54	18:47	07:57 (1)	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:08
26	08:23	07:23	06:16	07:48 (1)	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:44
	16:54	17:56	18:49	07:59 (1)	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:09
27	08:22	07:21	06:14	07:46 (1)	06:01	05:08	04:57	05:31	06:24	07:19	07:15	08:44
	16:56	17:58	18:51	08:01 (1)	20:48	21:39	22:01	21:33	20:30	19:15	17:05	16:10
28	08:20	07:19	06:11	07:43 (1)	05:59	05:07	04:57	05:32	06:26	07:21	07:17	08:44
	16:58	18:00	18:53	08:01 (1)	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:11
29	08:19		06:09		05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12
30	08:17		06:06		05:54	05:05	04:58	05:35	06:29	07:24	07:21	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	6 08:30 (1)	16:11
31	08:15		06:04		05:54	05:04		05:37	06:31		07:22	08:44
	17:04		19:58		21:44	21:27	20:21	21:27	20:21		16:56	16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		259
Total, worst case			296							6	347	233
Sun reduction		0.23	0.27							0.32	0.29	
Oper. time red.		1.00	1.00							1.00	1.00	
Wind dir. red.		0.65	0.65							0.65	0.65	
Total reduction		0.15	0.18							0.21	0.19	
Total, real		8	52							1	66	

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HY - H233

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	08:42 (1)	07:16	08:35 (1)	07:01
	16:15	17:06	26 09:08 (1)	18:02	33 09:08 (1)	20:00
2	08:44	08:12	08:40 (1)	07:14	08:37 (1)	06:59
	16:16	17:08	29 09:09 (1)	18:04	29 09:06 (1)	20:02
3	08:44	08:10	08:38 (1)	07:12	08:39 (1)	06:56
	16:17	17:10	32 09:10 (1)	18:06	24 09:03 (1)	20:04
4	08:43	08:09	08:36 (1)	07:09	08:42 (1)	06:54
	16:18	17:12	36 09:12 (1)	18:08	18 09:00 (1)	20:06
5	08:43	08:07	08:34 (1)	07:07	08:49 (1)	06:52
	16:20	17:14	39 09:13 (1)	18:10	2 08:51 (1)	20:08
6	08:43	08:05	08:32 (1)	07:05		06:49
	16:21	17:16	42 09:14 (1)	18:11		20:09
7	08:42	08:03	08:31 (1)	07:02	07:27 (2)	06:47
	16:22	17:18	44 09:15 (1)	18:13	1 07:28 (2)	20:11
8	08:42	08:01	08:31 (1)	07:00	07:24 (2)	06:44
	16:24	17:20	44 09:15 (1)	18:15	5 07:29 (2)	20:13
9	08:41	07:59	08:30 (1)	06:57	07:22 (2)	06:42
	16:25	17:22	46 09:16 (1)	18:17	8 07:30 (2)	20:15
10	08:41	07:57	08:30 (1)	06:55	07:19 (2)	06:40
	16:27	17:24	47 09:17 (1)	18:19	10 07:29 (2)	20:17
11	08:40	07:55	08:30 (1)	06:53	07:17 (2)	06:37
	16:28	17:26	48 09:18 (1)	18:21	13 07:30 (2)	20:19
12	08:39	07:53	08:29 (1)	06:50	07:14 (2)	06:35
	16:30	17:28	49 09:18 (1)	18:23	15 07:29 (2)	20:21
13	08:38	07:51	08:29 (1)	06:48	07:12 (2)	06:32
	16:31	17:30	50 09:19 (1)	18:25	17 07:29 (2)	20:22
14	08:37	07:49	08:28 (1)	06:45	07:09 (2)	06:30
	16:33	17:32	50 09:18 (1)	18:27	18 07:27 (2)	20:24
15	08:37	07:47	08:28 (1)	06:43	07:09 (2)	06:28
	16:35	17:34	50 09:18 (1)	18:29	18 07:27 (2)	20:26
16	08:36	07:45	08:28 (1)	06:41	07:09 (2)	06:25
	16:36	17:36	51 09:19 (1)	18:30	16 07:25 (2)	20:28
17	08:35	07:43	08:28 (1)	06:38	07:11 (2)	06:23
	16:38	17:38	51 09:19 (1)	18:32	12 07:23 (2)	20:30
18	08:33	07:41	08:29 (1)	06:36	07:13 (2)	06:21
	16:40	17:40	50 09:19 (1)	18:34	6 07:19 (2)	20:32
19	08:32	07:39	08:28 (1)	06:33		06:18
	16:41	17:42	50 09:18 (1)	18:36		20:33
20	08:31	07:37	08:29 (1)	06:31		06:16
	16:43	17:44	49 09:18 (1)	18:38		20:35
21	08:30	07:34	08:29 (1)	06:28		06:14
	16:45	17:46	49 09:18 (1)	18:40		20:37
22	08:29	07:32	08:29 (1)	06:26		06:12
	16:47	17:48	47 09:16 (1)	18:42		20:39
23	08:27	07:30	08:30 (1)	06:23		06:09
	16:49	17:50	46 09:16 (1)	18:44		20:41
24	08:26	07:28	08:30 (1)	06:21		06:07
	16:51	17:52	45 09:15 (1)	18:45		20:43
25	08:25	07:26	08:30 (1)	06:18		06:05
	16:53	17:54	44 09:14 (1)	18:47		20:45
26	08:23	07:23	08:32 (1)	06:16		06:03
	16:54	17:56	41 09:13 (1)	18:49		20:46
27	08:22	08:51 (3)	07:21	06:14		06:01
	16:56	1 08:52 (3)	17:58	18:51		20:48
28	08:20	08:49 (1)	07:19	06:11		05:59
	16:58	7 08:56 (1)	18:00	18:53		20:50
29	08:19	08:47 (1)		07:09		05:56
	17:00	13 09:00 (1)		19:55		20:52
30	08:17	08:45 (1)		07:06		05:54
	17:02	18 09:03 (1)		19:57		20:54
31	08:15	08:44 (1)		07:04		05:04
	17:04	22 09:06 (1)		19:58		21:44
Potential sun hours	250		273	367	420	510
Total, worst case	61		1231	245		
Sun reduction	0.24		0.23	0.27		
Oper. time red.	1.00		1.00	1.00		
Wind dir. red.	0.61		0.61	0.64		
Total reduction	0.15		0.14	0.17		
Total, real	9		175	42		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: HY - H233

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (2) 16:54	08:00 (1) 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (2) 16:52	08:00 (1) 16:09
3	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:56 (2) 16:50	08:01 (1) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:58 (2) 16:48	08:01 (1) 16:08
5	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	08:00 (2) 16:46	08:02 (1) 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:02 (2) 16:45	08:04 (1) 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:06 (1) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:09 (1) 16:06
9	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	09:19 (1) 16:39	08:11 (1) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	09:15 (1) 16:37	08:13 (1) 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	09:12 (1) 16:36	08:15 (1) 16:05
12	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	09:09 (1) 16:34	08:17 (1) 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	09:07 (1) 16:32	08:19 (1) 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	09:06 (1) 16:31	08:21 (1) 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	09:05 (1) 16:29	08:23 (3) 16:05
16	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	09:03 (1) 16:28	08:24 (3) 16:05
17	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	09:02 (1) 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	09:01 (1) 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	09:01 (1) 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	09:00 (1) 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:59 (1) 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:59 (1) 16:19	08:42 16:07
23	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:58 (1) 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:58 (1) 16:17	08:43 16:08
25	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	07:58 (1) 16:16	08:43 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	07:58 (1) 16:15	08:44 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:04	07:58 (1) 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	07:58 (1) 16:13	08:44 16:11
29	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	07:58 (1) 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	07:59 (1) 16:11	08:44 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56	07:59 (1) 16:11	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case			79	1028	438	
Sun reduction			0.32	0.29	0.27	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.66	0.61	0.61	
Total reduction			0.21	0.18	0.16	
Total, real			17	185	71	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HZ - H234

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		12:16 (1)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	05:39	04:59	05:39	06:33	07:26		07:24		07:54 (2)	08:19		12:17 (1)	
	16:15	34	12:50 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	26	08:20 (2)	16:10		08:20 (2)	16:10	6	12:23 (1)	
2	08:44		12:18 (1)	08:12		08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		07:56 (2)	08:21		12:13 (1)			
	16:16	33	12:51 (1)	17:08	4	08:44 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	23	08:19 (2)	16:09		15	12:28 (1)		
3	08:44		12:18 (1)	08:10		08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		07:58 (2)	08:22		12:11 (1)			
	16:17	32	12:50 (1)	17:10	7	08:45 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	21	08:19 (2)	16:08		19	12:30 (1)		
4	08:43		12:20 (1)	08:09		08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		08:00 (2)	08:24		12:10 (1)			
	16:18	30	12:50 (1)	17:12	10	08:46 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	18	08:18 (2)	16:08		22	12:32 (1)		
5	08:43		12:21 (1)	08:07		08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32		08:02 (2)	08:25		12:09 (1)			
	16:20	28	12:49 (1)	17:14	13	08:47 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	16	08:18 (2)	16:07		24	12:33 (1)		
6	08:43		12:22 (1)	08:05		08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34		08:04 (2)	08:27		12:09 (1)			
	16:21	27	12:49 (1)	17:16	16	08:48 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:44	13	08:17 (2)	16:07		26	12:35 (1)		
7	08:42		12:24 (1)	08:03		08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36		08:06 (2)	08:28		12:08 (1)			
	16:22	24	12:48 (1)	17:18	19	08:49 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	10	08:16 (2)	16:06		28	12:36 (1)		
8	08:42		12:25 (1)	08:01		08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38		08:09 (2)	08:29		12:08 (1)			
	16:24	22	12:47 (1)	17:20	21	08:49 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	7	08:16 (2)	16:06		30	12:38 (1)		
9	08:41		12:28 (1)	07:59		08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		08:11 (2)	08:30		12:07 (1)			
	16:25	19	12:47 (1)	17:22	24	08:50 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	4	08:15 (2)	16:05		32	12:39 (1)		
10	08:40		12:30 (1)	07:57		08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42								
	16:27	15	12:45 (1)	17:24	26	08:50 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37								
11	08:40		12:34 (1)	07:55		08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44								
	16:28	8	12:42 (1)	17:26		08:50 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36								
12	08:39			07:53		08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46								
	16:30			17:28	31	08:51 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34								
13	08:38			07:51		08:20 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48								
	16:31			17:30	30	08:50 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32								
14	08:37			07:49		08:20 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49								
	16:33			17:32	29	08:49 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31								
15	08:36			07:47		08:21 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51								
	16:34			17:34	28	08:49 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29								
16	08:36			07:45		08:21 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54		07:53								
	16:36			17:36	28	08:49 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28								
17	08:35			07:43		08:22 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55								
	16:38			17:38	26	08:48 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26								
18	08:33			07:41		08:23 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57								
	16:40			17:40	23	08:46 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25								
19	08:32			07:39		08:24 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		07:59								
	16:41			17:42	21	08:45 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22		16:23								
20	08:31			07:37		08:26 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		08:01								
	16:43			17:44	17	08:43 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20		16:22	4	09:07 (2)	16:22					
21	08:30			07:34		08:29 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		08:03								
	16:45			17:46	11	08:40 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18		16:20	14	09:12 (2)	16:20					
22	08:29			07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:05								
	16:47			17:48			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:07								
23	08:27			07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:07								
	16:49			17:50			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:07								
24	08:26			07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:09								
	16:51			17:52			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:09								
25	08:25			07:25			06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10		08:10								
	16:52			17:54			06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10		08:10								
26	08:23			07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		08:13								
	16:54			17:56			06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		08:13								
27	08:22			07:21			06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15		08:15								
	16:56			17:58			06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15		08:15								
28	08:20			07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17		08:17								
	16:58			18:00			06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17		08:17								
29	08:19						06:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19		08:19								
	17:00						06:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19		08:19								
30	08:17						06:07	05:54	05:05	04:58	05:35	06:29	07:24	08:20		08:20								
	17:02						06:07	05:54	05:05	04:58	05:35	06:29	07:24	08:20		08:20								
31	08:15						06:04	05:54	05:05	04:58	05:35	06:29	07:24	08:20		08:20								
	17:04						06:04	05:54	05:05	04:58	05:35	06:29	07:24	08:20		08:20								
Potential sun hours	250			273			367	420	494	510	512	460	382	328		282		259						
Total, worst case		272		412												0.29		138			1015			
Sun reduction		0.24		0.23												0.27		0.27			0.21			
Oper. time red.		1.00		1.00																				

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IA - H235

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44		13:10 (1)	08:14		08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		08:11 (2)	08:19				08:11 (2)	08:19		13:11 (1)
	16:15	32	13:42 (1)	17:06	30	09:12 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	29	08:40 (2)	16:10	4			08:40 (2)	16:10	4	13:15 (1)
2	08:44		13:11 (1)	08:12		08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		08:11 (2)	08:21				08:11 (2)	08:21		13:07 (1)
	16:16	31	13:42 (1)	17:08	33	09:13 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	30	08:41 (2)	16:09	13			08:41 (2)	16:09	13	13:20 (1)
3	08:44		13:12 (1)	08:10		08:39 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		08:10 (2)	08:22				08:10 (2)	08:22		13:05 (1)
	16:17	30	13:42 (1)	17:10	34	09:13 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	32	08:42 (2)	16:08	17			08:42 (2)	16:08	17	13:22 (1)
4	08:43		13:13 (1)	08:09		08:39 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		08:09 (2)	08:24				08:09 (2)	08:24		13:04 (1)
	16:18	29	13:42 (1)	17:12	34	09:13 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	33	08:42 (2)	16:08	20			08:42 (2)	16:08	20	13:24 (1)
5	08:43		13:14 (1)	08:07		08:39 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32		08:09 (2)	08:25				08:09 (2)	08:25		13:02 (1)
	16:20	27	13:41 (1)	17:14	34	09:13 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	33	08:42 (2)	16:07	23			08:42 (2)	16:07	23	13:25 (1)
6	08:43		13:16 (1)	08:05		08:39 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34		08:09 (2)	08:27				08:09 (2)	08:27		13:02 (1)
	16:21	25	13:41 (1)	17:16	33	09:12 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:44	33	08:42 (2)	16:07	25			08:42 (2)	16:07	25	13:27 (1)
7	08:42		13:17 (1)	08:03		08:40 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36		08:08 (2)	08:28				08:08 (2)	08:28		13:01 (1)
	16:22	23	13:40 (1)	17:18	32	09:12 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	34	08:42 (2)	16:06	27			08:42 (2)	16:06	27	13:28 (1)
8	08:42		13:19 (1)	08:01		08:40 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38		08:09 (2)	08:29				08:09 (2)	08:29		13:02 (1)
	16:24	20	13:39 (1)	17:20	32	09:12 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	34	08:43 (2)	16:06	28			08:43 (2)	16:06	28	13:30 (1)
9	08:41		13:21 (1)	07:59		08:41 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		08:11 (2)	08:30				08:11 (2)	08:30		13:01 (1)
	16:25	18	13:39 (1)	17:22	30	09:11 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	32	08:43 (2)	16:05	30			08:43 (2)	16:05	30	13:31 (1)
10	08:40		13:24 (1)	07:57		08:42 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42		08:13 (2)	08:32				08:13 (2)	08:32		13:01 (1)
	16:27	13	13:37 (1)	17:24	29	09:11 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	30	08:43 (2)	16:05	30			08:43 (2)	16:05	30	13:31 (1)
11	08:40		13:28 (1)	07:55		08:43 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44		08:15 (2)	08:33				08:15 (2)	08:33		13:00 (1)
	16:28	5	13:33 (1)	17:26	27	09:10 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	28	08:43 (2)	16:05	32			08:43 (2)	16:05	32	13:32 (1)
12	08:39			07:53		08:44 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46		08:17 (2)	08:34				08:17 (2)	08:34		13:00 (1)
	16:30			17:28	25	09:09 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	26	08:43 (2)	16:05	33			08:43 (2)	16:05	33	13:33 (1)
13	08:38			07:51		08:45 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48		08:19 (2)	08:35				08:19 (2)	08:35		13:01 (1)
	16:31			17:30	21	09:06 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32	23	08:42 (2)	16:05	34			08:42 (2)	16:05	34	13:35 (1)
14	08:37			07:49		08:47 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49		08:21 (2)	08:36				08:21 (2)	08:36		13:01 (1)
	16:33			17:32	17	09:04 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31	21	08:42 (2)	16:05	34			08:42 (2)	16:05	34	13:35 (1)
15	08:36			07:47		08:50 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51		08:23 (2)	08:37				08:23 (2)	08:37		13:01 (1)
	16:34			17:34	11	09:01 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	19	08:42 (2)	16:05	35			08:42 (2)	16:05	35	13:36 (1)
16	08:36			07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54		07:53		08:25 (2)	08:38				08:25 (2)	08:38		13:01 (1)
	16:36			17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28	16	08:41 (2)	16:05	35			08:41 (2)	16:05	35	13:36 (1)
17	08:34			07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55		08:27 (2)	08:39				08:27 (2)	08:39		13:01 (1)
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	16:41			17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22		16:23	8	08:39 (2)	16:05	36			08:39 (2)	16:05	36	13:38 (1)
20	08:31			07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		08:01		08:33 (2)	08:41				08:33 (2)	08:41		13:02 (1)
	16:43			17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20		16:22	5	08:38 (2)	16:06	36			08:38 (2)	16:06	36	13:38 (1)
21	08:30		09:00 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		08:02		08:35 (2)	08:41				08:35 (2)	08:41		13:03 (1)
	16:45	2	09:02 (2)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17		16:20	2	08:37 (2)	16:06	36			08:37 (2)	16:06	36	13:39 (1)
22	08:29		08:58 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:04			16:07					16:07	36	13:39 (1)
	16:47	5	09:03 (2)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15		16:19			16:07					16:07	36	13:39 (1)
23	08:27		08:57 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:06			16:07					16:07	36	13:40 (1)
	16:49	8	09:05 (2)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13		16:18			16:07					16:07	36	13:40 (1)
24	08:26		08:55 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:08			16:07					16:07	36	13:40 (1)
	16:51	11	09:06 (2)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11		16:17			16:08					16:08	36	13:40 (1)
25	08:25		08:54 (2)	07:25			06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11		08:09			16:08					16:08	36	13:40 (1)
	16:52	14	09:08 (2)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09		16:16			16:08					16:08	37	13:41 (1)
26	08:23		08:52 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		08:11			16:09					16:09	37	13:41

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park IE-F91 RHH9 Sligo +353719161416 abyrrne / abyrrne@jodireland.com Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Assumptions for shadow calculations

Shadow receptor: IB - H236

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	13:12 (1)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:13 (2)	08:19	13:12 (1)								
	16:15	33	13:45 (1)	17:06	32	09:14 (2)	18:02	20:00	20:55	21:45	22:00	21:25	16:54	28	08:41 (2)	16:10	7	13:19 (1)						
2	08:44	13:14 (1)	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:12 (2)	08:21	13:09 (1)								
	16:16	31	13:45 (1)	17:08	34	09:14 (2)	18:04	20:02	20:57	21:47	22:00	21:23	16:52	30	08:42 (2)	16:09	14	13:23 (1)						
3	08:44	13:14 (1)	08:10	08:40 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:11 (2)	08:22	13:07 (1)								
	16:17	30	13:44 (1)	17:10	34	09:14 (2)	18:06	20:04	20:59	21:48	21:59	21:21	16:50	32	08:43 (2)	16:08	18	13:25 (1)						
4	08:43	13:16 (1)	08:09	08:40 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:11 (2)	08:24	13:06 (1)								
	16:18	28	13:44 (1)	17:12	34	09:14 (2)	18:08	20:06	21:01	21:49	21:59	21:19	16:48	32	08:43 (2)	16:08	21	13:27 (1)						
5	08:43	13:16 (1)	08:07	08:40 (2)	07:07	06:52	05:44	05:00	05:02	05:45	06:39	07:33	07:32	08:10 (2)	08:25	13:04 (1)								
	16:20	28	13:44 (1)	17:14	34	09:14 (2)	18:09	20:08	21:03	21:50	21:58	21:18	16:46	33	08:43 (2)	16:07	24	13:28 (1)						
6	08:43	13:18 (1)	08:05	08:41 (2)	07:05	06:49	05:42	05:00	05:03	05:47	06:42	07:35	07:34	08:10 (2)	08:27	13:04 (1)								
	16:21	26	13:44 (1)	17:16	33	09:14 (2)	18:11	20:09	21:05	21:51	21:58	21:16	16:44	34	08:44 (2)	16:07	26	13:30 (1)						
7	08:42	13:19 (1)	08:03	08:41 (2)	07:02	06:47	05:40	05:04	05:04	05:49	06:44	07:37	07:36	08:10 (2)	08:28	13:03 (1)								
	16:22	24	13:43 (1)	17:18	32	09:13 (2)	18:13	20:11	21:06	21:52	21:57	21:14	16:43	34	08:44 (2)	16:06	28	13:31 (1)						
8	08:42	13:21 (1)	08:01	08:42 (2)	07:00	06:44	05:38	05:05	05:05	05:51	06:45	07:39	07:38	08:11 (2)	08:29	13:04 (1)								
	16:24	21	13:42 (1)	17:20	31	09:13 (2)	18:15	20:13	21:08	21:53	21:56	21:12	16:41	34	08:45 (2)	16:06	29	13:33 (1)						
9	08:41	13:23 (1)	07:59	08:43 (2)	06:57	06:42	05:36	05:06	05:06	05:52	06:47	07:41	07:40	08:11 (2)	08:30	13:03 (1)								
	16:25	19	13:42 (1)	17:22	29	09:12 (2)	18:17	20:15	21:10	21:54	21:56	21:10	16:39	34	08:45 (2)	16:05	30	13:33 (1)						
10	08:40	13:26 (1)	07:57	08:44 (2)	06:55	06:40	05:34	05:06	05:07	05:54	06:49	07:43	07:42	08:13 (2)	08:32	13:03 (1)								
	16:27	14	13:40 (1)	17:24	28	09:12 (2)	18:19	20:17	21:12	21:55	21:55	21:08	16:37	32	08:45 (2)	16:05	31	13:34 (1)						
11	08:40	13:29 (1)	07:55	08:45 (2)	06:53	06:37	05:33	05:06	05:08	05:56	06:51	07:44	07:44	08:15 (2)	08:33	13:02 (1)								
	16:28	8	13:37 (1)	17:26	26	09:11 (2)	18:21	20:19	21:13	21:56	21:54	21:06	16:36	30	08:45 (2)	16:05	33	13:35 (1)						
12	08:39	13:29 (1)	07:53	08:46 (2)	06:50	06:35	05:31	05:09	05:09	05:58	06:52	07:46	07:46	08:17 (2)	08:34	13:05 (1)								
	16:30	17	13:28	17:28	24	09:10 (2)	18:23	20:21	21:15	21:56	21:53	21:04	16:34	27	08:44 (2)	16:05	33	13:35 (1)						
13	08:38	13:31	07:51	08:47 (2)	06:48	06:32	05:29	05:05	05:11	05:59	06:54	07:48	07:48	08:19 (2)	08:35	13:03 (1)								
	16:31	17	13:30	17:30	20	09:07 (2)	18:25	20:22	21:17	21:57	21:52	21:01	16:32	25	08:44 (2)	16:05	34	13:37 (1)						
14	08:37	13:33	07:49	08:49 (2)	06:45	06:30	05:27	05:05	05:12	06:01	06:56	07:50	07:49	08:21 (2)	08:36	13:03 (1)								
	16:33	17	13:32	17:32	16	09:05 (2)	18:27	20:24	21:18	21:58	21:51	20:59	16:31	23	08:44 (2)	16:05	35	13:38 (1)						
15	08:36	13:34	07:47	08:53 (2)	06:43	06:28	05:26	05:05	05:13	06:03	06:58	07:52	07:51	08:23 (2)	08:37	13:04 (1)								
	16:34	17	13:34	17:34	8	09:01 (2)	18:29	20:26	21:20	21:58	21:50	20:57	16:29	20	08:43 (2)	16:05	35	13:39 (1)						
16	08:36	13:36	07:45	08:54 (2)	06:40	06:25	05:24	05:04	05:14	06:05	06:59	07:54	07:53	08:25 (2)	08:38	13:03 (1)								
	16:36	17	13:36	17:36	18	09:03 (2)	18:30	20:28	21:22	21:59	21:49	20:55	16:28	18	08:43 (2)	16:05	35	13:38 (1)						
17	08:34	13:38	07:43	08:55 (2)	06:38	06:23	05:22	05:04	05:16	06:06	07:01	07:56	07:55	08:27 (2)	08:39	13:03 (1)								
	16:38	17	13:38	17:38	18	09:02 (2)	18:32	20:30	21:23	21:59	21:48	20:53	16:26	15	08:42 (2)	16:05	36	13:39 (1)						
18	08:33	13:40	07:41	08:56 (2)	06:36	06:21	05:21	05:04	05:17	06:08	07:03	07:57	07:57	08:29 (2)	08:39	13:04 (1)								
	16:40	17	13:40	17:40	18	09:04 (2)	18:34	20:32	21:25	22:00	21:46	20:51	16:25	13	08:42 (2)	16:05	36	13:40 (1)						
19	08:30	13:41	07:38	08:57 (2)	06:35	06:20	05:19	05:04	05:18	06:09	07:04	07:58	07:59	08:31 (2)	08:40	13:05 (1)								
	16:41	17	13:42	17:42	18	09:05 (2)	18:36	20:33	21:27	22:00	21:45	20:48	16:23	10	08:41 (2)	16:05	36	13:41 (1)						
20	08:31	13:43	07:37	08:58 (2)	06:31	06:16	05:18	05:04	05:20	06:12	07:06	08:01	08:01	08:33 (2)	08:41	13:04 (1)								
	16:43	1	09:02 (2)	17:44	18	09:08 (2)	18:38	20:35	21:28	22:00	21:44	20:46	16:22	7	08:40 (2)	16:06	37	13:41 (1)						
21	08:30	13:44	07:34	08:59 (2)	06:30	06:14	05:16	05:04	05:21	06:13	07:08	08:03	08:02	08:35 (2)	08:41	13:05 (1)								
	16:45	4	09:04 (2)	17:46	18	09:10 (2)	18:40	20:37	21:30	22:01	21:42	20:44	16:20	5	08:40 (2)	16:06	37	13:42 (1)						
22	08:29	13:45	07:32	09:00 (2)	06:29	06:12	05:15	05:05	05:23	06:15	07:10	08:05	08:04	08:37 (2)	08:42	13:05 (1)								
	16:47	7	09:05 (2)	17:48	18	09:12 (2)	18:42	20:39	21:31	22:01	21:41	20:42	16:19	2	08:39 (2)	16:07	37	13:42 (1)						
23	08:27	13:46	07:30	09:01 (2)	06:28	06:09	05:13	05:05	05:24	06:17	07:12	08:07	08:06	08:38 (2)	08:42	13:06 (1)								
	16:49	10	09:07 (2)	17:50	18	09:13 (2)	18:43	20:41	21:33	22:01	21:40	20:39	16:18	1	08:39 (2)	16:07	37	13:43 (1)						
24	08:26	13:47	07:28	09:02 (2)	06:27	06:07	05:12	05:05	05:26	06:19	07:14	08:09	08:08	08:39 (2)	08:43	13:06 (1)								
	16:51	13	09:08 (2)	17:52	18	09:14 (2)	18:45	20:43	21:34	22:01	21:38	20:37	16:17	1	08:40 (2)	16:08	37	13:43 (1)						
25	08:25	13:48	07:25	09:03 (2)	06:25	06:05	05:11	05:06	05:27	06:20	07:15	08:11	08:09	08:40 (2)	08:43	13:07 (1)								
	16:52	15	09:09 (2)	17:54	18	09:15 (2)	18:47	20:44	21:36	22:01	21:37	20:35	16:16	1	08:41 (2)	16:08	36	13:43 (1)						
26	08:23	13:49	07:23	09:04 (2)	06:23	06:03	05:09	05:06	05:29	06:22	07:17	08:13	08:11	08:41 (2)	08:44	13:08 (1)								
	16:54	18	09:10 (2)	17:56	18	09:16 (2)	18:49	20:46	21:37	22:01	21:35	20:33	16:15	1	08:42 (2)	16:09	36	13:44 (1)						
27	08:22	13:51	07:21	09:05 (2)	06:21	06:01	05:08	05:06	05:31	06:24	07:19	08:15	08:21 (2)	08:13	08:44	13:09 (1)								
	16:56	20	09:11 (2)	17:58	18	09:17 (2)	18:51	20:48	21:39	22:01	21:33	20:30	16:14	11	08:32 (2)	16:14	16:10	35	13:44 (1)					
28	08:20	13:52	07:19	09:06 (2)	06:20	06:11	05:08	05:07	05:32	06:26	07:21	08:17	08:18 (2)	08:14	08:44	13:09 (1)								
	16:58	23	09:12 (2)	18:00	18	09:18 (2)	18:53	20:50	21:40	22:01	21:32	20:28	16:13	17	08:35 (2)	16:13	16:11	36	13:45 (1)					
29	08:19	13:53	07:17	09:07 (2)	06:19	07:09	05:56	05:06	05:34	06:28	07:23	08:19	08:16 (2)	08:16	08:44	13:10 (1)								
	17:00	25	09:12 (2)		18	09:19 (2)	18:55	20:52	21:42	22:01	21:30	20:25	16:12	21	08:37 (2)	16:12	16:11	35	13:45 (1)					
30	08:17	13:54	07:15	09:08 (2)	06:17	07:06	05:54	05:05	05:35	06:29	07:24	08:20	08:14 (2)	08:18	08:44	13:11 (1)								
	17:02	27	09:12 (2)		18	09:20 (2)	18:56	20:54	21:43	22:00	21:28	20:23	16:12	24	08:38 (2)	16:11	16:12	34	13:45 (1)					
31	08:15	13:54	07:14	09:09 (2)	06:16	07:04	05:54	05:04	05:37	06:31	07:26	08:22	08:14 (2)	08:18	08:44	13:11 (1)								
	17:04	30	09:14 (2)		18	09:21 (2)	18:58	20:56	21:44	22:01	21:27	20:21	16:12	27	08:41 (2)		16:13	33	13:44 (1)					
Potential sun hours	250					367		420		494		510		512		460		382		328		259		233
Total, worst case	455					415		415		415		415		415		415		415		415		415		415
Sun reduction	0.24					0.23		0.23		0.23		0.23		0.23		0.23		0.23		0.23		0.23		0.23
Oper. time red.	1.00					1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00
Wind dir. red.	0.62					0.61		0.61		0.61		0.61		0.61		0.61		0.61		0.61		0.61		0.61
Total reduction	0.15					0.14		0.14		0.14		0.14		0.14		0.14		0.14		0.14		0.14		0.14
Total, real	69					59		59		59		59		59		59		59	</					

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IC - H237

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: ID - H238
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 08:14 07:16 07:01 05:52 05:03 20:11 (5) 04:59 20:17 (5) 05:39 20:29 (5) 06:33 07:26 07:24 08:19											
	16:15 17:06 18:02 20:00 20:55 21:45 21:05 (5) 22:00 21:12 (5) 21:25 20:53 (5) 20:18 19:05 16:54 16:10											
2	08:44 08:12 07:14 06:59 05:50 05:02 20:12 (5) 05:00 20:18 (5) 05:40 20:31 (5) 06:35 07:28 07:26 08:21											
	16:16 17:08 18:04 20:02 20:57 21:46 21:06 (5) 22:00 21:12 (5) 21:23 20:52 (5) 20:16 19:02 16:52 16:09											
3	08:43 08:10 07:12 06:56 05:48 05:01 20:12 (5) 05:00 20:17 (5) 05:42 20:32 (5) 06:36 07:30 07:28 08:22											
	16:17 17:10 18:06 20:04 20:59 21:48 21:06 (5) 21:59 21:12 (5) 21:21 20:50 (5) 20:13 19:00 16:50 16:08											
4	08:43 08:08 07:09 06:54 05:46 05:00 20:11 (5) 05:01 20:18 (5) 05:44 20:34 (5) 06:38 07:31 07:30 08:24											
	16:18 17:12 18:08 20:06 21:01 21:49 21:06 (5) 21:59 21:12 (5) 21:19 20:48 (5) 20:11 18:57 16:48 16:08											
5	08:43 08:07 07:07 06:51 05:44 05:49 20:12 (5) 05:02 20:18 (5) 05:45 20:35 (5) 06:40 07:33 07:32 08:25											
	16:20 17:14 18:09 20:07 21:03 21:50 21:07 (5) 21:58 21:12 (5) 21:17 20:46 (5) 20:09 18:55 16:46 16:07											
6	08:42 08:05 07:04 06:49 05:42 05:49 20:12 (5) 05:03 20:18 (5) 05:47 20:38 (5) 06:42 07:35 07:34 08:26											
	16:21 17:16 18:11 20:09 21:04 20:31 (5) 21:51 21:57 21:13 (5) 21:15 20:45 (5) 20:06 18:52 16:44 16:07											
7	08:42 08:03 07:02 06:47 05:40 05:48 20:28 (5) 05:04 20:19 (5) 05:49 20:43 07:37 07:36 08:28											
	16:22 17:18 18:13 20:11 21:06 20:36 (5) 21:52 21:57 21:13 (5) 21:13 20:44 07:37 07:36 08:28											
8	08:41 08:01 07:00 06:44 05:38 05:45 20:25 (5) 04:57 20:19 (5) 05:51 20:45 07:39 07:38 08:29											
	16:24 17:20 18:15 20:13 21:08 20:37 (5) 21:53 21:56 21:13 (5) 21:11 20:41 07:39 07:38 08:29											
9	08:41 07:59 06:57 06:42 05:36 05:47 20:23 (5) 04:57 20:19 (5) 05:52 20:47 07:41 07:40 08:30											
	16:25 17:22 18:17 20:15 21:10 20:38 (5) 21:54 21:55 21:13 (5) 21:10 20:42 07:41 07:40 08:30											
10	08:40 07:57 06:55 06:39 05:34 05:46 20:21 (5) 04:56 20:19 (5) 05:54 20:49 07:42 07:42 08:31											
	16:27 17:24 18:19 20:17 21:11 20:40 (5) 21:55 21:55 21:13 (5) 21:07 20:46 07:42 07:42 08:31											
11	08:40 07:55 06:53 06:37 05:33 05:46 20:20 (5) 04:56 20:19 (5) 05:56 20:51 07:44 07:44 08:33											
	16:28 17:26 18:21 20:19 21:13 20:42 (5) 21:55 21:55 21:14 (5) 21:05 20:48 07:44 07:44 08:33											
12	08:39 07:53 06:50 06:35 05:31 05:45 20:18 (5) 04:55 20:19 (5) 05:58 20:52 07:46 07:45 08:34											
	16:30 17:28 18:23 20:20 21:15 20:43 (5) 21:56 21:56 21:14 (5) 21:03 20:49 07:46 07:45 08:34											
13	08:38 07:51 06:48 06:32 05:29 05:45 20:18 (5) 04:55 20:20 (5) 05:59 20:54 07:48 07:47 08:35											
	16:31 17:30 18:25 20:22 21:17 20:46 (5) 21:57 21:57 21:13 (5) 21:01 20:50 07:48 07:47 08:35											
14	08:37 07:49 06:45 06:30 05:27 05:45 20:16 (5) 04:55 20:20 (5) 06:01 20:56 07:50 07:49 08:36											
	16:33 17:32 18:27 20:24 21:18 20:47 (5) 21:57 21:57 21:13 (5) 21:05 20:59 07:50 07:49 08:36											
15	08:36 07:47 06:43 06:28 05:26 05:45 20:15 (5) 04:55 20:20 (5) 06:03 20:58 07:52 07:51 08:37											
	16:35 17:34 18:28 20:26 21:20 20:48 (5) 21:58 21:58 21:13 (5) 21:05 20:57 07:52 07:51 08:37											
16	08:35 07:45 06:40 06:25 05:24 05:44 20:15 (5) 04:54 20:21 (5) 06:05 20:59 07:54 07:53 08:38											
	16:36 17:36 18:30 20:28 21:22 20:50 (5) 21:59 21:59 21:14 (5) 21:05 20:55 07:54 07:53 08:38											
17	08:34 07:43 06:38 06:23 05:22 05:44 20:14 (5) 04:54 20:21 (5) 06:06 20:57 07:55 07:55 08:38											
	16:38 17:38 18:32 20:30 21:23 20:51 (5) 21:59 21:59 21:14 (5) 21:05 20:53 07:55 07:55 08:38											
18	08:33 07:41 06:36 06:21 05:21 05:44 20:14 (5) 04:54 20:21 (5) 06:08 20:57 07:57 07:57 08:39											
	16:40 17:40 18:34 20:31 21:25 20:52 (5) 22:00 22:00 21:12 (5) 21:05 20:51 07:57 07:57 08:39											
19	08:32 07:39 06:33 06:18 05:19 05:44 20:14 (5) 04:54 20:21 (5) 06:10 20:57 07:59 07:59 08:40											
	16:41 17:42 18:36 20:33 21:27 20:54 (5) 22:00 22:00 21:11 (5) 21:05 20:48 07:59 07:59 08:40											
20	08:31 07:36 06:31 06:16 05:18 05:44 20:12 (5) 04:54 20:22 (5) 06:12 20:58 07:59 07:59 08:40											
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21	08:30 07:34 06:28 06:14 05:16 05:43 20:12 (5) 04:55 20:22 (5) 06:13 20:59 07:59 07:59 08:40											
	16:45 17:46 18:40 20:37 21:30 20:57 (5) 22:00 22:00 21:09 (5) 21:05 20:44 07:59 07:59 08:40											
22	08:28 07:32 06:26 06:12 05:15 05:42 20:12 (5) 04:55 20:22 (5) 06:15 20:57 07:59 07:59 08:40											
	16:47 17:48 18:42 20:39 21:31 20:58 (5) 22:01 22:01 21:07 (5) 21:05 20:42 07:59 07:59 08:40											
23	08:27 07:30 06:23 06:09 05:13 05:41 20:11 (5) 04:55 20:23 (5) 06:17 20:57 07:59 07:59 08:40											
	16:49 17:50 18:43 20:41 21:33 20:59 (5) 22:01 22:01 21:07 (5) 21:05 20:39 07:59 07:59 08:40											
24	08:26 07:28 06:21 06:07 05:12 05:40 20:11 (5) 04:55 20:23 (5) 06:19 20:57 07:59 07:59 08:40											
	16:51 17:52 18:45 20:43 21:34 20:59 (5) 22:01 22:01 21:05 (5) 21:05 20:37 07:59 07:59 08:40											
25	08:24 07:25 06:18 06:05 05:11 05:39 20:11 (5) 04:56 20:24 (5) 06:20 20:57 07:59 07:59 08:40											
	16:52 17:54 18:47 20:44 21:36 21:02 (5) 22:01 22:01 21:11 (5) 21:05 20:35 07:59 07:59 08:40											
26	08:23 07:23 06:16 06:03 05:09 05:37 20:11 (5) 04:56 20:24 (5) 06:22 20:57 07:59 07:59 08:40											
	16:54 17:56 18:49 20:46 21:37 21:03 (5) 22:01 22:01 21:10 (5) 21:05 20:32 07:59 07:59 08:40											
27	08:22 07:21 06:13 06:01 05:08 05:35 20:11 (5) 04:56 20:25 (5) 06:24 20:57 07:59 07:59 08:40											
	16:56 17:58 18:51 20:48 21:39 21:04 (5) 22:01 22:01 21:11 (5) 21:05 20:30 07:59 07:59 08:40											
28	08:20 07:18 06:11 05:58 05:07 05:33 20:11 (5) 04:57 20:26 (5) 06:26 20:57 07:59 07:59 08:40											
	16:58 18:00 18:53 20:50 21:40 21:05 (5) 22:01 22:01 21:11 (5) 21:05 20:28 07:59 07:59 08:40											
29	08:18 07:09 05:56 05:06 05:06 20:11 (5) 04:58 20:27 (5) 06:28 20:57 07:59 07:59 08:40											
	17:00 19:55 20:52 21:41 21:41 21:05 (5) 22:01 22:01 21:12 (5) 21:05 20:25 07:59 07:59 08:40											
30	08:17 07:06 05:54 05:05 05:05 20:11 (5) 04:58 20:27 (5) 06:29 20:57 07:59 07:59 08:40											
	17:02 19:56 20:53 21:43 21:43 21:05 (5) 22:00 22:00 21:11 (5) 21:05 20:23 07:59 07:59 08:40											
31	08:15 07:04 05:54 05:04 05:04 20:11 (5) 04:58 20:29 (5) 06:31 20:57 07:59 07:59 08:40											
	17:04 19:58 20:54 21:44 21:44 21:05 (5) 22:00 22:00 21:10 (5) 21:05 20:21 07:59 07:59 08:40											
Potential sun hours	250 273 367 420 494 510 512 460 382 328 259 233											
Total, worst case					948	1626		95				
Sun reduction					0.38	0.32		0.34				
Oper. time red.					1.00	1.00		1.00				
Wind dir. red.					0.63	0.63		0.63				
Total reduction					0.24	0.20		0.22				
Total, real					228	328		20				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: IE - H239
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	20:20 (5) 20:55 (5)	04:59 22:00	20:30 (5) 21:25	05:39 21:25	20:32 (5) 20:18	06:33 19:05	07:26 16:54	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	20:22 (5) 20:55 (5)	05:00 22:00	20:30 (5) 21:23	05:40 21:23	20:34 (5) 20:16	06:35 19:02	07:28 16:52	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	20:22 (5) 20:55 (5)	05:00 21:59	20:29 (5) 21:21	05:42 21:21	20:34 (5) 20:13	06:36 19:00	07:30 16:50	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	20:22 (5) 20:54 (5)	05:01 21:59	20:29 (5) 21:19	05:44 21:19	20:36 (5) 20:11	06:38 18:57	07:31 16:40	07:30 16:40	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	20:23 (5) 20:55 (5)	05:02 21:58	20:29 (5) 21:17	05:45 21:17	20:37 (5) 20:09	06:40 18:55	07:33 16:32	07:32 16:32	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:31 (5) 21:51	20:23 (5) 20:55 (5)	05:03 21:57	20:29 (5) 21:15	05:47 21:15	20:39 (5) 20:06	06:42 18:52	07:35 16:44	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:29 (5) 21:52	20:23 (5) 20:54 (5)	05:04 21:57	20:29 (5) 21:13	05:49 21:13	20:40 18:57	06:43 16:30	07:37 16:43	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:27 (5) 21:53	20:24 (5) 20:54 (5)	05:05 21:56	20:29 (5) 21:11	05:51 21:11	20:41 20:01	06:45 18:48	07:39 16:41	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:25 (5) 21:54	20:25 (5) 20:55 (5)	05:06 21:55	20:29 (5) 21:09	05:52 21:09	20:42 19:59	06:47 18:45	07:41 16:39	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:23 (5) 20:40 (5)	20:25 (5) 21:55	05:07 21:54	20:29 (5) 21:07	05:54 21:07	20:43 19:56	06:49 18:43	07:42 16:37	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	20:23 (5) 20:42 (5)	20:25 (5) 21:55	05:08 21:54	20:29 (5) 21:05	05:56 21:05	20:44 19:54	06:50 18:40	07:44 16:36	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:22 (5) 20:43 (5)	20:26 (5) 21:56	05:09 21:53	20:29 (5) 21:03	05:58 21:03	20:45 19:51	06:52 18:38	07:46 16:34	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:21 (5) 20:44 (5)	20:26 (5) 21:57	05:11 21:52	20:29 (5) 21:01	05:59 21:01	20:46 19:49	06:54 18:36	07:48 16:32	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:21 (5) 20:47 (5)	20:26 (5) 21:57	05:12 21:51	20:28 (5) 21:05	06:01 21:05	20:47 19:47	06:56 18:33	07:50 16:31	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:20 (5) 20:48 (5)	20:27 (5) 21:58	05:13 21:50	20:28 (5) 21:04	06:03 21:04	20:48 19:44	06:58 18:31	07:52 16:29	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:20 (5) 20:50 (5)	20:27 (5) 21:59	05:14 21:48	20:29 (5) 21:05	06:05 21:05	20:49 19:42	06:59 18:29	07:54 16:28	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:19 (5) 20:51 (5)	20:27 (5) 21:59	05:16 21:47	20:29 (5) 21:05	06:06 21:05	20:50 19:39	07:01 18:26	07:55 16:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	20:19 (5) 20:52 (5)	20:28 (5) 21:59	05:17 21:46	20:28 (5) 21:05	06:08 21:05	20:51 19:37	07:03 18:24	07:57 16:25	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:19 (5) 20:54 (5)	20:28 (5) 22:00	05:18 21:45	20:28 (5) 21:04	06:10 21:04	20:52 19:34	07:05 18:22	07:59 16:23	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:19 (5) 20:55 (5)	20:28 (5) 22:00	05:21 21:42	20:29 (5) 21:05	06:13 21:05	20:50 19:28	07:08 18:17	08:03 16:20	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:25 18:42	06:12 20:39	05:15 21:31	20:19 (5) 20:55 (5)	20:29 (5) 22:01	05:25 21:41	20:29 (5) 21:05	06:15 21:05	20:49 19:27	07:10 18:15	08:04 16:19	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:18 (5) 20:54 (5)	20:29 (5) 22:01	05:24 21:39	20:29 (5) 21:05	06:17 21:05	20:48 19:24	07:12 18:13	08:07 16:18	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	20:18 (5) 20:55 (5)	20:29 (5) 22:01	05:26 21:38	20:29 (5) 21:05	06:19 21:05	20:47 19:22	07:13 18:11	08:09 16:17	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:19 (5) 20:55 (5)	20:30 (5) 22:01	05:27 21:36	20:30 (5) 21:04	06:20 21:05	20:46 19:19	07:15 17:09	08:09 16:16	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	20:19 (5) 20:55 (5)	20:29 (5) 22:01	05:29 21:35	20:29 (5) 21:02	06:22 21:02	20:45 19:17	07:17 17:07	08:11 16:15	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:19 (5) 20:55 (5)	20:30 (5) 22:01	05:31 21:33	20:30 (5) 21:01	06:24 21:01	20:44 19:14	07:19 17:04	08:13 16:14	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	20:20 (5) 20:55 (5)	20:29 (5) 22:01	05:32 21:32	20:30 (5) 21:29	06:26 21:28	20:43 19:09	07:21 17:02	08:14 16:13	08:14 16:13	08:44 16:11
29	08:18 17:00	07:09 19:54	05:56 20:52	05:06 21:41	05:06 21:41	20:20 (5) 20:55 (5)	20:30 (5) 22:00	05:34 21:30	20:31 (5) 21:27	06:28 21:25	20:44 19:09	07:22 17:00	08:16 16:12	08:16 16:12	08:44 16:12
30	08:17 17:02	07:06 19:56	05:54 20:53	05:05 21:43	05:05 21:43	20:20 (5) 20:55 (5)	20:29 (5) 22:00	05:35 21:28	20:31 (5) 21:25	06:29 21:23	20:43 19:07	07:24 16:58	08:17 16:11	08:17 16:11	08:44 16:12
31	08:15 17:04	07:04 19:58	05:04 21:44	05:04 21:44	05:04 21:44	20:20 (5) 20:55 (5)	20:29 (5) 21:26	05:37 21:26	20:32 (5) 21:26	06:31 21:26	20:44 19:07	07:22 16:56	08:18 16:13	08:18 16:13	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233			
Total, worst case					725	869	1015	82							
Sun reduction					0.38	0.32	0.32	0.34							
Oper. time red.					1.00	1.00	1.00	1.00							
Wind dir. red.					0.63	0.63	0.63	0.63							
Total reduction					0.24	0.20	0.21	0.22							
Total, real					175	176	208	18							

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IF - H240

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IG - H241

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: IH - H242
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	16:27 (5) 18:02	07:16 13	17:21 (4) 20:00	05:52 21
2	08:44 16:16	08:12 17:08	16:27 (5) 18:04	07:14 17	17:19 (4) 20:02	05:50 23
3	08:43 16:17	08:10 17:10	16:27 (5) 18:06	07:11 19	17:19 (4) 20:04	05:48 25
4	08:43 16:18	08:08 17:12	16:26 (5) 18:07	07:09 23	17:18 (4) 20:06	05:46 26
5	08:43 16:19	08:07 17:14	16:26 (5) 18:09	07:07 25	17:17 (4) 20:07	05:44 29
6	08:42 16:21	08:05 17:16	16:26 (5) 18:11	07:04 29	17:16 (4) 20:09	05:42 30
7	08:42 16:22	08:03 17:18	16:26 (5) 18:13	07:02 31	17:15 (4) 20:11	05:40 31
8	08:42 16:24	08:01 17:20	16:26 (5) 18:15	07:00 33	17:15 (4) 20:13	05:38 30
9	08:41 16:25	07:59 17:22	16:27 (5) 18:17	06:57 36	17:14 (4) 20:15	05:36 29
10	08:40 16:26	07:57 17:24	16:28 (5) 18:19	06:55 37	17:15 (4) 20:17	05:34 29
11	08:40 16:28	07:55 17:26	16:28 (5) 18:21	06:52 38	17:15 (4) 20:19	05:33 28
12	08:39 16:30	07:53 17:28	16:29 (5) 18:23	06:50 36	17:15 (4) 20:20	05:31 27
13	08:38 16:31	07:51 17:30	16:30 (5) 18:25	06:48 36	17:15 (4) 20:22	05:29 26
14	08:37 16:33	07:49 17:32	16:32 (5) 18:27	06:45 35	17:15 (4) 20:24	05:27 24
15	08:36 16:34	07:47 17:34	16:37 (5) 18:28	06:43 33	17:16 (4) 20:26	05:26 22
16	08:35 16:36	07:45 17:36	16:40 (5) 18:30	06:40 34	17:17 (4) 20:28	05:24 20
17	08:34 16:38	07:43 17:38	18:30 18:32	06:38 35	18:04 (3) 20:30	05:22 17
18	08:33 16:40	07:41 17:40	18:32 18:34	06:35 35	17:19 (4) 20:31	05:21 14
19	08:32 16:41	07:39 17:42	18:34 18:36	06:33 34	18:07 (3) 20:33	05:19 10
20	08:31 16:43	07:36 17:44	06:31 18:38	29	17:24 (4) 20:35	05:18 1
21	08:30 16:45	07:34 17:46	06:28 18:40	17	18:11 (3) 20:37	05:16 21:30
22	08:28 16:47	07:32 17:48	06:26 18:41	19	18:13 (3) 20:39	05:15 21:31
23	08:27 16:49	07:30 17:50	06:23 18:43	21	17:56 (3) 20:41	05:13 21:33
24	08:26 16:50	07:28 17:52	06:21 18:45	21	18:17 (3) 20:42	05:12 21:34
25	08:24 16:52	07:25 17:54	06:18 18:47	19	18:17 (3) 20:44	05:11 20:12 (2)
26	08:23 16:54	07:23 17:56	06:16 18:49	16	18:16 (3) 20:46	05:10 20:15 (2)
27	08:22 16:56	07:21 17:58	06:13 18:51	12	18:14 (3) 20:48	05:09 20:17 (2)
28	08:20 16:58	07:18 18:00	06:11 18:53	2	18:00 (3) 20:50	05:08 20:19 (2)
29	08:18 17:00	07:16 18:02	06:08 19:54	15	18:12 (3) 20:52	05:07 20:21 (2)
30	08:17 17:02	16:29 (5) 18:30 (5)	07:06 19:56	18	05:54 20:53	05:06 21:41
31	08:15 17:04	16:28 (5) 18:32 (5)	07:04 19:58		20:24 (2) 21:43	05:05 21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case	5	256	735	66	462	
Sun reduction	0.24	0.23	0.27	0.35	0.38	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.66	0.66	0.68	0.65	0.65	
Total reduction	0.16	0.15	0.18	0.23	0.25	
Total, real	1	39	135	15	114	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IH - H242

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1 04:59	05:39	20:15 (2) 06:33	07:26	17:54 (4) 07:24	15:57 (5) 08:19	
2 04:59	21:25 27	20:42 (2) 06:35	19:05 36	18:30 (4) 16:54	16:19 (5) 16:10	
3 05:00	21:23 28	20:43 (2) 06:36	07:28	17:53 (4) 07:26	15:57 (5) 08:21	
4 05:01	21:21 29	20:14 (2) 06:38	19:02 37	18:30 (4) 16:52	16:19 (5) 16:09	
5 05:02	21:19 30	20:43 (2) 06:40	07:30	17:53 (4) 07:28	15:56 (5) 08:22	
6 05:03	21:17 31	20:13 (2) 06:42	19:00 37	18:30 (4) 16:50	16:19 (5) 16:08	
7 05:04	21:15 31	20:14 (2) 06:43	07:31	17:52 (4) 07:30	15:56 (5) 08:24	
8 05:05	21:13 30	20:44 (2) 06:44	18:57 37	18:29 (4) 16:48	16:17 (5) 16:08	
9 05:06	21:11 28	20:13 (2) 06:47	07:33	17:52 (4) 07:32	15:56 (5) 08:25	
10 05:07	21:07 24	20:43 (2) 06:49	18:55 34	18:26 (4) 16:46	16:15 (5) 16:07	
11 05:08	21:05 22	20:13 (2) 06:50	07:35	17:52 (4) 07:34	15:56 (5) 08:26	
12 05:09	21:03 20	20:44 (2) 06:52	18:52 32	18:24 (4) 16:44	16:12 (5) 16:07	
13 05:10	21:01 18	20:13 (2) 06:54	07:37	17:51 (4) 07:36	15:56 (5) 08:28	
14 05:12	20:59 15	20:43 (2) 06:56	18:50 30	18:21 (4) 16:43	16:10 (5) 16:06	
15 05:13	20:57 13	20:14 (2) 06:58	07:39	17:51 (4) 07:38	15:56 (5) 08:29	
16 05:14	20:55 9	20:29 (2) 06:59	18:48 27	18:18 (4) 16:41	16:08 (5) 16:06	
17 05:16	20:53 6	20:16 (2) 07:01	07:41	17:52 (4) 07:40	15:57 (5) 08:30	
18 05:17	20:50 3	20:35 (2) 07:03	18:45 24	18:16 (4) 16:39	16:06 (5) 16:05	
19 05:18	20:48	20:14 (2) 07:05	07:42	17:52 (4) 07:42	15:59 (5) 08:31	
20 05:20	20:46	20:29 (2) 07:07	18:43 22	18:14 (4) 16:37	16:05 (5) 16:05	
21 05:21	20:44	20:15 (2) 07:09	07:44	17:53 (4) 07:44	16:00 (5) 08:33	
22 05:23	20:42	20:28 (2) 07:11	18:40 18	18:11 (4) 16:35	16:03 (5) 16:05	
23 05:24	20:40	20:16 (2) 07:13	07:46	17:54 (4) 07:45	16:03 (5) 08:34	
24 05:26	20:38	20:25 (2) 07:15	18:38 15	18:09 (4) 16:34	16:05 (5) 16:05	
25 05:27	20:36	20:17 (2) 07:17	07:48	17:55 (4) 07:47	16:05 (5) 08:35	
26 05:29	20:34	20:23 (2) 07:19	18:36 12	18:07 (4) 16:32	16:05 (5) 16:05	
27 05:30	20:32	20:19 (2) 07:21	07:50	17:56 (4) 07:49	16:05 (5) 08:36	
28 05:32	20:30	20:29 (2) 07:23	18:33 8	18:04 (4) 16:31	16:04 (5) 16:04	
29 05:34	20:28	20:15 (2) 07:25	07:52	17:58 (4) 07:51	16:03 (5) 08:37	
30 05:35	20:26	20:28 (2) 07:27	18:31 4	18:02 (4) 16:29	16:03 (5) 16:05	
31 05:37	20:24	20:16 (2) 07:29	07:54	17:53 (4) 07:53	16:03 (5) 08:38	
Potential sun hours	512	460	382	328	259	233
Total, worst case	149	389	386	448	167	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.65	0.65	0.68	0.67	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.17	
Total, real	31	86	84	88	29	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
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abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: II - H243

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:08 (3) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	20:26 (3) 20:57	43 21:01 (4)
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	20:08 (3) 20:59	05:01 43
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	20:29 (3) 21:01	21:48 42
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	20:08 (3) 21:03	04:59 42
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	20:32 (3) 21:04	21:50 42
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	20:08 (3) 21:06	04:58 41
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	20:09 (3) 21:08	04:57 41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	20:36 (4) 21:10	21:52 40
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	20:10 (3) 21:11	04:57 41
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	20:37 (4) 21:13	21:53 40
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	20:10 (3) 21:15	04:56 39
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	20:39 (4) 21:17	21:54 40
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	20:11 (3) 21:18	04:55 39
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	20:43 (4) 21:22	21:56 39
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	20:16 (3) 21:22	04:55 39
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	20:44 (4) 21:23	21:57 39
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	20:19 (4) 21:25	04:55 39
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	20:51 (4) 21:27	21:59 39
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	20:17 (4) 21:28	04:54 39
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	20:53 (4) 21:30	22:00 39
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	20:16 (4) 21:31	04:55 39
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	20:59 (4) 21:33	22:01 39
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	20:16 (4) 21:34	04:55 39
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	21:00 (4) 21:36	22:01 39
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	20:16 (4) 21:37	04:56 38
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	21:00 (4) 21:39	22:01 39
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	20:17 (4) 21:40	04:57 39
29	08:18 17:00		07:08 19:54	05:56 20:52	20:55 (4) 21:41	22:00 40
30	08:17 17:02		07:06 19:56	05:54 20:53	20:17 (4) 21:43	04:58 40
31	08:15 17:04		07:04 19:58		20:24 (3) 21:43	22:00 40
Potential sun hours	250	273	367	420	494	510
Total, worst case			402	54	1036	1201
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.65	0.64	0.63
Total reduction			0.18	0.23	0.24	0.20
Total, real			73	12	251	243

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
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abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: II - H243

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:25 (4)	05:39	20:24 (3)	06:33	07:26	18:15 (5)	07:24	08:19		
	22:00	40	21:05 (4)	21:25	29	20:53 (4)	20:18	19:05	21	18:36 (5)	16:54
2	05:00	20:26 (4)	05:40	20:23 (3)	06:35	07:28	18:16 (5)	07:26	08:21		
	22:00	40	21:06 (4)	21:23	29	20:52 (4)	20:16	19:02	17	18:33 (5)	16:52
3	05:00	20:25 (4)	05:42	20:21 (3)	06:36	07:30	18:17 (5)	07:28	08:22		
	21:59	40	21:05 (4)	21:21	29	20:50 (4)	20:13	19:00	14	18:31 (5)	16:50
4	05:01	20:25 (4)	05:44	20:20 (3)	06:38	07:31	18:19 (5)	07:30	08:24		
	21:59	41	21:06 (4)	21:19	28	20:48 (4)	20:11	18:57	10	18:29 (5)	16:48
5	05:02	20:25 (4)	05:45	20:19 (3)	06:40	07:33	18:21 (5)	07:32	08:25		
	21:58	41	21:06 (4)	21:17	27	20:46 (4)	20:09	18:55	5	18:26 (5)	16:46
6	05:03	20:25 (4)	05:47	20:18 (3)	06:42	07:35	18:26 (5)	07:34	08:26		
	21:57	42	21:07 (4)	21:15	27	20:45 (4)	20:06	18:52		16:44	16:07
7	05:04	20:26 (4)	05:49	20:18 (3)	06:43	07:37	18:27 (5)	07:36	08:28		
	21:57	41	21:07 (4)	21:13	25	20:43 (4)	20:04	18:50		16:43	16:06
8	05:05	20:26 (4)	05:51	20:17 (3)	06:45	07:39	18:28 (5)	07:38	08:29		
	21:56	42	21:08 (4)	21:11	24	20:41 (3)	20:01	18:48		16:41	16:06
9	05:06	20:26 (4)	05:52	20:17 (3)	06:47	07:41	18:29 (5)	07:40	08:30		
	21:55	42	21:08 (4)	21:09	22	20:39 (3)	19:59	18:45		16:39	16:05
10	05:07	20:26 (4)	05:54	20:16 (3)	06:49	07:42	18:30 (5)	07:42	08:31		
	21:55	42	21:08 (4)	21:07	21	20:37 (3)	19:56	18:43		16:37	16:05
11	05:08	20:26 (4)	05:56	20:17 (3)	06:50	07:44	18:31 (5)	07:44	08:33		
	21:54	42	21:08 (4)	21:05	18	20:35 (3)	19:54	18:40		16:36	16:05
12	05:09	20:26 (4)	05:57	20:17 (3)	06:52	07:46	18:32 (5)	07:45	08:34		
	21:53	43	21:09 (4)	21:03	17	20:34 (3)	19:51	18:38		16:34	16:05
13	05:11	20:26 (4)	05:59	20:16 (3)	06:54	07:48	18:33 (5)	07:47	08:35		
	21:52	43	21:09 (4)	21:01	15	20:31 (3)	19:49	18:36		16:32	16:05
14	05:12	20:25 (4)	06:01	20:17 (3)	06:56	07:50	18:34 (5)	07:49	08:36		
	21:51	44	21:09 (4)	20:59	12	20:29 (3)	19:47	18:33		16:31	16:05
15	05:13	20:25 (4)	06:03	20:18 (3)	06:58	07:52	18:35 (5)	07:51	08:37		
	21:50	44	21:09 (4)	20:57	10	20:28 (3)	19:44	18:31		16:29	16:05
16	05:14	20:26 (4)	06:05	20:18 (3)	06:59	07:54	18:36 (5)	07:53	08:38		
	21:49	44	21:10 (4)	20:55	7	20:25 (3)	19:42	18:29		16:27	16:05
17	05:16	20:26 (4)	06:06	20:19 (3)	07:01	18:30 (5)	07:55	07:55	08:38		
	21:47	44	21:10 (4)	20:53	4	20:23 (3)	19:39	18:26		16:26	16:05
18	05:17	20:26 (4)	06:08	20:20 (3)	07:03	18:26 (5)	07:57	07:57	08:39		
	21:46	44	21:10 (4)	20:50	2	20:22 (3)	19:37	18:24		16:25	16:05
19	05:18	20:26 (4)	06:10		07:05	18:24 (5)	07:59	07:59	08:40		
	21:45	43	21:09 (4)	20:48		19:34	19	18:43 (5)	18:22	16:23	16:05
20	05:20	20:26 (4)	06:12		07:06	18:22 (5)	08:01	08:00	08:41		
	21:44	44	21:10 (4)	20:46		19:32	23	18:45 (5)	18:20	16:22	16:06
21	05:21	20:26 (4)	06:13		07:08	18:20 (5)	08:03	08:02	08:41		
	21:42	43	21:09 (4)	20:44		19:29	25	18:45 (5)	18:17	16:20	16:06
22	05:23	20:26 (4)	06:15		07:10	18:19 (5)	08:05	08:04	08:42		
	21:41	41	21:07 (4)	20:42		19:27	26	18:45 (5)	18:15	16:19	16:06
23	05:24	20:27 (4)	06:17		07:12	18:18 (5)	08:07	08:06	08:42		
	21:39	40	21:07 (4)	20:39		19:24	28	18:46 (5)	18:13	16:18	16:07
24	05:26	20:27 (4)	06:19		07:13	18:17 (5)	08:09	08:08	08:43		
	21:38	38	21:05 (4)	20:37		19:22	29	18:46 (5)	18:11	16:17	16:08
25	05:27	20:27 (4)	06:20		07:15	18:16 (5)	07:11	08:09	08:43		
	21:36	37	21:04 (4)	20:35		19:19	30	18:46 (5)	17:09	16:16	16:08
26	05:29	20:27 (4)	06:22		07:17	18:15 (5)	07:13	08:11	08:43		
	21:35	35	21:02 (4)	20:32		19:17	31	18:46 (5)	17:06	16:15	16:09
27	05:30	20:28 (4)	06:24		07:19	18:15 (5)	07:14	08:13	08:44		
	21:33	33	21:01 (4)	20:30		19:14	30	18:45 (5)	17:04	16:13	16:10
28	05:32	20:28 (4)	06:26		07:21	18:15 (5)	07:16	08:14	08:44		
	21:32	31	20:59 (4)	20:28		19:12	29	18:44 (5)	17:02	16:12	16:11
29	05:34	20:29 (4)	06:28		07:22	18:15 (5)	07:18	08:16	08:44		
	21:30	29	20:58 (4)	20:25		19:09	26	18:41 (5)	17:00	16:12	16:11
30	05:35	20:29 (4)	06:29		07:24	18:15 (5)	07:20	08:17	08:44		
	21:28	27	20:56 (4)	20:23		19:07	23	18:38 (5)	16:58	16:11	16:12
31	05:37	20:26 (3)	06:31					07:22			08:44
	21:26	29	20:55 (4)	20:21				16:56			16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	1229		346		342		67				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.63		0.64		0.67		0.67				
Total reduction	0.20		0.22		0.22		0.20				
Total, real	252		76		74		13				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: IJ - H244

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	18:02	07:01	20:00	32	19:00 (5)	05:52	20:55	05:03	20:42 (3)	
2	08:44	16:16	08:12	17:08	18:04	07:12	18:04	18:04	06:59	20:02	32	18:59 (5)	05:50	20:57	05:02	20:43 (3)	
3	08:43	16:17	08:10	17:10	18:06	07:12	18:06	18:06	06:56	20:04	32	18:59 (5)	05:48	20:59	05:01	20:44 (3)	
4	08:43	16:18	08:08	17:12	18:07	07:09	18:07	18:07	06:54	20:06	31	19:00 (5)	05:46	21:01	05:00	20:45 (3)	
5	08:43	16:20	08:07	17:14	18:09	07:07	18:09	18:09	06:51	20:07	30	19:31 (5)	05:44	21:01	04:59	20:47 (3)	
6	08:42	16:21	08:05	17:16	18:11	07:04	18:11	18:11	06:49	20:09	29	19:29 (5)	05:42	21:04	04:59	20:48 (3)	
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	18:13	06:47	20:11	27	19:29 (5)	05:40	21:06	04:58	20:50 (3)	
8	08:41	16:24	08:01	17:20	18:15	07:00	18:15	18:15	06:44	20:13	25	19:27 (5)	05:38	21:08	04:57	20:53 (3)	
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	18:17	06:42	20:15	21	19:26 (5)	05:36	21:10	04:57	21:53	
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	18:19	06:39	20:17	17	19:24 (5)	05:34	21:11	04:56	21:55	
11	08:40	16:28	07:55	17:26	18:21	06:52	18:21	18:21	06:37	20:19	12	19:21 (5)	05:33	21:13	04:56	21:55	
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	18:23	06:35	20:20		19:19 (5)	05:31	21:15	04:55	21:56	
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	18:25	06:32	20:22			05:29	21:17	04:55	21:57	
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	18:27	06:30	20:24			05:27	21:18	04:55	21:57	
15	08:36	16:34	07:47	17:34	18:28	06:43	18:28	18:28	06:28	20:26			05:26	21:19	04:55	21:57	
16	08:35	16:36	07:45	17:36	18:30	06:40	18:30	18:30	06:25	20:28			05:24	21:20	04:54	21:58	
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	18:32	06:23	20:30			05:22	21:22	04:54	21:59	
18	08:33	16:40	07:41	17:40	18:34	06:35	18:34	18:34	06:21	20:31			05:21	21:23	04:54	21:59	
19	08:32	16:41	07:39	17:42	18:36	06:33	18:36	18:36	06:18	20:33			05:20	21:24	04:54	21:59	
20	08:31	16:43	07:36	17:44	18:38	06:31	18:38	18:38	06:16	20:35			05:19	21:25	04:54	21:59	
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	18:40	06:14	20:37			05:18	21:26	04:54	21:59	
22	08:28	16:47	07:32	17:48	18:42	06:26	18:42	18:42	06:12	20:39			05:16	21:27	04:54	21:59	
23	08:27	16:49	07:30	17:50	18:43	06:23	18:43	18:43	06:09	20:41			05:15	21:28	04:54	21:59	
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45	18:45	06:07	20:42			05:14	21:29	04:54	21:59	
25	08:24	16:52	07:25	17:54	18:47	06:18	18:47	18:47	06:05	20:44			05:13	21:30	04:54	21:59	
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	18:49	06:03	20:46			05:12	21:31	04:54	21:59	
27	08:22	16:56	07:21	17:58	18:51	06:13	18:51	18:51	06:01	20:48			05:11	21:32	04:54	21:59	
28	08:20	16:58	07:18	18:00	18:53	06:11	18:53	18:53	05:58	20:50			05:10	21:33	04:54	21:59	
29	08:18	17:00			18:55	07:09	19:01	19:01	05:56	20:52			05:09	21:34	04:54	21:59	
30	08:17	17:02			18:57	07:06	19:03	19:03	05:54	20:54			05:08	21:35	04:54	21:59	
31	08:15	17:04			18:59	07:04	19:05	19:05	05:52	20:56			05:07	21:36	04:54	21:59	
Potential sun hours	250		273		367				420				494		510		
Total, worst case					182				288				350		132		
Sun reduction					0.27				0.35				0.38		0.32		
Oper. time red.					1.00				1.00				1.00		1.00		
Wind dir. red.					0.67				0.67				0.63		0.62		
Total reduction					0.18				0.24				0.24		0.20		
Total, real					33				69				84		26		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: IJ - H244

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:49 (3) 06:33	19:06 (5) 07:26	07:24 08:19	
2	05:00 22:00	05:40 21:23	20:53 (3) 06:35	19:18 (5) 07:28	16:54 08:21	
3	05:00 21:59	05:42 21:21	20:50 (3) 06:35	19:03 (5) 07:28	16:52 08:21	
4	05:01 21:59	05:44 21:19	20:52 (3) 06:36	19:20 (5) 07:30	16:52 08:22	
5	05:02 21:58	05:45 21:17	20:13 06:38	19:01 (5) 07:30	16:50 08:24	
6	05:03 21:57	05:47 21:15	20:11 06:40	19:22 (5) 07:31	16:50 08:25	
7	05:04 21:57	05:49 21:13	20:25 06:42	19:23 (5) 07:33	16:48 08:26	
8	05:05 21:56	05:51 21:11	20:29 06:43	18:56 (5) 07:35	16:46 08:26	
9	05:06 21:55	05:52 21:09	20:06 06:45	19:25 (5) 07:37	16:44 08:28	
10	05:07 21:55	05:54 21:07	20:04 06:47	18:54 (5) 07:37	16:43 08:28	
11	05:08 21:54	05:56 21:05	20:01 06:49	19:24 (5) 07:39	16:43 08:29	
12	05:09 21:53	05:58 21:03	20:01 06:51	18:54 (5) 07:39	16:41 08:30	
13	05:11 21:52	05:59 21:01	20:01 06:52	19:25 (5) 07:41	16:40 08:30	
14	05:12 21:51	06:01 20:59	20:01 06:54	19:25 (5) 07:42	16:39 08:31	
15	05:13 21:50	06:03 20:57	20:01 06:56	19:24 (5) 07:44	16:37 08:33	
16	05:14 21:48	06:05 20:55	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
17	05:16 21:47	06:06 20:53	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
18	05:17 21:46	06:08 20:50	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
19	05:18 21:45	06:10 20:48	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
20	05:20 21:44	06:12 20:46	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
21	05:21 21:42	06:13 20:44	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
22	05:23 21:41	06:15 20:42	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
23	05:24 21:39	06:17 20:39	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
24	05:26 21:38	06:19 20:37	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
25	05:27 21:36	06:20 20:35	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
26	05:29 21:35	06:22 20:32	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
27	05:30 21:33	06:24 20:30	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
28	05:32 21:32	06:26 20:28	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
29	05:34 21:30	06:28 20:25	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
30	05:35 21:28	06:29 20:23	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
31	05:37 21:26	06:31 20:21	20:01 06:58	19:24 (5) 07:44	16:36 08:33	
Potential sun hours	512	460	382	328	259	233
Total, worst case	421	6	477			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.63	0.63	0.67			
Total reduction	0.20	0.21	0.22			
Total, real	86	1	103			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: IK - H245

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		19:05 (5)	05:52			05:03		20:44 (3)
	16:15	17:06	18:02						20:00	28	19:33 (5)	20:55			21:45	21	21:05 (3)
2	08:44	08:12	07:14						06:59		19:03 (5)	05:50			05:02		20:45 (3)
	16:16	17:08	18:04						20:02	32	19:35 (5)	20:57			21:46	20	21:05 (3)
3	08:43	08:10	07:12						06:56		19:03 (5)	05:48			05:01		20:45 (3)
	16:17	17:10	18:06						20:04	33	19:36 (5)	20:59			21:48	20	21:05 (3)
4	08:43	08:08	07:09						06:54		19:03 (5)	05:46			05:00		20:45 (3)
	16:18	17:12	18:07						20:06	33	19:36 (5)	21:01			21:49	19	21:04 (3)
5	08:43	08:07	07:07						06:51		19:03 (5)	05:44			04:59		20:47 (3)
	16:20	17:14	18:09						20:07	32	19:35 (5)	21:03			21:50	18	21:05 (3)
6	08:42	08:05	07:04						06:49		19:03 (5)	05:42			04:59		20:47 (3)
	16:21	17:16	18:11						20:09	32	19:35 (5)	21:04			21:51	17	21:04 (3)
7	08:42	08:03	07:02						06:47		19:03 (5)	05:40			04:58		20:47 (3)
	16:22	17:18	18:13						20:11	31	19:34 (5)	21:06			21:52	16	21:03 (3)
8	08:41	08:01	07:00						06:44		19:03 (5)	05:38			04:57		20:49 (3)
	16:24	17:20	18:15						20:13	30	19:33 (5)	21:08			21:53	14	21:03 (3)
9	08:41	07:59	06:57						06:42		19:04 (5)	05:36			04:57		20:50 (3)
	16:25	17:22	18:17						20:15	28	19:32 (5)	21:10			21:54	13	21:03 (3)
10	08:40	07:57	06:55						06:39		19:04 (5)	05:34			04:56		20:50 (3)
	16:27	17:24	18:19						20:17	26	19:30 (5)	21:11			21:55	12	21:02 (3)
11	08:40	07:55	06:52						06:37		19:06 (5)	05:33			04:56		20:51 (3)
	16:28	17:26	18:21						20:19	23	19:29 (5)	21:13			21:55	11	21:02 (3)
12	08:39	07:53	06:50						06:35		19:07 (5)	05:31			04:55		20:52 (3)
	16:30	17:28	18:23						20:20	21	19:28 (5)	21:15			21:56	10	21:02 (3)
13	08:38	07:51	06:48						06:32		19:09 (5)	05:29		20:43 (3)	04:55		20:52 (3)
	16:31	17:30	18:25						20:22	16	19:25 (5)	21:17	1	20:44 (3)	21:57	9	21:01 (3)
14	08:37	07:49	06:45						06:30		19:12 (5)	05:27		20:43 (3)	04:55		20:53 (3)
	16:33	17:32	18:27						20:24	9	19:21 (5)	21:18	4	20:47 (3)	21:57	7	21:00 (3)
15	08:36	07:47	06:43						06:28			05:26		20:42 (3)	04:55		20:54 (3)
	16:34	17:34	18:28						20:26			21:20	6	20:48 (3)	21:58	6	21:00 (3)
16	08:35	07:45	06:40						06:25			05:24		20:42 (3)	04:54		20:56 (3)
	16:36	17:36	18:30						20:28			21:22	8	20:50 (3)	21:59	3	20:59 (3)
17	08:34	07:43	06:38						06:23			05:22		20:41 (3)	04:54		20:57 (3)
	16:38	17:38	18:32						20:30			21:23	10	20:51 (3)	21:59	1	20:58 (3)
18	08:33	07:41	06:35						06:21			05:21		20:41 (3)	04:54		
	16:40	17:40	18:34						20:31			21:25	12	20:53 (3)	22:00		
19	08:32	07:39	06:33						06:18			05:19		20:41 (3)	04:54		
	16:41	17:42	18:36						20:33			21:27	13	20:54 (3)	22:00		
20	08:31	07:36	06:31						06:16			05:18		20:40 (3)	04:54		
	16:43	17:44	18:38						20:35			21:28	15	20:55 (3)	22:00		
21	08:30	07:34	06:28						06:14			05:16		20:41 (3)	04:54		
	16:45	17:46	18:40						20:37			21:30	16	20:57 (3)	22:00		
22	08:28	07:32	06:26						06:12			05:15		20:41 (3)	04:55		
	16:47	17:48	18:42						20:39			21:31	18	20:59 (3)	22:01		
23	08:27	07:30	06:23						06:09			05:13		20:40 (3)	04:55		
	16:49	17:50	18:43						20:41			21:33	19	20:59 (3)	22:01		
24	08:26	07:28	06:21						06:07			05:12		20:41 (3)	04:55		
	16:51	17:52	18:45						20:42			21:34	20	21:01 (3)	22:01		
25	08:24	07:25	06:18						06:05			05:11		20:41 (3)	04:56		
	16:52	17:54	18:47	5					18:16 (5)			21:36	21	21:02 (3)	22:01		
26	08:23	07:23	06:16						18:13 (5)			05:09		20:41 (3)	04:56		20:58 (3)
	16:54	17:56	18:49	10					18:23 (5)			21:37	23	21:04 (3)	22:01	3	21:01 (3)
27	08:22	07:21	06:13						18:10 (5)			05:08		20:42 (3)	04:56		20:57 (3)
	16:56	17:58	18:51	14					18:24 (5)			21:39	23	21:05 (3)	22:01	5	21:02 (3)
28	08:20	07:18	06:11						18:09 (5)			05:07		20:42 (3)	04:57		20:57 (3)
	16:58	18:00	18:53	17					18:26 (5)			21:40	24	21:06 (3)	22:01	6	21:03 (3)
29	08:18		07:09						19:07 (5)			05:06		20:42 (3)	04:58		20:57 (3)
	17:00		19:54	21					19:28 (5)			21:41	24	21:06 (3)	22:01	8	21:05 (3)
30	08:17		07:06						19:06 (5)			05:05		20:43 (3)	04:58		20:56 (3)
	17:02		19:56	24					19:30 (5)			21:43	23	21:06 (3)	22:00	9	21:05 (3)
31	08:15		07:04						19:05 (5)			05:04		20:43 (3)			
	17:04		19:58	26					19:31 (5)			21:44	22	21:05 (3)			
Potential sun hours	250	273	367						420			494			510		
Total, worst case				117					374			302			248		
Sun reduction				0.27					0.35			0.38			0.32		
Oper. time red.				1.00					1.00			1.00			1.00		
Wind dir. red.				0.67					0.67			0.63			0.63		
Total reduction				0.18					0.24			0.24			0.20		
Total, real				21					89			72			50		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: IK - H245

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 11	20:55 (3) 21:06 (3) 21:25	06:33 20:18 23	19:05 (5) 19:28 (5) 19:05	07:26 16:54 08:21	08:19 16:10 08:21
2	05:00 22:00 12	20:55 (3) 21:07 (3) 21:23	06:35 20:16 26	19:03 (5) 19:29 (5) 19:02	07:28 16:52 16:09	08:21 16:09 08:22
3	05:00 21:59 13	20:54 (3) 21:07 (3) 21:21	06:36 20:13 28	19:02 (5) 19:30 (5) 19:00	07:30 16:50 16:08	08:22 16:08 08:24
4	05:01 21:59 14	20:54 (3) 21:08 (3) 21:19	06:38 20:11 30	19:00 (5) 19:30 (5) 18:57	07:31 16:48 16:08	08:24 16:08 08:25
5	05:02 21:58 15	20:54 (3) 21:09 (3) 21:17	06:40 20:09 31	19:00 (5) 19:31 (5) 18:55	07:33 16:46 16:07	08:25 16:07 08:26
6	05:03 21:57 16	20:54 (3) 21:10 (3) 21:15	06:42 20:06 32	18:59 (5) 19:31 (5) 18:52	07:35 16:44 16:07	08:26 16:07 08:28
7	05:04 21:57 18	20:53 (3) 21:11 (3) 21:13	06:43 20:04 32	18:58 (5) 19:30 (5) 18:50	07:37 16:43 16:06	08:28 16:06 08:29
8	05:05 21:56 18	20:53 (3) 21:11 (3) 21:11	06:45 20:01 32	18:58 (5) 19:30 (5) 18:48	07:39 16:41 16:06	08:29 16:06 08:30
9	05:06 21:55 19	20:53 (3) 21:12 (3) 21:09	06:47 19:59 32	18:58 (5) 19:30 (5) 18:45	07:41 16:39 16:05	08:30 16:05 08:31
10	05:07 21:55 21	20:52 (3) 21:13 (3) 21:07	06:49 19:56 31	18:57 (5) 19:28 (5) 18:43	07:42 16:37 16:05	08:31 16:05 08:33
11	05:08 21:54 21	20:52 (3) 21:13 (3) 21:05	06:50 19:54 29	18:57 (5) 19:26 (5) 18:40	07:44 16:36 16:05	08:33 16:05 08:34
12	05:09 21:53 21	20:52 (3) 21:13 (3) 21:03	06:52 19:51 27	18:57 (5) 19:24 (5) 18:38	07:46 16:34 16:05	08:34 16:05 08:35
13	05:11 21:52 23	20:51 (3) 21:14 (3) 21:01	06:54 19:49 24	18:58 (5) 19:22 (5) 18:36	07:48 16:32 16:05	08:35 16:05 08:36
14	05:12 21:51 23	20:51 (3) 21:14 (3) 20:59	06:56 19:47 21	18:57 (5) 19:18 (5) 18:33	07:50 16:31 16:05	08:36 16:05 08:37
15	05:13 21:50 23	20:51 (3) 21:14 (3) 20:57	06:58 19:44 18	18:58 (5) 19:16 (5) 18:31	07:52 16:29 16:05	08:37 16:05 08:38
16	05:14 21:48 24	20:51 (3) 21:15 (3) 20:55	06:59 19:42 14	19:00 (5) 19:14 (5) 18:29	07:54 16:27 16:05	08:38 16:05 08:38
17	05:16 21:47 23	20:51 (3) 21:14 (3) 20:53	07:01 19:39 11	19:00 (5) 19:11 (5) 18:26	07:55 16:26 16:05	08:38 16:05 08:39
18	05:17 21:46 21	20:51 (3) 21:12 (3) 20:50	07:03 19:37 6	19:02 (5) 19:08 (5) 18:24	07:57 16:25 16:05	08:39 16:05 08:40
19	05:18 21:45 21	20:50 (3) 21:11 (3) 20:48	07:05 19:34 7	07:59 18:22 16:23	07:59 16:23 16:05	08:40 16:05 08:41
20	05:20 21:44 19	20:51 (3) 21:10 (3) 20:46	07:06 19:32 7	08:01 18:20 16:22	08:00 16:22 16:06	08:41 16:06 08:42
21	05:21 21:42 18	20:51 (3) 21:09 (3) 20:44	07:08 19:29 7	08:03 18:17 16:20	08:02 16:20 16:06	08:41 16:06 08:42
22	05:23 21:41 17	20:50 (3) 21:07 (3) 20:42	07:10 19:27 7	08:05 18:15 16:19	08:04 16:19 16:07	08:42 16:07 08:42
23	05:24 21:39 16	20:51 (3) 21:07 (3) 20:39	07:12 19:24 7	08:07 18:13 16:18	08:06 16:18 16:07	08:42 16:07 08:43
24	05:26 21:38 14	20:51 (3) 21:05 (3) 20:37	07:13 19:22 7	08:09 18:11 16:17	08:08 16:17 16:08	08:43 16:08 08:43
25	05:27 21:36 12	20:52 (3) 21:04 (3) 20:35	07:15 19:19 7	07:11 17:09 16:16	08:09 16:16 16:08	08:43 16:08 08:43
26	05:29 21:35 10	20:52 (3) 21:02 (3) 20:32	07:17 19:17 7	07:13 17:06 16:15	08:11 16:15 16:09	08:43 16:09 08:44
27	05:30 21:33 9	20:52 (3) 21:01 (3) 20:30	07:19 19:14 7	07:14 17:04 16:13	08:13 16:13 16:10	08:44 16:10 08:44
28	05:32 21:32 7	20:52 (3) 20:59 (3) 20:28	07:21 19:12 7	07:16 17:02 16:13	08:14 16:13 16:11	08:44 16:11 08:44
29	05:34 21:30 4	20:54 (3) 20:58 (3) 20:25	07:22 19:09 7	07:18 17:00 16:12	08:16 16:12 16:11	08:44 16:11 08:44
30	05:35 21:28 2	20:54 (3) 20:56 (3) 20:23	07:24 19:07 7	07:20 16:58 16:11	08:17 16:11 16:12	08:44 16:12 08:44
31	05:37 21:26 512	06:31 20:21 460	19:06 (5) 19:27 (5) 382	07:22 16:56 328	08:44 16:13 259	08:44 16:13 233
Potential sun hours	512	460	382	328	259	233
Total, worst case	485	47	447			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.63	0.67	0.67			
Total reduction	0.20	0.23	0.22			
Total, real	98	11	96			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IL - H246

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
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16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IM - H247

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:30 20:23	07:24 19:07	08:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: IN - H248

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:53 (1) 08:13 (1)	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (1) 08:12 (1)	07:26 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:56 (1) 08:12 (1)	07:28 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:58 (1) 08:12 (1)	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	08:00 (1) 08:11 (1)	07:32 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:29 (1) 07:32 (1)	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	06:42 20:06	07:35 18:53	08:02 (1) 08:10 (1)	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:27 (1) 07:34 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	06:44 20:04	07:37 18:50	08:04 (1) 08:09 (1)	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:24 (1) 07:34 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	06:45 20:02	07:39 18:48	08:06 (1) 08:07 (1)	07:38 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:22 (1) 07:34 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	06:47 19:59	07:41 18:45	08:07 (1) 08:08 (1)	07:40 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:19 (1) 07:34 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:58	06:49 19:57	07:43 18:43	07:42 07:44	16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:17 (1) 07:34 (1)	06:37 20:19	05:33 21:13	04:56 21:54	05:08 21:56	06:51 19:54	07:45 18:41	07:44 07:46	16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:14 (1) 07:33 (1)	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	06:52 19:52	07:46 18:38	07:46 07:48	16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:12 (1) 07:33 (1)	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	06:54 19:49	07:48 18:36	07:48 07:50	16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	07:12 (1) 07:31 (1)	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:56 19:47	07:50 18:34	07:50 07:51	16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	07:13 (1) 07:31 (1)	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:58 19:44	07:52 18:31	07:51 07:53	16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	07:14 (1) 07:28 (1)	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	07:00 19:42	07:54 18:29	07:53 07:55	16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	07:16 (1) 07:26 (1)	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	07:01 19:39	07:56 18:27	07:55 07:57	16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 07:59	16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 08:01	16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 08:02	16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 08:04	16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 08:06	16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 08:08	16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 08:10	16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:10 18:09	08:10 08:11	16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:11 08:07 (1)	08:11 07:56 (1)	16:08
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:13 08:09 (1)	08:13 07:54 (1)	16:09
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:15 08:11 (1)	08:15 07:53 (1)	16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:16 08:12 (1)	08:16 07:52 (1)	16:11
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	08:18 08:13 (1)	08:18 07:23	16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		08:19 16:56		16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case			165						78	93		
Sun reduction			0.27						0.32	0.29		
Oper. time red.			1.00						1.00	1.00		
Wind dir. red.			0.65						0.65	0.65		
Total reduction			0.18						0.21	0.19		
Total, real			29						16	18		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: IO - H249

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26		07:55 (1)	07:24	08:19
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	20	08:15 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	21	08:15 (1)	16:52	16:09
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	19	08:15 (1)	16:50	16:09
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	17	08:15 (1)	16:48	16:08
5	08:43	08:07	07:07		07:31 (1)	06:52	05:44	04:59	05:02	05:46		07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10	4	07:35 (1)	20:08	21:03	21:50	21:18	20:09		18:55	14	08:14 (1)	16:46	16:07
6	08:43	08:05	07:05		07:29 (1)	06:49	05:42	04:59	05:03	05:47		07:35		08:02 (1)	07:34	08:27
	16:21	17:16	18:12	7	07:36 (1)	20:10	21:05	21:51	21:16	20:06		18:53	12	08:14 (1)	16:45	16:07
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	05:49		07:37		08:04 (1)	07:36	08:28
	16:22	17:18	18:13	10	07:37 (1)	20:11	21:06	21:52	21:17	20:04		18:50	9	08:13 (1)	16:43	16:06
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	05:51		07:39		08:06 (1)	07:38	08:29
	16:24	17:20	18:15	13	07:37 (1)	20:13	21:08	21:53	21:12	20:02		18:48	6	08:12 (1)	16:41	16:06
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52		07:41		08:07 (1)	07:40	08:31
	16:25	17:22	18:17	16	07:38 (1)	20:15	21:10	21:54	21:10	19:59		18:45	2	08:09 (1)	16:39	16:06
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54		07:43		07:42	08:32	
	16:27	17:24	18:19	18	07:37 (1)	20:17	21:12	21:55	21:08	19:57		18:43		16:37	16:05	
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56		07:45		07:44	08:33	
	16:28	17:26	18:21	20	07:37 (1)	20:19	21:13	21:56	21:14	19:54		18:41		16:36	16:05	
12	08:39	07:53	06:50		07:15 (1)	06:35	05:31	04:56	05:09	05:58		07:46		07:46	08:34	
	16:30	17:28	18:23	21	07:36 (1)	20:21	21:15	21:56	21:13	19:52		18:38		16:34	16:05	
13	08:38	07:51	06:48		07:16 (1)	06:33	05:29	04:55	05:11	05:59		07:48		07:48	08:35	
	16:31	17:30	18:25	19	07:35 (1)	20:22	21:17	21:57	21:12	19:49		18:36		16:32	16:05	
14	08:37	07:49	06:45		07:16 (1)	06:30	05:27	04:55	05:12	06:01		07:50		07:50	08:36	
	16:33	17:32	18:27	17	07:33 (1)	20:24	21:19	21:58	21:11	19:47		18:34		16:31	16:05	
15	08:37	07:47	06:43		07:18 (1)	06:28	05:26	04:55	05:13	06:03		07:52		07:51	08:37	
	16:35	17:34	18:29	14	07:32 (1)	20:26	21:20	21:58	21:10	19:44		18:31		16:29	16:05	
16	08:36	07:45	06:41		07:19 (1)	06:25	05:24	04:55	05:14	06:05		07:54		07:53	08:38	
	16:36	17:36	18:31	10	07:29 (1)	20:28	21:22	21:59	21:49	20:55		18:29		16:28	16:05	
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01		07:56		07:55	08:39	
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39		18:27		16:26	16:05	
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03		07:58		07:57	08:39	
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37		18:24		16:25	16:05	
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05		07:59		07:59	08:40	
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34		18:22		16:23	16:05	
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01		08:01	08:41	
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20		16:22	16:06	
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03		08:02	08:41	
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18		16:21	16:06	
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05		08:04	08:42	
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15		16:19	16:07	
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07		08:06	08:43	
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13		16:18	16:07	
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09		08:08	08:43	
	16:51	17:52	18:45		20:43	21:35	22:01	21:28	20:37	19:22		18:11		16:17	16:08	
25	08:25	07:26	06:19		06:05	05:11	04:56	05:28	06:21	07:15		07:11		08:10	08:43	
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20		17:09		16:16	16:08	
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17		07:13		08:11	08:44	
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17		17:07		16:15	16:09	
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:15		08:13	08:44	
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	7	08:09 (1)	17:05	16:14	16:10	
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:59 (1)	17:17	08:15	08:44	
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	13	08:12 (1)	17:02	16:13	16:11	
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:57 (1)	17:19	08:16	08:44	
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17	08:14 (1)	17:00	16:12	16:12	
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		07:56 (1)	17:21	08:18	08:44	
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	19	08:15 (1)	16:58	16:11	16:13	
31	08:16		07:04			05:04		05:37	06:31			07:23			08:44	
	17:04		19:58			21:44		21:27	20:21			16:56			16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case				169						56		120				
Sun reduction				0.27						0.32		0.29				
Oper. time red.				1.00						1.00		1.00				
Wind dir. red.				0.65						0.65		0.65				
Total reduction				0.18						0.21		0.19				
Total, real				30						12		23				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IP - H250

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IQ - H251

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 18:02	07:01 18:02	05:52 18:02	05:03 18:02	04:59 18:02	05:39 18:02	06:33 18:02	07:26 18:02	08:19 18:02
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 18:04	06:59 18:04	05:50 18:04	05:02 18:04	05:00 18:04	05:40 18:04	06:35 18:04	07:28 18:04	08:21 18:04
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 18:06	06:57 18:06	05:48 18:06	05:01 18:06	05:00 18:06	05:42 18:06	06:37 18:06	07:30 18:06	08:22 18:06
4	08:44 16:18	08:09 17:12	07:09 18:08	07:34 (1) 18:08	06:54 18:08	05:46 18:08	05:00 18:08	05:01 18:08	05:44 18:08	06:38 18:08	07:32 18:08	08:24 18:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:31 (1) 18:10	06:52 18:10	05:44 18:10	05:02 18:10	05:00 18:10	05:46 18:10	06:40 18:10	07:33 18:10	08:25 18:10
6	08:43 16:21	08:05 17:16	07:05 18:12	07:29 (1) 18:12	06:49 18:12	05:42 18:12	05:03 18:12	05:03 18:12	05:47 18:12	06:42 18:12	07:35 18:12	08:27 18:12
7	08:42 16:22	08:03 17:18	07:02 18:13	07:28 (1) 18:13	06:47 18:13	05:40 18:13	05:04 18:13	05:04 18:13	05:49 18:13	06:44 18:13	07:37 18:13	08:28 18:13
8	08:42 16:24	08:01 17:20	07:00 18:15	07:28 (1) 18:15	06:44 18:15	05:38 18:15	05:05 18:15	05:05 18:15	05:51 18:15	06:45 18:15	07:39 18:15	08:29 18:15
9	08:41 16:25	07:59 17:22	06:58 18:17	07:30 (1) 18:17	06:42 18:17	05:36 18:17	05:06 18:17	05:06 18:17	05:52 18:17	06:47 18:17	07:41 18:17	08:31 18:17
10	08:41 16:27	07:57 17:24	06:55 18:19	07:30 (1) 18:19	06:40 18:19	05:35 18:19	05:07 18:19	05:07 18:19	05:54 18:19	06:49 18:19	07:43 18:19	08:32 18:19
11	08:40 16:28	07:55 17:26	06:53 18:21	07:44 (1) 18:21	06:37 18:21	05:33 18:21	05:08 18:21	05:08 18:21	05:56 18:21	06:51 18:21	07:45 18:21	08:33 18:21
12	08:39 16:30	07:53 17:28	06:50 18:23	07:41 (1) 18:23	06:35 18:23	05:31 18:23	05:09 18:23	05:09 18:23	05:58 18:23	06:52 18:23	07:46 18:23	08:34 18:23
13	08:38 16:31	07:51 17:30	06:48 18:25	07:41 (1) 18:25	06:35 18:25	05:29 18:25	05:11 18:25	05:11 18:25	05:59 18:25	06:54 18:25	07:48 18:25	08:35 18:25
14	08:37 16:33	07:49 17:32	06:45 18:27	07:41 (1) 18:27	06:30 18:27	05:27 18:27	05:12 18:27	05:12 18:27	06:01 18:27	06:56 18:27	07:50 18:27	08:36 18:27
15	08:37 16:35	07:47 17:34	06:43 18:29	07:41 (1) 18:29	06:28 18:29	05:26 18:29	05:13 18:29	05:13 18:29	06:03 18:29	06:58 18:29	07:52 18:29	08:37 18:29
16	08:36 16:36	07:45 17:36	06:41 18:31	07:41 (1) 18:31	06:25 18:31	05:24 18:31	05:14 18:31	05:14 18:31	06:05 18:31	07:00 18:31	07:54 18:31	08:38 18:31
17	08:35 16:38	07:43 17:38	06:38 18:32	07:41 (1) 18:32	06:23 18:32	05:22 18:32	05:16 18:32	05:16 18:32	06:06 18:32	07:01 18:32	07:56 18:32	08:39 18:32
18	08:34 16:40	07:41 17:40	06:36 18:34	07:41 (1) 18:34	06:21 18:34	05:21 18:34	05:17 18:34	05:17 18:34	06:08 18:34	07:03 18:34	07:58 18:34	08:40 18:34
19	08:32 16:42	07:39 17:42	06:33 18:36	07:41 (1) 18:36	06:19 18:36	05:19 18:36	05:19 18:36	05:19 18:36	06:10 18:36	07:05 18:36	07:59 18:36	08:40 18:36
20	08:31 16:43	07:37 17:44	06:31 18:38	07:41 (1) 18:38	06:16 18:38	05:18 18:38	05:20 18:38	05:20 18:38	06:12 18:38	07:07 18:38	08:01 18:38	08:41 18:38
21	08:30 16:45	07:34 17:46	06:28 18:40	07:41 (1) 18:40	06:14 18:40	05:16 18:40	05:21 18:40	05:21 18:40	06:14 18:40	07:08 18:40	08:03 18:40	08:41 18:40
22	08:29 16:47	07:32 17:48	06:26 18:42	07:41 (1) 18:42	06:12 18:42	05:15 18:42	05:23 18:42	05:23 18:42	06:15 18:42	07:10 18:42	08:05 18:42	08:42 18:42
23	08:27 16:49	07:30 17:50	06:23 18:44	07:41 (1) 18:44	06:10 18:44	05:13 18:44	05:24 18:44	05:24 18:44	06:17 18:44	07:12 18:44	08:07 18:44	08:43 18:44
24	08:26 16:51	07:28 17:52	06:21 18:45	07:41 (1) 18:45	06:07 18:45	05:12 18:45	05:26 18:45	05:26 18:45	06:19 18:45	07:14 18:45	08:09 18:45	08:43 18:45
25	08:25 16:53	07:26 17:54	06:19 18:47	07:41 (1) 18:47	06:05 18:47	05:11 18:47	05:27 18:47	05:27 18:47	06:21 18:47	07:15 18:47	08:10 18:47	08:43 18:47
26	08:23 16:54	07:23 17:56	06:16 18:49	07:41 (1) 18:49	06:03 18:49	05:09 18:49	05:29 18:49	05:29 18:49	06:22 18:49	07:17 18:49	08:11 18:49	08:44 18:49
27	08:22 16:56	07:21 17:58	06:14 18:51	07:41 (1) 18:51	06:01 18:51	05:08 18:51	05:31 18:51	05:31 18:51	06:24 18:51	07:19 18:51	08:13 18:51	08:44 18:51
28	08:20 16:58	07:19 18:00	06:11 18:53	07:41 (1) 18:53	05:59 18:53	05:07 18:53	05:32 18:53	05:32 18:53	06:26 18:53	07:21 18:53	08:15 18:53	08:44 18:53
29	08:19 17:00		07:09 19:05	07:41 (1) 19:05	05:56 19:05	05:06 19:05	05:34 19:05	05:34 19:05	06:28 19:05	07:23 19:05	08:16 19:05	08:44 19:05
30	08:17 17:02		07:06 19:07	07:41 (1) 19:07	05:54 19:07	05:05 19:07	05:35 19:07	05:35 19:07	06:29 19:07	07:24 19:07	08:18 19:07	08:44 19:07
31	08:16 17:04		07:04 19:09	07:41 (1) 19:09	05:54 19:09	05:05 19:09	05:35 19:09	05:35 19:09	06:29 19:09	07:24 19:09	08:18 19:09	08:44 19:09
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		4	160							169		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		1	28							32		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IR - H252

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

		January	February		March	April	May	June	July	August	September	October		November	December
	1	08:44	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24	08:19
		16:15	17:06		18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05		16:54	16:10
	2	08:44	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26	08:21
		16:16	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	16:09
	3	08:44	08:10		07:12	06:57	05:48	05:01	05:00	05:42	06:37	07:30		07:28	08:22
		16:17	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	16:09
	4	08:44	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30	08:24
		16:18	17:12		18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57		16:48	16:08
	5	08:43	08:07		07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33		07:32	08:25
		16:20	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	16:07
	6	08:43	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34	08:27
		16:21	17:16		18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53		16:45	16:07
	7	08:42	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36	08:28
		16:22	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	16:06
	8	08:42	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38	08:29
		16:24	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48		16:41	16:06
	9	08:41	07:59		06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40	08:31
		16:25	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	16:06
	10	08:41	07:57		06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43		07:42	08:32
		16:27	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	16:05
	11	08:40	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45		07:44	08:33
		16:28	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	16:05
	12	08:39	07:53		06:50	06:35	05:31	04:56	05:09	05:58	06:52	07:46		07:46	08:34
		16:30	17:28		18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	16:05
	13	08:38	07:51		06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48	08:35
		16:31	17:30		18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36		16:32	16:05
	14	08:37	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:35 (1)	07:50	08:36
		16:33	17:32		18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	11	08:46 (1)	16:31
	15	08:37	07:47	08:13 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:33 (1)	07:51	08:37
		16:35	17:34	2	08:15 (1)	18:29	20:26	21:20	21:58	20:57	19:44	18:31	15	08:48 (1)	16:29
	16	08:36	07:45	08:11 (1)	06:41	06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:32 (1)	07:53	08:38
		16:36	17:36	6	08:17 (1)	18:31	20:28	21:22	21:59	21:49	20:55	19:42	17	08:49 (1)	16:28
	17	08:35	07:43	08:09 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:31 (1)	07:55	08:39
		16:38	17:38	9	08:18 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	19	08:50 (1)	16:26
	18	08:34	07:41	08:07 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:30 (1)	07:57	08:39
		16:40	17:40	12	08:19 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	20	08:50 (1)	16:25
	19	08:32	07:39	08:04 (1)	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:29 (1)	07:59	08:40
		16:42	17:42	15	08:19 (1)	18:36	20:34	21:27	22:00	21:45	20:49	19:34	22	08:51 (1)	16:23
	20	08:31	07:37	08:02 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:29 (1)	08:01	08:41
		16:43	17:44	18	08:20 (1)	18:38	20:35	21:28	22:01	21:44	20:46	19:32	22	08:51 (1)	16:22
	21	08:30	07:34	08:00 (1)	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:31 (1)	08:02	08:41
		16:45	17:46	20	08:20 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	19	08:50 (1)	16:21
	22	08:29	07:32	07:58 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:33 (1)	08:04	08:42
		16:47	17:48	21	08:19 (1)	18:42	20:39	21:32	22:01	21:41	20:42	19:27	17	08:50 (1)	16:19
	23	08:27	07:30	07:58 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:35 (1)	08:06	08:43
		16:49	17:50	21	08:19 (1)	18:44	20:41	21:33	22:01	21:40	20:40	19:24	14	08:49 (1)	16:18
	24	08:26	07:28	07:59 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:37 (1)	08:08	08:43
		16:51	17:52	20	08:19 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	11	08:48 (1)	16:17
	25	08:25	07:26	08:00 (1)	06:19	06:05	05:11	04:56	05:27	06:21	07:15	07:11	07:39 (1)	08:10	08:43
		16:53	17:54	18	08:18 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20	8	07:47 (1)	16:16
	26	08:23	07:23	08:00 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	07:41 (1)	08:11	08:44
		16:54	17:56	16	08:16 (1)	18:49	20:46	21:38	22:01	21:35	20:33	19:17	5	07:46 (1)	16:15
	27	08:22	07:21	08:02 (1)	06:14	06:01	05:08	04:57	05:31	06:24	07:19	07:15	07:43 (1)	08:13	08:44
		16:56	17:58	13	08:15 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	1	07:44 (1)	16:14
	28	08:20	07:19	08:03 (1)	06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17		08:15	08:44
		16:58	18:00	9	08:12 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12		16:13	16:11
	29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19		08:16	08:44
		17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00		16:12	16:12
	30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21		08:18	08:44
		17:02			19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58		16:11	16:13
	31	08:16			07:04		05:04		05:37	06:31		07:23			08:44
		17:04			19:58		21:44		21:27	20:21		16:56			16:14
Potential sun hours	250		273		367		420		510		512		460		382
															328
Total, worst case			200											201	
Sun reduction			0.23											0.29	
Oper. time red.			1.00											1.00	
Wind dir. red.			0.64											0.64	
Total reduction			0.15											0.19	
Total, real			30											38	

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IS - H253

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IT - H254

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15 08:44 16:16 08:44 16:17 08:44 16:18	08:14 17:06 08:12 17:08 08:10 17:10 08:09 17:12	07:16 18:02 07:14 18:04 07:12 18:06 07:09 18:08	07:01 20:00 06:59 20:02 06:56 20:04 06:54 20:06	05:52 20:56 05:50 20:57 05:48 20:59 05:46 21:01	05:03 21:46 05:02 21:47 05:01 21:48 05:01 21:49	04:59 22:00 05:00 22:00 05:00 21:59 05:01 21:59	05:39 21:25 05:40 21:23 05:42 21:21 05:44 21:19	06:33 20:18 06:35 20:16 06:37 20:14 06:38 20:11	07:26 19:05 07:28 19:02 07:30 19:00 07:32 18:57	07:24 16:54 07:26 16:52 07:28 16:50 07:30 16:48	08:19 16:10 08:21 16:09 08:22 16:09 08:24 16:08	
2	08:44 16:16 08:44 16:17 08:44 16:18	08:14 17:06 08:12 17:08 08:10 17:10 08:09 17:12	07:16 18:02 07:14 18:04 07:12 18:06 07:09 18:08	07:01 20:00 06:59 20:02 06:56 20:04 06:54 20:06	05:52 20:56 05:50 20:57 05:48 20:59 05:46 21:01	05:03 21:46 05:02 21:47 05:01 21:48 05:01 21:49	04:59 22:00 05:00 22:00 05:00 21:59 05:01 21:59	05:39 21:25 05:40 21:23 05:42 21:21 05:44 21:19	06:33 20:18 06:35 20:16 06:37 20:14 06:38 20:11	07:26 19:05 07:28 19:02 07:30 19:00 07:32 18:57	07:24 16:54 07:26 16:52 07:28 16:50 07:30 16:48	08:19 16:10 08:21 16:09 08:22 16:09 08:24 16:08	
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4	08:44 16:18 08:43 16:20 08:43 16:21	08:09 17:12 08:07 17:14 08:05 17:16	07:09 18:08 07:07 18:10 07:05 18:12	06:54 20:06 06:52 20:08 06:49 20:10	05:46 21:01 05:44 21:03 05:42 21:05	05:00 21:49 04:59 21:50 05:03 21:51	05:01 21:59 05:02 21:58 05:03 21:58	05:04 21:19 05:06 21:18 05:47 21:16	05:44 21:19 05:46 21:18 05:42 20:06	06:38 20:11 06:40 21:09 06:42 20:06	07:32 18:57 07:33 18:55 07:35 18:53	07:30 16:48 07:32 16:46 07:34 16:07	08:24 16:08 08:25 16:07 08:27 16:07
5	08:43 16:20 08:43 16:21 08:42 16:22	08:07 17:14 08:05 17:16 08:03 17:18	07:07 18:10 07:05 18:12 07:02 18:13	06:52 20:08 06:49 20:10 06:47 20:11	05:44 21:03 05:42 21:05 05:40 21:06	04:59 21:50 04:59 21:51 04:58 21:52	05:02 21:58 05:03 21:58 05:04 21:57	05:06 21:18 05:47 21:16 05:49 21:14	05:46 21:18 05:42 20:06 06:44 20:04	06:40 21:09 06:42 20:06 06:44 20:04	07:33 18:55 07:35 18:53 07:37 18:50	07:32 16:07 07:34 16:45 07:36 16:43	08:25 16:07 08:27 16:06 08:28 16:06
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Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IU - H255

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IV - H256

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IW - H257

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
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31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IX - H258

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
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14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IY - H259

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IZ - H260

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JA - H261

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JB - H262

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JC - H263

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JD - H264

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JE - H265

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JF - H266

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JG - H267

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JH - H268

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JI - H269

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JJ - H270

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JK - H271

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:54	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JL - H272

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JM - H273

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JN - H274

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JO - H275

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JP - H276

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JQ - H277

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JR - H278

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JS - H279

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JT - H280

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JU - H281

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Sun reduction												
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Wind dir. red.												
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JV - H282

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JW - H283

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JX - H284

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JY - H285

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JZ - H286

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:19	08:19	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KA - H287

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24		
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KB - H288

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:18 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KC - H289

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KD - H290

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KE - H291

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KF - H292
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December								
1	08:44	08:14	07:16	07:01	05:52	06:18 (5)	05:03	05:33 (4)	04:59	05:32 (4)	05:39	06:29 (5)	06:33	07:26	07:24	08:19				
	16:15	17:06	18:02	20:00	20:55	33	06:51 (5)	21:45	7	05:40 (4)	22:00	13	05:45 (4)	21:25	24	06:53 (5)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	06:16 (5)	05:02	05:33 (4)	05:00	05:33 (4)	05:40	06:29 (5)	06:35	07:28	07:26	08:21				
	16:16	17:08	18:04	20:02	20:57	35	06:51 (5)	21:47	8	05:41 (4)	22:00	13	05:46 (4)	21:23	26	06:55 (5)	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:56	05:48	06:14 (5)	05:01	05:32 (4)	05:00	05:33 (4)	05:42	06:27 (5)	06:36	07:30	07:28	08:22				
	16:17	17:10	18:06	20:04	20:59	36	06:50 (5)	21:48	9	05:41 (4)	21:59	12	05:45 (4)	21:21	28	06:55 (5)	20:14	19:00	16:50	16:09
4	08:43	08:08	07:09	06:54	05:46	06:14 (5)	05:00	05:31 (4)	05:01	05:34 (4)	05:44	06:26 (5)	06:38	07:32	07:30	08:24				
	16:18	17:12	18:08	20:06	21:01	35	06:49 (5)	21:49	10	05:41 (4)	21:59	12	05:46 (4)	21:19	30	06:56 (5)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	06:14 (5)	04:59	05:31 (4)	05:02	05:35 (4)	05:46	06:26 (5)	06:40	07:33	07:32	08:25				
	16:20	17:14	18:10	20:08	21:03	35	06:49 (5)	21:50	10	05:41 (4)	21:58	11	05:46 (4)	21:17	31	06:57 (5)	20:09	18:55	16:46	16:07
6	08:43	08:05	07:05	06:49	05:42	06:15 (5)	04:59	05:30 (4)	05:03	05:36 (4)	05:47	06:25 (5)	06:42	07:35	07:34	08:26				
	16:21	17:16	18:11	20:09	21:04	34	06:49 (5)	21:51	11	05:41 (4)	21:58	11	05:47 (4)	21:16	33	06:58 (5)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	06:15 (5)	04:58	05:30 (4)	05:04	05:37 (4)	05:49	06:24 (5)	06:44	07:37	07:36	08:28				
	16:22	17:18	18:13	20:11	21:06	33	06:48 (5)	21:52	11	05:41 (4)	21:57	10	05:47 (4)	21:14	34	06:58 (5)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	06:16 (5)	04:57	05:29 (4)	05:05	05:38 (4)	05:51	06:23 (5)	06:45	07:39	07:38	08:29				
	16:24	17:20	18:15	20:13	21:08	31	06:47 (5)	21:53	12	05:41 (4)	21:56	10	05:48 (4)	21:12	35	06:58 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	06:16 (5)	04:57	05:29 (4)	05:06	05:39 (4)	05:52	06:23 (5)	06:47	07:41	07:40	08:30				
	16:25	17:22	18:17	20:15	21:10	30	06:46 (5)	21:54	12	05:41 (4)	21:55	9	05:48 (4)	21:10	36	06:59 (5)	19:59	18:45	16:39	16:06
10	08:40	07:57	06:55	06:40	05:35	06:18 (5)	04:56	05:28 (4)	05:07	05:40 (4)	05:54	06:24 (5)	06:49	07:43	07:42	08:32				
	16:27	17:24	18:19	20:17	21:12	27	06:45 (5)	21:55	12	05:40 (4)	21:55	9	05:49 (4)	21:08	36	07:00 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33	06:19 (5)	04:56	05:28 (4)	05:08	05:41 (4)	05:56	06:25 (5)	06:51	07:44	07:44	08:33				
	16:28	17:26	18:21	20:19	21:13	25	06:44 (5)	21:55	13	05:41 (4)	21:54	8	05:49 (4)	21:06	34	06:59 (5)	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	06:20 (5)	04:55	05:28 (4)	05:09	05:42 (4)	05:58	06:27 (5)	06:52	07:46	07:46	08:34				
	16:30	17:28	18:23	20:20	21:15	22	06:42 (5)	21:56	13	05:41 (4)	21:53	7	05:48 (4)	21:03	32	06:59 (5)	19:52	18:38	16:34	16:06
13	08:38	07:51	06:48	06:32	05:29	06:22 (5)	04:55	05:27 (4)	05:11	05:43 (4)	05:59	06:29 (5)	06:54	07:48	07:47	08:35				
	16:31	17:30	18:25	20:22	21:17	19	06:41 (5)	21:57	13	05:40 (4)	21:52	6	05:49 (4)	21:01	31	07:00 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27	06:23 (5)	04:55	05:27 (4)	05:12	05:44 (4)	06:01	06:30 (5)	06:56	07:50	07:49	08:36				
	16:33	17:32	18:27	20:24	21:18	16	06:39 (5)	21:58	13	05:40 (4)	21:51	5	05:49 (4)	21:09	29	06:59 (5)	19:47	18:34	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26	06:25 (5)	04:55	05:27 (4)	05:13	05:45 (4)	06:03	06:32 (5)	06:58	07:52	07:51	08:37				
	16:35	17:34	18:29	20:26	21:20	10	06:35 (5)	21:58	14	05:41 (4)	21:50	4	05:49 (4)	21:07	27	06:59 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24		04:55	05:27 (4)	05:14	05:47 (4)	06:05	06:33 (5)	06:59	07:54	07:53	08:38				
	16:36	17:36	18:30	20:28	21:22		21:59	05:41 (4)	21:49	3	05:50 (4)	20:55	25	06:58 (5)	19:42	18:29	16:28	16:05		
17	08:34	07:43	06:38	06:23	05:22		04:54	05:27 (4)	05:16	05:48 (4)	06:06	06:35 (5)	07:01	07:56	07:55	08:38				
	16:38	17:38	18:32	20:30	21:23		21:59	05:41 (4)	21:47	2	05:50 (4)	20:53	23	06:58 (5)	19:39	18:27	16:26	16:05		
18	08:33	07:41	06:36	06:21	05:21		04:54	05:27 (4)	05:17		06:08	06:37 (5)	07:03	07:57	07:57	08:39				
	16:40	17:40	18:34	20:32	1	06:46 (5)	21:25	22:00	14	05:41 (4)	21:46	20:51	21	06:58 (5)	19:37	18:24	16:25	16:05		
19	08:32	07:39	06:33	06:18	05:19		04:54	05:27 (4)	05:19		06:10	06:38 (5)	07:05	07:59	07:59	08:40				
	16:42	17:42	18:36	20:33	5	06:48 (5)	21:27	22:01	14	05:43 (4)	21:35	18	06:56 (5)	19:34	18:22	16:23	16:06			
20	08:31	07:37	06:31	06:16	05:18		04:54	05:27 (4)	05:20		06:12	06:40 (5)	07:06	08:01	08:00	08:41				
	16:43	17:44	18:38	20:35	8	06:49 (5)	21:28	22:00	14	05:41 (4)	21:44	20:46	16	06:56 (5)	19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16		04:55	05:27 (4)	05:21		06:13	06:42 (5)	07:08	08:03	08:02	08:41				
	16:45	17:46	18:40	20:37	11	06:50 (5)	21:30	22:01	14	05:41 (4)	21:42	20:44	13	06:55 (5)	19:29	18:18	16:21	16:06		
22	08:29	07:32	06:26	06:12	05:15		04:55	05:28 (4)	05:23		06:15	06:43 (5)	07:10	08:05	08:04	08:42				
	16:47	17:48	18:42	20:39	14	06:50 (5)	21:31	22:01	14	05:42 (4)	21:41	20:42	10	06:53 (5)	19:27	18:15	16:19	16:07		
23	08:27	07:30	06:23	06:09	05:13		04:55	05:28 (4)	05:24		06:17	06:45 (5)	07:12	08:07	08:06	08:42				
	16:49	17:50	18:43	20:41	16	06:50 (5)	21:33	22:01	14	05:42 (4)	21:39	20:39	7	06:52 (5)	19:24	18:13	16:18	16:07		
24	08:26	07:28	06:21	06:07	05:12		04:55	05:28 (4)	05:26		06:19	06:47 (5)	07:14	08:09	08:08	08:43				
	16:51	17:52	18:45	20:43	19	06:51 (5)	21:34	22:01	14	05:42 (4)	21:38	20:37	4	06:51 (5)	19:22	18:11	16:17	16:08		
25	08:25	07:25	06:18	06:05	05:11		04:56	05:29 (4)	05:27		06:21		07:15	07:11	08:09	08:43				
	16:53	17:54	18:47	20:44	21	06:51 (5)	21:36	22:01	14	05:43 (4)	21:36	20:35		19:19	17:09	16:16	16:08			
26	08:23	07:23	06:16	06:03	05:09		04:56	05:29 (4)	05:29		06:22		07:17	07:13	08:11	08:43				
	16:54	17:56	18:49	20:46	23	06:51 (5)	21:37	22:01	14	05:43 (4)	21:35	20:32		19:17	17:07	16:15	16:09			
27	08:22	07:21	06:14	06:01	05:08		04:57	05:30 (4)	05:31		06:24		07:19	07:15	08:13	08:44				
	16:56	17:58	18:51	20:48	26	06:52 (5)	21:39	2	05:40 (4)	22:01	14	05:44 (4)	21:33		19:15	17:05	16:14	16:10		
28	08:20	07:19	06:11	05:59	05:07		04:57	05:30 (4)	05:32		06:39 (5)	06:26		07:21	07:17	08:14	08:44			
	16:58	18:00	18:53	20:50	28	06:52 (5)	21:40	4	05:41 (4)	22:01	14	05:44 (4)	21:32	4	06:43 (5)	20:28	19:12	17:02	16:13	16:11
29	08:19		07:09	05:56	05:06		05:36 (4)	04:58	05:31 (4)	05:34		06:36 (5)	06:28		07:23	07:18	08:16	08:44		
	17:00		19:55	20:52	29	06:51 (5)	21:41	5	05:41 (4)	22:01	13	05:44 (4)	21:30	12	06:48 (5)	20:25	19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05		05:35 (4)	04:58	05:31 (4)	05:35		06:33 (5)	06:29		07:24	07:20	08:18	08:44		
	17:02		19:56	20:54	31	06:51 (5)	21:43	6	05:41 (4)	22:00	13	05:44 (4)	21:28	17	06:50 (5)	20:23	19:07	16:58	16:11	16:13
31	08:15		07:04		05:04		05:34 (4)					06:31 (5)	06:31		07:22				08:44	
	17:04		19:58		21:44	7	05:41 (4)					21:27	21							

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KG - H293

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:52 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:50 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:48 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:46 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 21:03	05:44 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 21:04	05:42 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:11 (5) 21:06	05:40 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:08 (5) 21:08	05:38 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:06 (5) 21:10	05:36 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:06 (5) 21:12	05:35 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:07 (5) 21:13	05:33 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	07:09 (5) 21:15	05:31 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	07:11 (5) 21:17	05:29 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	07:15 (5) 21:18	05:27 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	07:18 (5) 21:20	05:26 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	05:25 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	05:24 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	05:23 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	05:22 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:21 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:20 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	05:19 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	05:18 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	05:17 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	05:16 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	05:15 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	05:14 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	05:13 22:01
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	05:12 22:01
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	05:11 22:00
31	08:15 17:04		07:04 19:58	05:52 20:56	05:04 21:44	05:10 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			11	241		103
Sun reduction			0.27	0.35		0.32
Oper. time red.			1.00	1.00		1.00
Wind dir. red.			0.68	0.68		0.66
Total reduction			0.18	0.24		0.21
Total, real			2	57		22

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KG - H293

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 3	05:32 (3) 05:35 (3) 21:25	05:39 21:25 20:18	06:33 21 07:27 (5)	07:26 19:05 16:54	08:19 16:10 16:10
2	05:00 22:00 2	05:33 (3) 05:35 (3) 21:23	05:40 21:23 20:16	06:35 23 07:28 (5)	07:28 19:02 16:52	08:21 16:09 16:09
3	05:00 21:59 2	05:33 (3) 05:35 (3) 21:21	05:42 21:21 20:14	06:37 25 07:29 (5)	07:30 19:00 16:50	08:22 16:09 16:09
4	05:01 21:59 1	05:34 (3) 05:35 (3) 21:19	05:44 21:19 20:11	06:38 24 07:29 (5)	07:32 18:57 16:48	08:24 16:08 16:08
5	05:02 21:58 6	05:35 (3) 05:46 21:17	05:46 21:17 20:09	06:40 22 07:29 (5)	07:33 18:55 16:46	08:25 16:07 16:07
6	05:03 21:58 7	05:47 21:16 05:49	05:47 21:16 20:06	06:42 21 07:30 (5)	07:35 18:53 16:45	08:26 16:07 16:07
7	05:04 21:57 8	05:49 21:14 05:51	05:49 21:14 20:04	06:44 19 07:29 (5)	07:37 18:50 16:43	08:28 16:06 16:06
8	05:05 21:56 9	05:51 21:12 05:52	05:51 21:12 20:01	06:45 17 07:29 (5)	07:39 18:48 16:41	08:29 16:06 16:06
9	05:06 21:55 10	05:52 21:10 05:54	05:52 21:10 19:59	06:47 15 07:29 (5)	07:41 18:45 16:39	08:30 16:06 16:06
10	05:07 21:55 11	05:54 21:08 05:56	05:54 21:08 19:57	06:49 12 07:28 (5)	07:43 18:43 16:37	08:32 16:05 16:05
11	05:08 21:54 12	05:56 21:06 05:58	05:56 21:06 19:54	06:51 10 07:27 (5)	07:44 18:41 16:36	08:33 16:05 16:05
12	05:09 21:53 13	05:58 21:03 05:59	05:58 21:03 19:52	06:52 7 07:26 (5)	07:46 18:38 16:34	08:34 16:05 16:05
13	05:11 21:52 14	05:59 21:01 06:01	05:59 21:01 19:49	06:54 4 07:25 (5)	07:48 18:36 16:32	08:35 16:05 16:05
14	05:12 21:51 15	06:01 20:59 06:03	06:01 20:59 19:47	06:56 1 07:23 (5)	07:50 18:34 16:31	08:36 16:05 16:05
15	05:13 21:50 16	06:03 20:57 06:05	06:03 20:57 19:44	06:58 18:31 16:29	07:52 18:31 16:29	08:37 16:05 16:05
16	05:15 21:49 17	06:05 20:55 06:06	06:05 20:55 19:42	06:59 18:29 16:28	07:54 18:29 16:28	08:38 16:05 16:05
17	05:16 21:47 18	06:06 20:53 06:08	06:06 20:53 19:39	07:01 18:27 16:26	07:56 18:27 16:26	08:39 16:05 16:05
18	05:17 21:46 19	06:08 20:51 06:10	06:08 20:51 19:37	07:03 18:24 16:25	07:57 18:24 16:25	08:39 16:05 16:05
19	05:19 21:45 20	06:10 20:48 06:12	06:10 20:48 19:34	07:05 18:22 16:23	07:59 18:22 16:23	08:40 16:05 16:05
20	05:20 21:44 21	06:12 20:46 06:14	06:12 20:46 19:32	07:07 18:20 16:22	08:01 18:20 16:22	08:41 16:06 16:06
21	05:21 21:42 22	06:14 20:44 06:15	06:14 20:44 19:29	07:08 18:18 16:21	08:03 18:18 16:21	08:41 16:06 16:06
22	05:23 21:41 23	06:15 20:42 06:17	06:15 20:42 19:27	07:10 18:15 16:19	08:05 18:15 16:19	08:42 16:07 16:07
23	05:24 21:39 24	06:17 20:39 06:19	06:17 20:39 19:24	07:12 18:13 16:18	08:07 18:13 16:18	08:42 16:07 16:07
24	05:26 21:38 25	06:19 20:37 06:21	06:19 20:37 19:22	07:14 18:11 16:17	08:09 18:11 16:17	08:43 16:08 16:08
25	05:28 21:36 26	06:21 20:35 06:22	06:21 20:35 19:19	07:15 17:09 16:16	07:11 17:09 16:16	08:43 16:08 16:08
26	05:29 21:35 27	06:22 20:32 06:24	06:22 20:32 19:17	07:17 17:07 16:15	07:13 17:07 16:15	08:43 16:09 16:09
27	05:31 21:33 28	06:24 20:30 06:26	06:24 20:30 19:15	07:19 17:05 16:14	07:15 17:05 16:14	08:44 16:10 16:10
28	05:32 21:32 29	06:26 20:28 06:28	06:26 20:28 19:12	07:21 17:02 16:13	07:17 17:02 16:13	08:44 16:11 16:11
29	05:34 21:30 30	06:28 20:25 06:29	06:28 20:25 19:10	07:23 17:00 16:12	07:19 17:00 16:12	08:44 16:12 16:12
30	05:35 21:28 31	06:29 20:23 06:31	06:29 20:23 19:07	07:24 16:58 16:11	07:20 16:58 16:11	08:44 16:13 16:13
31	05:37 21:27 Potential sun hours	06:31 20:21 460	06:31 20:21 382	07:09 (5) 07:26 (5) 328	07:22 16:56 259	08:44 16:14 233
Total, worst case	8	35	221			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.68	0.68			
Total reduction	0.21	0.23	0.22			
Total, real	2	8	48			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KH - H294

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 21:03	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:14 (5) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:16 (5) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:16 (5) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:19 (5) 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:29 (5) 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	07:32 (5) 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	07:30 (5) 20:54	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	07:27 (5) 20:54	05:04 21:44	05:34 (3) 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			37	160	53	539
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.66	0.66
Total reduction			0.18	0.24	0.25	0.21
Total, real			7	38	13	113

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KH - H294

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 18	05:32 (3) 05:50 (3) 21	05:39 21:25 20:18	06:33 20:18 19:05	07:26 19:05 16:54	08:19 16:10 16:10
2	05:00 22:00 18	05:33 (3) 05:51 (3) 21	05:40 21:23 20:16	06:35 20:16 19:02	07:28 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 17	05:33 (3) 05:50 (3) 21	05:42 21:21 20:14	06:37 20:14 19:00	07:30 19:00 16:50	08:22 16:09 16:09
4	05:01 21:59 17	05:34 (3) 05:51 (3) 21	05:44 21:19 20:11	06:38 20:11 19:00	07:32 18:57 16:48	08:24 16:08 16:08
5	05:02 21:58 16	05:35 (3) 05:51 (3) 21	05:46 21:17 20:09	06:40 20:09 19:00	07:33 18:55 16:46	08:25 16:07 16:07
6	05:03 21:58 16	05:36 (3) 05:52 (3) 21	05:47 21:16 20:06	06:42 20:06 21	07:35 18:53 16:45	08:26 16:07 16:07
7	05:04 21:57 15	05:37 (3) 05:52 (3) 21	05:49 21:14 20:04	06:44 20:04 22	07:37 18:50 16:43	08:28 16:06 16:06
8	05:05 21:56 14	05:38 (3) 05:53 (3) 21	05:51 21:12 20:01	06:45 20:01 20	07:39 18:48 16:41	08:29 16:06 16:06
9	05:06 21:55 14	05:39 (3) 05:53 (3) 21	05:52 21:10 19:59	06:47 19:59 19	07:41 18:45 16:39	08:30 16:06 16:06
10	05:07 21:55 13	05:40 (3) 05:53 (3) 21	05:54 21:08 19:57	06:49 19:57 17	07:43 18:43 16:37	08:32 16:05 16:05
11	05:08 21:54 12	05:41 (3) 05:53 (3) 21	05:56 21:06 19:54	06:51 19:54 15	07:44 18:41 16:36	08:33 16:05 16:05
12	05:10 21:53 11	05:42 (3) 05:53 (3) 21	05:58 21:03 19:52	06:52 19:52 13	07:46 18:38 16:34	08:34 16:05 16:05
13	05:11 21:52 10	05:43 (3) 05:53 (3) 21	05:59 21:01 19:49	06:54 19:49 11	07:48 18:36 16:32	08:35 16:05 16:05
14	05:12 21:51 9	05:44 (3) 05:53 (3) 20	06:01 20:59 19:47	06:56 19:47 8	07:50 18:34 16:31	08:36 16:05 16:05
15	05:13 21:50 8	05:45 (3) 05:53 (3) 20	06:03 20:57 19:44	06:58 19:44 5	07:52 18:31 16:29	08:37 16:05 16:05
16	05:15 21:49 7	05:47 (3) 05:54 (3) 20	06:05 20:55 19:42	06:59 19:42 2	07:54 18:29 16:28	08:38 16:05 16:05
17	05:16 21:47 5	05:48 (3) 05:53 (3) 20	06:06 20:53 19:39	07:01 19:39 18:27	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 4	05:49 (3) 05:53 (3) 20	06:08 20:51 19:37	07:03 19:37 18:24	07:57 16:25 16:05	08:39 16:05 16:05
19	05:19 21:45 3	05:50 (3) 05:53 (3) 20	06:10 20:48 19:34	07:05 19:34 18:22	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44 1	05:52 (3) 05:53 (3) 20	06:12 20:46 19:32	07:07 19:32 18:20	08:01 16:22 16:06	08:41 16:06 16:06
21	05:21 21:42 0	05:53 (3) 06:14 20:44	07:08 20:44 19:29	08:03 18:18 16:21	08:02 16:21 16:06	08:41 16:06 16:06
22	05:23 21:41 0	06:15 20:42 19:27	07:10 19:27 18:15	08:05 16:19 16:07	08:04 16:19 16:07	08:42 16:07 16:07
23	05:24 21:39 0	06:17 20:39 19:24	07:12 19:24 18:13	08:07 16:18 16:07	08:06 16:18 16:07	08:42 16:07 16:07
24	05:26 21:38 0	06:19 20:37 19:22	07:14 19:22 18:11	08:09 16:17 16:08	08:08 16:17 16:08	08:43 16:08 16:08
25	05:28 21:36 0	06:21 20:35 19:19	07:15 19:19 17:09	08:11 16:16 16:08	08:09 16:16 16:08	08:43 16:08 16:08
26	05:29 21:35 0	06:22 20:33 19:17	07:17 19:17 17:07	08:13 16:15 16:09	08:11 16:15 16:09	08:43 16:09 16:09
27	05:31 21:33 0	06:24 20:30 19:15	07:19 19:15 17:05	08:15 16:14 16:10	08:13 16:14 16:10	08:44 16:10 16:10
28	05:32 21:32 0	06:26 20:28 19:12	07:21 19:12 17:02	08:17 16:13 16:11	08:14 16:13 16:11	08:44 16:11 16:11
29	05:34 21:30 0	06:28 20:25 19:10	07:23 19:10 17:00	08:19 16:12 16:12	08:16 16:12 16:12	08:44 16:12 16:12
30	05:35 21:28 0	06:29 20:23 19:07	07:24 19:07 16:58	08:18 16:11 16:13	08:18 16:11 16:13	08:44 16:13 16:13
31	05:37 21:27 0	06:31 20:21 19:05	07:26 19:05 16:56	08:20 16:14 16:14	08:19 16:14 16:14	08:44 16:14 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	228		197			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	49		43			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KI - H295

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	07:01	07:25 (5)	05:52	05:03	05:34 (3)					
	08:44	16:15	08:12	17:06	18:02	07:14	18:02	14	07:39 (5)	20:55	21:45	05:50 (3)					
2	08:44	16:16	08:12	17:08	18:04	07:14	18:04		07:23 (5)	05:50	05:02	05:33 (3)					
	08:44	16:16	08:10	17:08	18:04	07:12	18:04	16	07:39 (5)	20:57	21:47	05:50 (3)					
3	08:44	16:17	08:10	17:10	18:06	07:12	18:06		07:20 (5)	05:48	05:01	05:32 (3)					
	08:43	16:17	08:10	17:10	18:06	07:10	18:06	17	07:37 (5)	20:59	21:48	05:49 (3)					
4	08:43	16:18	08:09	17:12	18:08	07:09	18:08		07:18 (5)	05:46	05:00	05:31 (3)					
	08:43	16:18	08:07	17:12	18:08	07:07	18:08	19	07:37 (5)	21:01	21:49	05:49 (3)					
5	08:43	16:20	08:07	17:14	18:10	07:07	18:10		07:15 (5)	05:44	04:59	05:31 (3)					
	08:43	16:20	08:05	17:14	18:10	07:05	18:10	20	07:35 (5)	21:03	21:50	05:49 (3)					
6	08:43	16:21	08:05	17:16	18:11	07:05	18:11		07:16 (5)	05:42	04:59	05:30 (3)					
	08:42	16:21	08:03	17:16	18:11	07:03	18:11	18	07:34 (5)	21:04	21:51	05:49 (3)					
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13		07:18 (5)	05:40	04:58	05:30 (3)					
	08:42	16:22	08:01	17:18	18:13	07:00	18:13	14	07:32 (5)	21:06	21:52	05:49 (3)					
8	08:42	16:24	08:01	17:20	18:15	07:00	18:15		07:20 (5)	05:38	04:57	05:30 (3)					
	08:41	16:24	07:59	17:20	18:15	06:57	18:15	8	07:28 (5)	21:08	21:53	05:48 (3)					
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17		07:28 (5)	21:08	21:53	05:48 (3)					
	08:40	16:25	07:57	17:22	18:17	06:55	18:17		07:28 (5)	21:08	21:53	05:48 (3)					
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19		07:28 (5)	21:08	21:53	05:48 (3)					
	08:40	16:27	07:55	17:24	18:19	06:53	18:19		07:28 (5)	21:08	21:53	05:48 (3)					
11	08:40	16:28	07:55	17:26	18:21	06:53	18:21		07:28 (5)	21:08	21:53	05:48 (3)					
	08:39	16:28	07:53	17:26	18:21	06:50	18:21		07:28 (5)	21:08	21:53	05:48 (3)					
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23		07:28 (5)	21:08	21:53	05:48 (3)					
	08:38	16:30	07:51	17:28	18:23	06:48	18:23		07:28 (5)	21:08	21:53	05:48 (3)					
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25		07:28 (5)	21:08	21:53	05:48 (3)					
	08:37	16:31	07:49	17:30	18:25	06:45	18:25		07:28 (5)	21:08	21:53	05:48 (3)					
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27		07:28 (5)	21:08	21:53	05:48 (3)					
	08:36	16:33	07:47	17:32	18:27	06:43	18:27		07:28 (5)	21:08	21:53	05:48 (3)					
15	08:36	16:35	07:47	17:34	18:29	06:43	18:29		07:28 (5)	21:08	21:53	05:48 (3)					
	08:35	16:35	07:45	17:34	18:29	06:41	18:29		07:28 (5)	21:08	21:53	05:48 (3)					
16	08:35	16:36	07:45	17:36	18:30	06:41	18:30		07:28 (5)	21:08	21:53	05:48 (3)					
	08:34	16:36	07:43	17:36	18:30	06:38	18:30		07:28 (5)	21:08	21:53	05:48 (3)					
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32		07:28 (5)	21:08	21:53	05:48 (3)					
	08:33	16:38	07:41	17:38	18:32	06:36	18:32		07:28 (5)	21:08	21:53	05:48 (3)					
18	08:33	16:40	07:41	17:40	18:34	06:36	18:34		07:28 (5)	21:08	21:53	05:48 (3)					
	08:32	16:40	07:39	17:40	18:34	06:33	18:34		07:28 (5)	21:08	21:53	05:48 (3)					
19	08:32	16:42	07:39	17:42	18:36	06:33	18:36		07:28 (5)	21:08	21:53	05:48 (3)					
	08:31	16:42	07:37	17:42	18:36	06:31	18:36		07:28 (5)	21:08	21:53	05:48 (3)					
20	08:31	16:43	07:37	17:44	18:38	06:31	18:38		07:28 (5)	21:08	21:53	05:48 (3)					
	08:30	16:43	07:34	17:44	18:38	06:28	18:38		07:28 (5)	21:08	21:53	05:48 (3)					
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40		07:28 (5)	21:08	21:53	05:48 (3)					
	08:29	16:45	07:32	17:46	18:40	06:26	18:40		07:28 (5)	21:08	21:53	05:48 (3)					
22	08:29	16:47	07:32	17:48	18:42	06:26	18:42		07:28 (5)	21:08	21:53	05:48 (3)					
	08:27	16:47	07:30	17:48	18:42	06:23	18:42		07:28 (5)	21:08	21:53	05:48 (3)					
23	08:27	16:49	07:30	17:50	18:44	06:23	18:44		07:28 (5)	21:08	21:53	05:48 (3)					
	08:26	16:49	07:28	17:50	18:44	06:21	18:44		07:28 (5)	21:08	21:53	05:48 (3)					
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45		07:28 (5)	21:08	21:53	05:48 (3)					
	08:25	16:51	07:25	17:52	18:45	06:18	18:45		07:28 (5)	21:08	21:53	05:48 (3)					
25	08:25	16:53	07:25	17:54	18:47	06:18	18:47		07:28 (5)	21:08	21:53	05:48 (3)					
	08:23	16:53	07:23	17:54	18:47	06:16	18:47		07:28 (5)	21:08	21:53	05:48 (3)					
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49		07:28 (5)	21:08	21:53	05:48 (3)					
	08:22	16:54	07:21	17:56	18:49	06:14	18:49		07:28 (5)	21:08	21:53	05:48 (3)					
27	08:22	16:56	07:21	17:58	18:51	06:37 (5)	18:51		07:28 (5)	21:08	21:53	05:48 (3)					
	08:20	16:56	07:19	17:58	18:51	06:35 (5)	18:51	1	06:38 (5)	20:48	21:39	05:50 (3)					
28	08:20	16:58	07:19	18:00	18:53	06:35 (5)	18:53		06:39 (5)	20:50	21:40	05:50 (3)					
	08:19	16:58	07:17	18:00	18:53	06:32 (5)	18:53	4	06:39 (5)	20:50	21:40	05:50 (3)					
29	08:19	17:00	07:15	18:02	18:55	07:39 (5)	18:55		07:39 (5)	20:52	21:41	05:50 (3)					
	08:17	17:00	07:13	18:02	18:53	07:30 (5)	18:53	7	07:30 (5)	20:54	21:41	05:50 (3)					
30	08:17	17:02	07:11	18:04	18:55	07:30 (5)	18:55		07:30 (5)	20:54	21:41	05:50 (3)					
	08:15	17:02	07:09	18:04	18:53	07:27 (5)	18:53	9	07:27 (5)	20:54	21:41	05:50 (3)					
31	08:15	17:04	07:07	18:04	18:53	07:27 (5)	18:53		07:27 (5)	20:54	21:41	05:50 (3)					
	08:15	17:04	07:04	18:04	18:53	07:27 (5)	18:53	12	07:27 (5)	20:54	21:41	05:50 (3)					
Potential sun hours	250	273	367	420	494	510	437										
Total, worst case																	
Sun reduction																	
Oper. time red.																	
Wind dir. red.																	
Total reduction																	
Total, real																	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KI - H295

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 16	05:36 (3) 05:52 (3) 21:25	05:39 21:25 20:18	07:26 19:05 16:10	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 17	05:36 (3) 05:53 (3) 21:23	05:40 21:23 20:16	07:28 19:02 16:52	07:26 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 17	05:35 (3) 05:52 (3) 21:21	05:42 21:21 20:14	07:30 19:00 16:50	07:28 16:50 16:09	08:22 16:09 16:09
4	05:01 21:59 18	05:35 (3) 05:53 (3) 21:19	05:44 21:19 20:11	07:32 18:57 16:48	07:30 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 19	05:35 (3) 05:54 (3) 21:17	05:46 21:17 20:09	07:33 18:55 16:46	07:32 16:46 16:07	08:25 16:07 16:07
6	05:03 21:58 19	05:36 (3) 05:55 (3) 21:16	05:47 21:16 20:06	07:35 18:53 16:45	07:34 16:45 16:07	08:26 16:07 16:07
7	05:04 21:57 18	05:37 (3) 05:55 (3) 21:14	05:49 21:14 20:04	07:37 18:50 16:43	07:36 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 18	05:38 (3) 05:56 (3) 21:12	05:51 21:12 20:01	07:39 18:48 16:41	07:38 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 17	05:39 (3) 05:56 (3) 21:10	05:52 21:10 19:59	07:41 18:45 16:39	07:40 16:39 16:06	08:30 16:06 16:06
10	05:07 21:55 17	05:40 (3) 05:57 (3) 21:08	05:54 21:08 19:57	07:43 18:43 16:37	07:42 16:37 16:05	08:32 16:05 16:05
11	05:08 21:54 16	05:41 (3) 05:57 (3) 21:06	05:56 21:06 19:54	07:44 18:41 16:36	07:44 16:36 16:05	08:33 16:05 16:05
12	05:10 21:53 16	05:42 (3) 05:58 (3) 21:04	05:58 21:04 19:52	07:46 18:38 16:34	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 15	05:43 (3) 05:58 (3) 21:01	05:59 21:01 19:49	07:48 18:36 16:32	07:47 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 14	05:44 (3) 05:58 (3) 20:59	06:01 20:59 19:47	07:50 18:34 16:31	07:49 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 13	05:45 (3) 05:58 (3) 20:57	06:03 20:57 19:44	07:52 18:31 16:29	07:51 16:29 16:05	08:37 16:05 16:05
16	05:15 21:49 12	05:47 (3) 05:59 (3) 20:55	06:05 20:55 19:42	07:54 18:29 16:28	07:53 16:28 16:05	08:38 16:05 16:05
17	05:16 21:47 11	05:48 (3) 05:59 (3) 20:53	06:06 20:53 19:39	07:56 18:27 16:26	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 10	05:49 (3) 05:59 (3) 20:51	06:08 20:51 19:37	07:57 18:24 16:25	07:57 16:25 16:05	08:39 16:05 16:05
19	05:19 21:45 9	05:51 (3) 06:00 (3) 20:48	06:10 20:48 19:34	07:59 18:22 16:23	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44 8	05:52 (3) 06:00 (3) 20:46	06:12 20:46 19:32	08:01 18:20 16:22	08:01 16:22 16:06	08:41 16:06 16:06
21	05:21 21:42 7	05:53 (3) 06:00 (3) 20:44	06:14 20:44 19:29	08:03 18:18 16:21	08:02 16:21 16:06	08:41 16:06 16:06
22	05:23 21:41 5	05:55 (3) 06:00 (3) 20:42	06:15 20:42 19:27	08:05 18:15 16:19	08:04 16:19 16:07	08:42 16:07 16:07
23	05:24 21:39 4	05:56 (3) 06:00 (3) 20:39	06:17 20:39 19:24	08:07 18:13 16:18	08:06 16:18 16:07	08:42 16:07 16:07
24	05:26 21:38 2	05:57 (3) 05:59 (3) 20:37	06:19 20:37 19:22	08:09 18:11 16:17	08:08 16:17 16:08	08:43 16:08 16:08
25	05:28 21:36 1	06:21 20:35 19:19	07:15 19:19 17:09	07:11 17:09 16:16	08:09 16:16 16:08	08:43 16:08 16:08
26	05:29 21:35 1	06:22 20:33 19:17	07:17 19:17 17:07	07:13 17:07 16:15	08:11 16:15 16:09	08:43 16:09 16:09
27	05:31 21:33 1	06:24 20:30 19:15	07:19 19:15 17:05	07:15 17:05 16:14	08:13 16:14 16:10	08:44 16:10 16:10
28	05:32 21:32 1	06:26 20:28 19:12	07:21 19:12 17:02	07:17 17:02 16:13	08:14 16:13 16:11	08:44 16:11 16:11
29	05:34 21:30 1	06:28 20:25 19:10	07:23 19:10 17:00	07:19 17:00 16:12	08:16 16:12 16:12	08:44 16:12 16:12
30	05:35 21:28 1	06:29 20:23 19:07	07:24 19:07 16:58	07:20 16:58 16:11	08:18 16:11 16:13	08:44 16:13 16:13
31	05:37 21:27 1	06:31 20:21 19:05	07:26 19:05 16:56	07:22 16:56 16:14	08:19 16:14 16:14	08:44 16:14 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	318		162			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	67		35			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KJ - H296

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:07 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	08:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KK - H297

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:09 (1)	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	14	06:23 (1)	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:41		06:11 (1)	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	13	06:24 (1)	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48	05:01	05:01	05:42		06:12 (1)	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	11	06:23 (1)	20:14	19:00	16:50	16:09	
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44		06:14 (1)	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	9	06:23 (1)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44	06:10 (1)	04:59	05:02		06:16 (1)	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03	1	06:11 (1)	21:50	7	06:23 (1)	20:09	18:55	16:47	16:07	
6	08:43	08:05	07:05	06:49	05:42	06:09 (1)	04:59	05:03		06:17 (1)	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:09	21:05	3	06:12 (1)	21:51	5	06:22 (1)	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40	06:07 (1)	04:58	05:04		06:19 (1)	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	6	06:13 (1)	21:52	2	06:21 (1)	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38	06:05 (1)	04:57	05:05		06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	8	06:13 (1)	21:53		20:01	18:48	16:41	16:06		
9	08:41	07:59	06:58	06:42	05:36	06:03 (1)	04:57	05:06		06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	10	06:13 (1)	21:54		19:59	18:45	16:39	16:06		
10	08:41	07:57	06:55	06:40	05:35	06:02 (1)	04:56	05:07		06:49	07:43	07:42	08:32		
	16:27	17:24	18:19	20:17	21:12	12	06:14 (1)	21:55		19:57	18:43	16:37	16:05		
11	08:40	07:55	06:53	06:37	05:33	06:00 (1)	04:56	05:08		06:51	07:44	07:44	08:33		
	16:28	17:26	18:21	20:19	21:13	13	06:13 (1)	21:56		19:54	18:41	16:36	16:05		
12	08:39	07:53	06:50	06:35	05:31	05:58 (1)	04:56	05:10		06:52	07:46	07:46	08:34		
	16:30	17:28	18:23	20:21	21:15	15	06:13 (1)	21:56		19:52	18:38	16:34	16:05		
13	08:38	07:51	06:48	06:33	05:29	05:57 (1)	04:55	05:11		06:54	07:48	07:48	08:35		
	16:31	17:30	18:25	20:22	21:17	16	06:13 (1)	21:57		19:49	18:36	16:32	16:05		
14	08:37	07:49	06:45	06:30	05:27	05:55 (1)	04:55	05:12		06:01	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:19	18	06:13 (1)	21:58		19:47	18:34	16:31	16:05		
15	08:37	07:47	06:43	06:28	05:26	05:54 (1)	04:55	05:13		06:03	06:58	07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	21:20	19	06:13 (1)	21:58		19:44	18:31	16:29	16:05		
16	08:36	07:45	06:41	06:25	05:24	05:52 (1)	04:55	05:15		06:05	07:00	07:54	07:53	08:38	
	16:36	17:36	18:31	20:28	21:22	20	06:12 (1)	21:59		19:42	18:29	16:28	16:05		
17	08:35	07:43	06:38	06:23	05:22	05:53 (1)	04:54	05:16		06:06	07:01	07:56	07:55	08:39	
	16:38	17:38	18:32	20:30	21:24	19	06:12 (1)	21:59		19:39	18:27	16:26	16:05		
18	08:33	07:41	06:36	06:21	05:21	05:53 (1)	04:54	05:17		06:08	07:03	07:58	07:57	08:39	
	16:40	17:40	18:34	20:32	21:25	17	06:10 (1)	22:00		19:37	18:24	16:25	16:05		
19	08:32	07:39	06:33	06:19	05:19	05:54 (1)	04:54	05:19		06:10	07:05	07:59	07:59	08:40	
	16:42	17:42	18:36	20:34	21:27	16	06:10 (1)	22:00		19:34	18:22	16:23	16:05		
20	08:31	07:37	06:31	06:16	05:18	05:55 (1)	04:55	05:20		06:12	07:07	08:01	08:01	08:41	
	16:43	17:44	18:38	20:35	21:28	13	06:08 (1)	22:00		19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16	05:56 (1)	04:55	05:22		06:10 (1)	06:14	07:08	08:03	08:41	
	16:45	17:46	18:40	20:37	21:30	11	06:07 (1)	22:01	4	06:14 (1)	20:44	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	05:58 (1)	04:55	05:23		06:08 (1)	06:15	07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	21:31	8	06:06 (1)	22:01	9	06:17 (1)	20:42	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13		04:55	05:24		06:06 (1)	06:17	07:12	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	21:33		22:01	21:40	12	06:18 (1)	20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26		06:04 (1)	06:19	07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	21:35		22:01	21:38	15	06:19 (1)	20:37	19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11		04:56	05:28		06:04 (1)	06:21	07:15	07:11	08:09	08:43
	16:53	17:54	18:47	20:45	21:36		22:01	21:37	17	06:21 (1)	20:35	19:20	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:10		04:56	05:29		06:03 (1)	06:22	07:17	07:13	08:11	08:44
	16:55	17:56	18:49	20:46	21:37		22:01	21:35	18	06:21 (1)	20:33	19:17	17:07	16:15	16:09
27	08:22	07:21	06:14	06:01	05:08		04:57	05:31		06:03 (1)	06:24	07:19	07:15	08:13	08:44
	16:56	17:58	18:51	20:48	21:39		22:01	21:33	19	06:22 (1)	20:30	19:15	17:05	16:14	16:10
28	08:20	07:19	06:11	05:59	05:07		04:57	05:32		06:03 (1)	06:26	07:21	07:17	08:15	08:44
	16:58	18:00	18:53	20:50	21:40		22:01	21:32	19	06:22 (1)	20:28	19:12	17:02	16:13	16:11
29	08:19		07:09	05:56	05:06		04:58	05:34		06:05 (1)	06:28	07:23	07:19	08:16	08:44
	17:00		19:55	20:52	21:42		22:01	21:30	18	06:23 (1)	20:26	19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05		04:58	05:36		06:06 (1)	06:30	07:24	07:21	08:18	08:44
	17:02		19:57	20:54	21:43		22:00	21:28	17	06:23 (1)	20:23	19:07	16:58	16:11	16:13
31	08:15		07:04		05:04			05:37		06:08 (1)	06:31		07:22		08:44
	17:04		19:58		21:44			21:27	16	06:24 (1)	20:21		16:56		16:14
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259		233	
Total, worst case					225			164		61					
Sun reduction					0.38			0.32		0.34					
Oper. time red.					1.00			1.00		1.00					
Wind dir. red.					0.67			0.67		0.67					
Total reduction					0.25			0.22		0.23					
Total, real					57			35		14					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KL - H298
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	20 06:29 (1)	06:09 (1) 20:18	06:33 19:05	07:26 16:54	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	19 06:30 (1)	06:11 (1) 20:16	06:35 19:02	07:28 16:52	07:26 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	17 06:29 (1)	06:12 (1) 20:14	06:37 19:00	07:30 16:50	07:28 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	16 06:30 (1)	06:14 (1) 20:11	06:38 18:57	07:32 16:48	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 21:03	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	14 06:30 (1)	06:16 (1) 20:09	06:40 18:55	07:33 16:47	07:32 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:54	05:47 21:16	12 06:29 (1)	06:17 (1) 20:06	06:42 18:53	07:35 16:45	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	10 06:29 (1)	06:19 (1) 20:04	06:44 18:50	07:37 16:43	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	8 06:28 (1)	06:20 (1) 20:01	06:45 18:48	07:39 16:41	07:38 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	6 06:28 (1)	06:22 (1) 19:59	06:47 18:45	07:41 16:39	07:40 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	3 06:24 (1)	06:24 (1) 19:57	06:49 18:43	07:43 16:37	07:42 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06		06:27 (1) 19:57	06:51 19:54	07:44 18:41	07:44 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04			06:52 19:52	07:46 18:38	07:46 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01			06:54 19:49	07:48 18:36	07:48 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59			06:56 19:47	07:50 18:34	07:49 16:31
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57			06:58 19:44	07:52 18:31	07:51 16:29
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55			07:00 19:42	07:54 18:29	07:53 16:28
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53			07:01 19:39	07:56 18:27	07:55 16:26
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51			07:03 19:37	07:58 18:24	07:57 16:25
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49			07:05 19:34	07:59 18:22	08:00 16:23
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46			07:07 19:32	08:01 18:20	08:01 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44			07:08 19:29	08:03 18:18	08:02 16:21
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42			07:10 19:27	08:05 18:15	08:04 16:19
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39			07:12 19:24	08:07 18:13	08:06 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	3 06:16 (1)	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:14 20:35	9 06:23 (1)	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:11 20:33	13 06:24 (1)	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:11 20:30	15 06:26 (1)	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:09 20:28	18 06:27 (1)	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:09 20:26	19 06:28 (1)	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:08 20:23	20 06:28 (1)	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:08 20:21	21 06:29 (1)	06:31 20:21		07:22 16:56	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460			382	328	259
Total, worst case					238			118	125				
Sun reduction					0.38			0.32	0.34				
Oper. time red.					1.00			1.00	1.00				
Wind dir. red.					0.67			0.67	0.67				
Total reduction					0.26			0.22	0.23				
Total, real					61			26	29				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KM - H299

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	06:26 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:56	06:45 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	06:27 (1)	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	06:44 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48	06:28 (1)	05:01	05:00	05:42	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	06:42 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09	
4	08:43	08:09	07:09	06:54	05:46	06:30 (1)	05:00	05:01	05:44	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01	06:40 (1)	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44		04:59	05:02	05:46	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03		21:50	21:58	21:18	20:09	18:55	16:47	16:07	
6	08:43	08:05	07:05	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:09	21:05		21:51	21:58	21:16	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:14	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38		04:57	05:05	05:51	06:41 (1)	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:12	6 06:47 (1)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36		04:57	05:06	05:52	06:38 (1)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10		21:54	21:56	21:10	12 06:50 (1)	19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35		04:56	05:07	05:54	06:37 (1)	06:49	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12		21:55	21:55	21:08	15 06:52 (1)	19:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33		04:56	05:08	05:56	06:35 (1)	06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13		21:56	21:54	21:06	18 06:53 (1)	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	06:34 (1)	06:52	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	20 06:54 (1)	19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	06:34 (1)	06:54	07:48	07:48	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	21 06:55 (1)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:32 (1)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	23 06:55 (1)	19:47	18:34	16:31	16:05
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:32 (1)	06:58	07:52	07:51	08:37
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	23 06:55 (1)	19:44	18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	06:34 (1)	07:00	07:54	07:53	08:38
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	22 06:56 (1)	19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22		04:54	05:16	06:06	06:35 (1)	07:01	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	20 06:55 (1)	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08	06:37 (1)	07:03	07:58	07:57	08:39
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51	18 06:55 (1)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19	06:43 (1)	04:54	05:19	06:10	06:39 (1)	07:05	07:59	07:59	08:40
	16:42	17:42	18:36	20:34	3 06:46 (1)	21:27	22:00	21:45	20:49	16 06:55 (1)	19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	06:16	05:18	06:41 (1)	04:55	05:20	06:12	06:40 (1)	07:07	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	6 06:47 (1)	21:28	22:00	21:44	20:46	14 06:54 (1)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	06:39 (1)	04:55	05:21	06:14	06:42 (1)	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	9 06:48 (1)	21:30	22:01	21:42	20:44	12 06:54 (1)	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	06:36 (1)	04:55	05:23	06:15	06:44 (1)	07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	12 06:48 (1)	21:32	22:01	21:41	20:42	9 06:53 (1)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13	06:34 (1)	04:55	05:24	06:17	06:45 (1)	07:12	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	14 06:48 (1)	21:33	22:01	21:40	20:39	6 06:51 (1)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	06:32 (1)	04:55	05:26	06:19	06:47 (1)	07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	17 06:49 (1)	21:35	22:01	21:38	20:37	3 06:50 (1)	19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11	06:30 (1)	04:56	05:28	06:21	07:15	07:11	08:09	08:43	
	16:53	17:54	18:47	20:45	19 06:49 (1)	21:36	22:01	21:37	20:35	19:20	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:10	06:28 (1)	04:56	05:29	06:22	07:17	07:13	08:11	08:44	
	16:55	17:56	18:49	20:46	20 06:48 (1)	21:37	22:01	21:35	20:33	19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08	06:26 (1)	04:57	05:31	06:24	07:19	07:15	08:13	08:44	
	16:56	17:58	18:51	20:48	22 06:48 (1)	21:39	22:01	21:33	20:30	19:15	17:05	16:14	16:10	
28	08:20	07:19	06:11	05:59	05:07	06:24 (1)	04:57	05:32	06:26	07:21	07:17	08:15	08:44	
	16:58	18:00	18:53	20:50	24 06:48 (1)	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16:11	
29	08:19		07:09	05:56	05:06	06:25 (1)	04:58	05:34	06:28	07:23	07:19	08:16	08:44	
	17:00		19:55	20:52	22 06:47 (1)	21:42	22:01	21:30	20:26	19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05	06:25 (1)	04:58	05:36	06:29	07:24	07:21	08:18	08:44	
	17:02		19:57	20:54	21 06:46 (1)	21:43	22:01	21:28	20:23	19:07	16:58	16:11	16:13	
31	08:15		07:04		05:04			05:37	06:31		07:22		08:44	
	17:04		19:58		21:44			21:27	20:21		16:56		16:14	
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233	
Total, worst case				189	60				258					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.68	0.68				0.68					
Total reduction				0.24	0.26				0.23					
Total, real				45	15				60					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KN - H300

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:46 (1) 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:43 (1) 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:42 (1) 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:41 (1) 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	06:39 (1) 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:01 (1) 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	06:39 (1) 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	06:40 (1) 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	06:42 (1) 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	06:44 (1) 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	06:45 (1) 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	06:47 (1) 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	06:49 (1) 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	06:50 (1) 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	06:52 (1) 19:15	07:19 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	06:54 (1) 19:12	07:21 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00	07:09 19:55	05:56 20:52	05:06 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	06:56 (1) 19:10	07:23 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02	07:06 19:57	05:54 20:54	05:05 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04	07:04 19:58	05:04 20:04	05:04 21:44	05:04 21:44	05:04 21:27	05:37 20:21	06:31 20:21	07:22 16:56	07:22 16:56	08:44 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				242				241				
Sun reduction				0.35				0.34				
Oper. time red.				1.00				1.00				
Wind dir. red.				0.68				0.68				
Total reduction				0.24				0.23				
Total, real				58				56				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KO - H301

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:00 (1) 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:02 (1) 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:03 (1) 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:30 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00	07:19 19:00	06:11 19:55	05:59 20:52	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:26	07:21 19:10	08:17 17:00	08:15 16:12	08:44 16:11
30	08:17 17:02	07:17 19:05	06:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:29 20:23	07:24 19:07	08:18 17:00	08:18 16:11	08:44 16:13
31	08:15 17:04	07:15 19:04	06:04 19:58	05:54 20:54	05:04 21:44	04:58 22:01	05:37 21:27	06:31 20:21	07:24 19:07	08:18 17:00	08:18 16:11	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				276								
Sun reduction				0.35								
Oper. time red.				1.00								
Wind dir. red.				0.68								
Total reduction				0.24								
Total, real				66								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KP - H302

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March	April		May	June	July	August		September		October	November	December	
	1	08:44	08:14	07:16	07:01		05:52	05:03	04:59	05:39		06:33	07:01 (1)	07:26	07:24	08:19	
		16:15	17:06	18:02	20:00		20:56	21:45	22:00	21:25		20:18	25	07:26 (1)	19:05	16:54	16:10
	2	08:44	08:12	07:14	06:59		07:23 (1)	05:50	05:02	05:00	05:40	06:35		07:02 (1)	07:28	07:26	08:21
		16:16	17:08	18:04	20:02	2	07:25 (1)	20:57	21:47	22:00	21:23	20:16	25	07:27 (1)	19:02	16:52	16:09
	3	08:44	08:10	07:12	06:57		07:20 (1)	05:48	05:01	05:00	05:42	06:37		07:04 (1)	07:30	07:28	08:22
		16:17	17:10	18:06	20:04	6	07:26 (1)	20:59	21:48	21:59	21:21	20:14	23	07:27 (1)	19:00	16:50	16:09
	4	08:43	08:09	07:09	06:54		07:18 (1)	05:46	05:00	05:01	05:44	06:38		07:05 (1)	07:32	07:30	08:24
		16:18	17:12	18:08	20:06	10	07:28 (1)	21:01	21:49	21:59	21:19	20:11	21	07:26 (1)	18:57	16:48	16:08
	5	08:43	08:07	07:07	06:52		07:15 (1)	05:44	04:59	05:02	05:46	06:40		07:07 (1)	07:33	07:32	08:25
		16:20	17:14	18:10	20:08	13	07:28 (1)	21:03	21:50	21:58	21:18	20:09	18	07:25 (1)	18:55	16:46	16:07
	6	08:43	08:05	07:05	06:49		07:13 (1)	05:42	04:59	05:03	05:47	06:42		07:09 (1)	07:35	07:34	08:27
		16:21	17:16	18:12	20:09	16	07:29 (1)	21:05	21:51	21:58	21:16	20:06	16	07:25 (1)	18:53	16:45	16:07
	7	08:42	08:03	07:02	06:47		07:11 (1)	05:40	04:58	05:04	05:49	06:44		07:10 (1)	07:37	07:36	08:28
		16:22	17:18	18:13	20:11	18	07:29 (1)	21:06	21:52	21:57	21:14	20:04	13	07:23 (1)	18:50	16:43	16:06
	8	08:42	08:01	07:00	06:44		07:08 (1)	05:38	04:57	05:05	05:51	06:45		07:12 (1)	07:39	07:38	08:29
		16:24	17:20	18:15	20:13	20	07:28 (1)	21:08	21:53	21:56	21:12	20:01	10	07:22 (1)	18:48	16:41	16:06
	9	08:41	07:59	06:58	06:42		07:06 (1)	05:36	04:57	05:06	05:52	06:47		07:14 (1)	07:41	07:40	08:30
		16:25	17:22	18:17	20:15	23	07:29 (1)	21:10	21:54	21:56	21:10	19:59	6	07:20 (1)	18:45	16:39	16:06
	10	08:41	07:57	06:55	06:40		07:04 (1)	05:35	04:56	05:07	05:54	06:49		07:16 (1)	07:43	07:42	08:32
		16:27	17:24	18:19	20:17	25	07:29 (1)	21:12	21:55	21:55	21:08	19:57	3	07:19 (1)	18:43	16:37	16:05
	11	08:40	07:55	06:53	06:37		07:02 (1)	05:33	04:56	05:08	05:56	06:51		07:44	07:44	08:33	
		16:28	17:26	18:21	20:19	25	07:27 (1)	21:13	21:56	21:54	21:06	19:54		18:41	16:36	16:05	
	12	08:39	07:53	06:50	06:35		07:02 (1)	05:31	04:56	05:09	05:58	06:52		07:46	07:46	08:34	
		16:30	17:28	18:23	20:21	25	07:27 (1)	21:15	21:56	21:53	21:04	19:52		18:38	16:34	16:05	
	13	08:38	07:51	06:48	06:32		07:03 (1)	05:29	04:55	05:11	05:59	06:54		07:48	07:48	08:35	
		16:31	17:30	18:25	20:22	23	07:26 (1)	21:17	21:57	21:52	21:01	19:49		18:36	16:32	16:05	
	14	08:37	07:49	06:45	06:30		07:03 (1)	05:27	04:55	05:12	06:01	06:56		07:50	07:49	08:36	
		16:33	17:32	18:27	20:24	22	07:25 (1)	21:19	21:58	21:51	20:59	19:47		18:34	16:31	16:05	
	15	08:37	07:47	06:43	06:28		07:04 (1)	05:26	04:55	05:13	06:03	06:58		07:52	07:51	08:37	
		16:35	17:34	18:29	20:26	20	07:24 (1)	21:20	21:58	21:50	20:57	19:44		18:31	16:29	16:05	
	16	08:36	07:45	06:41	06:25		07:05 (1)	05:24	04:55	05:15	06:05	06:59		07:54	07:53	08:38	
		16:36	17:36	18:31	20:28	17	07:22 (1)	21:22	21:59	21:49	20:55	19:42		18:29	16:28	16:05	
	17	08:35	07:43	06:38	06:23		07:06 (1)	05:22	04:54	05:16	06:06	07:01		07:56	07:55	08:39	
		16:38	17:38	18:32	20:30	13	07:19 (1)	21:24	21:59	21:48	20:53	19:39		18:27	16:26	16:05	
	18	08:33	07:41	06:36	06:21		07:10 (1)	05:21	04:54	05:17	06:08	07:03		07:58	07:57	08:39	
		16:40	17:40	18:34	20:32	5	07:15 (1)	21:25	22:00	21:46	20:51	19:37		18:24	16:25	16:05	
	19	08:32	07:39	06:33	06:19		05:19	04:54	05:19	05:19	06:10	07:05		07:59	07:59	08:40	
		16:42	17:42	18:36	20:34		21:27	22:00	21:45	20:49		19:34		18:22	16:23	16:05	
	20	08:31	07:37	06:31	06:16		05:18	04:54	05:20	06:12		07:07		08:01	08:01	08:41	
		16:43	17:44	18:38	20:35		21:28	22:00	21:44	20:46		19:32		18:20	16:22	16:06	
	21	08:30	07:34	06:28	06:14		05:16	04:55	05:21	06:14		07:08		08:03	08:02	08:41	
		16:45	17:46	18:40	20:37		21:30	22:01	21:42	20:44		19:29		18:18	16:21	16:06	
	22	08:29	07:32	06:26	06:12		05:15	04:55	05:23	06:15		07:10		08:05	08:04	08:42	
		16:47	17:48	18:42	20:39		21:32	22:01	21:41	20:42		19:27		18:15	16:19	16:07	
	23	08:27	07:30	06:23	06:10		05:13	04:55	05:24	06:17		07:12		08:07	08:06	08:42	
		16:49	17:50	18:44	20:41		21:33	22:01	21:40	20:39		19:24		18:13	16:18	16:07	
	24	08:26	07:28	06:21	06:07		05:12	04:55	05:26	06:19		07:14		08:09	08:08	08:43	
		16:51	17:52	18:45	20:43		21:35	22:01	21:38	20:37		19:22		18:11	16:17	16:08	
	25	08:25	07:26	06:19	06:05		05:11	04:56	05:28	06:21		07:15		07:11	08:09	08:43	
		16:53	17:54	18:47	20:45		21:36	22:01	21:37	20:35	6	07:19 (1)		17:09	16:16	16:08	
	26	08:23	07:23	06:16	06:03		05:10	04:56	05:29	06:22		07:09 (1)		07:13	08:11	08:44	
		16:54	17:56	18:49	20:46		21:37	22:01	21:35	20:33	13	07:22 (1)		17:07	16:15	16:09	
	27	08:22	07:21	06:14	06:01		05:08	04:57	05:31	06:24		07:07 (1)		07:15	08:13	08:44	
		16:56	17:58	18:51	20:48		21:39	22:01	21:33	20:30	17	07:24 (1)		17:05	16:14	16:10	
	28	08:20	07:19	06:11	05:59		05:07	04:57	05:32	06:26		07:06 (1)		07:17	08:15	08:44	
		16:58	18:00	18:53	20:50		21:40	22:01	21:32	20:28	19	07:25 (1)		17:02	16:13	16:11	
	29	08:19		07:09	05:56		05:06	04:58	05:34	06:28		07:04 (1)		07:19	08:16	08:44	
		17:00		19:55	20:52		21:42	22:01	21:30	20:26	22	07:26 (1)		17:00	16:12	16:12	
	30	08:17		07:06	05:54		05:05	04:58	05:36	06:29		07:03 (1)		07:21	08:18	08:44	
		17:02		19:57	20:54		21:43	22:01	21:28	20:23	23	07:26 (1)		16:58	16:11	16:13	
	31	08:15		07:04			05:04		05:37	06:31		07:02 (1)		07:22		08:44	
		17:04		19:58			21:44		21:27	20:21	25	07:27 (1)		16:56		16:14	
Potential sun hours		250	273	367	420		494	510	512	460		382		328	259	233	
Total, worst case					283							160					
Sun reduction					0.35							0.34					
Oper. time red.					1.00							1.00					
Wind dir. red.					0.67							0.67					
Total reduction					0.24							0.23					
Total, real					67							29					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KQ - H303

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26		07:55 (1)	07:24	08:19
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	25	08:20 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	25	08:19 (1)	16:52	16:09
3	08:44	08:10	07:12		06:56	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	23	08:19 (1)	16:50	16:09
4	08:43	08:09	07:09		07:34 (1)	06:54	05:46	05:00	05:01	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08	3	07:37 (1)	20:06	21:01	21:49	21:59	20:11		18:57	20	08:18 (1)	16:48	16:08
5	08:43	08:07	07:07		07:31 (1)	06:52	05:44	04:59	05:02	05:46		07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10	7	07:38 (1)	20:08	21:03	21:50	21:58	20:09		18:55	18	08:18 (1)	16:46	16:07
6	08:43	08:05	07:05		07:29 (1)	06:49	05:42	04:59	05:03	05:47		07:35		08:02 (1)	07:34	08:27
	16:21	17:16	18:12	10	07:39 (1)	20:10	21:05	21:51	21:58	20:06		18:53	15	08:17 (1)	16:45	16:07
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	05:49		07:37		08:04 (1)	07:36	08:28
	16:22	17:18	18:13	14	07:41 (1)	20:11	21:06	21:52	21:57	20:04		18:50	12	08:16 (1)	16:43	16:06
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	05:51		07:39		08:06 (1)	07:38	08:29
	16:24	17:20	18:15	17	07:41 (1)	20:13	21:08	21:53	21:56	20:02		18:48	9	08:15 (1)	16:41	16:06
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52		07:41		08:07 (1)	07:40	08:30
	16:25	17:22	18:17	19	07:41 (1)	20:15	21:10	21:54	21:56	20:10		18:45	5	08:12 (1)	16:39	16:06
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54		07:43		07:42	08:32	
	16:27	17:24	18:19	22	07:41 (1)	20:17	21:12	21:55	21:58	19:57		18:43		16:37	16:05	
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56		07:44		07:44	08:33	
	16:28	17:26	18:21	24	07:41 (1)	20:19	21:13	21:56	21:54	19:54		18:41		16:36	16:05	
12	08:39	07:53	06:50		07:15 (1)	06:35	05:31	04:56	05:09	05:58		07:46		07:46	08:34	
	16:30	17:28	18:23	25	07:40 (1)	20:21	21:15	21:56	21:53	19:52		18:38		16:34	16:05	
13	08:38	07:51	06:48		07:16 (1)	06:32	05:29	04:55	05:11	05:59		07:48		07:48	08:35	
	16:31	17:30	18:25	24	07:40 (1)	20:22	21:17	21:57	21:52	19:49		18:36		16:32	16:05	
14	08:37	07:49	06:45		07:16 (1)	06:30	05:27	04:55	05:12	06:01		07:50		07:50	08:36	
	16:33	17:32	18:27	22	07:38 (1)	20:24	21:19	21:58	21:51	20:59		18:34		16:31	16:05	
15	08:37	07:47	06:43		07:17 (1)	06:28	05:26	04:55	05:13	06:03		07:52		07:51	08:37	
	16:35	17:34	18:29	21	07:38 (1)	20:26	21:20	21:58	21:50	20:57		18:31		16:29	16:05	
16	08:36	07:45	06:41		07:17 (1)	06:25	05:24	04:55	05:14	06:05		07:54		07:53	08:38	
	16:36	17:36	18:31	19	07:36 (1)	20:28	21:22	21:59	21:49	20:55		18:29		16:28	16:05	
17	08:35	07:43	06:38		07:19 (1)	06:23	05:22	04:54	05:16	06:06		07:56		07:55	08:39	
	16:38	17:38	18:32	15	07:34 (1)	20:30	21:24	21:59	21:48	20:53		18:27		16:26	16:05	
18	08:34	07:41	06:36		07:21 (1)	06:21	05:21	04:54	05:17	06:08		07:58		07:57	08:39	
	16:40	17:40	18:34	10	07:31 (1)	20:32	21:25	22:00	21:46	20:51		18:24		16:25	16:05	
19	08:32	07:39	06:33			06:19	05:19	04:54	05:19	06:10		07:59		07:59	08:40	
	16:42	17:42	18:36			20:34	21:27	22:00	21:45	20:49		18:22		16:23	16:05	
20	08:31	07:37	06:31			06:16	05:18	04:54	05:20	06:12		07:07		08:01	08:41	
	16:43	17:44	18:38			20:35	21:28	22:01	21:44	20:46		18:20		16:22	16:06	
21	08:30	07:34	06:28			06:14	05:16	04:55	05:21	06:14		07:08		08:03	08:42	
	16:45	17:46	18:40			20:37	21:30	22:01	21:42	20:44		18:18		16:21	16:06	
22	08:29	07:32	06:26			06:12	05:15	04:55	05:23	06:15		07:10		08:05	08:44	
	16:47	17:48	18:42			20:39	21:32	22:01	21:41	20:42		18:15		16:19	16:07	
23	08:27	07:30	06:23			06:09	05:13	04:55	05:24	06:17		07:12		08:07	08:42	
	16:49	17:50	18:44			20:41	21:33	22:01	21:40	20:40		18:13		16:18	16:07	
24	08:26	07:28	06:21			06:07	05:12	04:55	05:26	06:19		07:14		08:09	08:43	
	16:51	17:52	18:45			20:43	21:35	22:01	21:38	20:37		18:11		16:17	16:08	
25	08:25	07:26	06:19			06:05	05:11	04:56	05:27	06:21		07:15		08:10	08:43	
	16:53	17:54	18:47			20:45	21:36	22:01	21:37	20:35		19:20	7	08:13 (1)	17:09	
26	08:23	07:23	06:16			06:03	05:09	04:56	05:29	06:22		07:17		08:01 (1)	07:13	
	16:54	17:56	18:49			20:46	21:37	22:01	21:35	20:33		19:17	14	08:15 (1)	17:07	
27	08:22	07:21	06:14			06:01	05:08	04:57	05:31	06:24		07:19		07:59 (1)	07:15	
	16:56	17:58	18:51			20:48	21:39	22:01	21:33	20:30		19:15	18	08:17 (1)	17:05	
28	08:20	07:19	06:11			05:59	05:07	04:57	05:32	06:26		07:21		07:58 (1)	07:17	
	16:58	18:00	18:53			20:50	21:40	22:01	21:32	20:28		19:12	20	08:18 (1)	17:02	
29	08:19		07:09			05:56	05:06	04:58	05:34	06:28		07:23		07:57 (1)	07:19	
	17:00		19:55			20:52	21:42	22:01	21:30	20:26		19:10	22	08:19 (1)	17:00	
30	08:17		07:06			05:54	05:05	04:58	05:35	06:29		07:24		07:56 (1)	07:21	
	17:02		19:57			20:54	21:43	22:01	21:28	20:23		19:07	24	08:20 (1)	16:58	
31	08:16		07:04				05:04		05:37	06:31		07:22			08:44	
	17:04		19:58				21:44		21:27	20:21		16:56			16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case				252							105		152			
Sun reduction				0.27							0.32		0.29			
Oper. time red.				1.00							1.00		1.00			
Wind dir. red.				0.65							0.65		0.65			
Total reduction				0.18							0.21		0.19			
Total, real				44						22		29				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KR - H304

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 07:55 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	08:13 (1) 18:31 (1)	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 07:57 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:11 (1) 20:31 (1)	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 07:57 (1)	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	08:09 (1) 23:32 (1)	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	07:34 (1) 07:57 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:08 (1) 25:33 (1)	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:31 (1) 07:57 (1)	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	08:08 (1) 25:33 (1)	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:31 (1) 07:57 (1)	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:07 (1) 26:33 (1)	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:31 (1) 07:57 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:07 (1) 26:33 (1)	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:30 (1) 07:56 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	08:07 (1) 26:33 (1)	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:31 (1) 07:56 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:07 (1) 25:32 (1)	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:31 (1) 07:55 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:09 (1) 22:31 (1)	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:32 (1) 07:54 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:11 (1) 19:30 (1)	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:33 (1) 07:52 (1)	06:35 20:21	05:31 21:15	04:56 21:53	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:13 (1) 16:29 (1)	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:34 (1) 07:50 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:15 (1) 13:28 (1)	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	07:36 (1) 07:47 (1)	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:17 (1) 9:26 (1)	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29		06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:19 (1) 5:24 (1)	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31		06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	08:24 (1)	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32		06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27		07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34		06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24		07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22		07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20		08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18		08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44		06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13		08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11		08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09		08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	07:48 (1) 07:49 (1)	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07		08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	07:46 (1) 07:53 (1)	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05		08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	07:43 (1) 07:54 (1)	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02		08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55		05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:19 (1) 7:26 (1)	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57		05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:15 (1) 14:29 (1)	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58			05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:19 16:14	08:44 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	298		259	233
Total, worst case			297								298			
Sun reduction		0.23	0.27							0.32	0.29			
Oper. time red.		1.00	1.00							1.00	1.00			
Wind dir. red.		0.65	0.65							0.65	0.65			
Total reduction		0.15	0.18							0.21	0.19			
Total, real		3	52						4		57			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KS - H305

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 18:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	07:54 (1) 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	07:58 (1) 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	07:58 (1) 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	07:58 (1) 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	07:58 (1) 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	07:58 (1) 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	07:58 (1) 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	07:58 (1) 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	07:58 (1) 16:05
10	08:41 16:27	07:57 17:24	06:55 18:24 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	07:58 (1) 16:05
11	08:40 16:28	07:55 17:26	06:53 18:30 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	07:58 (1) 16:05
12	08:39 16:30	07:53 17:28	06:50 18:32 (1)	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	07:58 (1) 16:05
13	08:38 16:31	07:51 17:30	06:48 18:33 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	07:58 (1) 16:05
14	08:37 16:33	07:49 17:32	06:45 18:33 (1)	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	07:58 (1) 16:05
15	08:37 16:35	07:47 17:34	06:43 18:34 (1)	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	07:58 (1) 16:05
16	08:36 16:36	07:45 17:36	06:41 18:34 (1)	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	07:58 (1) 16:05
17	08:35 16:38	07:43 17:38	06:38 18:35 (1)	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	07:58 (1) 16:05
18	08:34 16:40	07:41 17:40	06:36 18:35 (1)	06:21 20:32	05:21 21:25	04:54 22:00	05:17 20:51	07:03 19:37	07:58 18:24	07:57 17:23	07:57 16:25	07:58 (1) 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36 (1)	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	07:05 19:34	07:59 18:22	07:59 17:25	07:59 16:23	07:58 (1) 16:05
20	08:31 16:43	07:37 17:44	06:31 18:37 (1)	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	07:07 19:32	08:01 18:20	07:57 17:22	07:57 16:22	07:58 (1) 16:05
21	08:30 16:45	07:34 17:46	06:28 18:37 (1)	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	07:08 19:29	08:03 18:18	07:56 17:21	07:56 16:21	07:58 (1) 16:05
22	08:29 16:47	07:32 17:48	06:26 18:33 (1)	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	07:10 19:27	08:05 18:15	07:55 17:19	07:55 16:19	07:58 (1) 16:05
23	08:27 16:49	07:30 17:50	06:23 18:32 (1)	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	07:12 19:24	08:07 18:13	07:53 17:17	07:53 16:18	07:58 (1) 16:05
24	08:26 16:51	07:28 17:52	06:21 18:31 (1)	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	07:14 19:22	08:09 18:11	07:51 17:15	07:51 16:17	07:58 (1) 16:05
25	08:25 16:53	07:26 17:54	06:19 18:29 (1)	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	07:15 19:20	08:11 17:09	07:50 17:09	07:50 16:16	07:58 (1) 16:05
26	08:23 16:54	07:23 17:56	06:16 18:28 (1)	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	07:17 19:17	08:13 17:07	07:50 17:07	07:50 16:15	07:58 (1) 16:05
27	08:22 16:56	07:21 17:58	06:14 18:25 (1)	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	07:19 19:15	08:15 17:05	07:50 17:05	07:50 16:14	07:58 (1) 16:05
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	07:21 19:12	08:15 17:02	07:50 17:02	07:50 16:13	07:58 (1) 16:05
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	07:23 19:10	08:16 17:00	07:47 17:00	07:47 16:12	07:58 (1) 16:05
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	07:24 19:07	08:18 16:58	07:50 17:02	07:50 16:11	07:58 (1) 16:05
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44	05:04 21:44	05:37 21:27	07:22 20:21	08:18 16:56	07:52 17:59 (1)	07:52 16:14	07:58 (1) 16:05
Potential sun hours	250	273	357	420	494	510	512	460	382	328	259	233
Total, worst case			357							361	4	
Sun reduction			0.23							0.29	0.27	
Oper. time red.			1.00							1.00	1.00	
Wind dir. red.			0.63							0.63	0.63	
Total reduction			0.15							0.19	0.17	
Total, real			53							67	1	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KT - H306

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06		07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	07:54 (1) 08:22 (1)	08:19 16:10
2	08:44 16:16	08:12 17:08		07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	07:56 (1) 08:21 (1)	08:21 16:09
3	08:44 16:17	08:10 17:10	3	08:38 (1) 08:41 (1)	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 20:14	06:37 19:00	07:30 16:50	07:28 08:20 (1)	08:22 16:09
4	08:43 16:18	08:09 17:12	8	08:36 (1) 08:44 (1)	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 20:11	06:38 18:57	07:32 16:48	07:30 08:19 (1)	08:24 16:08
5	08:43 16:20	08:07 17:14	12	08:34 (1) 08:46 (1)	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 20:09	06:40 18:55	07:33 16:46	07:32 08:17 (1)	08:25 16:07
6	08:43 16:21	08:05 17:16	16	08:32 (1) 08:48 (1)	07:05 18:11	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 20:16	06:42 18:53	07:35 16:45	07:34 08:15 (1)	08:27 16:07
7	08:42 16:22	08:03 17:18	19	08:30 (1) 08:49 (1)	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 20:04	06:44 18:50	07:37 16:43	07:36 08:13 (1)	08:28 16:06
8	08:42 16:24	08:01 17:20	22	08:28 (1) 08:50 (1)	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 20:01	06:45 18:48	07:39 16:41	07:38 08:09 (1)	08:29 16:06
9	08:41 16:25	07:59 17:22	25	08:26 (1) 08:51 (1)	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 20:00	06:47 18:45	07:41 16:39	07:40 08:10	08:30 16:05
10	08:41 16:27	07:57 17:24	28	08:24 (1) 08:52 (1)	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:58	05:54 20:03	06:49 18:43	07:43 16:37	07:43 08:10	08:32 16:05
11	08:40 16:28	07:55 17:26	31	08:22 (1) 08:53 (1)	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 20:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	34	08:20 (1) 08:54 (1)	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 20:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	35	08:19 (1) 08:54 (1)	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 20:01	06:54 18:36	07:48 16:32	07:48 08:10	08:35 16:05
14	08:37 16:33	07:49 17:32	36	08:18 (1) 08:54 (1)	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 18:34	07:50 16:31	09:02 (1) 09:13 (1)	07:49 16:31
15	08:37 16:35	07:47 17:34	36	08:18 (1) 08:54 (1)	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:59 (1) 09:16 (1)	07:51 16:29
16	08:36 16:36	07:45 17:36	36	08:18 (1) 08:54 (1)	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 20:55	06:05 20:55	06:59 18:29	07:54 16:28	08:56 (1) 09:18 (1)	07:53 16:28
17	08:35 16:38	07:43 17:38	35	08:19 (1) 08:54 (1)	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	08:54 (1) 09:20 (1)	07:55 16:26
18	08:33 16:40	07:41 17:40	35	08:19 (1) 08:54 (1)	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:53 (1) 09:21 (1)	07:57 16:25
19	08:32 16:41	07:39 17:42	35	08:18 (1) 08:53 (1)	06:33 18:36	06:18 20:33	05:18 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	08:52 (1) 09:22 (1)	07:59 16:23
20	08:31 16:43	07:37 17:44	34	08:19 (1) 08:53 (1)	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:51 (1) 09:23 (1)	08:01 16:22
21	08:30 16:45	07:34 17:46	33	08:20 (1) 08:53 (1)	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:50 (1) 09:23 (1)	08:02 16:21
22	08:29 16:47	07:32 17:48	31	08:20 (1) 08:51 (1)	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:49 (1) 09:24 (1)	08:04 16:19
23	08:27 16:49	07:30 17:50	29	08:21 (1) 08:50 (1)	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:49 (1) 09:24 (1)	08:06 16:18
24	08:26 16:51	07:28 17:52	27	08:22 (1) 08:49 (1)	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:48 (1) 09:24 (1)	08:08 16:17
25	08:25 16:53	07:26 17:54	24	08:23 (1) 08:47 (1)	06:18 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	07:48 (1) 08:24 (1)	08:09 16:16
26	08:23 16:54	07:23 17:56	20	08:25 (1) 08:45 (1)	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	07:48 (1) 08:24 (1)	08:11 16:15
27	08:22 16:56	07:21 17:58	15	08:28 (1) 08:43 (1)	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	07:48 (1) 08:24 (1)	08:13 16:14
28	08:20 16:58	07:19 18:00	5	08:32 (1) 08:37 (1)	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	07:48 (1) 08:23 (1)	08:15 16:13
29	08:19 17:00			07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	07:19 16:58	08:23 (1) 09:01 (1)	08:16 16:12
30	08:17 17:02			07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	07:21 16:58	07:50 (1) 08:23 (1)	08:18 16:11
31	08:15 17:04			07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56	07:22 16:56	07:52 (1) 08:22 (1)	08:44 16:13
Potential sun hours	250	273		367	420	494	510	512	460	382	328	259		233
Total, worst case		664									546	129		
Sun reduction		0.23									0.29	0.27		
Oper. time red.		1.00									1.00	1.00		
Wind dir. red.		0.62									0.62	0.62		
Total reduction		0.15									0.18	0.17		
Total, real		96									100	21		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KU - H307

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		08:14		08:42 (1)	07:16		08:31 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26		06:33	07:26		07:24		07:56 (1)	08:19		
	16:15		17:06	17	08:59 (1)	18:02	31	09:02 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05		20:18	19:05		16:54	44	08:40 (1)	16:10		
2	08:44		08:12		08:40 (1)	07:14		08:33 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28		06:35	07:28		07:26		07:57 (1)	08:21		
	16:16		17:08	21	09:01 (1)	18:04	28	09:01 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02		20:16	19:02		16:52	42	08:39 (1)	16:09		
3	08:44		08:10		08:38 (1)	07:12		08:35 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30		06:37	07:30		07:28		07:58 (1)	08:22		
	16:17		17:10	25	09:03 (1)	18:06	22	08:57 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00		20:14	19:00		16:50	40	08:38 (1)	16:08		
4	08:43		08:09		08:36 (1)	07:09		08:39 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32		06:38	07:32		07:30		08:00 (1)	08:24		
	16:18		17:12	29	09:05 (1)	18:08	15	08:54 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57		20:11	18:57		16:48	38	08:38 (1)	16:08		
5	08:43		08:07		08:34 (1)	07:07		08:32 (1)	06:50	05:42	05:44	04:59	05:02	05:45	06:40		05:45	06:40		07:32		08:02 (1)	08:25		
	16:20		17:14	32	09:06 (1)	18:10		09:06 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55		21:18	20:09		16:46	35	08:37 (1)	16:07		
6	08:43		08:05		08:32 (1)	07:05		08:30 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35		05:47	06:42		07:34		08:04 (1)	08:27		
	16:21		17:16	35	09:07 (1)	18:11		09:07 (1)	20:09	21:05	21:51	21:58	21:16	20:06	18:53		21:16	20:06		16:45	31	08:35 (1)	16:07		
7	08:42		08:03		08:30 (1)	07:02		08:28 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37		05:49	06:44		07:36		08:06 (1)	08:28		
	16:22		17:18	38	09:08 (1)	18:13		09:08 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50		21:14	20:04		16:43	28	08:34 (1)	16:06		
8	08:42		08:01		08:28 (1)	07:00		08:26 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39		05:51	06:45		07:38		08:09 (1)	08:29		
	16:24		17:20	41	09:09 (1)	18:15		09:09 (1)	20:13	21:08	21:53	21:56	21:12	20:01	18:48		21:12	20:01		16:41	25	08:34 (1)	16:06		
9	08:41		07:59		08:27 (1)	06:57		08:25 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41		05:52	06:47		09:16 (1)	07:40	08:11 (1)	08:30		
	16:25		17:22	43	09:10 (1)	18:17		09:10 (1)	20:15	21:10	21:54	21:56	21:10	20:01	18:45		21:10	20:01		8	09:24 (1)	16:39	21	08:32 (1)	16:05
10	08:41		07:57		08:27 (1)	06:55		08:25 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43		05:54	06:49		09:11 (1)	07:42	08:13 (1)	08:32		
	16:27		17:24	44	09:11 (1)	18:19		09:11 (1)	20:17	21:12	21:55	21:55	21:08	20:01	18:43		21:08	20:01		18	09:29 (1)	16:37	17	08:30 (1)	16:05
11	08:40		07:55		08:26 (1)	06:53		08:24 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:44		05:56	06:51		09:08 (1)	07:44	08:15 (1)	08:33		
	16:28		17:26	45	09:11 (1)	18:21		09:11 (1)	20:19	21:13	21:56	21:54	21:06	20:06	18:54		21:06	20:06		24	09:32 (1)	16:36	13	08:28 (1)	16:05
12	08:39		07:53		08:26 (1)	06:50		08:24 (1)	06:35	05:31	04:55	05:09	05:57	06:52	07:45		05:57	06:52		09:06 (1)	07:45	08:16 (1)	08:31		
	16:30		17:28	46	09:12 (1)	18:23		09:12 (1)	20:21	21:15	21:56	21:53	21:04	20:01	18:38		21:04	20:01		29	09:35 (1)	16:34	7	08:24 (1)	16:05
13	08:38		07:51		08:26 (1)	06:48		08:24 (1)	06:32	05:29	04:55	05:11	05:59	06:54	07:48		05:59	06:54		09:04 (1)	07:48	08:19 (1)	08:35		
	16:31		17:30	46	09:12 (1)	18:25		09:12 (1)	20:22	21:17	21:57	21:52	21:01	20:01	18:36		21:01	20:01		32	09:36 (1)	16:32	3	08:22 (3)	16:05
14	08:37		07:49		08:25 (1)	06:45		08:23 (1)	06:30	05:27	04:55	05:12	06:01	06:56	07:50		06:01	06:56		09:02 (1)	07:49	08:20 (1)	08:36		
	16:33		17:32	47	09:12 (1)	18:27		09:12 (1)	20:24	21:19	21:58	21:51	20:59	20:01	18:34		20:59	20:01		36	09:38 (1)	16:31	36	08:38 (1)	16:05
15	08:37		07:47		08:25 (1)	06:43		08:23 (1)	06:28	05:26	04:55	05:13	06:03	06:58	07:52		06:03	06:58		09:01 (1)	07:51	08:21 (1)	08:37		
	16:35		17:34	47	09:12 (1)	18:29		09:12 (1)	20:26	21:20	21:58	21:50	20:57	20:01	18:31		20:57	20:01		38	09:39 (1)	16:29	38	08:39 (1)	16:05
16	08:36		07:45		08:25 (1)	06:41		08:23 (1)	06:25	05:24	04:54	05:14	06:05	06:59	07:54		06:05	06:59		09:00 (1)	07:53	08:22 (1)	08:38		
	16:36		17:36	48	09:13 (1)	18:30		09:13 (1)	20:28	21:22	21:59	21:49	20:55	20:01	18:29		20:55	20:01		40	09:40 (1)	16:28	40	08:40 (1)	16:05
17	08:35		07:43		08:25 (1)	06:38		08:23 (1)	06:23	05:22	04:54	05:16	06:06	07:01	07:56		06:06	07:01		08:58 (1)	07:55	08:23 (1)	08:39		
	16:38		17:38	48	09:13 (1)	18:32		09:13 (1)	20:30	21:24	21:59	21:48	20:53	20:01	18:27		20:53	20:01		42	09:40 (1)	16:26	42	08:40 (1)	16:05
18	08:33		07:41		08:25 (1)	06:36		08:23 (1)	06:21	05:21	04:54	05:17	06:08	07:03	07:58		06:08	07:03		08:58 (1)	07:57	08:24 (1)	08:39		
	16:40		17:40	48	09:13 (1)	18:34		09:13 (1)	20:32	21:25	22:00	21:46	20:51	20:01	18:24		20:51	20:01		43	09:41 (1)	16:25	43	08:41 (1)	16:05
19	08:32		07:39		08:24 (1)	06:33		08:22 (1)	06:18	05:19	04:53	05:19	06:10	07:05	07:59		06:10	07:05		09:02 (1)	07:55	08:25 (1)	08:40		
	16:41		17:42	48	09:12 (1)	18:36		09:12 (1)	20:33	21:27	22:00	21:45	20:48	20:01	18:24		20:48	20:01		45	09:42 (1)	16:23	45	08:42 (1)	16:05
20	08:31		07:37		08:25 (1)	06:31		08:23 (1)	06:16	05:18	04:54	05:20	06:12	07:07	08:01		06:12	07:07		09:01 (1)	07:56	08:26 (1)	08:41		
	16:43		17:44	47	09:12 (1)	18:38		09:12 (1)	20:35	21:28	22:00	21:44	20:46	20:01	18:22		20:46	20:01		46	09:42 (1)	16:22	46	08:42 (1)	16:06
21	08:30		07:34		08:25 (1)	06:28		08:23 (1)	06:14	05:16	04:55	05:21	06:13	07:08	08:03		06:13	07:08		09:03 (1)	07:58	08:27 (1)	08:41		
	16:45		17:46	47	09:12 (1)	18:40		09:12 (1)	20:37	21:30	22:01	21:42	20:44	20:01	18:18		20:44	20:01		46	09:42 (1)	16:21	46	08:42 (1)	16:06
22	08:29		07:32		08:25 (1)	06:26		08:23 (1)	06:12	05:15	04:55	05:23	06:15	07:10	08:05		06:15	07:10		09:04 (1)	07:59	08:28 (1)	08:42		
	16:47		17:48	45	09:10 (1)	18:42		09:10 (1)	20:39	21:31	22:01	21:41	20:42	20:01	18:15		20:42	20:01		47	09:42 (1)	16:19	47	08:42 (1)	16:07
23	08:27		07:30		08:26 (1)	06:23		08:24 (1)	06:09	05:13	04:55	05:24	06:17	07:12	08:07		06:17	07:12		09:05 (1)	07:58	08:29 (1)	08:42		
	16:49		17:50	44	09:10 (1)	18:44		09:10 (1)	20:41	21:33	22:01	21:40	20:39	20:01	18:13		20:39	20:01		47	09:42 (1)	16:18	47	08:42 (1)	16:07
24	08:26		07:28		08:27 (1)	06:21		08:25 (1)	06:07	05:12	04:55	05:26	06:19	07:14	08:09		06:19	07:14		09:06 (1)	07:59	08:30 (1)	08:43		
	16:51		17:52	43	09:10 (1)	18:45		09:10 (1)	20:43	21:35	22:01	21:38	20:37	20:01	18:11		20:37	20:01		48	09:42 (1)	16:17	48	08:42 (1)	16:08
25	08:25		07:26		08:27 (1)	06:18		08:25 (1)	06:05	05:11	04:56	05:27	06:21	07:15	07:11		06:21	07:15		09:07 (1)	07:59	08:31 (1)	08:43		
	16:53		17:54	41	09:08 (1)	18:47		09:08 (1)	20:45	21:36	22:01	21:37	20:35	20:01	18:09		20:35	20:01		48	09:42 (1)	16:16	48	08:42 (1)	16:08
26	08:23		07:23		08:28 (1)	06:16		08:26 (1)	06:03	05:09	04:56	05:29	06:22	07:17	07:13		06:22	07:17		09:08 (1)	07:58	08:32 (1)	08:44		
	16:54		17:56	39	09:07 (1)	18:49		09:07 (1)	20:46	21:37	22:01	21:35	20:33	20:01	18:07		20:33	20:01		49	09:43 (1)	16:15	49	08:43 (1)	16:09
27	08:22		07:21		08:29 (1)	06:14		08:27 (1)	06:01	05:08	04:56	05:31	06:24	07:19	07:15		06:24	07:19		09:09 (1)	07:59	08:33 (1)	08:44		
	16:56		17:58	37	09:06 (1)	18:51		09:06 (1)	20:48	21:39	22:01	21:33	20:30	20:01	18:05		20:30	20:01		48	09:42 (1)	16:14	48	08:42 (1)	16:10
28	08:20		07:19		08:29 (1)	06:11		08:27 (1)	05:59	05:07	04:57	05:32	06:26	07:21	07:17		06:26	07:21							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KV - H308

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44	09:39 (3)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24							07:24		08:19		11:01 (1)	
	16:15	59	11:50 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54							16:54		16:10	29	11:30 (1)	
2	08:44	09:40 (3)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26							07:26		08:21		11:00 (1)	
	16:16	58	11:51 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52							16:52		16:09	32	11:32 (1)	
3	08:44	09:41 (3)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28							07:28		08:22		10:59 (1)	
	16:17	55	11:50 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50							16:50		16:08	34	11:33 (1)	
4	08:43	09:42 (3)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30							07:30		08:24		10:59 (1)	
	16:18	54	11:51 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48							16:48		16:08	35	11:34 (1)	
5	08:43	09:43 (3)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32							07:32		08:25		10:59 (1)	
	16:20	50	11:50 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46							16:46		16:07	39	11:35 (1)	
6	08:43	09:46 (3)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34							07:34		08:27		10:59 (1)	
	16:21	47	11:51 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45							16:45		16:07	46	11:37 (1)	
7	08:42	09:48 (3)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36							07:36		08:28		10:59 (1)	
	16:22	40	11:50 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43							16:43		16:06	50	11:37 (1)	
8	08:42	11:14 (1)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38							07:38		08:29		10:59 (1)	
	16:24	35	11:49 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41							16:41		16:06	53	11:39 (1)	
9	08:41	11:16 (1)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40							07:40		08:30		10:59 (1)	
	16:25	34	11:50 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39							16:39		16:05	55	11:39 (1)	
10	08:41	11:17 (1)	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42							07:42		08:32		10:59 (1)	
	16:27	32	11:49 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37							16:37		16:05	58	11:40 (1)	
11	08:40	11:18 (1)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44							07:44		08:33		10:59 (1)	
	16:28	30	11:48 (1)	17:26	08:25 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41							18:41		16:05	59	11:40 (1)	
12	08:39	11:20 (1)	07:53	3	08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46							07:46		16:05		11:40 (1)	
	16:30	27	11:47 (1)	17:28	6	08:26 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38						18:38		16:05	60	11:42 (1)	
13	08:38	11:22 (1)	07:51		08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48							07:48		08:35		10:59 (1)	
	16:31	24	11:46 (1)	17:30	9	08:27 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36						18:36		16:05	62	11:43 (1)	
14	08:37	11:24 (1)	07:49		08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50							07:50		08:36		10:59 (1)	
	16:33	21	11:45 (1)	17:32	12	08:27 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34						18:34		16:05	63	11:43 (1)	
15	08:36	11:27 (1)	07:47		08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52							07:52		08:37		10:59 (1)	
	16:35	16	11:43 (1)	17:34	15	08:28 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	4	08:44 (2)	07:51			07:51		16:05	65	11:44 (1)	
16	08:36	11:31 (1)	07:45		08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54				08:39 (2)	07:53		07:53		08:38		10:59 (1)	
	16:36	8	11:39 (1)	17:36	17	08:28 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	13	08:52 (2)	16:28			16:28		16:05	64	11:44 (1)	
17	08:35		07:43		08:09 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56				08:37 (2)	07:55		07:55		08:39		10:59 (1)	
	16:38		17:38	19	08:28 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	17	08:54 (2)	16:26			16:26		16:05	65	11:44 (1)		
18	08:33		07:41		08:07 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57				08:35 (2)	07:57		07:57		08:39		10:59 (1)	
	16:40		17:40	22	08:29 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	21	08:56 (2)	16:25			16:25		16:05	65	11:45 (1)		
19	08:32		07:39		08:04 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59				08:34 (2)	07:59		07:59		08:40		10:59 (1)	
	16:41		17:42	24	08:28 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	23	08:57 (2)	16:23			16:23		16:05	66	11:46 (1)		
20	08:31		07:37		08:02 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01				08:33 (2)	08:01		08:01		08:41		10:59 (1)	
	16:43		17:44	26	08:28 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	24	08:57 (2)	16:22			16:22		16:06	67	11:46 (1)		
21	08:30		07:34		08:02 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03				08:32 (2)	08:02		08:02		08:41		10:59 (1)	
	16:45		17:46	25	08:27 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	26	08:58 (2)	16:20			16:20		16:06	67	11:47 (1)		
22	08:29		07:32		08:02 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05				08:33 (2)	08:04		08:04		08:42		10:59 (1)	
	16:47		17:48	24	08:26 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	25	08:58 (2)	16:19			16:19		16:07	67	11:47 (1)		
23	08:27		07:30		08:03 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07				08:35 (2)	08:06		08:06		08:42		10:59 (1)	
	16:49		17:50	22	08:25 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	23	08:58 (2)	16:18			16:18		16:07	67	11:48 (1)		
24	08:26		07:28		08:05 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09				08:37 (2)	08:08		08:08		08:43		10:59 (1)	
	16:51		17:52	19	08:24 (2)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	21	08:58 (2)	16:17			16:17		16:08	66	11:48 (1)		
25	08:25		07:25		08:05 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11				07:39 (2)	08:09		08:09		08:43		10:59 (1)	
	16:52		17:54	16	08:21 (2)	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	19	07:58 (2)	16:16			16:16		16:08		11:48 (1)		
26	08:23		07:23		08:08 (2)	06:17	06:03	05:09	04:56	05:29	06:22	07:17	08:13				07:41 (2)	08:11		08:11		08:44		10:59 (1)	
	16:54		17:56	11	08:19 (2)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16	07:57 (2)	16:15			16:15	8	11:17 (1)	16:09	65	11:49 (1)	
27	08:22		07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	09:11				07:43 (2)	08:13		08:13		11:06 (1)		10:59 (1)	
	16:56		17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	14	07:57 (2)	16:14	16	11:22 (1)	16:14		16:14	16	11:22 (1)	16:10	65	11:50 (1)
28	08:20		07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	09:13				07:45 (2)	08:14		08:14		11:04 (1)		10:59 (1)	
	16:58		18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	11	07:56 (2)	16:13	21	11:25 (1)	16:11		16:11	21	11:25 (1)	16:11	65	11:50 (1)
29	08:19				07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	09:15				07:47 (2)	08:16		08:16		11:02 (1)		10:59 (1)	
	17:00				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	8	07:55 (2)	16:12	24	11:26 (1)	16:12		16:12	24	11:26 (1)	16:12	63	11:50 (1)
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	09:16				07:50 (2)	08:18		08:18		11:0			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KW - H309

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		12:23 (1)	08:14		08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	05:39	06:33	07:26			07:24		07:54 (2)	08:19			
	16:15	31	12:54 (1)	17:06	5	08:47 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05				16:54	29	08:23 (2)	16:10			
2	08:44		12:24 (1)	08:12		08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28				07:26		07:56 (2)	08:21			12:23 (1)
	16:16	31	12:55 (1)	17:08	9	08:49 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02				16:52	27	08:23 (2)	16:09	6		12:29 (1)
3	08:44		12:24 (1)	08:10		08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30				07:28		07:58 (2)	08:22			12:19 (1)
	16:17	30	12:54 (1)	17:10	12	08:50 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00				16:50	24	08:22 (2)	16:08	13		12:32 (1)
4	08:43		12:26 (1)	08:09		08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32				07:30		08:00 (2)	08:24			12:17 (1)
	16:18	28	12:54 (1)	17:12	14	08:50 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57				16:48	22	08:22 (2)	16:08	18		12:35 (1)
5	08:43		12:27 (1)	08:07		08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33				07:32		08:02 (2)	08:25			12:16 (1)
	16:20	26	12:53 (1)	17:14	17	08:51 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55				16:46	19	08:21 (2)	16:07	21		12:37 (1)
6	08:43		12:29 (1)	08:05		08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35				07:34		08:04 (2)	08:27			12:15 (1)
	16:21	24	12:53 (1)	17:16	20	08:52 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53				16:44	17	08:21 (2)	16:07	24		12:39 (1)
7	08:42		12:30 (1)	08:03		08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37				07:36		08:06 (2)	08:28			12:14 (1)
	16:22	22	12:52 (1)	17:18	22	08:52 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50				16:43	14	08:20 (2)	16:06	26		12:40 (1)
8	08:42		12:32 (1)	08:01		08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39				07:38		08:09 (2)	08:29			12:14 (1)
	16:24	18	12:50 (1)	17:20	25	08:53 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48				16:41	11	08:20 (2)	16:06	28		12:42 (1)
9	08:41		12:35 (1)	07:59		08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41				07:40		08:11 (2)	08:30			12:14 (1)
	16:25	14	12:49 (1)	17:22	27	08:53 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45				16:39	8	08:19 (2)	16:05	29		12:43 (1)
10	08:40		12:39 (1)	07:57		08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43				07:42		08:13 (2)	08:32			12:13 (1)
	16:27	7	12:46 (1)	17:24	29	08:53 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43				16:37	5	08:18 (2)	16:05	31		12:44 (1)
11	08:40		07:55			08:23 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44				07:44		08:15 (2)	08:33			12:13 (1)
	16:28		17:26		30	08:53 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41				16:36	2	08:17 (2)	16:05	31		12:44 (1)
12	08:39		07:53			08:23 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46				07:46			08:34			12:13 (1)
	16:30		17:28		30	08:53 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38				16:34			16:05	32		12:45 (1)
13	08:38		07:51			08:24 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48				07:48			08:35			12:14 (1)
	16:31		17:30		29	08:53 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36				16:32			16:05	33		12:47 (1)
14	08:37		07:49			08:23 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50				07:49			08:36			12:14 (1)
	16:33		17:32		29	08:52 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33				16:31			16:05	34		12:48 (1)
15	08:36		07:47			08:24 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52				07:51			08:37			12:14 (1)
	16:34		17:34		27	08:51 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31				16:29			16:05	35		12:49 (1)
16	08:36		07:45			08:25 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54				07:53			08:38			12:13 (1)
	16:36		17:36		26	08:51 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29				16:28			16:05	35		12:48 (1)
17	08:35		07:43			08:26 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56				07:55			08:39			12:13 (1)
	16:38		17:38		24	08:50 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27				16:26			16:05	36		12:49 (1)
18	08:33		07:41			08:27 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57				07:57			08:39			12:14 (1)
	16:40		17:40		20	08:47 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24				16:25			16:05	36		12:50 (1)
19	08:32		07:39			08:29 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59				07:59			08:40			12:15 (1)
	16:41		17:42		17	08:46 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22				16:23			16:05	36		12:51 (1)
20	08:31		07:37			08:32 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01				08:01			08:41			12:14 (1)
	16:43		17:44		11	08:43 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20				16:22			16:06	37		12:51 (1)
21	08:30		07:34			08:28	06:14	06:00	05:16	04:54	05:21	06:13	07:08	08:03				09:06 (2)			08:01			12:15 (1)
	16:45		17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	17:04				09:10 (2)			16:20			12:52 (1)
22	08:29		07:32			08:26	06:12	06:00	05:15	04:55	05:23	06:15	07:10	08:05				09:01 (2)			08:04			12:15 (1)
	16:47		17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	17:02				09:14 (2)			16:19			12:52 (1)
23	08:27		07:30			08:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:59				08:59 (2)			08:06			12:16 (1)
	16:49		17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	17:00				09:17 (2)			16:18			12:53 (1)
24	08:26		07:28			08:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:57				08:57 (2)			08:08			12:17 (1)
	16:51		17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	17:00				09:18 (2)			16:17			12:53 (1)
25	08:25		07:25			08:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10	09:04				07:55 (2)			08:09			12:17 (1)
	16:52		17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09	17:00				08:19 (2)			16:16			12:53 (1)
26	08:23		07:23			08:16	06:03	05:09	04:56	05:29	06:22	07:17	08:12	09:06				07:54 (2)			08:11			12:18 (1)
	16:54		17:56			18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	17:00				08:20 (2)			16:15			12:54 (1)
27	08:22		07:21			08:14	06:01	05:08	04:56	05:31	06:24	07:19	08:14	09:08				07:53 (2)			08:13			12:19 (1)
	16:56		17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	17:00				08:21 (2)			16:14			12:54 (1)
28	08:20		07:19			08:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17					07:53 (2)			08:14			12:19 (1)
	16:58		18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	17:00				08:21 (2)			16:13			12:54 (1)
29	08:19					07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19					07:52 (2)			08:16			12:20 (1)
	17:00					19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	17:00				08:22 (2)			16:1			

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KX - H310

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KY - H311

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KZ - H312

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06 9 16:34 (5)	07:16 18:02 18 17:34 (4)	07:01 20:00 17:15 (4)	05:52 20:55 26 20:26 (2)	05:03 21:45 21:45
2	08:44 16:16	08:12 17:08 11 16:37 (5)	07:14 18:04 21 17:36 (4)	06:59 20:02 17:36 (4)	05:50 20:57 27 20:27 (2)	05:02 21:46 21:46
3	08:43 16:17	08:10 17:10 14 16:39 (5)	07:11 18:06 23 17:38 (4)	06:56 20:04 17:15 (4)	05:48 20:59 29 20:29 (2)	05:01 21:48 21:48
4	08:43 16:18	08:08 17:12 16 16:41 (5)	07:09 18:07 27 17:41 (4)	06:54 20:06 17:14 (4)	05:46 21:01 30 20:30 (2)	05:00 21:49 21:49
5	08:43 16:19	08:07 17:14 18 16:43 (5)	07:07 18:09 29 17:42 (4)	06:51 20:07 17:13 (4)	05:44 21:03 30 20:30 (2)	04:59 21:50 21:50
6	08:42 16:21	08:05 17:16 20 16:45 (5)	07:04 18:11 32 17:45 (4)	06:49 20:09 17:13 (4)	05:42 21:04 29 20:29 (2)	04:59 21:51 21:51
7	08:42 16:22	08:03 17:18 21 16:47 (5)	07:02 18:13 33 17:46 (4)	06:47 20:11 17:13 (4)	05:40 21:06 28 20:29 (2)	04:58 21:52 21:52
8	08:42 16:24	08:01 17:20 22 16:48 (5)	07:00 18:15 35 17:48 (4)	06:44 20:13 17:13 (4)	05:38 21:08 27 20:28 (2)	04:57 21:53 21:53
9	08:41 16:25	07:59 17:22 21 16:48 (5)	06:57 18:17 37 17:49 (4)	06:42 20:15 17:12 (4)	05:36 21:10 25 20:27 (2)	04:57 21:54 21:54
10	08:40 16:26	07:57 17:24 19 16:47 (5)	06:55 18:19 36 17:49 (4)	06:39 20:17 17:13 (4)	05:34 21:11 24 20:26 (2)	04:56 21:55 21:55
11	08:40 16:28	07:55 17:26 17 16:46 (5)	06:52 18:21 34 17:48 (4)	06:37 20:19 17:14 (4)	05:33 21:13 22 20:26 (2)	04:56 21:55 21:55
12	08:39 16:30	07:53 17:28 15 16:44 (5)	06:50 18:23 33 17:47 (4)	06:35 20:20 17:14 (4)	05:31 21:15 21 20:25 (2)	04:55 21:56 21:56
13	08:38 16:31	07:51 17:30 10 16:42 (5)	06:48 18:25 31 17:46 (4)	06:32 20:22 17:15 (4)	05:29 21:17 18 20:23 (2)	04:55 21:57 21:57
14	08:37 16:33	07:49 17:32 18:27	06:45 18:27 30 18:00 (3)	06:30 20:24 17:15 (4)	05:27 21:18 14 20:22 (2)	04:55 21:57 21:57
15	08:36 16:34	07:47 17:34 18:28	06:43 18:28 30 18:02 (3)	06:28 20:26 17:17 (4)	05:26 21:20 10 20:19 (2)	04:54 21:58 21:58
16	08:35 16:36	07:45 17:36 18:30	06:40 18:30 30 18:04 (3)	06:25 20:28 17:18 (4)	05:24 21:22 20:05 (2)	04:54 21:59 21:59
17	08:34 16:38	07:43 17:38 18:32	06:38 18:32 27 18:06 (3)	06:23 20:30 17:21 (4)	05:22 21:23 20:07 (2)	04:54 21:59 21:59
18	08:33 16:40	07:41 17:40 18:34	06:35 18:34 21 18:07 (3)	06:21 20:31 17:24 (4)	05:21 21:25 20:08 (2)	04:54 22:00 22:00
19	08:32 16:41	07:39 17:42 18:36	06:33 18:36 15 18:10 (3)	06:18 20:33 17:55 (3)	05:19 21:27 20:09 (2)	04:54 22:00 22:00
20	08:31 16:43	07:36 17:44 18:38	06:31 18:38 17 18:11 (3)	06:16 20:35 17:54 (3)	05:18 21:28 20:10 (2)	04:54 22:00 22:00
21	08:30 16:45	07:34 17:46 18:40	06:28 18:40 18 18:13 (3)	06:14 20:37 17:55 (3)	05:16 21:30 20:12 (2)	04:54 22:01 22:01
22	08:28 16:47	07:32 17:48 18:41	06:26 18:41 21 18:15 (3)	06:12 20:39 17:54 (3)	05:15 21:31 1 20:09 (2)	04:55 22:01 22:01
23	08:27 16:49	07:30 17:50 18:43	06:23 18:43 20 18:15 (3)	06:09 20:41 17:55 (3)	05:13 21:33 5 20:12 (2)	04:55 22:01 22:01
24	08:26 16:50	07:28 17:52 18:45	06:21 18:45 17 18:13 (3)	06:07 20:42 17:56 (3)	05:12 21:34 9 20:14 (2)	04:55 22:01 22:01
25	08:24 16:52	07:25 17:54 4 17:26 (4)	06:18 18:47 13 18:11 (3)	06:05 20:44 17:58 (3)	05:11 21:36 11 20:04 (2)	04:55 22:01 22:01
26	08:23 16:54	07:23 17:56 8 17:28 (4)	06:16 18:49 7 18:07 (3)	06:03 20:46 18:00 (3)	05:09 21:37 14 20:17 (2)	04:56 22:01 22:01
27	08:22 16:56	07:21 17:58 12 17:31 (4)	06:13 18:51 17:19 (4)	06:01 20:48 20:48	05:08 21:39 17 20:19 (2)	04:56 22:01 22:01
28	08:20 16:58	07:18 18:00 15 17:32 (4)	06:11 18:53 17:17 (4)	05:58 20:50 20:50	05:07 21:40 19 20:21 (2)	04:57 22:01 22:01
29	08:18 17:00	 19:54	07:08 19:54 20:52	05:56 20:52 20:52	05:06 21:41 21 20:22 (2)	04:57 22:01 22:01
30	08:17 17:02	16:27 (5) 3 16:30 (5)	07:06 19:56 20:53	05:54 20:53 20:53	05:05 21:43 23 20:24 (2)	04:58 22:00 22:00
31	08:15 17:04	16:26 (5) 6 16:32 (5)	07:04 19:58 20:54	 20:54	05:04 21:44 20:01 (2)	 20:01 (2)
Potential sun hours	250	273	367	420	494	510
Total, worst case	9	252	655	120	360	
Sun reduction	0.24	0.23	0.27	0.35	0.38	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.66	0.66	0.68	0.65	0.65	
Total reduction	0.16	0.15	0.18	0.23	0.25	
Total, real	1	39	120	27	89	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KZ - H312

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	21	20:14 (2) 20:35 (2)	06:33 20:18		07:26 19:05	17:53 (4) 18:25 (4)	07:24 16:54	15:57 (5) 16:17 (5)	08:19 16:10
2	04:59 22:00	05:40 21:23	23	20:14 (2) 20:37 (2)	06:35 20:16		07:28 19:02	17:52 (4) 18:26 (4)	07:26 16:52	15:56 (5) 16:18 (5)	08:21 16:09
3	05:00 21:59	05:42 21:21	25	20:12 (2) 20:37 (2)	06:36 20:13		07:30 19:00	17:51 (4) 18:26 (4)	07:28 16:50	15:56 (5) 16:18 (5)	08:22 16:08
4	05:01 21:59	05:44 21:19	26	20:12 (2) 20:38 (2)	06:38 20:11		07:31 18:57	17:50 (4) 18:27 (4)	07:30 16:48	15:55 (5) 16:17 (5)	08:24 16:08
5	05:02 21:58	05:45 21:17	27	20:11 (2) 20:38 (2)	06:40 20:09		07:33 18:55	17:50 (4) 18:26 (4)	07:32 16:46	15:55 (5) 16:15 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	29	20:10 (2) 20:39 (2)	06:42 20:06		07:35 18:52	17:50 (4) 18:24 (4)	07:34 16:44	15:55 (5) 16:12 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	30	20:10 (2) 20:40 (2)	06:43 20:04		07:37 18:50	17:48 (4) 18:21 (4)	07:36 16:43	15:55 (5) 16:10 (5)	08:28 16:06
8	05:05 21:56	05:50 21:11	30	20:09 (2) 20:39 (2)	06:45 20:01		07:39 18:48	17:48 (4) 18:18 (4)	07:38 16:41	15:55 (5) 16:08 (5)	08:29 16:06
9	05:06 21:55	05:52 21:10	30	20:09 (2) 20:39 (2)	06:47 19:59		07:41 18:45	17:48 (4) 18:16 (4)	07:40 16:39	15:55 (5) 16:06 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	29	20:08 (2) 20:37 (2)	06:49 19:56		07:42 18:43	17:48 (4) 18:14 (4)	07:42 16:37	15:57 (5) 16:05 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	26	20:09 (2) 20:35 (2)	06:50 19:54		07:44 18:40	17:49 (4) 18:11 (4)	07:44 16:35	15:58 (5) 16:03 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	25	20:09 (2) 20:34 (2)	06:52 19:51		07:46 18:38	17:49 (4) 18:09 (4)	07:45 16:34	15:59 (5) 16:01 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01	23	20:08 (2) 20:31 (2)	06:54 19:49		07:48 18:36	17:50 (4) 18:07 (4)	07:47 16:32		08:35 16:05
14	05:12 21:51	06:01 20:59	20	20:09 (2) 20:29 (2)	06:56 19:47		07:50 18:33	17:51 (4) 18:04 (4)	07:49 16:31		08:36 16:04
15	05:13 21:50	06:03 20:57	19	20:09 (2) 20:28 (2)	06:58 19:44		07:52 18:31	17:52 (4) 18:02 (4)	07:51 16:29		08:37 16:05
16	05:14 21:49	06:04 20:55	16	20:09 (2) 20:25 (2)	06:59 19:42		07:54 18:29	17:53 (4) 17:59 (4)	07:53 16:27		08:38 16:05
17	05:16 21:47	06:06 20:53	13	20:10 (2) 20:23 (2)	07:01 19:39	18:50 (3) 4	07:55 18:54 (3)	17:55 (4) 17:57 (4)	07:55 16:26		08:38 16:05
18	05:17 21:46	06:08 20:50	11	20:11 (2) 20:22 (2)	07:03 19:37		07:57 18:58 (3)		07:57 16:24		08:39 16:05
19	05:18 21:45	06:10 20:48	8	20:11 (2) 20:19 (2)	07:05 19:34	16	07:59 19:00 (3)		07:59 16:23		08:40 16:05
20	05:20 21:44	06:12 20:46	4	20:13 (2) 20:17 (2)	07:06 19:32	19	08:01 19:01 (3)		08:00 16:22		08:41 16:06
21	05:21 21:42	06:13 20:44			07:08 19:29	21	08:03 19:01 (3)		08:02 16:20		08:41 16:06
22	05:23 21:41	06:15 20:42			07:10 19:27		08:05 18:58 (3)		08:04 16:19		08:42 16:06
23	05:24 21:39	06:17 20:39			07:12 19:24	17	08:07 18:56 (3)		08:06 16:18		08:42 16:07
24	05:26 21:38	06:19 20:37			07:13 19:22	16	08:09 18:54 (3)		08:08 16:17		08:43 16:08
25	05:27 21:36	06:20 20:35			07:15 19:19	18	07:11 18:51 (3)		08:09 16:16		08:43 16:08
26	05:29 21:35	06:22 20:32			07:17 19:17	27	07:13 18:48 (3)		08:11 16:14		08:43 16:09
27	05:30 21:33	06:24 20:30			07:19 19:14	28	07:14 18:01 (4)		08:13 16:13		08:44 16:10
28	05:32 21:32	20:22 (2) 20:28 (2)	6	06:26 20:28 (2)	07:21 19:12	31	07:16 17:58 (4)	16:05 (5) 4	08:14 16:09 (5)		08:44 16:11
29	05:34 21:30	20:19 (2) 20:31 (2)	12	06:27 20:25 (2)	07:22 19:09	29	07:18 18:41 (3)	16:01 (5) 11	08:16 16:12 (5)		08:44 16:11
30	05:35 21:28	20:17 (2) 20:33 (2)	16	06:29 20:23 (2)	07:24 19:07	30	07:20 18:24 (4)	15:59 (5) 15	08:18 16:14 (5)		08:44 16:12
31	05:37 21:26	20:16 (2) 20:35 (2)	19	06:31 20:21			07:22 16:56	15:57 (5) 18			08:44 16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	53		435		287		463		177		
Sun reduction	0.32		0.34		0.32		0.29		0.27		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.65		0.65		0.68		0.68		0.66		
Total reduction	0.21		0.22		0.22		0.20		0.17		
Total, real	11		96		62		91		31		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LA - H313

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	19:08 (3) 20:55	20:22 (2) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	19:16 (3) 20:57	20:26 (2) 21:46
3	08:43 16:17	08:10 17:10	16:36 (5) 18:06	07:11 20:04	05:48 20:59	20:18 (2) 21:48
4	08:43 16:18	08:08 17:12	16:34 (5) 18:07	07:09 20:06	05:46 21:01	20:17 (2) 21:49
5	08:43 16:19	08:07 17:14	16:34 (5) 18:09	07:07 20:07	05:44 21:03	20:16 (2) 21:50
6	08:42 16:21	08:05 17:16	16:33 (5) 18:11	07:04 20:09	05:42 21:04	20:32 (2) 21:51
7	08:42 16:22	08:03 17:18	16:32 (5) 18:13	07:02 20:11	05:40 21:06	20:15 (2) 21:52
8	08:42 16:24	08:01 17:20	16:32 (5) 18:15	07:00 20:13	05:38 21:08	20:14 (2) 21:53
9	08:41 16:25	07:59 17:22	16:32 (5) 18:17	06:57 20:15	05:36 21:10	20:14 (2) 21:54
10	08:40 16:26	07:57 17:24	16:32 (5) 18:19	06:55 20:17	05:34 21:11	20:13 (2) 21:55
11	08:40 16:28	07:55 17:26	16:32 (5) 18:21	06:52 20:19	05:33 21:13	20:13 (2) 21:55
12	08:39 16:30	07:53 17:28	16:32 (5) 18:23	06:50 20:20	05:31 21:15	20:13 (2) 21:56
13	08:38 16:31	07:51 17:30	16:32 (5) 18:25	06:48 20:22	05:29 21:17	20:13 (2) 21:57
14	08:37 16:33	07:49 17:32	16:33 (5) 18:27	06:45 20:24	05:27 21:18	20:13 (2) 21:57
15	08:36 16:34	07:47 17:34	16:34 (5) 18:28	06:43 20:26	05:26 21:20	20:13 (2) 21:58
16	08:35 16:36	07:45 17:36	16:35 (5) 18:30	06:40 20:28	05:24 21:22	20:14 (2) 21:59
17	08:34 16:38	07:43 17:38	16:37 (5) 18:32	06:38 20:30	05:22 21:23	20:13 (2) 21:59
18	08:33 16:40	07:41 17:40	16:38 (5) 18:34	06:35 20:31	05:21 21:25	20:14 (2) 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:15 (2) 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:15 (2) 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:16 (2) 22:01
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	20:17 (2) 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:17 (2) 22:01
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	20:18 (2) 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:19 (2) 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	20:20 (2) 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:21 (2) 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	20:23 (2) 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	20:24 (2) 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	20:27 (2) 22:01
31	08:15 17:04		07:04 19:58	05:53 20:55	05:04 21:44	20:33 (2) 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case		263	827	8	638	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.64	
Total reduction		0.15	0.18	0.24	0.24	
Total, real		40	151	2	156	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LA - H313

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59	05:39	20:23 (2)	06:33		07:26	18:04 (4)	07:24	16:02 (5)	08:19	
	22:00	21:25	30 20:53 (2)	20:18		19:05	32 18:36 (4)	16:54	21 16:23 (5)	16:10	
2	04:59	05:40	20:24 (2)	06:35		07:28	18:04 (4)	07:26		16:02 (5)	08:21
	22:00	21:23	28 20:52 (2)	20:16		19:02	29 18:33 (4)	16:52	19 16:21 (5)	16:09	
3	05:00	05:42	20:23 (2)	06:36		07:30	18:05 (4)	07:28		16:02 (5)	08:22
	21:59	21:21	27 20:50 (2)	20:13		19:00	26 18:31 (4)	16:50	17 16:19 (5)	16:08	
4	05:01	05:44	20:24 (2)	06:38		07:31	18:06 (4)	07:30		16:02 (5)	08:24
	21:59	21:19	24 20:48 (2)	20:11		18:57	23 18:29 (4)	16:48	15 16:17 (5)	16:08	
5	05:02	05:45	20:24 (2)	06:40		07:33	18:06 (4)	07:32		16:03 (5)	08:25
	21:58	21:17	22 20:46 (2)	20:09		18:55	20 18:26 (4)	16:46	12 16:15 (5)	16:07	
6	05:03	05:47	20:25 (2)	06:42		07:35	18:07 (4)	07:34		16:03 (5)	08:26
	21:58	21:15	20 20:45 (2)	20:06		18:52	17 18:24 (4)	16:44	9 16:12 (5)	16:07	
7	05:04	05:49	20:25 (2)	06:43		07:37	18:08 (4)	07:36		16:04 (5)	08:28
	21:57	21:13	18 20:43 (2)	20:04		18:50	13 18:21 (4)	16:43	6 16:10 (5)	16:06	
8	05:05	05:50	20:25 (2)	06:45		07:39	18:09 (4)	07:38		16:06 (5)	08:29
	21:56	21:11	16 20:41 (2)	20:01		18:48	9 18:18 (4)	16:41	2 16:08 (5)	16:06	
9	05:06	05:52	20:27 (2)	06:47		07:41	18:12 (4)	07:40			08:30
	21:55	21:09	12 20:39 (2)	19:59		18:45	4 18:16 (4)	16:39			16:05
10	05:07	05:54	20:27 (2)	06:49		07:42		16:37			08:31
	21:55	21:07	10 20:37 (2)	19:56		18:43		16:37			16:05
11	05:08	05:56	20:29 (2)	06:50	19:01 (3)	07:44		16:34			08:33
	21:54	21:05	6 20:35 (2)	19:54	6 19:07 (3)	18:40		16:35			16:05
12	05:09	05:57	20:31 (2)	06:52	18:58 (3)	07:46		16:34			08:34
	21:53	21:03	3 20:34 (2)	19:51	13 19:11 (3)	18:38		16:34			16:05
13	05:10	05:59		06:54	18:56 (3)	07:48		16:37			08:35
	21:52	21:01		19:49	16 19:12 (3)	18:36		16:32			16:05
14	05:12	20:34 (2)	06:01	06:56	18:53 (3)	07:50		16:32			08:36
	21:51	8 20:42 (2)	20:59	19:47	20 19:13 (3)	18:33		16:31			16:04
15	05:13	20:32 (2)	06:03	06:58	18:52 (3)	07:52		16:31			08:37
	21:50	12 20:44 (2)	20:57	19:44	22 19:14 (3)	18:31		16:29			16:05
16	05:14	20:30 (2)	06:04	06:59	18:24 (4)	07:54		16:27			08:38
	21:49	15 20:45 (2)	20:55	19:42	34 19:14 (3)	18:29		16:27			16:05
17	05:16	20:30 (2)	06:06	07:01	18:19 (4)	07:55		16:26			08:38
	21:47	17 20:47 (2)	20:53	19:39	40 19:11 (3)	18:26		16:26			16:05
18	05:17	20:29 (2)	06:08	07:03	18:16 (4)	07:57		16:26			08:39
	21:46	19 20:48 (2)	20:50	19:37	42 19:08 (3)	18:24		16:24			16:05
19	05:18	20:28 (2)	06:10	07:05	18:14 (4)	07:59		16:23			08:40
	21:45	21 20:49 (2)	20:48	19:34	44 19:06 (3)	18:22		16:23			16:05
20	05:20	20:28 (2)	06:12	07:06	18:13 (4)	08:01		16:22			08:41
	21:44	22 20:50 (2)	20:46	19:32	44 19:04 (3)	18:20		16:22			16:06
21	05:21	20:27 (2)	06:13	07:08	18:10 (4)	08:03		16:20			08:41
	21:42	24 20:51 (2)	20:44	19:29	45 19:01 (3)	18:17		16:20			16:06
22	05:23	20:26 (2)	06:15	07:10	18:09 (4)	08:05		16:19			08:42
	21:41	25 20:51 (2)	20:42	19:27	44 18:58 (3)	18:15		16:19			16:06
23	05:24	20:26 (2)	06:17	07:12	18:08 (4)	08:07	17:12 (5)	16:18			08:42
	21:39	26 20:52 (2)	20:39	19:24	42 18:56 (3)	18:13	5 17:17 (5)	16:18			16:07
24	05:26	20:25 (2)	06:19	07:13	18:08 (4)	08:09	17:08 (5)	16:17			08:43
	21:38	27 20:52 (2)	20:37	19:22	40 18:54 (3)	18:11	12 17:20 (5)	16:17			16:08
25	05:27	20:25 (2)	06:20	07:15	18:06 (4)	07:11	16:06 (5)	16:16			08:43
	21:36	28 20:53 (2)	20:35	19:19	38 18:44 (4)	17:09	16 16:22 (5)	16:16			16:08
26	05:29	20:24 (2)	06:22	07:17	18:06 (4)	07:13	16:04 (5)	16:14			08:43
	21:35	29 20:53 (2)	20:32	19:17	38 18:44 (4)	17:06	19 16:23 (5)	16:14			16:09
27	05:30	20:24 (2)	06:24	07:19	18:05 (4)	07:14	16:03 (5)	16:13			08:44
	21:33	29 20:53 (2)	20:30	19:14	39 18:44 (4)	17:04	21 16:24 (5)	16:13			16:10
28	05:32	20:24 (2)	06:26	07:21	18:05 (4)	07:16	16:02 (5)	16:12			08:44
	21:32	30 20:54 (2)	20:28	19:12	39 18:44 (4)	17:02	23 16:25 (5)	16:12			16:11
29	05:34	20:23 (2)	06:27	07:22	18:05 (4)	07:18	16:02 (5)	16:16			08:44
	21:30	31 20:54 (2)	20:25	19:09	36 18:41 (4)	17:00	23 16:25 (5)	16:12			16:11
30	05:35	20:24 (2)	06:29	07:24	18:04 (4)	07:20	16:01 (5)	16:18			08:44
	21:28	30 20:54 (2)	20:23	19:07	34 18:38 (4)	16:58	24 16:25 (5)	16:11			16:12
31	05:37	20:24 (2)	06:31			07:22	16:01 (5)				08:44
	21:26	31 20:55 (2)	20:21			16:56	24 16:25 (5)				16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case		424		216		676			101		
Sun reduction		0.32		0.34		0.32			0.27		
Oper. time red.		1.00		1.00		1.00			1.00		
Wind dir. red.		0.64		0.64		0.68			0.65		
Total reduction		0.21		0.22		0.22			0.17		
Total, real		88		47		146			18		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LB - H314

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:44 (4) 20:55	05:03 20:31 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:44 (4) 20:57	05:02 20:33 (2)
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:46 (4) 20:59	05:01 20:36 (2)
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:48 (4) 21:01	05:00 20:33 (2)
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	18:50 (4) 21:03	04:59 20:34 (2)
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	18:53 (4) 21:04	04:59 20:35 (2)
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	19:20 (3) 21:06	04:58 20:35 (2)
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	19:26 (3) 21:08	04:57 20:36 (2)
9	08:41 16:25	07:59 17:22	16:50 (5) 18:17	06:57 20:15	05:38 21:10	20:37 (2) 21:53
10	08:40 16:26	07:57 17:24	16:48 (5) 18:19	06:55 20:17	05:34 21:11	20:34 (2) 21:55
11	08:40 16:28	07:55 17:26	16:48 (5) 18:21	06:52 20:19	05:33 21:13	20:32 (2) 21:55
12	08:39 16:30	07:53 17:28	16:46 (5) 18:23	06:50 20:20	05:31 21:15	20:31 (2) 21:56
13	08:38 16:31	07:51 17:30	16:45 (5) 18:25	06:48 20:22	05:29 21:17	20:30 (2) 21:57
14	08:37 16:33	07:49 17:32	16:45 (5) 18:27	17:56 (4) 20:24	05:27 21:18	20:30 (2) 21:57
15	08:36 16:34	07:47 17:34	16:45 (5) 18:28	17:54 (4) 20:26	05:26 21:20	20:29 (2) 21:58
16	08:35 16:36	07:45 17:36	16:45 (5) 18:30	17:51 (4) 20:28	05:24 21:22	20:29 (2) 21:59
17	08:34 16:38	07:43 17:38	16:45 (5) 18:32	17:50 (4) 20:30	05:22 21:23	20:28 (2) 21:59
18	08:33 16:40	07:41 17:40	16:45 (5) 18:34	17:48 (4) 20:31	05:21 21:25	20:28 (2) 22:00
19	08:32 16:41	07:39 17:42	16:45 (5) 18:36	17:47 (4) 20:33	05:19 21:27	20:29 (2) 22:00
20	08:31 16:43	07:36 17:44	16:46 (5) 18:38	17:45 (4) 20:35	05:18 21:28	20:28 (2) 22:00
21	08:30 16:45	07:34 17:46	16:47 (5) 18:40	17:45 (4) 20:37	05:16 21:30	20:28 (2) 22:01
22	08:28 16:47	07:32 17:48	16:47 (5) 18:41	17:44 (4) 20:39	05:15 21:31	20:29 (2) 22:01
23	08:27 16:49	07:30 17:50	16:49 (5) 18:43	17:43 (4) 20:41	05:13 21:33	20:28 (2) 22:01
24	08:26 16:50	07:28 17:52	16:52 (5) 18:45	17:42 (4) 20:42	05:12 21:34	20:28 (2) 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	17:42 (4) 20:44	05:11 21:36	20:29 (2) 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	17:42 (4) 20:46	05:09 21:37	20:29 (2) 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:42 (4) 20:48	05:08 21:39	20:30 (2) 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	17:43 (4) 20:50	05:07 21:40	20:30 (2) 22:01
29	08:18 17:00		07:08 19:54	18:42 (4) 20:52	05:06 21:41	20:30 (2) 22:01
30	08:17 17:02		07:06 19:56	18:43 (4) 20:53	05:05 21:43	20:31 (2) 22:00
31	08:15 17:04		07:04 19:58	18:43 (4) 20:53	05:04 21:44	20:31 (2) 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case		261	543	253	517	447
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.68	0.67	0.63	0.63
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		40	99	60	125	90

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LB - H314

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59	20:43 (2)	05:39	20:42 (2)	06:33		07:26	07:24	16:18 (5)	08:19	
	22:00	15	20:58 (2)	21:25	11	20:53 (2)	20:18		16:54	5	16:23 (5)
2	04:59	20:43 (2)	05:40	20:43 (2)	06:35		07:28	07:26	16:20 (5)	08:21	
	22:00	16	20:59 (2)	21:23	9	20:52 (2)	20:16		16:52	1	16:21 (5)
3	05:00	20:42 (2)	05:42	20:43 (2)	06:36		07:30	07:28			08:22
	21:59	17	20:59 (2)	21:21	7	20:50 (2)	20:13		16:50		16:08
4	05:01	20:42 (2)	05:44	20:45 (2)	06:38		07:31	07:30			08:24
	21:59	18	21:00 (2)	21:19	3	20:48 (2)	20:11		16:48		16:08
5	05:02	20:42 (2)	05:45		06:40		19:17 (3)	07:33	07:32		08:25
	21:58	19	21:01 (2)	21:17		20:09	6	19:23 (3)	18:55		16:07
6	05:03	20:41 (2)	05:47		06:42		18:50 (4)	07:35	07:34		08:26
	21:58	21	21:02 (2)	21:15		20:06	23	19:26 (3)	18:52		16:07
7	05:04	20:41 (2)	05:49		06:43		18:45 (4)	07:37	07:36		08:28
	21:57	21	21:02 (2)	21:13		20:04	34	19:27 (3)	18:50		16:06
8	05:05	20:41 (2)	05:51		06:45		18:42 (4)	07:39	07:38		08:29
	21:56	22	21:03 (2)	21:11		20:01	42	19:28 (3)	18:48		16:06
9	05:06	20:41 (2)	05:52		06:47		18:40 (4)	07:41	07:40		08:30
	21:55	23	21:04 (2)	21:09		19:59	47	19:29 (3)	18:45		16:05
10	05:07	20:40 (2)	05:54		06:49		18:38 (4)	07:42	07:42		08:31
	21:55	24	21:04 (2)	21:07		19:56	50	19:28 (3)	18:43		16:05
11	05:08	20:40 (2)	05:56		06:50		18:36 (4)	07:44	07:44		08:33
	21:54	25	21:05 (2)	21:05		19:54	50	19:26 (3)	18:40		16:05
12	05:09	20:40 (2)	05:57		06:52		18:35 (4)	07:46	07:45		08:34
	21:53	25	21:05 (2)	21:03		19:51	49	19:24 (3)	18:38		16:05
13	05:10	20:39 (2)	05:59		06:54		18:34 (4)	07:48	07:47		08:35
	21:52	26	21:05 (2)	21:01		19:49	48	19:22 (3)	18:36		16:05
14	05:12	20:39 (2)	06:01		06:56		18:33 (4)	07:50	07:49		08:36
	21:51	27	21:06 (2)	20:59		19:47	45	19:18 (3)	18:33		16:04
15	05:13	20:39 (2)	06:03		06:58		18:32 (4)	07:52	07:51		08:37
	21:50	27	21:06 (2)	20:57		19:44	44	19:16 (3)	18:31		16:05
16	05:14	20:38 (2)	06:04		06:59		18:31 (4)	07:54	07:53		08:38
	21:49	28	21:06 (2)	20:55		19:42	43	19:14 (3)	18:29		16:05
17	05:16	20:39 (2)	06:06		07:01		18:30 (4)	07:55			08:38
	21:47	28	21:07 (2)	20:53		19:39	41	19:11 (3)	18:26	3	17:30 (5)
18	05:17	20:39 (2)	06:08		07:03		18:30 (4)	07:57	17:22 (5)		07:57
	21:46	28	21:07 (2)	20:50		19:37	38	19:08 (3)	18:24	12	17:34 (5)
19	05:18	20:38 (2)	06:10		07:05		18:30 (4)	07:59	17:20 (5)		07:59
	21:45	29	21:07 (2)	20:48		19:34	36	19:06 (4)	18:22	16	17:36 (5)
20	05:20	20:39 (2)	06:12		07:06		18:30 (4)	08:01	17:18 (5)		08:00
	21:44	29	21:08 (2)	20:46		19:32	34	19:04 (4)	18:20	19	17:37 (5)
21	05:21	20:38 (2)	06:13		07:08		18:29 (4)	08:03	17:17 (5)		08:02
	21:42	30	21:08 (2)	20:44		19:29	32	19:01 (4)	18:17	21	17:38 (5)
22	05:23	20:38 (2)	06:15		07:10		18:29 (4)	08:05	17:16 (5)		08:04
	21:41	29	21:07 (2)	20:42		19:27	29	18:58 (4)	18:15	23	17:39 (5)
23	05:24	20:39 (2)	06:17		07:12		18:30 (4)	08:07	17:15 (5)		08:06
	21:39	28	21:07 (2)	20:39		19:24	26	18:56 (4)	18:13	24	17:39 (5)
24	05:26	20:38 (2)	06:19		07:13		18:30 (4)	08:09	17:15 (5)		08:08
	21:38	27	21:05 (2)	20:37		19:22	24	18:54 (4)	18:11	24	17:39 (5)
25	05:27	20:39 (2)	06:20		07:15		18:30 (4)	07:11	16:15 (5)		08:09
	21:36	25	21:04 (2)	20:35		19:19	21	18:51 (4)	17:09	23	16:38 (5)
26	05:29	20:39 (2)	06:22		07:17		18:31 (4)	07:13	16:14 (5)		08:11
	21:35	23	21:02 (2)	20:32		19:17	17	18:48 (4)	17:06	22	16:36 (5)
27	05:30	20:39 (2)	06:24		07:19		18:32 (4)	07:14	16:14 (5)		08:13
	21:33	21	21:00 (2)	20:30		19:14	14	18:46 (4)	17:04	20	16:34 (5)
28	05:32	20:39 (2)	06:26		07:21		18:34 (4)	07:16	16:15 (5)		08:14
	21:32	20	20:59 (2)	20:28		19:12	10	18:44 (4)	17:02	16	16:31 (5)
29	05:34	20:39 (2)	06:27		07:22		18:36 (4)	07:18	16:15 (5)		08:16
	21:30	18	20:57 (2)	20:25		19:09	5	18:41 (4)	17:00	14	16:29 (5)
30	05:35	20:40 (2)	06:29		07:24				16:16 (5)		08:18
	21:28	16	20:56 (2)	20:23		19:07			16:27 (5)		16:11
31	05:37	20:41 (2)	06:31						16:16 (5)		08:44
	21:26	14	20:55 (2)	20:21					16:56	9	16:25 (5)
Potential sun hours	512		460		382		328		259		233
Total, worst case		719		30		808		257		6	
Sun reduction		0.32		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.63		0.63		0.67		0.66		0.66	
Total reduction		0.20		0.22		0.22		0.19		0.18	
Total, real		147		6		175		50		1	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LC - H315

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	07:01	07:01	20:00	05:52	20:02 (3)	05:03	20:08 (4)			
2	08:44	16:16	08:12	17:08	18:04	07:11	18:04	20:02	20:02	06:59	20:55	24	20:26 (3)	21:45	37	20:45 (4)	
3	08:43	16:17	08:10	17:10	18:06	07:04	18:06	20:04	20:04	06:54	20:50	20:02 (3)	05:02	20:10 (4)			
4	08:43	16:18	08:08	17:12	18:07	07:09	18:07	20:06	20:06	06:51	20:57	25	20:27 (4)	21:46	36	20:46 (4)	
5	08:43	16:20	08:07	17:14	18:09	2	17:42 (5)	20:07	20:07	06:49	20:58	27	20:29 (4)	21:48	35	20:45 (4)	
6	08:42	16:21	08:05	17:16	18:11	8	17:45 (5)	20:09	20:09	06:47	20:59	27	20:30 (4)	21:49	35	20:45 (4)	
7	08:42	16:22	08:03	17:18	18:13	12	17:46 (5)	20:11	20:11	06:44	20:54	29	20:32 (4)	21:50	34	20:45 (4)	
8	08:41	16:24	08:01	17:20	18:15	15	17:48 (5)	20:13	20:13	06:42	20:52	29	20:34 (4)	21:51	34	20:45 (4)	
9	08:41	16:25	07:59	17:22	18:17	19	17:50 (5)	20:15	20:15	06:39	20:54	30	20:36 (4)	21:52	32	20:44 (4)	
10	08:40	16:27	07:57	17:24	18:19	22	17:52 (5)	20:17	20:17	06:37	20:53	31	20:37 (4)	21:53	31	20:44 (4)	
11	08:40	16:28	07:55	17:26	18:21	25	17:55 (5)	20:19	20:19	06:35	20:53	33	20:39 (4)	21:54	30	20:43 (4)	
12	08:39	16:30	07:53	17:28	18:23	28	17:56 (5)	20:20	20:20	06:33	20:53	33	20:40 (4)	21:55	30	20:44 (4)	
13	08:38	16:31	07:51	17:30	18:25	30	17:58 (5)	20:22	20:22	06:32	20:53	37	20:42 (4)	21:55	30	20:44 (4)	
14	08:37	16:33	07:49	17:32	18:27	30	17:57 (5)	20:24	20:24	06:30	20:51	39	20:43 (4)	21:56	29	20:44 (4)	
15	08:36	16:34	07:47	17:34	18:28	29	17:57 (5)	20:26	20:26	06:28	20:52	40	20:44 (4)	21:57	28	20:43 (4)	
16	08:35	16:36	07:45	17:36	18:30	29	17:56 (5)	20:28	20:28	06:25	20:52	44	20:47 (4)	21:58	27	20:43 (4)	
17	08:34	16:38	07:43	17:38	18:32	28	17:56 (5)	20:30	20:30	06:23	20:52	44	20:47 (4)	21:59	27	20:44 (4)	
18	08:33	16:40	07:41	17:40	18:34	26	17:54 (5)	20:31	20:31	06:21	20:51	43	20:47 (4)	22:00	27	20:44 (4)	
19	08:32	16:41	07:39	17:42	18:36	25	17:54 (5)	20:33	20:33	06:18	20:51	44	20:48 (4)	22:00	26	20:44 (4)	
20	08:31	16:43	07:36	17:44	18:38	23	17:52 (5)	20:35	20:35	06:16	20:51	43	20:47 (4)	22:00	26	20:44 (4)	
21	08:30	16:45	07:34	17:46	18:40	19	17:50 (5)	20:37	20:37	06:14	20:51	43	20:47 (4)	22:00	26	20:44 (4)	
22	08:28	16:47	07:32	17:48	18:42	14	17:47 (5)	20:39	20:39	06:12	20:51	43	20:48 (4)	22:01	26	20:45 (4)	
23	08:27	16:49	07:30	17:50	18:43	7	17:44 (5)	20:41	20:41	06:09	20:51	43	20:47 (4)	22:01	26	20:45 (4)	
24	08:26	16:51	07:28	17:52	18:45			20:42	20:42	06:07	20:51	42	20:47 (4)	22:01	26	20:45 (4)	
25	08:24	16:52	07:25	17:54	18:47			20:44	20:44	06:05	20:51	42	20:47 (4)	22:01	27	20:46 (4)	
26	08:23	16:54	07:23	17:56	18:49			20:46	20:46	06:03	20:51	41	20:47 (4)	22:01	27	20:46 (4)	
27	08:22	16:56	07:21	17:58	18:51			20:48	20:48	06:01	20:51	41	20:47 (4)	22:01	27	20:45 (4)	
28	08:20	16:58	07:18	18:00	18:53			20:50	20:50	05:58	20:51	39	20:46 (4)	22:01	27	20:46 (4)	
29	08:18	17:00			19:54			20:52	20:52	05:56	20:51	39	20:46 (4)	22:01	28	20:47 (4)	
30	08:17	17:02			19:56			20:53	20:53	05:54	20:51	39	20:46 (4)	22:01	28	20:47 (4)	
31	08:15	17:04			19:58					05:52	20:51	37	20:45 (4)				
Potential sun hours	250		273		367			420			494			510			
Total, worst case					391			125			1159			876			
Sun reduction					0.27			0.35			0.38			0.32			
Oper. time red.					1.00			1.00			1.00			1.00			
Wind dir. red.					0.68			0.65			0.64			0.64			
Total reduction					0.18			0.23			0.24			0.20			
Total, real					72			29			283			179			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LC - H315

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:19 (4)	05:39	20:15 (4)	06:33	07:26	18:07 (5)	07:24	08:19		
	22:00	29	20:48 (4)	21:25	38	20:53 (4)	20:18	19:05	29	18:36 (5)	16:54
2	05:00	20:19 (4)	05:40	20:16 (4)	06:35	07:28	18:07 (5)	07:26	08:21		
	22:00	30	20:49 (4)	21:23	36	20:52 (4)	20:16	19:02	26	18:33 (5)	16:52
3	05:00	20:18 (4)	05:42	20:15 (4)	06:36	07:30	18:08 (5)	07:28	08:22		
	21:59	31	20:49 (4)	21:21	35	20:50 (4)	20:13	19:00	23	18:31 (5)	16:50
4	05:01	20:18 (4)	05:44	20:16 (4)	06:38	07:31	18:08 (5)	07:30	08:24		
	21:59	31	20:49 (4)	21:19	32	20:48 (4)	20:11	18:57	21	18:29 (5)	16:48
5	05:02	20:18 (4)	05:45	20:16 (3)	06:40	07:33	18:09 (5)	07:32	08:25		
	21:58	32	20:50 (4)	21:17	30	20:46 (4)	20:09	18:55	17	18:26 (5)	16:46
6	05:03	20:18 (4)	05:47	20:15 (3)	06:42	07:35	18:10 (5)	07:34	08:26		
	21:57	33	20:51 (4)	21:15	30	20:45 (4)	20:06	18:52	14	18:24 (5)	16:44
7	05:04	20:18 (4)	05:49	20:14 (3)	06:43	07:37	18:11 (5)	07:36	08:28		
	21:57	33	20:51 (4)	21:13	29	20:43 (4)	20:04	18:50	10	18:21 (5)	16:43
8	05:05	20:18 (4)	05:51	20:12 (3)	06:45	07:39	18:13 (5)	07:38	08:29		
	21:56	34	20:52 (4)	21:11	29	20:41 (4)	20:01	18:48	5	18:18 (5)	16:41
9	05:06	20:17 (4)	05:52	20:12 (3)	06:47	07:41		07:40	08:30		
	21:55	35	20:52 (4)	21:09	27	20:39 (4)	19:59	18:45		16:39	16:05
10	05:07	20:17 (4)	05:54	20:10 (3)	06:49	07:42		07:42	08:31		
	21:55	36	20:53 (4)	21:07	27	20:37 (4)	19:56	18:43		16:37	16:05
11	05:08	20:17 (4)	05:56	20:10 (3)	06:50	07:44		07:44	08:33		
	21:54	36	20:53 (4)	21:05	25	20:35 (4)	19:54	18:40		16:36	16:05
12	05:09	20:17 (4)	05:57	20:10 (3)	06:52	07:46		07:45	08:34		
	21:53	37	20:54 (4)	21:03	24	20:34 (3)	19:51	18:38		16:34	16:05
13	05:11	20:16 (4)	05:59	20:09 (3)	06:54	07:48		07:47	08:35		
	21:52	38	20:54 (4)	21:01	22	20:31 (3)	19:49	18:36		16:32	16:05
14	05:12	20:16 (4)	06:01	20:09 (3)	06:56	07:50		07:49	08:36		
	21:51	38	20:54 (4)	20:59	20	20:29 (3)	19:47	18:33		16:31	16:05
15	05:13	20:15 (4)	06:03	20:09 (3)	06:58	07:52		07:51	08:37		
	21:50	40	20:55 (4)	20:57	19	20:28 (3)	19:44	18:31		16:29	16:05
16	05:14	20:16 (4)	06:05	20:09 (3)	06:59	07:54		07:53	08:38		
	21:49	40	20:56 (4)	20:55	16	20:25 (3)	19:42	18:29		16:27	16:05
17	05:16	20:15 (4)	06:06	20:09 (3)	07:01	07:55		07:55	08:38		
	21:47	41	20:56 (4)	20:53	14	20:23 (3)	19:39	18:26		16:26	16:05
18	05:17	20:15 (4)	06:08	20:10 (3)	07:03	07:57		07:57	08:39		
	21:46	41	20:56 (4)	20:50	12	20:22 (3)	19:37	18:24		16:25	16:05
19	05:18	20:15 (4)	06:10	20:10 (3)	07:05	07:59		07:59	08:40		
	21:45	41	20:56 (4)	20:48	9	20:19 (3)	19:34	18:22		16:23	16:05
20	05:20	20:15 (4)	06:12	20:11 (3)	07:06	18:26 (5)	08:01	08:00	08:41		
	21:44	42	20:57 (4)	20:46	6	20:17 (3)	19:32	1	18:27 (5)	18:20	16:22
21	05:21	20:15 (4)	06:13	20:12 (3)	07:08	18:19 (5)	08:03		08:02	08:41	
	21:42	42	20:57 (4)	20:44	3	20:15 (3)	19:29	13	18:32 (5)	18:17	16:20
22	05:23	20:14 (4)	06:15		07:10	18:16 (5)	08:05		08:04	08:42	
	21:41	43	20:57 (4)	20:42		19:27	18:34 (5)	18:15		16:19	16:06
23	05:24	20:15 (4)	06:17		07:12	18:14 (5)	08:07		08:06	08:42	
	21:39	43	20:58 (4)	20:39		19:24	22	18:36 (5)	18:13	16:18	16:07
24	05:26	20:14 (4)	06:19		07:13	18:13 (5)	08:09		08:08	08:43	
	21:38	44	20:58 (4)	20:37		19:22	24	18:37 (5)	18:11	16:17	16:08
25	05:27	20:15 (4)	06:20		07:15	18:11 (5)	07:11		08:09	08:43	
	21:36	43	20:58 (4)	20:35		19:19	26	18:37 (5)	17:09	16:16	16:08
26	05:29	20:14 (4)	06:22		07:17	18:10 (5)	07:13		08:11	08:43	
	21:35	44	20:58 (4)	20:32		19:17	27	18:37 (5)	17:06	16:15	16:09
27	05:30	20:15 (4)	06:24		07:19	18:09 (5)	07:14		08:13	08:44	
	21:33	43	20:58 (4)	20:30		19:14	29	18:38 (5)	17:04	16:13	16:10
28	05:32	20:14 (4)	06:26		07:21	18:09 (5)	07:16		08:14	08:44	
	21:32	44	20:58 (4)	20:28		19:12	29	18:38 (5)	17:02	16:12	16:11
29	05:34	20:15 (4)	06:28		07:22	18:08 (5)	07:18		08:16	08:44	
	21:30	43	20:58 (4)	20:25		19:09	30	18:38 (5)	17:00	16:12	16:11
30	05:35	20:15 (4)	06:29		07:24	18:07 (5)	07:20		08:17	08:44	
	21:28	41	20:56 (4)	20:23		19:07	30	18:37 (5)	16:58	16:11	16:12
31	05:37	20:15 (4)	06:31						07:22		08:44
	21:26	40	20:55 (4)	20:21					16:56		16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	1188		483		249		145				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.64		0.64		0.68		0.68				
Total reduction	0.21		0.22		0.22		0.20				
Total, real	246		106		54		29				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LD - H316

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:14 (3) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	20:13 (3) 20:57	21:45 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	20:13 (3) 20:59	21:45 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	20:12 (3) 21:01	21:45 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	20:12 (3) 21:03	21:45 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	20:12 (3) 21:04	21:45 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	20:13 (3) 21:06	21:45 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	20:13 (3) 21:08	21:45 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	20:13 (3) 21:10	21:45 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	17:50 (5) 17:52 (5)	06:39 20:17	21:54 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	17:47 (5) 17:55 (5)	06:37 20:19	21:54 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	17:44 (5) 17:56 (5)	06:35 20:20	21:54 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	17:43 (5) 17:58 (5)	06:32 20:22	21:54 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	17:41 (5) 18:00 (5)	06:30 20:24	21:54 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	17:40 (5) 18:02 (5)	06:28 20:26	21:54 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	17:39 (5) 18:04 (5)	06:25 20:28	21:54 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	17:39 (5) 18:06 (5)	06:23 20:30	21:54 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	17:37 (5) 18:07 (5)	06:21 20:31	21:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	17:37 (5) 18:08 (5)	06:18 20:33	21:54 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	17:37 (5) 18:07 (5)	06:16 20:35	21:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	17:37 (5) 18:07 (5)	06:14 20:37	21:54 22:00
22	08:28 16:47	07:32 17:48	06:26 18:42	17:37 (5) 18:06 (5)	06:12 20:39	21:54 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	17:37 (5) 18:06 (5)	06:09 20:41	21:54 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	17:37 (5) 18:04 (5)	06:07 20:42	21:54 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	17:39 (5) 18:03 (5)	06:05 20:44	21:54 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	17:40 (5) 18:02 (5)	06:03 20:46	21:54 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:41 (5) 17:59 (5)	06:01 20:48	21:54 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	17:44 (5) 17:57 (5)	05:58 20:50	21:54 22:01
29	08:18 17:00		07:09 19:54	05:56 20:52	20:16 (3) 20:22 (3)	21:54 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	20:15 (3) 20:24 (3)	21:54 22:01
31	08:15 17:04		07:04 19:58		05:04 21:44	21:54 22:01
Potential sun hours	250	273	367	420	494	510
Total, worst case			413	20	896	1293
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.64	0.63	0.63
Total reduction			0.18	0.23	0.24	0.20
Total, real			75	5	216	259

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
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abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LD - H316

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December	
1	04:59		20:32 (4)	05:39	20:25 (3)	06:33	07:26		18:22 (5)	07:24	08:19	
	22:00	43	21:15 (4)	21:25	20:53 (4)	20:18	19:05	14	18:36 (5)	16:54	16:10	
2	05:00		20:32 (4)	05:40	20:25 (3)	06:35	07:28		18:24 (5)	07:26	08:21	
	22:00	44	21:16 (4)	21:23	20:52 (4)	20:16	19:02	9	18:33 (5)	16:52	16:09	
3	05:00		20:32 (4)	05:42	20:23 (3)	06:36	07:30		18:26 (5)	07:28	08:22	
	21:59	43	21:15 (4)	21:21	20:50 (4)	20:13	19:00	5	18:31 (5)	16:50	16:08	
4	05:01		20:32 (4)	05:44	20:23 (3)	06:38	07:31			07:30	08:24	
	21:59	44	21:16 (4)	21:19	20:47 (3)	20:11	18:57			16:48	16:08	
5	05:02		20:32 (4)	05:45	20:22 (3)	06:40	07:33			07:32	08:25	
	21:58	44	21:16 (4)	21:17	20:46 (3)	20:09	18:55			16:46	16:07	
6	05:03		20:33 (4)	05:47	20:22 (3)	06:42	07:35			07:34	08:26	
	21:57	43	21:16 (4)	21:15	20:45 (3)	20:06	18:52			16:44	16:07	
7	05:04		20:33 (4)	05:49	20:22 (3)	06:43	07:37			07:36	08:28	
	21:57	44	21:17 (4)	21:13	20:43 (3)	20:04	18:50			16:43	16:06	
8	05:05		20:33 (4)	05:51	20:22 (3)	06:45	07:39			07:38	08:29	
	21:56	44	21:17 (4)	21:11	20:41 (3)	20:01	18:48			16:41	16:06	
9	05:06		20:33 (4)	05:52	20:22 (3)	06:47	07:41			07:40	08:30	
	21:55	44	21:17 (4)	21:09	20:39 (3)	19:59	18:45			16:39	16:05	
10	05:07		20:33 (4)	05:54	20:21 (3)	06:49	07:42			07:42	08:31	
	21:55	44	21:17 (4)	21:07	20:37 (3)	19:56	18:43			16:37	16:05	
11	05:08		20:33 (4)	05:56	20:22 (3)	06:50	07:44			07:44	08:33	
	21:54	44	21:17 (4)	21:05	20:35 (3)	19:54	18:40			16:36	16:05	
12	05:09		20:33 (4)	05:57	20:23 (3)	06:52	07:46			07:45	08:34	
	21:53	44	21:17 (4)	21:03	20:34 (3)	19:51	18:38			16:34	16:05	
13	05:11		20:34 (4)	05:59	20:22 (3)	06:54	07:48			07:47	08:35	
	21:52	43	21:17 (4)	21:01	20:31 (3)	19:49	18:36			16:32	16:05	
14	05:12		20:34 (4)	06:01	20:23 (3)	06:56	07:50			07:49	08:36	
	21:51	42	21:16 (4)	20:59	20:29 (3)	19:47	18:33			16:31	16:05	
15	05:13		20:34 (4)	06:03	20:25 (3)	06:58	18:34 (5)	07:52		07:51	08:37	
	21:50	41	21:15 (4)	20:57	20:28 (3)	19:44	18:45 (5)	18:31		16:29	16:05	
16	05:14		20:35 (4)	06:05		06:59	18:31 (5)	07:54		07:53	08:38	
	21:49	40	21:15 (4)	20:55		19:42	18:48 (5)	18:29		16:27	16:05	
17	05:16		20:35 (4)	06:06		07:01	18:28 (5)	07:55		07:55	08:38	
	21:47	39	21:14 (4)	20:53		19:39	18:49 (5)	18:26		16:26	16:05	
18	05:17		20:35 (4)	06:08		07:03	18:26 (5)	07:57		07:57	08:39	
	21:46	37	21:12 (4)	20:50		19:37	18:50 (5)	18:24		16:25	16:05	
19	05:18		20:35 (4)	06:10		07:05	18:25 (5)	07:59		07:59	08:40	
	21:45	36	21:11 (4)	20:48		19:34	18:51 (5)	18:22		16:23	16:05	
20	05:20		20:36 (4)	06:12		07:06	18:24 (5)	08:01		08:00	08:41	
	21:44	34	21:10 (4)	20:46		19:32	18:52 (5)	18:20		16:22	16:06	
21	05:21		20:36 (4)	06:13		07:08	18:22 (5)	08:03		08:02	08:41	
	21:42	33	21:09 (4)	20:44		19:29	18:51 (5)	18:17		16:20	16:06	
22	05:23		20:36 (4)	06:15		07:10	18:22 (5)	08:05		08:04	08:42	
	21:41	31	21:07 (4)	20:42		19:27	18:52 (5)	18:15		16:19	16:06	
23	05:24		20:37 (4)	06:17		07:12	18:21 (5)	08:07		08:06	08:42	
	21:39	30	21:07 (4)	20:39		19:24	18:52 (5)	18:13		16:18	16:07	
24	05:26		20:37 (4)	06:19		07:13	18:21 (5)	08:09		08:08	08:43	
	21:38	28	21:05 (4)	20:37		19:22	18:52 (5)	18:11		16:17	16:08	
25	05:27		20:38 (4)	06:20		07:15	18:20 (5)	07:11		08:09	08:43	
	21:36	26	21:04 (4)	20:35		19:19	18:51 (5)	17:09		16:16	16:08	
26	05:29		20:38 (4)	06:22		07:17	18:20 (5)	07:13		08:11	08:43	
	21:35	24	21:02 (4)	20:32		19:17	18:48 (5)	17:06		16:15	16:09	
27	05:30		20:39 (4)	06:24		07:19	18:20 (5)	07:14		08:13	08:44	
	21:33	22	21:01 (4)	20:30		19:14	18:46 (5)	17:04		16:13	16:10	
28	05:32		20:31 (3)	06:26		07:21	18:21 (5)	07:16		08:14	08:44	
	21:32	28	20:59 (4)	20:28		19:12	18:44 (5)	17:02		16:12	16:11	
29	05:34		20:29 (3)	06:28		07:22	18:21 (5)	07:18		08:16	08:44	
	21:30	29	20:58 (4)	20:25		19:09	18:41 (5)	17:00		16:12	16:11	
30	05:35		20:27 (3)	06:29		07:24	18:21 (5)	07:20		08:17	08:44	
	21:28	29	20:56 (4)	20:23		19:07	18:38 (5)	16:58		16:11	16:12	
31	05:37		20:26 (3)	06:31				07:22			08:44	
	21:26	29	20:55 (4)	20:21				16:56			16:13	
Potential sun hours	512			460		382		328		259	233	
Total, worst case		1146			267		393		28			
Sun reduction		0.32			0.34		0.32		0.29			
Oper. time red.		1.00			1.00		1.00		1.00			
Wind dir. red.		0.63			0.64		0.67		0.67			
Total reduction		0.20			0.22		0.22		0.20			
Total, real		233			59		85		6			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LE - H317

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		18:50 (5)	05:52			05:03		20:42 (4)
	16:15	17:06	18:02						20:00	15	19:05 (5)	20:55			21:45	28	21:10 (4)
2	08:44	08:12	07:14						06:59		18:52 (5)	05:50		20:25 (3)	05:02		20:43 (4)
	16:16	17:08	18:04						20:02	9	19:01 (5)	20:57	2	20:27 (3)	21:46	29	21:12 (4)
3	08:43	08:10	07:12						06:56			05:48		20:24 (3)	05:01		20:43 (4)
	16:17	17:10	18:06						20:04			20:59	5	20:29 (3)	21:48	30	21:13 (4)
4	08:43	08:08	07:09						06:54			05:46		20:23 (3)	05:00		20:42 (4)
	16:18	17:12	18:07						20:06			21:01	7	20:30 (3)	21:49	32	21:14 (4)
5	08:43	08:07	07:07						06:51			05:44		20:22 (3)	04:59		20:43 (4)
	16:20	17:14	18:09						20:07			21:03	10	20:32 (3)	21:50	32	21:15 (4)
6	08:42	08:05	07:04						06:49			05:42		20:21 (3)	04:59		20:42 (4)
	16:21	17:16	18:11						20:09			21:04	12	20:33 (3)	21:51	34	21:16 (4)
7	08:42	08:03	07:02						06:47			05:40		20:21 (3)	04:58		20:42 (4)
	16:22	17:18	18:13						20:11			21:06	15	20:36 (3)	21:52	34	21:16 (4)
8	08:41	08:01	07:00						06:44			05:38		20:21 (3)	04:57		20:42 (4)
	16:24	17:20	18:15						20:13			21:08	16	20:37 (3)	21:53	36	21:18 (4)
9	08:41	07:59	06:57						06:42			05:36		20:20 (3)	04:57		20:42 (4)
	16:25	17:22	18:17						20:15			21:10	18	20:38 (3)	21:54	36	21:18 (4)
10	08:40	07:57	06:55						06:39			05:34		20:20 (3)	04:56		20:42 (4)
	16:27	17:24	18:19						20:17			21:11	20	20:40 (3)	21:55	37	21:19 (4)
11	08:40	07:55	06:52						06:37			05:33		20:21 (3)	04:56		20:43 (4)
	16:28	17:26	18:21						20:19			21:13	21	20:42 (3)	21:55	37	21:20 (4)
12	08:39	07:53	06:50						06:35			05:31		20:21 (3)	04:55		20:43 (4)
	16:30	17:28	18:23						20:20			21:15	22	20:43 (3)	21:56	38	21:21 (4)
13	08:38	07:51	06:48						06:32			05:29		20:20 (3)	04:55		20:43 (4)
	16:31	17:30	18:25						20:22			21:17	24	20:44 (3)	21:57	38	21:21 (4)
14	08:37	07:49	06:45					17:57 (5)	06:30			05:27		20:21 (3)	04:55		20:43 (4)
	16:33	17:32	18:27	3	18:00 (5)	20:24			20:24			21:18	24	20:45 (3)	21:57	39	21:22 (4)
15	08:36	07:47	06:43					17:54 (5)	06:28			05:26		20:21 (3)	04:55		20:43 (4)
	16:34	17:34	18:28	8	18:02 (5)	20:26			20:26			21:20	23	20:44 (3)	21:58	39	21:22 (4)
16	08:35	07:45	06:40					17:51 (5)	06:25			05:24		20:22 (3)	04:54		20:44 (4)
	16:36	17:36	18:30	13	18:04 (5)	20:28			20:28			21:22	22	20:44 (3)	21:59	39	21:23 (4)
17	08:34	07:43	06:38					17:50 (5)	06:23			05:22		20:23 (3)	04:54		20:44 (4)
	16:38	17:38	18:32	16	18:06 (5)	20:30			20:30			21:23	20	20:43 (3)	21:59	39	21:23 (4)
18	08:33	07:41	06:35					17:48 (5)	06:21			05:21		20:24 (3)	04:54		20:44 (4)
	16:40	17:40	18:34	19	18:07 (5)	20:31			20:31			21:25	19	20:43 (3)	22:00	40	21:24 (4)
19	08:32	07:39	06:33					17:47 (5)	06:18			05:19		20:25 (3)	04:54		20:44 (4)
	16:41	17:42	18:36	23	18:10 (5)	20:33			20:33			21:27	20	20:54 (4)	22:00	40	21:24 (4)
20	08:31	07:36	06:31					17:46 (5)	06:16			05:18		20:26 (3)	04:54		20:44 (4)
	16:43	17:44	18:38	25	18:11 (5)	20:35			20:35			21:28	21	20:55 (4)	22:00	40	21:24 (4)
21	08:30	07:34	06:28					17:45 (5)	06:14			05:16		20:27 (3)	04:54		20:44 (4)
	16:45	17:46	18:40	28	18:13 (5)	20:37			20:37			21:30	22	20:57 (4)	22:00	40	21:24 (4)
22	08:28	07:32	06:26					17:44 (5)	06:12			05:15		20:30 (3)	04:55		20:45 (4)
	16:47	17:48	18:42	31	18:15 (5)	20:39			20:39			21:31	20	20:59 (4)	22:01	40	21:25 (4)
23	08:27	07:30	06:23					17:44 (5)	06:09			05:13		20:46 (4)	04:55		20:45 (4)
	16:49	17:50	18:43	32	18:16 (5)	20:41			20:41			21:33	13	20:59 (4)	22:01	40	21:25 (4)
24	08:26	07:28	06:21					17:43 (5)	06:07			05:12		20:45 (4)	04:55		20:45 (4)
	16:51	17:52	18:45	32	18:15 (5)	20:42			20:42			21:34	16	21:01 (4)	22:01	40	21:25 (4)
25	08:24	07:25	06:18					17:44 (5)	06:05			05:11		20:45 (4)	04:56		20:46 (4)
	16:52	17:54	18:47	31	18:15 (5)	20:44			20:44			21:36	17	21:02 (4)	22:01	39	21:25 (4)
26	08:23	07:23	06:16					17:44 (5)	06:03			05:09		20:44 (4)	04:56		20:46 (4)
	16:54	17:56	18:49	31	18:15 (5)	20:46			20:46			21:37	20	21:04 (4)	22:01	39	21:25 (4)
27	08:22	07:21	06:13					17:44 (5)	06:01			05:08		20:44 (4)	04:56		20:45 (4)
	16:56	17:58	18:51	29	18:13 (5)	20:48			20:48			21:39	21	21:05 (4)	22:01	39	21:24 (4)
28	08:20	07:18	06:11					17:45 (5)	05:58			05:07		20:44 (4)	04:57		20:46 (4)
	16:58	18:00	18:53	28	18:13 (5)	20:50			20:50			21:40	22	21:06 (4)	22:01	39	21:25 (4)
29	08:18		07:09					18:45 (5)	05:56			05:06		20:43 (4)	04:58		20:47 (4)
	17:00		19:54	26	19:11 (5)	20:52			20:52			21:41	24	21:07 (4)	22:01	38	21:25 (4)
30	08:17		07:06					18:46 (5)	05:54			05:05		20:43 (4)	04:58		20:46 (4)
	17:02		19:56	24	19:10 (5)	20:53			20:53			21:43	25	21:08 (4)	22:00	38	21:24 (4)
31	08:15		07:04					18:47 (5)				05:04		20:43 (4)			
	17:04		19:58	20	19:07 (5)							21:44	26	21:09 (4)			
Potential sun hours	250	273	367		420							494			510		
Total, worst case					24							547			1109		
Sun reduction					0.35							0.38			0.32		
Oper. time red.					1.00							1.00			1.00		
Wind dir. red.					0.67							0.63			0.61		
Total reduction					0.18							0.24			0.20		
Total, real					77							131			218		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LE - H317

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 37	20:47 (4) 21:24 (4) 21:25	05:39 22 20:53 (3) 20:18		07:26 07:24 08:19	
2	05:00 22:00 36	20:48 (4) 21:24 (4) 21:23	05:40 21 20:52 (3) 20:16		19:05 16:54 16:10	
3	05:00 21:59 36	20:47 (4) 21:23 (4) 21:21	05:42 19 20:50 (3) 20:13		07:28 07:26 08:21	
4	05:01 21:59 35	20:48 (4) 21:23 (4) 21:19	05:44 17 20:51 (3) 20:11		19:02 16:52 16:09	
5	05:02 21:58 35	20:48 (4) 21:23 (4) 21:17	05:45 16 20:50 (3) 20:09		07:30 07:28 08:22	
6	05:03 21:57 33	20:49 (4) 21:22 (4) 21:15	05:47 14 20:51 (3) 20:06		19:00 16:50 16:08	
7	05:04 21:57 33	20:49 (4) 21:22 (4) 21:13	05:49 11 20:52 (3) 20:04		07:31 07:30 08:24	
8	05:05 21:56 32	20:49 (4) 21:21 (4) 21:11	05:51 10 20:48 (3) 20:11		18:57 16:48 16:08	
9	05:06 21:55 31	20:50 (4) 21:21 (4) 21:09	05:52 7 20:39 (3) 19:59		07:33 07:32 08:25	
10	05:07 21:55 30	20:50 (4) 21:20 (4) 21:07	05:54 4 20:37 (3) 19:56		18:55 16:46 16:07	
11	05:08 21:54 28	20:51 (4) 21:19 (4) 21:05	05:56 1 20:35 (3) 19:54		07:35 07:34 08:26	
12	05:09 21:53 27	20:51 (4) 21:18 (4) 21:03	05:57 19 19:51 (5) 18:38		18:52 16:44 16:07	
13	05:11 21:52 26	20:51 (4) 21:17 (4) 21:01	05:59 23 19:49 (5) 18:36		18:48 16:41 16:06	
14	05:12 21:51 24	20:52 (4) 21:16 (4) 20:59	06:01 25 19:47 (5) 18:33		07:37 07:36 08:28	
15	05:13 21:50 23	20:52 (4) 21:15 (4) 20:57	06:03 28 19:44 (5) 18:31		07:39 07:38 08:29	
16	05:14 21:48 22	20:53 (4) 21:15 (4) 20:55	06:05 29 19:42 (5) 18:29		18:40 16:43 16:05	
17	05:16 21:47 20	20:54 (4) 21:14 (4) 20:53	06:06 30 19:39 (5) 18:26		07:40 07:39 08:30	
18	05:17 21:46 18	20:54 (4) 21:12 (4) 20:50	06:08 31 19:37 (5) 18:24		18:42 16:45 16:05	
19	05:18 21:45 16	20:55 (4) 21:11 (4) 20:48	06:10 31 19:34 (5) 18:22		18:43 16:37 16:05	
20	05:20 21:44 14	20:56 (4) 21:10 (4) 20:46	06:12 31 19:32 (5) 18:20		07:44 07:44 08:33	
21	05:21 21:42 17	20:41 (3) 21:09 (4) 20:44	06:13 31 19:29 (5) 18:17		18:40 16:36 16:05	
22	05:23 21:41 21	20:38 (3) 21:07 (4) 20:42	06:15 29 19:27 (5) 18:15		18:41 16:35 16:05	
23	05:24 21:39 22	20:37 (3) 21:07 (4) 20:39	06:17 26 19:24 (5) 18:13		07:46 07:45 08:34	
24	05:26 21:38 21	20:36 (3) 21:05 (4) 20:37	06:19 23 19:22 (5) 18:11		18:42 16:34 16:05	
25	05:27 21:36 19	20:35 (3) 21:04 (4) 20:35	06:20 21 19:19 (5) 18:09		18:43 16:33 16:06	
26	05:29 21:35 20	20:34 (3) 20:54 (3) 20:32	06:22 17 19:17 (5) 18:06		18:44 16:32 16:11	
27	05:30 21:33 21	20:34 (3) 20:55 (3) 20:30	06:24 14 19:14 (5) 17:04		18:45 16:31 16:10	
28	05:32 21:32 22	20:33 (3) 20:55 (3) 20:28	06:26 10 19:12 (5) 17:02		18:46 16:30 16:09	
29	05:34 21:30 23	20:33 (3) 20:56 (3) 20:25	06:28 5 19:09 (5) 17:00		18:47 16:29 16:08	
30	05:35 21:28 24	20:32 (3) 20:56 (3) 20:23	06:29 19:07		18:48 16:28 16:07	
31	05:37 21:26 23	20:32 (3) 20:55 (3) 20:21	06:31 382		18:49 16:27 16:06	
Potential sun hours	512	460	382	328	259	233
Total, worst case	789	142	446			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.62	0.64	0.67			
Total reduction	0.20	0.22	0.22			
Total, real	158	31	96			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LF - H318

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:56 (5) 20:55	05:52 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:56 (5) 20:57	05:50 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:57 (5) 20:59	05:48 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:58 (5) 21:01	05:46 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	18:58 (5) 21:03	05:44 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	19:00 (5) 21:04	05:42 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	19:02 (5) 21:06	05:40 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	19:15 (5) 21:08	05:38 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	21:10	05:36 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	21:11	05:34 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	21:13	05:33 21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	21:15	05:31 21:57
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	21:17	05:29 21:58
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	21:18	05:27 21:59
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	21:20	05:26 22:00
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	21:22	05:24 22:01
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	21:23	05:22 22:02
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	21:25	05:21 22:03
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	21:27	05:19 22:04
20	08:31 16:43	07:36 17:44	06:31 18:38	18:07 (5) 20:35	05:18 21:28	05:18 22:05
21	08:30 16:45	07:34 17:46	06:28 18:40	18:05 (5) 20:37	05:16 21:30	05:16 22:06
22	08:28 16:47	07:32 17:48	06:26 18:42	18:02 (5) 20:39	05:15 21:31	05:15 22:07
23	08:27 16:49	07:30 17:50	06:23 18:43	18:01 (5) 20:41	05:13 21:33	05:13 22:08
24	08:26 16:51	07:28 17:52	06:21 18:45	17:59 (5) 20:42	05:12 21:34	05:12 22:09
25	08:24 16:52	07:25 17:54	06:18 18:47	17:59 (5) 20:44	05:11 21:36	05:11 22:10
26	08:23 16:54	07:23 17:56	06:16 18:49	17:58 (5) 20:46	05:09 21:37	05:09 22:11
27	08:22 16:56	07:21 17:58	06:13 18:51	17:57 (5) 20:48	05:08 21:39	05:08 22:12
28	08:20 16:58	07:18 18:00	06:11 18:53	17:57 (5) 20:50	05:07 21:40	05:07 22:13
29	08:18 17:00		07:09 19:54	18:56 (5) 20:52	05:06 21:41	05:06 22:14
30	08:17 17:02		07:06 19:56	18:56 (5) 20:53	05:05 21:43	05:05 22:15
31	08:15 17:04		07:04 19:58	18:55 (5) 19:26 (5)	05:04 21:44	05:04 21:09 (4)
Potential sun hours	250	273	367	420	494	510
Total, worst case			256	160	350	626
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.63	0.61
Total reduction			0.18	0.24	0.24	0.19
Total, real			47	38	84	121

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LF - H318

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July			August			September			October	November	December
1	04:59		21:03 (4)	05:39		20:40 (3)	06:33			07:26	07:24	08:19
	22:00	21	21:24 (4)	21:25	13	20:53 (3)	20:18			19:05	16:54	16:10
2	05:00		21:04 (4)	05:40		20:40 (3)	06:35			07:28	07:26	08:21
	22:00	20	21:24 (4)	21:23	12	20:52 (3)	20:16			19:02	16:52	16:09
3	05:00		21:03 (4)	05:42		20:40 (3)	06:36			07:30	07:28	08:22
	21:59	20	21:23 (4)	21:21	10	20:50 (3)	20:13			19:00	16:50	16:08
4	05:01		21:04 (4)	05:44		20:41 (3)	06:38			07:31	07:30	08:24
	21:59	19	21:23 (4)	21:19	7	20:48 (3)	20:11			18:57	16:48	16:08
5	05:02		21:05 (4)	05:45		20:41 (3)	06:40	18:59 (5)		07:33	07:32	08:25
	21:58	18	21:23 (4)	21:17	5	20:46 (3)	20:09	13	19:12 (5)	18:55	16:46	16:07
6	05:03		21:05 (4)	05:47		20:42 (3)	06:42			18:57 (5)	07:35	08:26
	21:57	17	21:22 (4)	21:15	3	20:45 (3)	20:06	17	19:14 (5)	18:52	16:44	16:07
7	05:04		21:06 (4)	05:49			06:43			18:54 (5)	07:37	08:28
	21:57	16	21:22 (4)	21:13			20:04	21	19:15 (5)	18:50	16:43	16:06
8	05:05		21:06 (4)	05:51			06:45			18:52 (5)	07:39	08:29
	21:56	15	21:21 (4)	21:11			20:01	24	19:16 (5)	18:48	16:41	16:06
9	05:06		21:07 (4)	05:52			06:47			18:51 (5)	07:41	08:30
	21:55	14	21:21 (4)	21:09			19:59	26	19:17 (5)	18:45	16:39	16:05
10	05:07		21:08 (4)	05:54			06:49			18:49 (5)	07:42	08:31
	21:55	12	21:20 (4)	21:07			19:56	28	19:17 (5)	18:43	16:37	16:05
11	05:08		21:08 (4)	05:56			06:50			18:48 (5)	07:44	08:33
	21:54	11	21:19 (4)	21:05			19:54	30	19:18 (5)	18:40	16:36	16:05
12	05:09		21:09 (4)	05:57			06:52			18:48 (5)	07:46	08:34
	21:53	9	21:18 (4)	21:03			19:51	30	19:18 (5)	18:38	16:34	16:05
13	05:11		21:09 (4)	05:59			06:54			18:47 (5)	07:48	08:35
	21:52	8	21:17 (4)	21:01			19:49	31	19:18 (5)	18:36	16:32	16:05
14	05:12		21:10 (4)	06:01			06:56			18:46 (5)	07:50	08:36
	21:51	6	21:16 (4)	20:59			19:47	31	19:17 (5)	18:33	16:31	16:05
15	05:13		21:11 (4)	06:03			06:58			18:46 (5)	07:52	08:37
	21:50	4	21:15 (4)	20:57			19:44	30	19:16 (5)	18:31	16:29	16:05
16	05:14		20:48 (3)	06:05			06:59			18:46 (5)	07:54	08:38
	21:48	10	21:15 (4)	20:55			19:42	28	19:14 (5)	18:29	16:27	16:05
17	05:16		20:47 (3)	06:06			07:01			18:45 (5)	07:55	08:38
	21:47	10	20:57 (3)	20:53			19:39	26	19:11 (5)	18:26	16:26	16:05
18	05:17		20:45 (3)	06:08			07:03			18:46 (5)	07:57	08:39
	21:46	13	20:58 (3)	20:50			19:37	22	19:08 (5)	18:24	16:25	16:05
19	05:18		20:44 (3)	06:10			07:05			18:46 (5)	07:59	08:40
	21:45	15	20:59 (3)	20:48			19:34	20	19:06 (5)	18:22	16:23	16:05
20	05:20		20:44 (3)	06:12			07:06			18:47 (5)	08:01	08:41
	21:44	17	21:01 (3)	20:46			19:32	17	19:04 (5)	18:20	16:22	16:06
21	05:21		20:43 (3)	06:13			07:08			18:47 (5)	08:03	08:41
	21:42	18	21:01 (3)	20:44			19:29	14	19:01 (5)	18:17	16:20	16:06
22	05:23		20:42 (3)	06:15			07:10			18:49 (5)	08:05	08:42
	21:41	20	21:02 (3)	20:42			19:27	10	18:59 (5)	18:15	16:19	16:07
23	05:24		20:42 (3)	06:17			07:12			18:51 (5)	08:07	08:42
	21:39	21	21:03 (3)	20:39			19:24	5	18:56 (5)	18:13	16:18	16:07
24	05:26		20:41 (3)	06:19			07:13			08:09	08:08	08:43
	21:38	22	21:03 (3)	20:37			19:22			18:11	16:17	16:08
25	05:27		20:41 (3)	06:20			07:15			07:11	08:09	08:43
	21:36	23	21:04 (3)	20:35			19:19			17:09	16:16	16:08
26	05:29		20:40 (3)	06:22			07:17			07:13	08:11	08:43
	21:35	22	21:02 (3)	20:32			19:17			17:06	16:15	16:09
27	05:30		20:41 (3)	06:24			07:19			07:14	08:13	08:44
	21:33	20	21:01 (3)	20:30			19:14			17:04	16:13	16:10
28	05:32		20:40 (3)	06:26			07:21			07:16	08:14	08:44
	21:32	19	20:59 (3)	20:28			19:12			17:02	16:13	16:11
29	05:34		20:40 (3)	06:28			07:22			07:18	08:16	08:44
	21:30	18	20:58 (3)	20:25			19:09			17:00	16:12	16:11
30	05:35		20:40 (3)	06:29			07:24			07:20	08:17	08:44
	21:28	16	20:56 (3)	20:23			19:07			16:58	16:11	16:12
31	05:37		20:40 (3)	06:31						07:22		08:44
	21:26	15	20:55 (3)	20:21						16:56		16:13
Potential sun hours	512			460			382			328	259	233
Total, worst case		489			50			423				
Sun reduction		0.32			0.34			0.32				
Oper. time red.		1.00			1.00			1.00				
Wind dir. red.		0.62			0.63			0.68				
Total reduction		0.20			0.22			0.22				
Total, real		98			11			92				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LG - H319

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:56 (5) 20:55	05:52 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:55 (5) 20:57	05:50 21:46
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	18:56 (5) 20:59	05:48 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:57 (5) 21:01	05:46 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	18:57 (5) 21:03	05:44 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	18:58 (5) 21:04	05:42 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	18:59 (5) 21:06	05:40 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	19:01 (5) 21:08	05:38 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	19:04 (5) 21:10	05:36 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	19:15 (5) 21:11	05:34 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	05:33 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	05:31 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	05:29 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	05:27 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	05:26 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	05:24 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	05:22 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	05:21 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	05:19 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:18 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	18:07 (5) 20:37	05:16 21:30	05:16 22:00
22	08:28 16:47	07:32 17:48	06:26 18:42	18:04 (5) 20:39	05:15 21:31	05:15 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	18:03 (5) 20:41	05:13 21:33	05:13 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	18:00 (5) 20:42	05:12 21:34	05:12 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	18:00 (5) 20:44	05:11 21:36	05:11 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	17:59 (5) 20:46	05:09 21:37	05:09 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:57 (5) 20:48	05:08 21:39	05:08 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	17:57 (5) 20:50	05:07 21:40	05:07 22:01
29	08:18 17:00		07:09 19:54	18:56 (5) 20:52	05:06 21:41	05:06 22:01
30	08:17 17:02		07:06 19:56	18:56 (5) 20:53	05:05 21:43	05:05 22:00
31	08:15 17:04		07:04 19:58	18:55 (5) 20:53	05:04 21:44	05:04 20:54 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case			248	220	373	257
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.63	0.61
Total reduction			0.18	0.24	0.24	0.20
Total, real			45	52	90	50

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LG - H319

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00 7	21:17 (4) 21:24 (4) 21:25	05:39 20:53 (3) 20:18		07:26 19:05 16:54	08:19 16:10
2	05:00 22:00 6	21:18 (4) 21:24 (4) 21:23	05:40 20:46 (3) 20:16		07:28 19:02 16:52	08:21 16:09
3	05:00 21:59 6	21:17 (4) 21:23 (4) 21:21	05:42 20:46 (3) 20:13	11	19:02 (5) 19:13 (5) 19:00	07:30 16:50 16:08
4	05:01 21:59 5	21:18 (4) 21:23 (4) 21:19	05:44 20:46 (3) 20:11	17	18:58 (5) 19:15 (5) 18:57	07:31 16:48 16:08
5	05:02 21:58 4	21:19 (4) 21:23 (4) 21:17	05:45 20:09 20:09	21	18:56 (5) 19:17 (5) 18:55	07:33 16:46 16:07
6	05:03 21:57 2	21:20 (4) 21:22 (4) 21:15	05:47 20:06 20:06	24	18:54 (5) 19:18 (5) 18:52	07:35 16:44 16:07
7	05:04 21:57 1	21:21 (4) 21:22 (4) 21:13	05:49 20:04 20:04	27	18:52 (5) 19:19 (5) 18:50	07:37 16:43 16:06
8	05:05 21:56 3	05:51 21:11 20:54 (3)	05:51 20:01 05:52	28	18:51 (5) 19:19 (5) 18:50 (5)	07:38 16:41 16:06
9	05:06 21:55 8	05:52 21:09 20:57 (3)	05:52 19:59 20:52 (3)	30	07:41 19:20 (5) 18:45	07:40 16:39 16:05
10	05:07 21:55 8	05:54 21:07 21:00 (3)	05:54 19:56 20:50 (3)	32	07:42 19:20 (5) 18:43	07:42 16:37 16:05
11	05:08 21:54 11	05:56 21:05 21:01 (3)	05:56 19:54 21:05	32	07:44 19:20 (5) 18:40	07:44 16:36 16:05
12	05:09 21:53 13	05:57 21:03 20:49 (3)	05:57 19:51 21:03	32	07:46 19:20 (5) 18:38	07:45 16:34 16:05
13	05:11 21:52 15	05:59 21:01 20:48 (3)	05:59 19:49 21:01	33	07:48 19:20 (5) 18:36	07:47 16:32 16:05
14	05:12 21:51 16	06:01 20:59 21:03 (3)	06:01 19:47 20:48 (3)	32	07:50 19:18 (5) 18:33	07:49 16:31 16:05
15	05:13 21:50 18	06:03 20:57 20:47 (3)	06:03 19:44 20:57	30	07:52 19:16 (5) 18:31	07:51 16:29 16:05
16	05:14 21:48 19	06:05 20:55 20:47 (3)	06:05 19:42 20:55	27	07:54 19:14 (5) 18:29	07:53 16:27 16:05
17	05:16 21:47 21	06:06 20:53 21:07 (3)	06:06 19:39 20:53	25	07:55 19:11 (5) 18:26	07:55 16:26 16:05
18	05:17 21:46 21	06:08 20:50 21:07 (3)	06:08 19:37 20:50	21	07:57 19:08 (5) 18:24	07:57 16:25 16:05
19	05:18 21:45 22	06:10 20:48 20:45 (3)	06:10 19:34 20:48	18	07:59 19:06 (5) 18:22	07:59 16:23 16:05
20	05:20 21:44 23	06:12 20:46 21:08 (3)	06:12 19:32 20:46	15	08:00 19:04 (5) 18:20	08:00 16:22 16:06
21	05:21 21:42 23	06:13 20:44 21:08 (3)	06:13 19:29 20:44	12	08:03 19:01 (5) 18:17	08:02 16:20 16:06
22	05:23 21:41 23	06:15 20:42 21:07 (3)	06:15 19:27 20:42	8	08:05 18:51 (5) 18:15	08:04 16:19 16:07
23	05:24 21:39 23	06:17 20:39 21:07 (3)	06:17 19:24 20:39	2	08:07 18:54 (5) 18:13	08:06 16:18 16:07
24	05:26 21:38 21	06:19 20:37 21:05 (3)	06:19 19:22 20:37		08:09 18:11 16:17	08:08 16:17 16:08
25	05:27 21:36 20	06:20 20:35 21:04 (3)	06:20 19:19 20:35		07:11 17:09 16:16	08:09 16:16 16:08
26	05:29 21:35 18	06:22 20:32 21:02 (3)	06:22 19:17 20:32		07:13 17:06 16:15	08:11 16:15 16:09
27	05:30 21:33 17	06:24 20:30 21:01 (3)	06:24 19:14 20:30		07:14 17:04 16:13	08:13 16:13 16:10
28	05:32 21:32 15	06:26 20:28 20:44 (3)	06:26 19:12 20:28		07:16 17:02 16:13	08:14 16:13 16:11
29	05:34 21:30 13	06:28 20:25 20:45 (3)	06:28 19:09 20:25		07:18 17:00 16:12	08:16 16:12 16:11
30	05:35 21:28 12	06:29 20:23 20:44 (3)	06:29 19:07 20:24		07:20 16:58 16:11	08:17 16:11 16:12
31	05:37 21:26 10	06:31 20:21 20:45 (3)	06:31 20:21		07:22 16:56 16:13	08:18 16:13 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case	416	18	477			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.63	0.63	0.68			
Total reduction	0.20	0.22	0.22			
Total, real	85	4	103			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LH - H320

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LI - H321

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LJ - H322

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LK - H323

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LL - H324

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LM - H325

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1 08:44	08:14	16:21 (5)	07:16	17:06 (4)	07:01	05:52
16:15	17:06	13 16:34 (5)	18:02	28 17:34 (4)	20:00	20:55
2 08:44	08:12	16:22 (5)	07:14	17:05 (4)	06:59	20:50
16:16	17:08	15 16:37 (5)	18:04	31 17:36 (4)	20:02	20:57
3 08:43	08:10	16:22 (5)	07:11	17:06 (4)	06:56	20:54
16:17	17:10	17 16:39 (5)	18:06	32 17:38 (4)	20:04	20:59
4 08:43	08:08	16:22 (5)	07:09	17:06 (4)	06:54	20:54
16:18	17:12	19 16:41 (5)	18:07	34 17:40 (4)	20:06	21:01
5 08:43	08:07	16:22 (5)	07:07	17:06 (4)	06:51	20:54
16:19	17:14	21 16:43 (5)	18:09	33 17:39 (4)	20:07	21:03
6 08:42	08:05	16:23 (5)	07:04	17:07 (4)	06:49	20:52
16:21	17:16	21 16:44 (5)	18:11	31 17:38 (4)	20:09	21:04
7 08:42	08:03	16:24 (5)	07:02	17:07 (4)	06:47	20:50
16:22	17:18	19 16:43 (5)	18:13	30 17:37 (4)	20:11	21:06
8 08:42	08:01	16:25 (5)	07:00	17:08 (4)	06:44	20:53
16:24	17:20	17 16:42 (5)	18:15	28 17:36 (4)	20:13	21:08
9 08:41	07:59	16:26 (5)	06:57	17:09 (4)	06:42	20:56
16:25	17:22	15 16:41 (5)	18:17	25 17:34 (4)	20:15	21:10
10 08:40	07:57	16:28 (5)	06:55	17:11 (4)	06:39	20:53
16:26	17:24	11 16:39 (5)	18:19	21 17:32 (4)	20:17	21:11
11 08:40	07:55	16:33 (5)	06:52	17:14 (4)	06:37	20:53
16:28	17:26	2 16:35 (5)	18:21	19 17:55 (3)	20:19	21:13
12 08:39	07:53	06:50	17:17 (4)	06:35	20:51	21:15
16:30	17:28	18:23	13 17:56 (3)	20:20	21:15	21:56
13 08:38	07:51	06:48	17:50 (3)	06:32	20:52	21:57
16:31	17:30	18:25	8 17:58 (3)	20:22	21:17	21:57
14 08:37	07:49	06:45	17:49 (3)	06:30	20:52	21:57
16:33	17:32	18:27	11 18:00 (3)	20:24	21:18	21:57
15 08:36	07:47	06:43	17:49 (3)	06:28	20:52	21:58
16:34	17:34	18:28	13 18:02 (3)	20:26	21:20	21:58
16 08:35	07:45	06:40	17:48 (3)	06:25	19:57 (2)	21:58
16:36	17:36	18:30	16 18:04 (3)	20:28	2 19:59 (2)	21:59
17 08:34	07:43	06:38	17:49 (3)	06:23	19:55 (2)	21:59
16:38	17:38	18:32	17 18:06 (3)	20:30	6 20:01 (2)	21:59
18 08:33	07:41	06:35	17:49 (3)	06:21	19:54 (2)	21:59
16:40	17:40	18:34	18 18:07 (3)	20:31	9 20:03 (2)	22:00
19 08:32	07:39	06:33	17:50 (3)	06:18	19:53 (2)	22:00
16:41	17:42	18:36	18 18:08 (3)	20:33	12 20:05 (2)	22:00
20 08:31	07:36	17:14 (4)	06:31	17:50 (3)	06:16	22:00
16:43	17:44	2 17:16 (4)	18:38	16 18:06 (3)	20:35	22:00
21 08:30	07:34	17:12 (4)	06:28	17:53 (3)	06:14	22:01
16:45	17:46	6 17:18 (4)	18:40	12 18:05 (3)	20:37	22:01
22 08:28	07:32	17:10 (4)	06:26	17:56 (3)	06:12	22:01
16:47	17:48	9 17:19 (4)	18:41	4 18:00 (3)	20:39	22:01
23 08:27	07:30	17:10 (4)	06:23	06:09	19:50 (2)	22:01
16:49	17:50	12 17:22 (4)	18:43	20:41	22 20:12 (2)	22:01
24 08:26	07:28	17:09 (4)	06:21	06:07	19:49 (2)	22:01
16:50	17:52	15 17:24 (4)	18:45	20:42	25 20:14 (2)	22:01
25 08:24	07:25	17:07 (4)	06:18	06:05	19:49 (2)	22:01
16:52	17:54	19 17:26 (4)	18:47	20:44	26 20:15 (2)	22:01
26 08:23	07:23	17:07 (4)	06:16	06:03	19:49 (2)	22:01
16:54	17:56	21 17:28 (4)	18:49	20:46	28 20:17 (2)	22:01
27 08:22	07:21	17:07 (4)	06:13	06:00	19:49 (2)	22:01
16:56	17:58	24 17:31 (4)	18:51	20:48	29 20:18 (2)	22:01
28 08:20	16:23 (5)	07:18	17:06 (4)	05:58	19:50 (2)	22:01
16:58	3 16:26 (5)	18:00	26 17:32 (4)	20:50	28 20:18 (2)	22:01
29 08:18	16:22 (5)	07:08	05:56	19:50 (2)	20:56	22:01
17:00	6 16:28 (5)	19:54	20:52	20:17 (2)	21:41	22:01
30 08:17	16:21 (5)	07:06	05:54	19:50 (2)	20:55	22:01
17:02	9 16:30 (5)	19:56	20:53	20:17 (2)	21:43	22:01
31 08:15	16:21 (5)	07:04	05:04	21:44	21:44	22:01
17:04	11 16:32 (5)	19:58	21:44	21:44	21:44	22:01
Potential sun hours	250	273	367	420	494	510
Total, worst case	29	304	458	294	104	
Sun reduction	0.24	0.23	0.27	0.35	0.38	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.66	0.67	0.68	0.65	0.65	
Total reduction	0.16	0.16	0.18	0.23	0.25	
Total, real	5	47	84	67	26	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LM - H325

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:29 (3) 16:54	15:58 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:36 (3) 16:52	16:09 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:50 (4) 16:50	15:54 (5) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:48 (4) 16:48	15:53 (5) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:46 (4) 16:46	15:53 (5) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:45 (4) 16:44	15:52 (5) 16:07
7	05:04 21:57	05:49 21:13	20:08 (2) 20:04	07:37 18:50	17:42 (4) 16:43	15:52 (5) 16:06
8	05:05 21:56	05:50 21:11	20:05 (2) 20:01	07:39 18:48	17:42 (4) 16:41	15:52 (5) 16:06
9	05:06 21:55	05:52 21:09	20:03 (2) 19:59	07:41 18:45	17:41 (4) 16:39	15:52 (5) 16:05
10	05:07 21:55	05:54 21:07	20:01 (2) 19:56	07:42 18:43	17:40 (4) 16:37	15:53 (5) 16:05
11	05:08 21:54	05:56 21:05	20:00 (2) 19:54	07:44 18:40	17:40 (4) 16:35	15:53 (5) 16:05
12	05:09 21:53	05:57 21:03	19:59 (2) 19:51	07:46 18:38	17:39 (4) 16:34	15:53 (5) 16:05
13	05:10 21:52	05:59 21:01	19:58 (2) 19:49	07:48 18:36	17:39 (4) 16:32	15:54 (5) 16:05
14	05:12 21:51	06:01 20:59	19:57 (2) 19:47	07:50 18:33	17:39 (4) 16:31	15:55 (5) 16:04
15	05:13 21:50	06:03 20:57	19:57 (2) 19:44	07:52 18:31	17:39 (4) 16:29	15:58 (5) 16:05
16	05:14 21:49	06:04 20:55	19:56 (2) 19:42	07:54 18:29	17:39 (4) 16:27	15:58 (5) 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 19:39	07:55 18:26	17:40 (4) 16:26	15:58 (5) 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 19:37	07:57 18:24	17:40 (4) 16:24	15:58 (5) 16:05
19	05:18 21:45	06:10 20:48	19:55 (2) 19:34	07:59 18:22	17:41 (4) 16:23	15:58 (5) 16:05
20	05:20 21:44	06:12 20:46	19:55 (2) 19:32	08:01 18:20	17:42 (4) 16:22	15:58 (5) 16:06
21	05:21 21:42	06:13 20:44	19:56 (2) 19:29	08:03 18:17	17:43 (4) 16:20	15:58 (5) 16:06
22	05:23 21:41	06:15 20:42	19:55 (2) 19:27	18:38 (3) 18:15	08:05 16:19	15:58 (5) 16:06
23	05:24 21:39	06:17 20:39	19:56 (2) 19:24	18:36 (3) 18:13	08:07 16:18	15:58 (5) 16:07
24	05:26 21:38	06:19 20:37	19:57 (2) 19:22	18:34 (3) 18:11	08:09 16:17	15:58 (5) 16:08
25	05:27 21:36	06:20 20:35	19:57 (2) 19:19	18:32 (3) 18:11	08:09 16:16	15:58 (5) 16:08
26	05:29 21:35	06:22 20:32	19:58 (2) 19:17	18:31 (3) 18:08	07:13 16:14	15:58 (5) 16:09
27	05:30 21:33	06:24 20:30	20:00 (2) 19:14	18:30 (3) 18:06	07:14 16:13	15:58 (5) 16:10
28	05:32 21:32	06:26 20:28	19:21 19:12	18:30 (3) 18:44 (3)	07:16 17:02	15:58 (5) 16:11
29	05:34 21:30	06:27 20:25	19:22 19:09	18:30 (3) 18:41 (3)	07:18 17:00	15:58 (5) 16:11
30	05:35 21:28	06:29 20:23	19:24 19:07	18:29 (3) 18:38 (3)	07:20 16:58	15:58 (5) 16:12
31	05:37 21:26	06:31 20:21		07:22 16:56	16:00 (5) 16:05 (5)	15:58 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		401	129	468	190	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		89	28	93	33	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LN - H326

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	19:54 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	20:20 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	19:54 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	20:19 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48	19:55 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	20:18 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	19:55 (5)	05:00	05:01	05:44	20:14 (5)	06:38	07:31	08:23
	16:18	17:12	18:07	20:06	21:01	20:17 (5)	21:49	21:59	21:19	4 20:18 (5)	20:11	18:57	16:48
5	08:43	08:07	07:07	06:51	05:44	19:56 (5)	04:59	05:02	05:45	20:10 (5)	06:40	07:33	08:25
	16:20	17:14	18:09	20:07	21:03	20:16 (5)	21:50	21:58	21:17	11 20:21 (5)	20:09	18:55	16:46
6	08:42	08:05	07:04	06:49	05:42	19:57 (5)	04:59	05:03	05:47	20:08 (5)	06:42	07:35	08:26
	16:21	17:16	18:11	20:09	21:04	20:14 (5)	21:51	21:57	21:15	16 20:24 (5)	20:06	18:52	16:44
7	08:42	08:03	07:02	06:47	05:40	19:59 (5)	04:58	05:04	05:49	20:07 (5)	06:43	07:37	08:28
	16:22	17:18	18:13	20:11	21:06	20:14 (5)	21:52	21:57	21:13	18 20:25 (5)	20:04	18:50	16:43
8	08:41	08:01	07:00	06:44	05:38	20:01 (5)	04:57	05:05	05:51	20:05 (5)	06:45	07:39	08:29
	16:24	17:20	18:15	20:13	21:08	20:11 (5)	21:53	21:56	21:11	21 20:26 (5)	20:01	18:48	16:41
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	20:05 (5)	06:47	07:41	08:30
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	22 20:27 (5)	19:59	18:45	16:39
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	20:03 (5)	06:49	07:42	08:31
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	24 20:27 (5)	19:56	18:43	16:37
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:03 (5)	06:50	07:44	08:33
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	24 20:27 (5)	19:54	18:40	16:36
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:57	20:03 (5)	06:52	07:46	08:34
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	25 20:28 (5)	19:51	18:38	16:34
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	20:01 (5)	06:54	07:48	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	27 20:28 (5)	19:49	18:36	16:32
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	20:01 (5)	06:56	07:50	08:36
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	27 20:28 (5)	19:47	18:33	16:31
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	20:02 (5)	06:58	07:52	08:37
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	26 20:28 (5)	19:44	18:31	16:29
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	20:01 (5)	06:59	07:54	08:37
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	24 20:25 (5)	19:42	18:29	16:27
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06	20:01 (5)	07:01	07:55	08:38
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	22 20:23 (5)	19:39	18:26	16:26
18	08:33	07:41	06:35	06:21	05:21		04:54	05:17	06:08	20:02 (5)	07:03	07:57	08:39
	16:40	17:40	18:34	20:31	21:25		21:59	21:46	20:50	20 20:22 (5)	19:37	18:24	16:25
19	08:32	07:39	06:33	06:18	20:03 (5) 05:19		04:54	05:18	06:10	20:01 (5)	07:05	07:59	08:40
	16:41	17:42	18:36	20:33	2 20:05 (5) 21:27		22:00	21:45	20:48	18 20:19 (5)	19:34	18:22	16:23
20	08:31	07:36	06:31	06:16	20:01 (5) 05:18		04:54	05:20	06:12	20:02 (5)	07:06	08:01	08:41
	16:43	17:44	18:38	20:35	6 20:07 (5) 21:28		22:00	21:43	20:46	15 20:17 (5)	19:32	18:20	16:22
21	08:30	07:34	06:28	06:14	19:58 (5) 05:16		04:54	05:21	06:13	20:03 (5)	07:08	08:03	08:41
	16:45	17:46	18:40	20:37	10 20:08 (5) 21:30		22:00	21:42	20:44	12 20:15 (5)	19:29	18:17	16:20
22	08:28	07:32	06:26	06:12	19:57 (5) 05:15		04:55	05:23	06:15	20:03 (5)	07:10	08:05	08:42
	16:47	17:48	18:41	20:39	13 20:10 (5) 21:31		22:01	21:41	20:42	9 20:12 (5)	19:27	18:15	16:19
23	08:27	07:30	06:23	06:09	19:56 (5) 05:13		04:55	05:24	06:17	20:05 (5)	07:12	08:07	08:42
	16:49	17:50	18:43	20:41	16 20:12 (5) 21:33		22:01	21:39	20:39	5 20:10 (5)	19:24	18:13	16:18
24	08:26	07:28	06:21	06:07	19:55 (5) 05:12		04:55	05:26	06:19	20:07 (5)	07:13	08:09	08:43
	16:51	17:52	18:45	20:42	18 20:13 (5) 21:34		22:01	21:38	20:37	2 20:09 (5)	19:22	18:11	16:17
25	08:24	07:25	06:18	06:05	19:55 (5) 05:11		04:56	05:27	06:20		07:15	07:11	08:09
	16:52	17:54	18:47	20:44	20 20:15 (5) 21:36		22:01	21:36	20:35		19:19	17:09	16:16
26	08:23	07:23	06:16	06:03	19:54 (5) 05:09		04:56	05:29	06:22		07:17	07:13	08:11
	16:54	17:56	18:49	20:46	23 20:17 (5) 21:37		22:01	21:35	20:32		19:17	17:06	16:15
27	08:21	07:21	06:13	06:01	19:54 (5) 05:08		04:56	05:30	06:24		07:19	07:14	08:13
	16:56	17:58	18:51	20:48	25 20:19 (5) 21:39		22:01	21:33	20:30		19:14	17:04	16:13
28	08:20	07:18	06:11	05:58	19:54 (5) 05:07		04:57	05:32	06:26		07:21	07:16	08:14
	16:58	18:00	18:53	20:50	27 20:21 (5) 21:40		22:01	21:32	20:28		19:12	17:02	16:13
29	08:18		07:08	05:56	19:54 (5) 05:06		04:58	05:34	06:28		07:22	07:18	08:16
	17:00		19:54	20:52	26 20:20 (5) 21:41		22:00	21:30	20:25		19:09	17:00	16:12
30	08:17		07:06	05:54	19:54 (5) 05:05		04:58	05:35	06:29		07:24	07:20	08:17
	17:02		19:56	20:53	26 20:20 (5) 21:43		22:00	21:28	20:23		19:07	16:58	16:11
31	08:15		07:04		05:04			05:37	06:31			07:22	08:14
	17:04		19:58		21:44			21:26	20:21			16:56	16:13
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233
Total, worst case				212	158			372					
Sun reduction				0.35	0.38			0.34					
Oper. time red.				1.00	1.00			1.00					
Wind dir. red.				0.65	0.65			0.65					
Total reduction				0.23	0.25			0.22					
Total, real				48	39			82					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LO - H327

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	19:51 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:55	20	20:11 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50		19:52 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	18	20:10 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48		19:53 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	15	20:08 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46		19:55 (5)	05:00	05:01	05:44	06:38	07:31	07:30	08:23	
	16:18	17:12	18:07	20:06	21:01	11	20:06 (5)	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44			04:59	05:02	05:45	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:03			21:50	21:58	21:17	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42			04:59	05:03	05:47	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04			21:51	21:57	21:15	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40			04:58	05:04	05:49	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06			21:52	21:57	21:13	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38			04:57	05:05	05:51	20:07 (5)	06:45	07:39	08:29	
	16:24	17:20	18:15	20:13	21:08			21:53	21:56	21:11	6 20:13 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36			04:57	05:06	05:52	20:04 (5)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10			21:54	21:55	21:09	12 20:16 (5)	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34			04:56	05:07	05:54	20:01 (5)	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11			21:54	21:54	21:07	16 20:17 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33			04:56	05:08	05:56	20:00 (5)	06:50	07:44	07:43	08:33
	16:28	17:26	18:21	20:18	21:13			21:55	21:54	21:05	19 20:19 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31			04:55	05:09	05:57	19:59 (5)	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15			21:56	21:53	21:03	21 20:20 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29			04:55	05:11	05:59	19:58 (5)	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17			21:57	21:52	21:01	22 20:20 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27			04:55	05:12	06:01	19:57 (5)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:18			21:57	21:51	20:59	24 20:21 (5)	19:47	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26			04:55	05:13	06:03	19:57 (5)	06:58	07:52	07:51	08:37
	16:34	17:34	18:28	20:26	21:20			21:58	21:50	20:57	25 20:22 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	19:59 (5)	05:24		04:54	05:14	06:05	19:55 (5)	06:59	07:54	07:53	08:38
	16:36	17:36	18:30	20:28	1 20:00 (5)	21:22		21:59	21:48	20:55	26 20:21 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	19:56 (5)	05:22		04:54	05:16	06:06	19:55 (5)	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30	5 20:01 (5)	21:23		21:59	21:47	20:53	26 20:21 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	19:54 (5)	05:21		04:54	05:17	06:08	19:55 (5)	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31	9 20:03 (5)	21:25		21:59	21:46	20:50	27 20:22 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	19:53 (5)	05:19		04:54	05:18	06:10	19:55 (5)	07:05	07:59	07:59	08:40
	16:41	17:42	18:36	20:33	12 20:05 (5)	21:27		22:00	21:45	20:48	24 20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:52 (5)	05:18		04:54	05:20	06:12	19:55 (5)	07:06	08:01	08:00	08:41
	16:43	17:44	18:38	20:35	15 20:07 (5)	21:28		22:00	21:43	20:46	22 20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:50 (5)	05:16		04:54	05:21	06:13	19:55 (5)	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	18 20:08 (5)	21:30		22:00	21:42	20:44	20 20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:50 (5)	05:15		04:55	05:23	06:15	19:55 (5)	07:10	08:05	08:04	08:42
	16:47	17:48	18:41	20:39	20 20:10 (5)	21:31		22:01	21:41	20:42	17 20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:49 (5)	05:13		04:55	05:24	06:17	19:56 (5)	07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	23 20:12 (5)	21:33		22:01	21:39	20:39	14 20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:49 (5)	05:12		04:55	05:26	06:19	19:57 (5)	07:13	08:09	08:07	08:43
	16:51	17:52	18:45	20:42	24 20:13 (5)	21:34		22:01	21:38	20:37	12 20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:49 (5)	05:11		04:56	05:27	06:20	19:57 (5)	07:15	07:11	08:09	08:43
	16:52	17:54	18:47	20:44	26 20:15 (5)	21:36		22:01	21:36	20:35	9 20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:49 (5)	05:09		04:56	05:29	06:22	19:59 (5)	07:17	07:13	08:11	08:43
	16:54	17:56	18:49	20:46	26 20:15 (5)	21:37		22:01	21:35	20:32	5 20:04 (5)	19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	19:49 (5)	05:08		04:56	05:30	06:24	20:01 (5)	07:19	07:14	08:13	08:43
	16:56	17:58	18:51	20:48	25 20:14 (5)	21:39		22:01	21:33	20:30	1 20:02 (5)	19:14	17:04	16:13	16:10
28	08:20	07:18	06:11	05:58	19:49 (5)	05:07		04:57	05:32	06:26		07:21	07:16	08:14	08:44
	16:58	18:00	18:53	20:50	25 20:14 (5)	21:40		22:01	21:32	20:28		19:12	17:02	16:13	16:11
29	08:18		07:08	05:56	19:50 (5)	05:06		04:58	05:34	06:28		07:22	07:18	08:16	08:44
	17:00		19:54	20:52	23 20:13 (5)	21:41		22:00	21:30	20:25		19:09	17:00	16:12	16:11
30	08:17		07:06	05:54	19:50 (5)	05:05		04:58	05:35	06:29		07:24	07:20	08:17	08:44
	17:02		19:56	20:53	22 20:12 (5)	21:43		22:00	21:28	20:23		19:07	16:58	16:11	16:12
31	08:15		07:04			05:04			05:37	06:31			07:22		08:44
	17:04		19:58			21:44			21:26	20:21			16:56		16:13
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233	
Total, worst case				274	64				348						
Sun reduction				0.35	0.38				0.34						
Oper. time red.				1.00	1.00				1.00						
Wind dir. red.				0.65	0.65				0.65						
Total reduction				0.23	0.25				0.22						
Total, real				63	16				77						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyarne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LP - H328

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	19:53 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:55	20:04 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	19:57 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	2 19:59 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48		05:01	05:00	05:42	06:36	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59		21:48	21:59	21:21	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46		05:00	05:01	05:44	06:38	07:31	07:30	08:23	
	16:18	17:12	18:07	20:06	21:01		21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44		04:59	05:02	05:45	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:02		21:50	21:58	21:17	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04		21:51	21:57	21:15	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:13	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38		04:57	05:05	05:51	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:11	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:03 (5)	06:50	07:44	08:33	
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	7 20:10 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:57	20:01 (5)	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	12 20:13 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:58 (5)	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	16 20:14 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:57 (5)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	18 20:15 (5)	19:46	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26	19:55 (5)	04:55	05:13	06:03	19:56 (5)	06:58	07:52	07:51	08:37
	16:34	17:34	18:28	20:26	3 19:58 (5)	21:20	21:58	21:50	20:57	20 20:16 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24	19:53 (5)	04:54	05:14	06:05	19:54 (5)	06:59	07:54	07:53	08:37
	16:36	17:36	18:30	20:28	7 20:00 (5)	21:22	21:59	21:48	20:55	22 20:16 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	05:22	19:51 (5)	04:54	05:16	06:06	19:54 (5)	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30	10 20:01 (5)	21:23	21:59	21:47	20:53	23 20:17 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	05:21	19:50 (5)	04:54	05:17	06:08	19:54 (5)	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31	13 20:03 (5)	21:25	21:59	21:46	20:50	24 20:18 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	05:19	19:49 (5)	04:54	05:18	06:10	19:52 (5)	07:05	07:59	07:59	08:40
	16:41	17:42	18:36	20:33	16 20:05 (5)	21:27	22:00	21:45	20:48	25 20:17 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	05:18	19:48 (5)	04:54	05:20	06:12	19:52 (5)	07:06	08:01	08:00	08:41
	16:43	17:44	18:38	20:35	19 20:07 (5)	21:28	22:00	21:43	20:46	25 20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	19:47 (5)	04:54	05:21	06:13	19:52 (5)	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21 20:08 (5)	21:30	22:00	21:42	20:44	23 20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	05:15	19:47 (5)	04:55	05:23	06:15	19:52 (5)	07:10	08:05	08:04	08:42
	16:47	17:48	18:41	20:39	23 20:10 (5)	21:31	22:01	21:41	20:42	20 20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	05:13	19:47 (5)	04:55	05:24	06:17	19:52 (5)	07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	25 20:12 (5)	21:33	22:01	21:39	20:39	18 20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	19:47 (5)	04:55	05:26	06:19	19:53 (5)	07:13	08:09	08:07	08:43
	16:51	17:52	18:45	20:42	24 20:11 (5)	21:34	22:01	21:38	20:37	16 20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	05:11	19:47 (5)	04:56	05:27	06:20	19:53 (5)	07:15	07:11	08:09	08:43
	16:52	17:54	18:47	20:44	24 20:11 (5)	21:36	22:01	21:36	20:35	13 20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:09	19:47 (5)	04:56	05:29	06:22	19:54 (5)	07:17	07:13	08:11	08:43
	16:54	17:56	18:49	20:46	23 20:10 (5)	21:37	22:01	21:35	20:32	10 20:04 (5)	19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	05:08	19:48 (5)	04:56	05:30	06:24	19:55 (5)	07:19	07:14	08:13	08:43
	16:56	17:58	18:51	20:48	22 20:10 (5)	21:39	22:01	21:33	20:30	7 20:02 (5)	19:14	17:04	16:13	16:10
28	08:20	07:18	06:11	05:58	05:07	19:49 (5)	04:57	05:32	06:26	19:56 (5)	07:21	07:16	08:14	08:44
	16:58	18:00	18:53	20:50	20 20:09 (5)	21:40	22:01	21:32	20:28	3 19:59 (5)	19:12	17:02	16:13	16:11
29	08:18		07:08	05:56	05:06	19:50 (5)	04:58	05:34	06:28		07:22	07:18	08:16	08:44
	17:00		19:54	20:52	17 20:07 (5)	21:41	22:00	21:30	20:25		19:09	17:00	16:12	16:11
30	08:17		07:06	05:54	05:05	19:51 (5)	04:58	05:35	06:29		07:24	07:20	08:17	08:44
	17:02		19:56	20:53	15 20:06 (5)	21:43	22:00	21:28	20:23		19:07	16:58	16:11	16:12
31	08:15		07:04		05:04			05:37	06:31		07:22			08:44
	17:04		19:58		21:44			21:26	20:21		16:56			16:13
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case				282	13				302					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.65	0.65				0.65					
Total reduction				0.23	0.25				0.22					
Total, real				65	3				67					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LQ - H329

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	19:52 (5) 21:15	05:31 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:49 (5) 21:17	05:29 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:47 (5) 21:18	05:27 21:57	05:12 21:51	06:01 20:59	20:00 (5) 19:46	06:56 19:46	07:50 18:33	08:36 16:31
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:46 (5) 21:20	05:26 21:58	05:13 21:50	06:03 20:57	2 20:02 (5) 19:44	06:58 19:44	07:52 18:31	08:37 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:45 (5) 21:22	05:24 21:59	05:14 21:48	06:05 20:55	11 20:07 (5) 19:51	06:59 19:42	07:54 18:29	08:37 16:27
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:44 (5) 21:23	05:22 21:59	05:16 21:47	06:06 20:53	15 20:08 (5) 19:51	07:01 19:42	07:55 18:26	08:38 16:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	20:01 (5) 21:25	21:59	05:17 21:46	06:08 20:50	18 19:50 (5) 20:10 (5)	07:03 19:37	07:57 18:24	08:39 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	20:03 (5) 21:27	05:19 22:00	05:18 21:45	06:10 20:48	20 19:49 (5) 20:10 (5)	07:05 19:34	07:59 18:22	08:40 16:23
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:43 (5) 21:28	05:18 22:00	05:18 21:43	06:12 20:46	21 19:48 (5) 20:11 (5)	07:06 19:32	08:01 18:20	08:41 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	20:07 (5) 21:30	05:16 22:00	05:21 21:42	06:13 20:44	23 19:48 (5) 20:12 (5)	07:08 19:29	08:03 18:17	08:42 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	20:06 (5) 21:31	05:15 22:01	05:23 21:41	06:15 20:42	24 20:12 (5) 20:11 (5)	07:10 19:27	08:05 18:15	08:42 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:43 (5) 21:33	05:13 22:01	05:24 21:39	06:17 20:39	24 20:11 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:43 (5) 21:34	05:12 22:01	05:26 21:38	06:19 20:37	23 19:47 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:43 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	20:05 (5) 21:36	05:11 22:01	05:27 21:36	06:20 20:35	22 19:46 (5) 20:06 (5)	07:15 19:19	07:11 17:09	08:43 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:45 (5) 21:37	05:09 22:01	05:29 21:35	06:22 20:32	20 19:46 (5) 20:04 (5)	07:17 19:17	07:13 17:06	08:43 16:15
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:46 (5) 21:39	05:08 22:01	05:30 21:33	06:24 20:30	18 19:47 (5) 20:02 (5)	07:19 19:14	07:14 17:04	08:43 16:13
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	20:01 (5) 21:40	05:07 22:01	05:32 21:32	06:26 20:28	15 19:47 (5) 19:59 (5)	07:21 19:12	07:16 17:02	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	19:58 (5) 21:40	05:06 22:01	05:34 21:30	06:28 20:25	12 19:48 (5) 19:57 (5)	07:22 19:09	07:18 17:00	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53		05:05 22:00	05:35 21:27	06:29 20:23	9 19:50 (5) 19:55 (5)	07:24 19:07	07:20 16:58	08:44 16:11
31	08:15 17:04		07:04 19:58			05:04 21:44	05:37 21:26	06:31 20:21	5 19:51 (5) 19:52 (5)	07:22 16:56	07:22 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				278				283				
Sun reduction				0.35				0.34				
Oper. time red.				1.00				1.00				
Wind dir. red.				0.65				0.65				
Total reduction				0.23				0.22				
Total, real				64				63				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LR - H330

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:53 (5) 19:54 (5)	05:29 21:17	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:51 (5) 19:56 (5)	05:27 21:18	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:49 (5) 19:58 (5)	05:26 21:20	05:13 21:50	06:03 20:57	20:01 (5) 19:57 (5)	07:52 07:54	07:51 07:53	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:48 (5) 19:59 (5)	05:24 21:22	05:14 21:48	06:05 20:55	11 20:08 (5)	06:59 19:42	07:54 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:47 (5) 20:01 (5)	05:22 21:23	05:16 21:47	06:06 20:53	15 20:10 (5)	07:01 19:39	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:46 (5) 20:03 (5)	05:21 21:25	05:17 21:46	06:08 20:50	17 20:11 (5)	07:03 19:37	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	19:46 (5) 20:05 (5)	05:19 21:26	05:18 21:45	06:10 20:48	19 20:11 (5)	07:05 19:34	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:46 (5) 20:07 (5)	05:18 21:28	05:14 21:43	06:12 20:46	21 20:12 (5)	07:06 19:32	08:01 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:45 (5) 20:07 (5)	05:16 21:30	05:14 21:42	06:13 20:44	21 20:12 (5)	07:08 19:29	08:03 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	19:45 (5) 20:07 (5)	05:15 21:31	05:15 21:41	06:15 20:41	22 20:12 (5)	07:10 19:27	08:05 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:46 (5) 20:06 (5)	05:13 21:33	05:17 21:39	06:17 20:39	20 20:10 (5)	07:12 19:24	08:07 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:47 (5) 20:05 (5)	05:12 21:34	05:26 22:01	06:19 21:38	19 20:09 (5)	07:13 19:22	08:09 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19:47 (5) 20:04 (5)	05:11 21:36	05:27 22:01	06:20 20:35	17 20:06 (5)	07:15 19:19	08:11 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:49 (5) 20:03 (5)	05:09 21:37	05:29 22:01	06:22 20:32	14 20:04 (5)	07:17 19:17	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:51 (5) 20:01 (5)	05:08 21:39	05:30 22:01	06:24 20:30	12 20:02 (5)	07:19 19:14	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	20:01 (5) 21:40	05:07 22:01	05:32 22:01	06:26 20:28	9 19:59 (5)	07:21 19:12	08:14 16:12	08:44 16:11
29	08:18 17:00	07:08 18:00	05:56 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:27 20:25	5 19:57 (5)	07:22 19:09	08:16 16:12	08:44 16:11
30	08:17 17:02	07:06 18:06	05:54 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	1 19:55 (5)	07:24 19:07	08:17 16:58	08:44 16:12
31	08:15 17:04	07:04 18:04	05:54 19:58	05:54 20:58	05:04 21:44	04:58 22:00	05:37 21:26	06:31 20:21		07:22 16:56	08:17 16:58	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				220		26		228				
Sun reduction				0.35		0.32		0.34				
Oper. time red.				1.00		1.00		1.00				
Wind dir. red.				0.65		0.61		0.65				
Total reduction				0.23		0.19		0.22				
Total, real				50		5		50				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LS - H331

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:20 (4) 21:24 (4)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:21 (4) 21:24 (4)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	21:20 (4) 21:23 (4)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	21:21 (4) 21:23 (4)	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	21:22 (4) 21:23 (4)	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	07:34 16:44
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	07:36 16:43
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:16 (4) 21:17 (4)	05:05 21:16	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:15 (4) 21:18 (4)	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:15 (4) 21:19 (4)	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:16 (4) 21:20 (4)	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:16 (4) 21:21 (4)	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:15 (4) 21:21 (4)	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:15 (4) 21:22 (4)	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:16 (4) 21:22 (4)	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:16 (4) 21:23 (4)	05:14 21:48	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:16 (4) 21:23 (4)	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:16 (4) 21:24 (4)	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:16 (4) 21:24 (4)	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:16 (4) 21:24 (4)	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:16 (4) 21:24 (4)	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:17 (4) 21:25 (4)	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:17 (4) 21:25 (4)	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:17 (4) 21:25 (4)	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:18 (4) 21:25 (4)	05:27 21:36	06:20 20:35	19:22 19:19	18:11 17:09	16:17 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:18 (4) 21:25 (4)	05:29 21:35	06:22 20:32	19:17 19:17	17:06 17:06	16:15 16:15
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:18 (4) 21:24 (4)	05:30 21:33	06:24 20:30	19:19 19:14	17:14 17:04	16:13 16:13
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:19 (4) 21:25 (4)	05:32 21:32	06:26 20:28	19:21 19:12	17:16 17:02	16:14 16:12
29	08:18 17:00	07:08 17:54	07:08 18:54	05:56 20:52	05:06 21:41	04:58 22:00	21:19 (4) 21:25 (4)	05:34 21:30	06:27 20:25	19:22 19:09	17:18 17:00	16:16 16:12
30	08:17 17:02	07:06 17:56	07:06 18:56	05:54 20:53	05:05 21:43	04:58 22:00	21:19 (4) 21:24 (4)	05:35 21:28	06:29 20:23	19:24 19:07	17:20 16:58	16:17 16:11
31	08:15 17:04	07:04 17:58	07:04 18:58	05:04 21:44	05:04 21:44	05:04 21:44	05:37 21:26	05:37 21:26	06:31 20:21	19:22 16:56	17:22 16:56	16:11 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case							143		13			
Sun reduction							0.32		0.32			
Oper. time red.							1.00		1.00			
Wind dir. red.							0.61		0.61			
Total reduction							0.19		0.20			
Total, real							28		3			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LT - H332

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	20:37 (4) 20:53 (4)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	20:38 (4) 20:52 (4)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	20:38 (4) 20:50 (4)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	20:38 (4) 20:48 (4)	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	20:31 (4) 20:32 (4)	04:59 21:50	05:02 21:58	20:38 (4) 20:46 (4)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:30 (4) 20:33 (4)	04:59 21:51	05:03 21:57	20:39 (4) 20:45 (4)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:29 (4) 20:36 (4)	04:58 21:52	05:04 21:57	20:40 (4) 20:43 (4)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:28 (4) 20:37 (4)	04:57 21:53	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:28 (4) 20:38 (4)	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:27 (4) 20:40 (4)	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:27 (4) 20:42 (4)	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:27 (4) 20:43 (4)	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:27 (4) 20:44 (4)	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	05:27 21:18	20:27 (4) 20:47 (4)	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:27 (4) 20:48 (4)	04:55 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:28 (4) 20:49 (4)	04:54 21:59	05:14 21:48	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:28 (4) 20:48 (4)	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	20:29 (4) 20:48 (4)	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	20:30 (4) 20:48 (4)	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:30 (4) 20:46 (4)	04:54 22:00	05:20 21:43	20:45 (4) 20:53 (4)	06:12 20:46	07:06 19:32	08:01 18:20	08:40 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:31 (4) 20:46 (4)	04:54 22:00	05:21 21:42	20:43 (4) 20:54 (4)	06:13 20:44	07:08 19:29	08:03 18:17	08:41 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	20:33 (4) 20:45 (4)	04:55 22:01	05:23 21:41	20:41 (4) 20:55 (4)	06:15 20:41	07:10 19:27	08:05 18:15	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:33 (4) 20:43 (4)	04:55 22:01	05:24 21:39	20:41 (4) 20:57 (4)	06:17 20:39	07:12 19:24	08:07 18:13	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	20:36 (4) 20:41 (4)	04:55 22:01	05:26 21:38	20:40 (4) 20:57 (4)	06:19 20:37	07:13 19:22	08:09 18:11	08:43 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	05:29 21:36	20:40 (4) 20:58 (4)	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	05:29 21:35	20:39 (4) 20:59 (4)	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14
27	08:21 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	05:30 21:33	20:38 (4) 20:59 (4)	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:13
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	05:32 21:31	20:38 (4) 20:59 (4)	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:00	05:34 21:30	05:34 20:25	20:37 (4) 20:57 (4)	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	05:35 20:23	20:38 (4) 20:56 (4)	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	05:37 21:26	20:38 (4) 20:55 (4)	06:31 20:21		07:22 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233
Total, worst case					268			201		69			
Sun reduction					0.38			0.32		0.34			
Oper. time red.					1.00			1.00		1.00			
Wind dir. red.					0.64			0.64		0.64			
Total reduction					0.24			0.21		0.22			
Total, real					65			41		15			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LU - H333

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LV - H334

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	16:27 (5) 18:02	07:16 17:34 (4)	07:01 20:00	05:52 20:26 (2)
2	08:44 16:16	08:12 17:08	16:28 (5) 18:04	07:14 17:36 (4)	06:59 20:02	05:50 20:26 (2)
3	08:43 16:17	08:10 17:10	16:27 (5) 18:06	07:11 17:38 (4)	06:56 20:04	05:48 20:26 (2)
4	08:43 16:18	08:08 17:12	16:27 (5) 18:07	07:09 17:41 (4)	06:54 20:06	05:46 20:25 (2)
5	08:43 16:19	08:07 17:14	16:27 (5) 18:09	07:07 17:42 (4)	06:51 20:07	05:44 20:24 (2)
6	08:42 16:21	08:05 17:16	16:27 (5) 18:11	07:04 17:44 (4)	06:49 20:09	05:42 20:23 (2)
7	08:42 16:22	08:03 17:18	16:27 (5) 18:13	07:02 17:46 (4)	06:47 20:11	05:40 20:23 (2)
8	08:42 16:24	08:01 17:20	16:28 (5) 18:15	07:00 17:48 (4)	06:44 20:13	05:38 20:22 (2)
9	08:41 16:25	07:59 17:22	16:29 (5) 18:17	06:57 17:48 (4)	06:42 20:15	05:36 20:21 (2)
10	08:40 16:26	07:57 17:24	16:29 (5) 18:19	06:55 17:48 (4)	06:39 20:17	05:34 20:19 (2)
11	08:40 16:28	07:55 17:26	16:31 (5) 18:21	06:52 17:47 (4)	06:37 20:19	05:33 20:17 (2)
12	08:39 16:30	07:53 17:28	16:31 (5) 18:23	06:50 17:46 (4)	06:35 20:20	05:31 20:13 (2)
13	08:38 16:31	07:51 17:30	16:33 (5) 18:25	06:48 17:45 (4)	06:32 20:22	05:29 21:17
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 18:00 (3)	06:28 20:24	05:27 21:18
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 18:02 (3)	06:26 20:26	05:26 21:20
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 18:04 (3)	06:25 20:28	05:24 21:22
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 18:06 (3)	06:23 20:30	05:22 21:23
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 18:07 (3)	06:21 20:31	05:21 21:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 18:10 (3)	06:18 20:33	05:19 21:27
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 18:11 (3)	06:16 20:35	05:18 21:28
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 18:13 (3)	20:04 (2) 20:37	05:16 21:30
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 18:14 (3)	20:02 (2) 20:39	05:15 21:31
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 18:13 (3)	20:01 (2) 20:41	05:13 21:33
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 18:10 (3)	20:00 (2) 20:42	05:12 21:34
25	08:24 16:52	07:25 17:54	17:22 (4) 18:47	06:05 18:00 (3)	19:59 (2) 20:44	05:11 21:36
26	08:23 16:54	07:23 17:56	17:21 (4) 18:49	06:03 20:46	19:59 (2) 20:17 (2)	05:09 21:37
27	08:22 16:56	07:21 17:58	17:20 (4) 18:51	06:00 20:48	19:58 (2) 20:19 (2)	05:08 21:39
28	08:20 16:58	07:18 18:00	17:18 (4) 18:53	05:58 20:50	19:58 (2) 20:21 (2)	05:07 21:40
29	08:18 17:00		07:08 19:54	05:56 20:52	19:58 (2) 20:22 (2)	05:06 21:41
30	08:17 17:02	16:29 (5) 16:30 (5)	07:06 19:56	05:54 20:53	19:57 (2) 20:24 (2)	05:05 21:43
31	08:15 17:04	16:28 (5) 16:32 (5)	07:04 19:58		05:04 21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case	5	237	590	166	257	
Sun reduction	0.24	0.23	0.27	0.35	0.38	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.66	0.66	0.68	0.65	0.65	
Total reduction	0.16	0.15	0.18	0.23	0.25	
Total, real	1	36	108	38	63	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LV - H334

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:18 (2) 20:26 (2)	06:33 20:18	07:26 19:05	17:55 (4) 16:54
2	04:59 22:00	05:40 21:23	20:15 (2) 20:29 (2)	06:35 20:16	07:26 19:02	17:54 (4) 16:52
3	05:00 21:59	05:42 21:21	20:13 (2) 20:30 (2)	06:36 20:13	07:28 19:00	17:53 (4) 16:50
4	05:01 21:59	05:44 21:19	20:12 (2) 20:31 (2)	06:38 20:11	07:30 18:57	17:52 (4) 16:48
5	05:02 21:58	05:45 21:17	20:10 (2) 20:32 (2)	06:40 20:09	07:32 18:55	17:51 (4) 16:46
6	05:03 21:58	05:47 21:15	20:09 (2) 20:33 (2)	06:42 20:06	07:34 18:52	17:51 (4) 16:44
7	05:04 21:57	05:49 21:13	20:09 (2) 20:34 (2)	06:43 20:04	07:36 18:50	17:50 (4) 16:43
8	05:05 21:56	05:50 21:11	20:07 (2) 20:34 (2)	06:45 20:01	07:38 18:48	17:49 (4) 16:41
9	05:06 21:55	05:52 21:09	20:07 (2) 20:35 (2)	06:47 19:59	07:40 18:45	17:49 (4) 16:39
10	05:07 21:55	05:54 21:07	20:06 (2) 20:34 (2)	06:49 19:56	07:42 18:43	17:49 (4) 16:37
11	05:08 21:54	05:56 21:05	20:06 (2) 20:35 (2)	06:50 19:54	07:44 18:40	17:50 (4) 16:35
12	05:09 21:53	05:57 21:03	20:06 (2) 20:34 (2)	06:52 19:51	07:46 18:38	17:50 (4) 16:34
13	05:10 21:52	05:59 21:01	20:05 (2) 20:31 (2)	06:54 19:49	07:48 18:36	17:51 (4) 16:32
14	05:12 21:51	06:01 20:59	20:05 (2) 20:29 (2)	06:56 19:47	07:50 18:33	17:51 (4) 16:31
15	05:13 21:50	06:03 20:57	20:05 (2) 20:28 (2)	06:58 19:44	07:52 18:31	17:52 (4) 16:29
16	05:14 21:49	06:04 20:55	20:05 (2) 20:25 (2)	06:59 19:42	07:54 18:29	17:53 (4) 16:27
17	05:16 21:47	06:06 20:53	20:05 (2) 20:23 (2)	07:01 19:39	07:55 18:26	17:55 (4) 16:26
18	05:17 21:46	06:08 20:50	20:06 (2) 20:22 (2)	07:03 19:37	07:57 18:24	17:57 (4) 16:24
19	05:18 21:45	06:10 20:48	20:06 (2) 20:19 (2)	07:05 19:34	07:59 18:22	17:59 (4) 16:23
20	05:20 21:44	06:12 20:46	20:07 (2) 20:17 (2)	07:06 19:32	08:01 18:20	17:59 (4) 16:22
21	05:21 21:42	06:13 20:44	20:08 (2) 20:15 (2)	07:08 19:29	08:03 18:17	17:59 (4) 16:20
22	05:23 21:41	06:15 20:42	20:09 (2) 20:12 (2)	07:10 19:27	08:05 18:15	17:59 (4) 16:19
23	05:24 21:39	06:17 20:39	20:12 (2) 19:24	07:12 19:24	08:07 18:13	17:59 (4) 16:18
24	05:26 21:38	06:19 20:37	20:13 (2) 19:22	07:13 19:22	08:09 18:11	17:59 (4) 16:17
25	05:27 21:36	06:20 20:35	20:15 (2) 19:19	07:15 19:19	08:09 18:09	17:59 (4) 16:16
26	05:29 21:35	06:22 20:32	20:17 (2) 19:17	07:17 19:17	08:11 18:07	17:59 (4) 16:14
27	05:30 21:33	06:24 20:30	20:19 (2) 19:14	07:19 19:14	08:13 18:04	17:59 (4) 16:13
28	05:32 21:32	06:26 20:28	20:21 (2) 19:12	07:21 19:12	08:14 18:02	17:59 (4) 16:12
29	05:34 21:30	06:27 20:25	20:23 (2) 19:09	07:22 19:09	08:16 18:00	17:59 (4) 16:11
30	05:35 21:28	06:29 20:23	20:25 (2) 19:07	07:24 19:07	08:18 18:00	17:59 (4) 16:10
31	05:37 21:26	06:31 20:21	20:27 (2) 19:05	07:26 19:05	08:20 18:00	17:59 (4) 16:09
Potential sun hours	512	460	382	328	259	233
Total, worst case			429	233	444	157
Sun reduction			0.34	0.32	0.29	0.27
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.65	0.68	0.67	0.66
Total reduction			0.22	0.22	0.20	0.17
Total, real			95	50	88	27

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LW - H335

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44 16:15	08:14 17:06	16:24 (5) 16:34 (5)	07:16 18:02	22	17:12 (4) 17:34 (4)	07:01 20:00	05:52 20:55	19:54 (2) 20:23 (2)	05:03 21:45	
2	08:44 16:16	08:12 17:08	16:25 (5) 16:37 (5)	07:14 18:04	25	17:11 (4) 17:36 (4)	06:59 20:02	05:50 20:57	19:55 (2) 20:22 (2)	05:02 21:46	
3	08:43 16:17	08:10 17:10	16:25 (5) 16:39 (5)	07:11 18:06	27	17:11 (4) 17:38 (4)	06:56 20:04	05:48 20:59	19:55 (2) 20:21 (2)	05:01 21:48	
4	08:43 16:18	08:08 17:12	16:25 (5) 16:41 (5)	07:09 18:07	30	17:11 (4) 17:41 (4)	06:54 20:06	05:46 21:01	19:56 (2) 20:20 (2)	05:00 21:49	
5	08:43 16:19	08:07 17:14	16:25 (5) 16:43 (5)	07:07 18:09	32	17:10 (4) 17:42 (4)	06:51 20:07	05:44 21:03	19:56 (2) 20:19 (2)	04:59 21:50	
6	08:42 16:21	08:05 17:16	16:25 (5) 16:45 (5)	07:04 18:11	34	17:11 (4) 17:45 (4)	06:49 20:09	05:42 21:04	19:57 (2) 20:17 (2)	04:59 21:51	
7	08:42 16:22	08:03 17:18	16:26 (5) 16:47 (5)	07:02 18:13	34	17:10 (4) 17:44 (4)	06:47 20:11	05:40 21:06	20:00 (2) 20:17 (2)	04:58 21:52	
8	08:42 16:24	08:01 17:20	16:26 (5) 16:47 (5)	07:00 18:15	33	17:11 (4) 17:44 (4)	06:44 20:13	05:38 21:08	20:01 (2) 20:15 (2)	04:57 21:53	
9	08:41 16:25	07:59 17:22	16:27 (5) 16:46 (5)	06:57 18:17	31	17:11 (4) 17:42 (4)	06:42 20:15	05:36 21:10	20:04 (2) 20:11 (2)	04:57 21:54	
10	08:40 16:26	07:57 17:24	16:29 (5) 16:45 (5)	06:55 18:19	30	17:12 (4) 17:42 (4)	06:39 20:17	05:34 21:11		04:56 21:55	
11	08:40 16:28	07:55 17:26	16:30 (5) 16:43 (5)	06:52 18:21	27	17:14 (4) 17:41 (4)	06:37 20:19	05:33 21:13		04:56 21:55	
12	08:39 16:30	07:53 17:28	16:32 (5) 16:40 (5)	06:50 18:23	23	17:15 (4) 17:38 (4)	06:35 20:20	05:31 21:15		04:55 21:56	
13	08:38 16:31	07:51 17:30		06:48 18:25	23	17:17 (4) 17:58 (3)	06:32 20:22	05:29 21:17		04:55 21:57	
14	08:37 16:33	07:49 17:32		06:45 18:27	21	17:19 (4) 18:00 (3)	06:30 20:24	05:27 21:18		04:55 21:57	
15	08:36 16:34	07:47 17:34		06:43 18:28	9	17:53 (3) 18:02 (3)	06:28 20:26	05:26 21:20		04:54 21:58	
16	08:35 16:36	07:45 17:36		06:40 18:30	12	17:52 (3) 18:04 (3)	06:25 20:28	05:24 21:22		04:54 21:59	
17	08:34 16:38	07:43 17:38		06:38 18:32	14	17:52 (3) 18:06 (3)	06:23 20:30	05:22 21:23		04:54 21:59	
18	08:33 16:40	07:41 17:40		06:35 18:34	15	17:52 (3) 18:07 (3)	06:21 20:31	05:21 21:25		04:54 22:00	
19	08:32 16:41	07:39 17:42		06:33 18:36	18	17:52 (3) 18:10 (3)	06:18 20:33	05:19 21:27		04:54 22:00	
20	08:31 16:43	07:36 17:44		06:31 18:38	19	17:52 (3) 18:11 (3)	06:16 20:35	05:18 21:28		04:54 22:00	
21	08:30 16:45	07:34 17:46		06:28 18:40	18	17:53 (3) 18:11 (3)	06:14 20:37	05:16 21:30		04:54 22:01	
22	08:28 16:47	07:32 17:48		06:26 18:41	15	17:54 (3) 18:09 (3)	06:12 20:39	05:15 21:31		04:55 22:01	
23	08:27 16:49	07:30 17:50	17:18 (4) 17:22 (4)	06:23 18:43	11	17:56 (3) 18:07 (3)	06:09 20:41	05:13 21:33		04:55 22:01	
24	08:26 16:50	07:28 17:52	17:17 (4) 17:24 (4)	06:21 18:45			06:07 20:42	05:12 21:34		04:55 22:01	
25	08:24 16:52	07:25 17:54	17:15 (4) 17:26 (4)	06:18 18:47			06:05 20:44	05:11 21:36		04:55 22:01	
26	08:23 16:54	07:23 17:56	17:14 (4) 17:28 (4)	06:16 18:49			06:03 20:46	05:09 21:37		04:56 22:01	
27	08:22 16:56	07:21 17:58	17:13 (4) 17:31 (4)	06:13 18:51			06:00 20:48	05:08 21:39		04:56 22:01	
28	08:20 16:58	07:18 18:00	17:12 (4) 17:32 (4)	06:11 18:53			05:58 20:50	05:07 21:40		04:57 22:01	
29	08:18 17:00	16:26 (5) 16:28 (5)		07:08 19:54			05:56 20:52	05:06 21:41		04:57 22:01	
30	08:17 17:02	16:25 (5) 16:30 (5)		07:06 19:56			05:54 20:53	05:05 21:43		04:58 22:00	
31	08:15 17:04	16:25 (5) 16:32 (5)		07:04 19:58				05:04 21:44			
Potential sun hours	250	273		367		420		494		510	
Total, worst case	14	262		523		224		187			
Sun reduction	0.24	0.23		0.27		0.35		0.38			
Oper. time red.	1.00	1.00		1.00		1.00		1.00			
Wind dir. red.	0.66	0.66		0.68		0.65		0.65			
Total reduction	0.16	0.15		0.18		0.23		0.25			
Total, real	2	40		96		51		46			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LW - H335

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:54 (4) 16:54	15:58 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:52 (4) 16:52	15:57 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:51 (4) 16:50	15:56 (5) 16:08
4	05:01 21:59	05:44 21:19	20:13 (2) 20:11	07:31 18:57	17:50 (4) 16:48	15:55 (5) 16:08
5	05:02 21:58	05:45 21:17	20:10 (2) 20:09	07:33 18:55	17:48 (4) 16:46	15:55 (5) 16:07
6	05:03 21:58	05:47 21:15	20:08 (2) 20:06	07:35 18:52	17:48 (4) 16:44	15:55 (5) 16:07
7	05:04 21:57	05:49 21:13	20:07 (2) 20:04	07:37 18:50	17:46 (4) 16:43	15:54 (5) 16:06
8	05:05 21:56	05:50 21:11	20:06 (2) 20:01	07:39 18:48	17:45 (4) 16:41	15:54 (5) 16:06
9	05:06 21:55	05:52 21:09	20:05 (2) 19:59	07:41 18:45	17:45 (4) 16:39	15:55 (5) 16:05
10	05:07 21:55	05:54 21:07	20:03 (2) 19:56	07:42 18:43	17:45 (4) 16:37	15:56 (5) 16:05
11	05:08 21:54	05:56 21:05	20:03 (2) 19:54	07:44 18:40	17:45 (4) 16:35	15:56 (5) 16:05
12	05:09 21:53	05:57 21:03	20:03 (2) 19:51	07:46 18:38	17:45 (4) 16:34	15:57 (5) 16:05
13	05:10 21:52	05:59 21:01	20:02 (2) 19:49	07:48 18:36	17:45 (4) 16:32	15:58 (5) 16:05
14	05:12 21:51	06:01 20:59	20:02 (2) 19:47	07:50 18:33	17:45 (4) 16:31	15:59 (5) 16:04
15	05:13 21:50	06:03 20:57	20:02 (2) 19:44	07:52 18:31	17:46 (4) 16:29	15:57 (5) 16:05
16	05:14 21:49	06:04 20:55	20:01 (2) 19:42	07:54 18:29	17:46 (4) 16:27	15:56 (5) 16:05
17	05:16 21:47	06:06 20:53	20:01 (2) 19:39	07:55 18:26	17:47 (4) 16:26	15:55 (5) 16:05
18	05:17 21:46	06:08 20:50	20:01 (2) 19:37	07:57 18:24	17:48 (4) 16:24	15:54 (5) 16:05
19	05:18 21:45	06:10 20:48	20:01 (2) 19:34	07:59 18:22	17:50 (4) 16:23	15:53 (5) 16:05
20	05:20 21:44	06:12 20:46	20:01 (2) 19:32	08:01 18:53 (3)	17:52 (4) 16:22	15:52 (5) 16:06
21	05:21 21:42	06:13 20:44	20:02 (2) 19:29	08:03 18:40 (3)	16:20 16:20	15:51 (5) 16:06
22	05:23 21:41	06:15 20:42	20:02 (2) 19:27	08:05 18:38 (3)	16:19 16:19	15:50 (5) 16:06
23	05:24 21:39	06:17 20:39	20:03 (2) 19:24	08:07 18:37 (3)	16:18 16:18	15:49 (5) 16:07
24	05:26 21:38	06:19 20:37	20:05 (2) 19:22	08:09 18:36 (3)	16:17 16:17	15:48 (5) 16:08
25	05:27 21:36	06:20 20:35	19:22 19:19	08:11 18:34 (3)	16:16 16:16	15:47 (5) 16:08
26	05:29 21:35	06:22 20:32	19:17 19:17	08:13 18:34 (3)	16:15 16:14	15:46 (5) 16:09
27	05:30 21:33	06:24 20:30	19:19 19:14	08:14 18:34 (3)	16:14 16:13	15:45 (5) 16:10
28	05:32 21:32	06:26 20:28	19:21 19:12	08:16 18:34 (3)	16:13 16:12	15:44 (5) 16:11
29	05:34 21:30	06:27 20:25	19:22 19:09	08:18 18:34 (3)	16:12 16:12	15:43 (5) 16:11
30	05:35 21:28	06:29 20:23	19:11 19:07	08:20 18:33 (3)	16:11 16:11	15:42 (5) 16:12
31	05:37 21:26	06:31 20:21	19:09 19:05	08:22 18:32 (3)	16:10 16:10	15:41 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		412	171	462	177	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		91	37	91	31	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LX - H336

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June			
1	08:44 16:15	08:14 17:06	16:24 (5) 16:34 (5)	07:16 18:02	17:09 (4) 17:34 (4)	07:01 20:00	05:52 20:55	19:52 (2) 20:14 (2)	05:03 21:45
2	08:44 16:16	08:12 17:08	16:24 (5) 16:37 (5)	07:14 18:04	17:08 (4) 17:36 (4)	06:59 20:02	05:50 20:57	19:52 (2) 20:13 (2)	05:02 21:46
3	08:43 16:17	08:10 17:10	16:24 (5) 16:39 (5)	07:11 18:06	17:08 (4) 17:38 (4)	06:56 20:04	05:48 20:59	19:54 (2) 20:11 (2)	05:01 21:48
4	08:43 16:18	08:08 17:12	16:24 (5) 16:41 (5)	07:09 18:07	17:09 (4) 17:41 (4)	06:54 20:06	05:46 21:01	19:55 (2) 20:09 (2)	05:00 21:49
5	08:43 16:19	08:07 17:14	16:25 (5) 16:43 (5)	07:07 18:09	17:08 (4) 17:41 (4)	06:51 20:07	05:44 21:03	19:58 (2) 20:06 (2)	04:59 21:50
6	08:42 16:21	08:05 17:16	16:25 (5) 16:45 (5)	07:04 18:11	17:09 (4) 17:41 (4)	06:49 20:09	05:42 21:04		04:59 21:51
7	08:42 16:22	08:03 17:18	16:26 (5) 16:46 (5)	07:02 18:13	17:09 (4) 17:40 (4)	06:47 20:11	05:40 21:06		04:58 21:52
8	08:42 16:24	08:01 17:20	16:26 (5) 16:45 (5)	07:00 18:15	17:10 (4) 17:39 (4)	06:44 20:13	05:38 21:08		04:57 21:53
9	08:41 16:25	07:59 17:22	16:28 (5) 16:44 (5)	06:57 18:17	17:11 (4) 17:37 (4)	06:42 20:15	05:36 21:10		04:57 21:54
10	08:40 16:26	07:57 17:24	16:29 (5) 16:43 (5)	06:55 18:19	17:12 (4) 17:36 (4)	06:39 20:17	05:34 21:11		04:56 21:55
11	08:40 16:28	07:55 17:26	16:31 (5) 16:41 (5)	06:52 18:21	17:15 (4) 17:55 (3)	06:37 20:19	05:33 21:13		04:56 21:55
12	08:39 16:30	07:53 17:28		06:50 18:23	17:17 (4) 17:56 (3)	06:35 20:20	05:31 21:15		04:55 21:56
13	08:38 16:31	07:51 17:30		06:48 18:25	17:51 (3) 17:58 (3)	06:32 20:22	05:29 21:17		04:55 21:57
14	08:37 16:33	07:49 17:32		06:45 18:27	17:50 (3) 18:00 (3)	06:30 20:24	05:27 21:18		04:55 21:57
15	08:36 16:34	07:47 17:34		06:43 18:28	17:50 (3) 18:02 (3)	06:28 20:26	05:26 21:20		04:54 21:58
16	08:35 16:36	07:45 17:36		06:40 18:30	17:49 (3) 18:04 (3)	06:25 20:28	19:56 (2) 19:59 (2)	05:24 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38		06:38 18:32	17:50 (3) 18:06 (3)	06:23 20:30	19:54 (2) 20:01 (2)	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40		06:35 18:34	17:50 (3) 18:07 (3)	06:21 20:31	19:53 (2) 20:03 (2)	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42		06:33 18:36	17:51 (3) 18:10 (3)	06:18 20:33	19:52 (2) 20:05 (2)	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44		06:31 18:38	17:51 (3) 18:08 (3)	06:16 20:35	19:52 (2) 20:07 (2)	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	17:17 (4)	06:28 18:40	17:53 (3) 18:06 (3)	06:14 20:37	19:50 (2) 20:08 (2)	05:16 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	17:15 (4)	06:26 18:41	17:55 (3) 18:02 (3)	06:12 20:39	19:50 (2) 20:10 (2)	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	17:13 (4)	06:23 18:43		06:09 20:41	19:49 (2) 20:12 (2)	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	17:13 (4)	06:21 18:45		06:07 20:42	19:49 (2) 20:14 (2)	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	17:11 (4)	06:18 18:47		06:05 20:44	19:49 (2) 20:15 (2)	05:11 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	17:10 (4)	06:16 18:49		06:03 20:46	19:49 (2) 20:17 (2)	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	17:10 (4)	06:13 18:51		06:00 20:48	19:49 (2) 20:17 (2)	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	17:09 (4)	06:11 18:53		05:58 20:50	19:50 (2) 20:17 (2)	05:07 21:40	04:57 22:01
29	08:18 17:00	16:25 (5) 16:28 (5)		07:08 19:54		05:56 20:52	19:50 (2) 20:16 (2)	05:06 21:41	04:57 22:01
30	08:17 17:02	16:25 (5) 16:30 (5)		07:06 19:56		05:54 20:53	19:51 (2) 20:15 (2)	05:05 21:43	04:58 22:00
31	08:15 17:04	16:24 (5) 16:32 (5)		07:04 19:58			05:04 21:44		
Potential sun hours	250	273		367		420	494		510
Total, worst case	16	274		460		293	82		
Sun reduction	0.24	0.23		0.27		0.35	0.38		
Oper. time red.	1.00	1.00		1.00		1.00	1.00		
Wind dir. red.	0.66	0.66		0.68		0.65	0.65		
Total reduction	0.16	0.15		0.18		0.23	0.25		
Total, real	3	42		84		67	20		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LX - H336

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:57 (4) 16:54	15:58 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:54 (4) 16:52	15:57 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:51 (4) 16:50	15:56 (5) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:49 (4) 16:48	15:55 (5) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:48 (4) 16:46	15:55 (5) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:47 (4) 16:44	15:54 (5) 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	17:45 (4) 16:43	15:54 (5) 16:06
8	05:05 21:56	05:50 21:11	20:06 (2) 20:01	07:39 18:48	17:44 (4) 16:41	15:54 (5) 16:06
9	05:06 21:55	05:52 21:09	20:04 (2) 19:59	07:41 18:45	17:43 (4) 16:39	15:54 (5) 16:05
10	05:07 21:55	05:54 21:07	20:02 (2) 19:56	07:42 18:43	17:43 (4) 16:37	15:56 (5) 16:05
11	05:08 21:54	05:56 21:05	20:01 (2) 19:54	07:44 18:40	17:42 (4) 16:35	15:56 (5) 16:05
12	05:09 21:53	05:57 21:03	20:00 (2) 19:51	07:46 18:38	17:42 (4) 16:34	15:57 (5) 16:05
13	05:10 21:52	05:59 21:01	19:58 (2) 19:49	07:48 18:36	17:42 (4) 16:32	15:57 (5) 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 19:47	07:50 18:33	17:42 (4) 16:31	15:59 (5) 16:04
15	05:13 21:50	06:03 20:57	19:57 (2) 19:44	07:52 18:31	17:42 (4) 16:29	15:59 (5) 16:05
16	05:14 21:49	06:04 20:55	19:56 (2) 19:42	07:54 18:29	17:43 (4) 16:27	15:59 (5) 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 19:39	07:55 18:26	17:43 (4) 16:26	15:59 (5) 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 19:37	07:57 18:24	17:44 (4) 16:24	15:59 (5) 16:05
19	05:18 21:45	06:10 20:48	19:55 (2) 19:34	07:59 18:22	17:45 (4) 16:23	15:59 (5) 16:05
20	05:20 21:44	06:12 20:46	19:55 (2) 19:32	08:01 18:20	17:46 (4) 16:22	15:59 (5) 16:06
21	05:21 21:42	06:13 20:44	19:55 (2) 19:29	08:03 18:17	17:50 (4) 16:20	15:59 (5) 16:06
22	05:23 21:41	06:15 20:42	19:55 (2) 19:27	08:05 18:15	16:20	15:59 (5) 16:06
23	05:24 21:39	06:17 20:39	19:55 (2) 19:24	08:07 18:13	16:19	15:59 (5) 16:07
24	05:26 21:38	06:19 20:37	19:56 (2) 19:22	08:09 18:11	16:18	15:59 (5) 16:08
25	05:27 21:36	06:20 20:35	19:56 (2) 19:19	08:11 18:09	16:17	15:59 (5) 16:08
26	05:29 21:35	06:22 20:32	19:57 (2) 19:17	08:13 18:06	16:16	15:59 (5) 16:09
27	05:30 21:33	06:24 20:30	19:59 (2) 19:14	08:14 18:04	16:15	15:59 (5) 16:10
28	05:32 21:32	06:26 20:28	19:59 (2) 19:12	08:16 18:02	16:14	15:59 (5) 16:11
29	05:34 21:30	06:27 20:25	19:59 (2) 19:09	08:18 18:00	16:13	15:59 (5) 16:11
30	05:35 21:28	06:29 20:23	19:59 (2) 19:07	08:20 18:38 (3)	16:12	15:59 (5) 16:12
31	05:37 21:26	06:31 20:21	19:59 (2) 19:05	08:22 16:56	16:11 (5)	15:59 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		379	129	456	174	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		84	28	90	30	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LY - H337

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	17:14 (4) 20:00	07:01 20:55	19:52 (2) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	17:13 (4) 20:02	06:59 20:57	20:13 (2) 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	17:13 (4) 20:04	06:56 20:59	19:55 (2) 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	17:13 (4) 20:06	06:54 21:01	19:58 (2) 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	17:13 (4) 20:07	06:51 21:03	20:07 (2) 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	17:13 (4) 20:09	06:49 21:04	21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	17:13 (4) 20:11	06:47 21:06	21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	17:14 (4) 20:13	06:44 21:08	21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	17:14 (4) 20:15	06:42 21:10	21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	17:15 (4) 20:17	06:39 21:11	21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	17:17 (4) 20:19	06:37 21:13	21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	17:18 (4) 20:20	06:35 21:15	21:57
13	08:38 16:31	07:51 17:30	06:48 18:25	17:21 (4) 20:22	06:32 21:17	21:58
14	08:37 16:33	07:49 17:32	06:45 18:27	17:26 (4) 20:24	06:30 21:18	21:59
15	08:36 16:34	07:47 17:34	06:43 18:28	17:52 (3) 20:26	06:28 21:20	22:00
16	08:35 16:36	07:45 17:36	06:40 18:30	17:51 (3) 20:28	06:25 21:22	22:01
17	08:34 16:38	07:43 17:38	06:38 18:32	18:04 (3) 20:30	3 19:59 (2) 21:23	22:02
18	08:33 16:40	07:41 17:40	06:35 18:34	17:51 (3) 20:31	7 20:01 (2) 21:25	22:03
19	08:32 16:41	07:39 17:42	06:33 18:36	18:07 (3) 20:33	10 20:03 (2) 21:27	22:04
20	08:31 16:43	07:36 17:44	06:31 18:38	17:52 (3) 20:35	13 20:05 (2) 21:28	22:05
21	08:30 16:45	07:34 17:46	06:28 18:40	18:10 (3) 20:37	15 20:07 (2) 21:30	22:06
22	08:28 16:47	07:32 17:48	06:26 18:41	17:53 (3) 20:39	18 20:08 (2) 21:31	22:07
23	08:27 16:49	07:30 17:50	06:23 17:20 (4) 18:43	18:06 (3) 20:41	20 20:10 (2) 21:33	22:08
24	08:26 16:50	07:28 17:52	06:21 17:24 (4) 18:45	06:09 20:42	22 20:12 (2) 21:34	22:09
25	08:24 16:52	07:25 17:54	06:18 17:17 (4) 18:47	06:07 20:44	24 20:14 (2) 21:36	22:10
26	08:23 16:54	07:23 17:56	06:16 17:16 (4) 18:49	06:05 20:46	25 20:15 (2) 21:37	22:11
27	08:22 16:56	07:21 17:58	06:13 17:16 (4) 18:51	06:03 20:48	27 20:17 (2) 21:39	22:12
28	08:20 16:58	07:18 18:00	06:11 17:14 (4) 18:53	06:00 20:50	27 20:17 (2) 21:40	22:13
29	08:18 17:00		07:08 19:54	05:58 20:52	26 20:16 (2) 21:41	22:14
30	08:17 17:02		07:06 19:56	05:54 20:53	24 20:15 (2) 21:42	22:15
31	08:15 17:04		07:04 19:58	05:52 20:54	22 20:14 (2) 21:43	22:16
Potential sun hours	250	273	367	420	494	510
Total, worst case		61	457	283	63	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.68	0.68	0.65	0.65	
Total reduction		0.16	0.18	0.23	0.25	
Total, real		10	84	65	16	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LY - H337

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:58 (4) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:55 (4) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:54 (4) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:52 (4) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:51 (4) 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:50 (4) 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	17:48 (4) 16:43	08:28 16:06
8	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	17:48 (4) 16:41	08:29 16:06
9	05:06 21:55	05:52 21:09	20:06 (2) 19:59	07:41 18:45	17:47 (4) 16:39	08:30 16:05
10	05:07 21:55	05:54 21:07	20:03 (2) 19:56	07:42 18:43	17:47 (4) 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	20:02 (2) 19:54	07:44 18:40	17:47 (4) 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	20:01 (2) 19:51	07:46 18:38	17:47 (4) 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	19:59 (2) 19:49	07:48 18:36	17:47 (4) 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 19:47	07:50 18:33	17:48 (4) 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	19:58 (2) 19:44	07:52 18:31	17:48 (4) 16:29	08:37 16:04
16	05:14 21:49	06:04 20:55	19:56 (2) 19:42	07:54 18:29	17:49 (4) 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 19:39	07:55 18:26	17:50 (4) 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 19:37	07:57 18:24	17:51 (4) 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	19:55 (2) 19:34	07:59 18:22	17:55 (4) 16:22	08:40 16:05
20	05:20 21:44	06:12 20:46	19:55 (2) 19:32	08:01 18:20	16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	19:56 (2) 19:29	08:03 18:17	16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	19:55 (2) 19:27	08:05 18:15	16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	19:56 (2) 19:24	08:07 18:13	16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	19:56 (2) 19:22	08:09 18:11	16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	19:56 (2) 19:19	08:11 18:09	16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	19:57 (2) 19:17	08:13 18:07	16:15	08:43 16:09
27	05:30 21:33	06:24 20:30	19:59 (2) 19:14	08:14 18:04	16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	20:02 (2) 19:12	18:03 (3) 18:44 (3)	16:13 16:12	16:10 16:11
29	05:34 21:30	06:27 20:25	19:09	18:33 (3) 18:41 (3)	16:16 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	18:01 (4) 18:38 (3)	07:20 16:11	08:44 16:12
31	05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		349	137	388		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.67	0.68		
Total reduction		0.22	0.22	0.20		
Total, real		77	30	77		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LZ - H338

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:57 (2) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	17:35 (4) 20:02	06:59 20:57	20:18 (2) 21:46
3	08:43 16:17	08:10 17:10	07:11 18:05	17:34 (4) 20:04	06:56 20:59	19:58 (2) 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	17:33 (4) 20:06	06:54 21:01	20:17 (2) 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	17:41 (4) 20:07	20:06 21:03	20:02 (2) 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	17:30 (4) 20:09	06:49 21:04	20:12 (2) 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	17:45 (4) 20:11	20:09 21:06	04:58 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	17:29 (4) 20:13	06:47 21:08	04:58 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	17:48 (4) 20:15	20:13 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	17:46 (4) 20:17	20:11 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	17:52 (4) 20:18	20:17 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	17:50 (4) 20:20	20:15 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	17:54 (4) 20:22	20:17 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	17:56 (4) 20:24	20:19 21:18	04:54 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	17:57 (4) 20:26	20:20 21:20	04:54 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	17:59 (4) 20:28	20:22 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	17:53 (4) 20:30	20:24 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	17:55 (4) 20:31	20:26 20:02 (2)	04:54 21:59
19	08:32 16:41	07:39 17:42	06:33 18:36	17:49 (4) 20:33	20:03 (2) 20:01 (2)	22:00 04:54
20	08:31 16:43	07:36 17:44	06:31 18:38	17:46 (4) 20:35	20:05 (2) 19:59 (2)	22:00 04:54
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	20:07 (2) 20:08 (2)	22:00 22:01
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	20:10 (2) 19:56 (2)	04:55 04:55
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	20:12 (2) 20:12 (2)	22:01 22:01
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	20:14 (2) 19:56 (2)	04:55 04:55
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	20:15 (2) 20:15 (2)	22:01 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	20:17 (2) 19:55 (2)	04:56 04:56
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	20:19 (2) 20:19 (2)	22:01 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	20:21 (2) 20:21 (2)	04:57 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	20:22 (2) 20:20 (2)	04:57 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	20:23 (2) 20:19 (2)	04:58 22:00
31	08:15 17:04		07:04 19:58		05:04 21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case			331	208	81	
Sun reduction			0.27	0.35	0.38	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.68	0.65	0.65	
Total reduction			0.18	0.23	0.25	
Total, real			61	48	20	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LZ - H338

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:07 (4) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:06 (4) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:06 (4) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:05 (4) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:05 (4) 16:46	08:25 16:07
6	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	18:06 (4) 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	20:15 (2) 20:19 (2)	06:43 20:04	07:36 18:50	08:28 16:43
8	05:05 21:56	05:50 21:11	20:11 (2) 20:22 (2)	06:45 20:01	07:38 18:48	08:29 16:41
9	05:06 21:55	05:52 21:09	20:09 (2) 20:24 (2)	06:47 19:59	07:41 18:45	08:30 16:05
10	05:07 21:55	05:54 21:07	20:07 (2) 20:25 (2)	06:49 19:56	07:42 18:43	08:31 16:05
11	05:08 21:54	05:56 21:05	20:06 (2) 20:26 (2)	06:50 19:54	07:44 18:40	08:33 16:05
12	05:09 21:53	05:57 21:03	20:05 (2) 20:27 (2)	06:52 19:51	07:46 18:38	08:34 16:05
13	05:10 21:52	05:59 21:01	20:04 (2) 20:27 (2)	06:54 19:49	07:48 18:36	08:35 16:05
14	05:12 21:51	06:01 20:59	20:03 (2) 20:28 (2)	06:56 19:47	07:50 18:33	08:36 16:04
15	05:13 21:50	06:03 20:57	20:03 (2) 20:28 (2)	06:57 19:44	07:52 18:31	08:37 16:04
16	05:14 21:49	06:04 20:55	20:02 (2) 20:25 (2)	06:59 19:42	07:54 18:29	08:38 16:05
17	05:16 21:47	06:06 20:53	20:02 (2) 20:23 (2)	07:01 19:39	07:55 18:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:02 (2) 20:22 (2)	07:03 19:37	07:57 18:24	08:39 16:05
19	05:18 21:45	06:10 20:48	20:01 (2) 20:19 (2)	07:05 19:34	07:59 18:22	08:40 16:05
20	05:20 21:44	06:12 20:46	20:02 (2) 20:17 (2)	07:06 19:32	08:01 18:20	08:41 16:06
21	05:21 21:42	06:13 20:44	20:02 (2) 20:15 (2)	07:08 19:29	08:03 18:17	08:41 16:06
22	05:23 21:41	06:15 20:42	20:02 (2) 20:12 (2)	07:10 19:27	08:05 18:15	08:42 16:06
23	05:24 21:39	06:17 20:39	20:03 (2) 20:10 (2)	07:12 19:24	08:07 18:13	08:42 16:07
24	05:26 21:38	06:19 20:37	20:04 (2) 20:09 (2)	07:13 19:22	18:21 (4) 18:28 (4)	08:43 16:08
25	05:27 21:36	06:20 20:35	20:05 (2) 20:06 (2)	07:15 19:19	18:16 (4) 18:31 (4)	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	18:14 (4) 18:33 (4)	07:09 17:06	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	18:12 (4) 18:34 (4)	07:14 17:04	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	18:10 (4) 18:35 (4)	07:16 17:02	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	18:09 (4) 18:36 (4)	07:18 17:00	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	18:07 (4) 18:36 (4)	07:20 16:58	08:44 16:12
31	05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		296	144	193		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.68	0.68		
Total reduction		0.22	0.22	0.20		
Total, real		65	31	38		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: MA - H339

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:52 (5) 20:19 (5)	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:53 (5) 20:19 (5)	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:53 (5) 20:18 (5)	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:53 (5) 20:17 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:10 (5) 20:20 (5)	06:38 20:11	07:31 18:57	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:54 (5) 20:16 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:07 (5) 20:22 (5)	06:40 20:09	07:33 18:55	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:55 (5) 20:14 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:06 (5) 20:24 (5)	06:42 20:06	07:35 18:52	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:57 (5) 20:14 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:05 (5) 20:25 (5)	06:43 20:04	07:37 18:50	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	19:59 (5) 20:12 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:03 (5) 20:26 (5)	06:45 20:01	07:39 18:48	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:01 (5) 20:09 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:03 (5) 20:27 (5)	06:47 19:59	07:41 18:45	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11		04:56 21:54	05:07 21:54	05:54 21:07	20:01 (5) 20:27 (5)	06:49 19:56	07:42 18:43	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13		04:56 21:55	05:08 21:54	05:56 21:05	20:01 (5) 20:27 (5)	06:50 19:54	07:44 18:40	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15		04:55 21:56	05:09 21:53	05:58 21:03	20:01 (5) 20:28 (5)	06:52 19:51	07:46 18:38	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	20:00 (5) 20:27 (5)	06:54 19:49	07:48 18:36	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	05:12 21:51	06:01 20:59	20:00 (5) 20:28 (5)	06:56 19:47	07:50 18:33	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	05:13 21:50	06:03 20:57	20:00 (5) 20:28 (5)	06:58 19:44	07:52 18:31	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	19:59 (5) 20:25 (5)	06:59 19:42	07:54 18:29	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	19:59 (5) 20:23 (5)	07:01 19:39	07:55 18:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25		04:54 21:59	05:17 21:46	06:08 20:50	20:00 (5) 20:22 (5)	07:03 19:37	07:57 18:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 20:05 (5)	05:19 20:05 (5)	04:54 22:00	05:18 21:45	06:10 20:48	19:59 (5) 20:19 (5)	07:05 19:34	07:59 18:22	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 20:07 (5)	05:18 20:07 (5)	04:54 22:00	05:20 21:43	06:12 20:46	20:00 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 20:08 (5)	05:16 20:08 (5)	04:54 22:00	05:21 21:42	06:13 20:44	20:01 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 20:10 (5)	05:15 20:10 (5)	04:55 22:01	05:23 21:41	06:15 20:42	20:01 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 20:12 (5)	05:13 20:12 (5)	04:55 22:01	05:24 21:39	06:17 20:39	20:03 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 20:13 (5)	05:12 20:13 (5)	04:55 22:01	05:26 21:38	06:19 20:37	20:05 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 20:15 (5)	05:11 20:15 (5)	04:56 22:01	05:27 21:36	06:20 20:35		07:15 19:19	07:11 17:09	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 20:17 (5)	05:09 20:17 (5)	04:56 22:01	05:29 21:35	06:22 20:32		07:17 19:17	07:13 17:06	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	05:08 20:19 (5)	04:56 22:01	05:30 21:33	06:24 20:30		07:19 19:14	07:14 17:04	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 20:20 (5)	05:07 20:20 (5)	04:57 22:01	05:32 21:32	06:26 20:28		07:21 19:12	07:16 17:02	08:44 16:11
29	08:18 17:00		07:08 19:04	05:56 20:52	05:06 20:20 (5)	05:06 20:20 (5)	04:58 22:00	05:34 21:30	06:28 20:25		07:22 19:09	07:18 17:00	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 20:20 (5)	05:05 20:20 (5)	04:58 22:00	05:35 21:28	06:29 20:23		07:24 19:07	07:20 16:58	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44			05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259
Total, worst case				233	181				417				
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.65	0.65				0.65				
Total reduction				0.23	0.25				0.22				
Total, real				53	45				92				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: MB - H340

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	19:52 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:55	20:17 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	19:52 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	20:16 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:43	08:10	07:11	06:56	05:48	19:53 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	20:16 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08		
4	08:43	08:08	07:09	06:54	05:46	19:53 (5)	05:00	05:01	05:44	06:38	07:31	07:30	08:23		
	16:18	17:12	18:07	20:06	21:01	20:14 (5)	21:49	21:59	21:19	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	06:51	05:44	19:54 (5)	04:59	05:02	05:45	20:09 (5)	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:03	20:13 (5)	21:50	21:58	21:17	8	20:17 (5)	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	19:56 (5)	04:59	05:03	05:47	20:07 (5)	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04	20:11 (5)	21:51	21:57	21:15	13	20:20 (5)	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	19:58 (5)	04:58	05:04	05:49	20:06 (5)	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	20:10 (5)	21:52	21:57	21:13	16	20:22 (5)	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	20:02 (5)	04:57	05:05	05:51	20:03 (5)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	20:06 (5)	21:53	21:56	21:11	20	20:23 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	20:03 (5)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	21	20:24 (5)	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	20:01 (5)	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	23	20:24 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:01 (5)	06:50	07:44	07:43	08:33	
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	24	20:25 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:58	20:00 (5)	06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	26	20:26 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:59 (5)	06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	26	20:25 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:59 (5)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	27	20:26 (5)	19:47	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	19:59 (5)	06:58	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	27	20:26 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	19:58 (5)	06:59	07:54	07:53	08:38	
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	27	20:25 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06	19:58 (5)	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	25	20:23 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	20:01 (5) 05:21		04:54	05:17	06:08	19:59 (5)	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	2	20:03 (5) 21:25	21:59	21:46	20:50	23	20:22 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	19:58 (5) 05:19		04:54	05:18	06:10	19:58 (5)	07:05	07:59	07:59	08:40	
	16:41	17:42	18:36	20:33	7	20:05 (5) 21:27	22:00	21:45	20:48	21	20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:57 (5) 05:18		04:54	05:20	06:12	19:59 (5)	07:06	08:01	08:00	08:41	
	16:43	17:44	18:38	20:35	10	20:07 (5) 21:28	22:00	21:43	20:46	18	20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:55 (5) 05:16		04:54	05:21	06:13	19:59 (5)	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	13	20:08 (5) 21:30	22:00	21:42	20:44	16	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:54 (5) 05:15		04:55	05:23	06:15	19:59 (5)	07:10	08:05	08:04	08:42	
	16:47	17:48	18:41	20:39	16	20:10 (5) 21:31	22:01	21:41	20:42	13	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:53 (5) 05:13		04:55	05:24	06:17	20:01 (5)	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	19	20:12 (5) 21:33	22:01	21:39	20:39	9	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:52 (5) 05:12		04:55	05:26	06:19	20:02 (5)	07:13	08:09	08:07	08:43	
	16:51	17:52	18:45	20:42	21	20:13 (5) 21:34	22:01	21:38	20:37	7	20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:52 (5) 05:11		04:56	05:27	06:20	20:04 (5)	07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	23	20:15 (5) 21:36	22:01	21:36	20:35	2	20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:52 (5) 05:09		04:56	05:29	06:22		07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	25	20:17 (5) 21:37	22:01	21:35	20:32		19:17	17:06	16:15	16:09	
27	08:21	07:21	06:13	06:01	19:51 (5) 05:08		04:56	05:30	06:24		07:19	07:14	08:13	08:44	
	16:56	17:58	18:51	20:48	28	20:19 (5) 21:39	22:01	21:33	20:30		19:14	17:04	16:13	16:10	
28	08:20	07:18	06:11	05:58	19:51 (5) 05:07		04:57	05:32	06:26		07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	28	20:19 (5) 21:40	22:01	21:32	20:28		19:12	17:02	16:13	16:11	
29	08:18		07:08	05:56	19:51 (5) 05:06		04:58	05:34	06:28		07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	27	20:18 (5) 21:41	22:00	21:30	20:25		19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	19:52 (5) 05:05		04:58	05:35	06:29		07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	26	20:18 (5) 21:43	22:00	21:28	20:23		19:07	16:58	16:11	16:12	
31	08:15		07:04		05:04			05:37	06:31			07:22		08:44	
	17:04		19:58		21:44			21:26	20:21			16:56		16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233	
Total, worst case				245	143				392						
Sun reduction				0.35	0.38				0.34						
Oper. time red.				1.00	1.00				1.00						
Wind dir. red.				0.65	0.65				0.65						
Total reduction				0.23	0.25				0.22						
Total, real				56	35				87						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MC - H341

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	21:06 (4) 22:00	04:59 14	21:10 (4) 21:24 (4)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	21:06 (4) 21:12 (4)	05:00 13	21:11 (4) 21:24 (4)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:48	21:06 (4) 21:13 (4)	05:00 13	21:10 (4) 21:23 (4)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:05 (4) 21:14 (4)	05:01 12	05:01 21:23 (4)	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	21:06 (4) 21:15 (4)	05:02 12	05:02 21:23 (4)	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:06 (4) 21:16 (4)	05:03 10	05:03 21:22 (4)	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:05 (4) 21:16 (4)	05:04 10	05:04 21:22 (4)	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:06 (4) 21:17 (4)	05:05 8	05:05 21:21 (4)	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:05 (4) 21:18 (4)	05:06 13	05:06 21:13 (4)	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:06 (4) 21:19 (4)	05:07 6	05:07 21:20 (4)	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:06 (4) 21:20 (4)	05:08 14	05:08 21:14 (4)	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:05 (4) 21:20 (4)	05:09 15	05:09 21:15 (4)	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:06 (4) 21:21 (4)	05:11 15	05:11 21:18 (4)	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:06 (4) 21:22 (4)	05:12 16	05:12 21:21 (4)	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:07 (4) 21:22 (4)	05:13 15	05:13 21:07 (4)	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:07 (4) 21:23 (4)	05:14 16	05:14 21:07 (4)	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:07 (4) 21:23 (4)	05:16 16	05:16 21:07 (4)	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:07 (4) 21:24 (4)	05:17 17	05:17 21:07 (4)	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:07 (4) 21:24 (4)	05:18 17	05:18 21:07 (4)	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:07 (4) 21:24 (4)	05:20 17	05:20 21:07 (4)	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:07 (4) 21:24 (4)	05:21 17	05:21 21:08 (4)	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:08 (4) 21:25 (4)	05:23 17	05:23 21:08 (4)	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:08 (4) 21:25 (4)	05:24 17	05:24 21:08 (4)	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:08 (4) 21:25 (4)	05:26 17	05:26 21:08 (4)	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:09 (4) 21:25 (4)	05:27 16	05:27 21:09 (4)	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:09 (4) 21:25 (4)	05:29 16	05:29 21:09 (4)	06:22 20:32	07:17 19:17	08:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:09 (4) 21:24 (4)	05:30 15	05:30 21:09 (4)	06:24 20:30	07:19 19:14	08:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:09 (4) 21:25 (4)	05:32 16	05:32 21:09 (4)	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00	07:18 19:54	06:08 19:54	05:56 20:52	05:06 21:41	04:57 22:00	21:10 (4) 21:25 (4)	05:34 15	05:34 21:10 (4)	06:27 20:25	07:22 19:09	08:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02	07:17 19:56	06:06 20:53	05:54 21:43	05:05 1	04:58 21:08 (4)	21:10 (4) 21:24 (4)	05:35 14	05:35 21:10 (4)	06:29 20:23	07:24 19:07	08:17 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04	07:15 19:58	06:04 19:58	05:04 21:44	05:04 3	04:58 21:06 (4)	21:06 (4) 21:09 (4)	05:37 3	05:37 21:06 (4)	06:31 20:21	07:22 16:56	08:19 16:16	08:19 16:13	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case					4	411	116							
Sun reduction					0.38	0.32	0.32							
Oper. time red.					1.00	1.00	1.00							
Wind dir. red.					0.61	0.61	0.61							
Total reduction					0.23	0.19	0.20							
Total, real					1	80	23							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MD - H342

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: ME - H343

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MF - H344

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
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18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MG - H345

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
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22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MH - H346

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MI - H347

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MJ - H348

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MK - H349

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: ML - H350

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:44 (4) 20:55	05:03 20:31 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:45 (4) 20:57	05:02 20:32 (2)
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:47 (4) 20:59	05:01 20:33 (2)
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:49 (4) 21:01	05:00 20:33 (2)
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	18:52 (4) 21:03	04:59 20:33 (2)
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	19:30 (3) 21:04	21:50 20:51 (2)
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 20:51 (2)
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 20:51 (2)
9	08:41 16:25	07:59 17:22	16:49 (5) 18:17	06:57 20:15	05:36 21:10	04:57 20:50 (2)
10	08:40 16:26	07:57 17:24	16:48 (5) 18:19	06:55 20:17	05:34 21:11	04:56 20:49 (2)
11	08:40 16:28	07:55 17:26	16:47 (5) 18:21	06:52 20:19	05:33 21:13	04:56 20:49 (2)
12	08:39 16:30	07:53 17:28	16:45 (5) 18:23	06:50 20:20	05:31 21:15	04:55 20:48 (2)
13	08:38 16:31	07:51 17:30	16:45 (5) 18:25	17:57 (4) 20:22	05:29 21:17	04:55 20:47 (2)
14	08:37 16:33	07:49 17:32	16:45 (5) 18:27	17:53 (4) 20:24	05:27 21:18	04:55 20:45 (2)
15	08:36 16:34	07:47 17:34	16:45 (5) 18:28	17:51 (4) 20:26	05:26 21:20	04:55 20:48 (2)
16	08:35 16:36	07:45 17:36	16:45 (5) 18:30	17:49 (4) 20:28	05:24 21:22	04:54 20:50 (2)
17	08:34 16:38	07:43 17:38	16:45 (5) 18:32	17:48 (4) 20:30	05:22 21:23	04:54 20:51 (2)
18	08:33 16:40	07:41 17:40	16:44 (5) 18:34	17:46 (4) 20:31	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	16:45 (5) 18:36	17:45 (4) 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	16:46 (5) 18:38	17:44 (4) 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	16:47 (5) 18:40	17:43 (4) 20:37	05:16 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	16:48 (5) 18:41	17:42 (4) 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	16:50 (5) 18:43	17:42 (4) 20:41	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	16:53 (5) 18:45	17:41 (4) 20:42	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	17:41 (4) 20:44	05:11 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	06:17 18:49	17:41 (4) 20:46	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:41 (4) 20:48	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	17:42 (4) 20:50	05:07 21:40	04:57 22:01
29	08:18 17:00		07:08 19:54	18:41 (4) 20:52	05:06 21:41	04:57 22:01
30	08:17 17:02		07:06 19:56	18:42 (4) 20:53	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	18:43 (4) 19:31 (3)	05:04 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case		256	571	209	541	205
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.67	0.67	0.63	0.63
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		40	105	50	131	42

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: ML - H350

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July			August			September			October			November			December	
1	04:59		20:44 (2)	05:39		20:39 (2)	06:33		07:26			07:24		16:18 (5)	08:19		
	22:00	9	20:53 (2)	21:25	14	20:53 (2)	20:18		19:05			16:54	5	16:23 (5)	16:10		
2	04:59		20:44 (2)	05:40		20:40 (2)	06:35		07:28			07:26		16:19 (5)	08:21		
	22:00	10	20:54 (2)	21:23	12	20:52 (2)	20:16		19:02			16:52	2	16:21 (5)	16:09		
3	05:00		20:42 (2)	05:42		20:40 (2)	06:36		07:30			07:28			08:22		
	21:59	12	20:54 (2)	21:21	10	20:50 (2)	20:13		19:00			16:50			16:08		
4	05:01		20:42 (2)	05:44		20:41 (2)	06:38		07:31			07:30			08:24		
	21:59	14	20:56 (2)	21:19	7	20:48 (2)	20:11		18:57			16:48			16:08		
5	05:02		20:42 (2)	05:45		20:42 (2)	06:40		07:33			07:32			08:25		
	21:58	15	20:57 (2)	21:17	4	20:46 (2)	20:09		18:55			16:46			16:07		
6	05:03		20:41 (2)	05:47		20:44 (2)	06:42		19:14 (3)	07:35		07:34			08:26		
	21:58	17	20:58 (2)	21:15	1	20:45 (2)	20:06	9	19:23 (3)	18:52		16:44			16:07		
7	05:04		20:41 (2)	05:49			06:43		18:48 (4)	07:37		07:36			08:28		
	21:57	18	20:59 (2)	21:13			20:04	24	19:25 (3)	18:50		16:43			16:06		
8	05:05		20:41 (2)	05:51			06:45		18:43 (4)	07:39		07:38			08:29		
	21:56	18	20:59 (2)	21:11			20:01	35	19:26 (3)	18:48		16:41			16:06		
9	05:06		20:40 (2)	05:52			06:47		18:41 (4)	07:41		07:40			08:30		
	21:55	20	21:00 (2)	21:09			19:59	42	19:27 (3)	18:45		16:39			16:05		
10	05:07		20:40 (2)	05:54			06:49		18:38 (4)	07:42		07:42			08:31		
	21:55	21	21:01 (2)	21:07			19:56	47	19:27 (3)	18:43		16:37			16:05		
11	05:08		20:39 (2)	05:56			06:50		18:36 (4)	07:44		07:44			08:33		
	21:54	22	21:01 (2)	21:05			19:54	50	19:26 (3)	18:40		16:35			16:05		
12	05:09		20:39 (2)	05:57			06:52		18:35 (4)	07:46		07:45			08:34		
	21:53	23	21:02 (2)	21:03			19:51	49	19:24 (3)	18:38		16:34			16:05		
13	05:10		20:38 (2)	05:59			06:54		18:34 (4)	07:48		07:47			08:35		
	21:52	24	21:02 (2)	21:01			19:49	48	19:22 (3)	18:36		16:32			16:05		
14	05:12		20:38 (2)	06:01			06:56		18:32 (4)	07:50		07:49			08:36		
	21:51	25	21:03 (2)	20:59			19:47	46	19:18 (3)	18:33		16:31			16:04		
15	05:13		20:37 (2)	06:03			06:58		18:31 (4)	07:52		07:51			08:37		
	21:50	26	21:03 (2)	20:57			19:44	45	19:16 (3)	18:31		16:29			16:05		
16	05:14		20:37 (2)	06:04			06:59		18:31 (4)	07:54		07:53			08:38		
	21:49	26	21:03 (2)	20:55			19:42	43	19:14 (3)	18:29		16:27			16:05		
17	05:16		20:37 (2)	06:06			07:01		18:29 (4)	07:55		07:55			08:38		
	21:47	28	21:05 (2)	20:53			19:39	42	19:11 (3)	18:26		16:26			16:05		
18	05:17		20:37 (2)	06:08			07:03		18:29 (4)	07:57		17:23 (5)	07:57		08:39		
	21:46	28	21:05 (2)	20:50			19:37	39	19:08 (3)	18:24	10	17:33 (5)	16:24		16:05		
19	05:18		20:37 (2)	06:10			07:05		18:29 (4)	07:59		17:20 (5)	07:59		08:40		
	21:45	28	21:05 (2)	20:48			19:34	37	19:06 (4)	18:22	15	17:35 (5)	16:23		16:05		
20	05:20		20:37 (2)	06:12			07:06		18:29 (4)	08:01		17:18 (5)	08:00		08:41		
	21:44	29	21:06 (2)	20:46			19:32	35	19:04 (4)	18:20	19	17:37 (5)	16:22		16:06		
21	05:21		20:37 (2)	06:13			07:08		18:28 (4)	08:03		17:17 (5)	08:02		08:41		
	21:42	29	21:06 (2)	20:44			19:29	33	19:01 (4)	18:17	21	17:38 (5)	16:20		16:06		
22	05:23		20:36 (2)	06:15			07:10		18:28 (4)	08:05		17:16 (5)	08:04		08:42		
	21:41	29	21:05 (2)	20:42			19:27	30	18:58 (4)	18:15	22	17:38 (5)	16:19		16:06		
23	05:24		20:37 (2)	06:17			07:12		18:28 (4)	08:07		17:15 (5)	08:06		08:42		
	21:39	29	21:06 (2)	20:39			19:24	28	18:56 (4)	18:13	24	17:39 (5)	16:18		16:07		
24	05:26		20:36 (2)	06:19			07:13		18:29 (4)	08:09		17:15 (5)	08:08		08:43		
	21:38	29	21:05 (2)	20:37			19:22	25	18:54 (4)	18:11	24	17:39 (5)	16:17		16:08		
25	05:27		20:37 (2)	06:20			07:15		18:28 (4)	07:11		16:14 (5)	08:09		08:43		
	21:36	27	21:04 (2)	20:35			19:19	23	18:51 (4)	17:09	24	16:38 (5)	16:16		16:08		
26	05:29		20:37 (2)	06:22			07:17		18:29 (4)	07:13		16:14 (5)	08:11		08:43		
	21:35	25	21:02 (2)	20:32			19:17	19	18:48 (4)	17:06	22	16:36 (5)	16:14		16:09		
27	05:30		20:36 (2)	06:24			07:19		18:30 (4)	07:14		16:14 (5)	08:13		08:44		
	21:33	24	21:00 (2)	20:30			19:14	16	18:46 (4)	17:04	20	16:34 (5)	16:13		16:10		
28	05:32		20:37 (2)	06:26			07:21		18:31 (4)	07:16		16:14 (5)	08:14		08:44		
	21:32	22	20:59 (2)	20:28			19:12	13	18:44 (4)	17:02	17	16:31 (5)	16:12		16:11		
29	05:34		20:37 (2)	06:27			07:22		18:33 (4)	07:18		16:15 (5)	08:16		08:44		
	21:30	20	20:57 (2)	20:25			19:09	8	18:41 (4)	17:00	14	16:29 (5)	16:12		16:11		
30	05:35		20:38 (2)	06:29			07:24		18:34 (4)	07:20		16:15 (5)	08:18		08:44		
	21:28	18	20:56 (2)	20:23			19:07	4	18:38 (4)	16:58	12	16:27 (5)	16:11		16:12		
31	05:37		20:39 (2)	06:31					07:22			16:16 (5)			08:44		
	21:26	16	20:55 (2)	20:21					16:56	9	16:25 (5)				16:13		
Potential sun hours	512			460			382		328		259				233		
Total, worst case		681		48			790		253		7						
Sun reduction		0.32		0.34			0.32		0.29		0.27						
Oper. time red.		1.00		1.00			1.00		1.00		1.00						
Wind dir. red.		0.63		0.63			0.67		0.66		0.66						
Total reduction		0.20		0.22			0.22		0.19		0.18						
Total, real		140		10			171		49		1						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MM - H351

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MN - H352

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MO - H353

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MP - H354

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MQ - H355

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	08:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MR - H356

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:04 (5)	07:16		16:43 (4)	07:01			05:52		19:48 (2)	05:03			
	16:15			17:06	17	16:21 (5)	18:02	33	17:16 (4)	20:00		20:55	35	20:23 (2)	21:45			
2	08:44			08:12	16:06 (5)	07:14		16:43 (4)	06:59			05:50		19:48 (2)	05:02			
	16:16			17:08	14	16:20 (5)	18:04	31	17:14 (4)	20:02		20:57	34	20:22 (2)	21:46			
3	08:44			08:10	16:08 (5)	07:12		16:45 (4)	06:56			05:48		19:48 (2)	05:01			
	16:17			17:10	9	16:17 (5)	18:06	27	17:12 (4)	20:04		20:59	33	20:21 (2)	21:48			
4	08:43			08:08		07:09		16:48 (4)	06:54			05:46		19:48 (2)	05:00			
	16:18			17:12		18:07		17:11 (4)	20:06			21:01	33	20:21 (2)	21:49			
5	08:43			08:07		07:07		16:50 (4)	06:51			05:44		19:49 (2)	04:59			
	16:19			17:14		18:09		17:07 (4)	20:07			21:03	31	20:20 (2)	21:50			
6	08:42			08:05		07:04		16:55 (4)	06:49			05:42		19:49 (2)	04:59			
	16:21			17:16		18:11	9	17:45 (3)	20:09			21:04	30	20:19 (2)	21:51			
7	08:42			08:03		07:02		17:41 (3)	06:47			05:40		19:51 (2)	04:58			
	16:22			17:18		18:13	5	17:46 (3)	20:11			21:06	28	20:19 (2)	21:52			
8	08:42			08:01		07:00		17:41 (3)	06:44			05:38		19:51 (2)	04:57			
	16:24			17:20	2	16:50 (4)	18:15	7	17:48 (3)	20:13		21:08	27	20:18 (2)	21:53			
9	08:41			07:59		06:57		17:39 (3)	06:42			05:36		19:52 (2)	04:57			
	16:25			17:22	6	16:52 (4)	18:17	11	17:50 (3)	20:15		21:10	24	20:16 (2)	21:54			
10	08:40			07:57		06:55		17:39 (3)	06:39			05:34		19:53 (2)	04:56			
	16:26			17:24	9	16:54 (4)	18:19	13	17:52 (3)	20:17		21:11	21	20:14 (2)	21:55			
11	08:40			07:55		06:52		17:39 (3)	06:37			05:33		19:56 (2)	04:56			
	16:28			17:26	12	16:56 (4)	18:21	16	17:55 (3)	20:19		21:13	18	20:14 (2)	21:55			
12	08:39			07:53		06:50		17:38 (3)	06:35			05:31		19:57 (2)	04:55			
	16:30			17:28	16	16:58 (4)	18:23	18	17:56 (3)	20:20		21:15	14	20:11 (2)	21:56			
13	08:38			07:51		06:48		17:39 (3)	06:32			05:29		20:00 (2)	04:55			
	16:31			17:30	18	17:00 (4)	18:25	19	17:58 (3)	20:22		21:17	7	20:07 (2)	21:57			
14	08:37			07:49		06:45		18:00 (3)	06:30			05:27			04:55			
	16:33			17:32	21	17:02 (4)	18:27	22	18:08 (3)	20:24		21:18			21:58			
15	08:36		15:58 (5)	07:47		06:43		17:39 (3)	06:28			05:26			04:54			
	16:34	1	15:59 (5)	17:34	24	17:05 (4)	18:28	23	18:02 (3)	20:26		21:20			21:58			
16	08:35		15:57 (5)	07:45		06:40		17:39 (3)	06:25			05:24			04:54			
	16:36	3	16:00 (5)	17:36	27	17:07 (4)	18:30	22	18:01 (3)	20:28		21:22			21:59			
17	08:34		15:57 (5)	07:43		06:38		17:41 (3)	06:23		19:58 (2)	05:22			04:54			
	16:38	6	16:03 (5)	17:38	29	17:09 (4)	18:32	19	18:00 (3)	20:30	3	20:01 (2)		21:23	21:59			
18	08:33		15:58 (5)	07:41		06:35		17:42 (3)	06:21			19:56 (2)		05:21	04:54			
	16:40	7	16:05 (5)	17:40	32	17:11 (4)	18:34	15	17:57 (3)	20:31	7	20:03 (2)		21:25	22:00			
19	08:32		15:58 (5)	07:39		06:33		17:45 (3)	06:18			19:54 (2)		05:19	04:54			
	16:41	9	16:07 (5)	17:42	34	17:13 (4)	18:36	10	17:55 (3)	20:33	11	20:05 (2)		21:27	22:00			
20	08:31		15:57 (5)	07:36		06:31			06:16			19:53 (2)		05:18	04:54			
	16:43	11	16:08 (5)	17:44	37	17:16 (4)	18:38		20:35	14	20:07 (2)	21:28			22:00			
21	08:30		15:58 (5)	07:34		06:28			06:14			19:51 (2)		05:16	04:54			
	16:45	13	16:11 (5)	17:46	39	17:18 (4)	18:40		20:37	17	20:08 (2)	21:30			22:01			
22	08:29		15:57 (5)	07:32		06:26			06:12			19:50 (2)		05:15	04:55			
	16:47	15	16:12 (5)	17:48	40	17:19 (4)	18:42		20:39	20	20:10 (2)	21:31			22:01			
23	08:27		15:58 (5)	07:30		06:23			06:09			19:50 (2)		05:13	04:55			
	16:49	17	16:15 (5)	17:50	42	17:21 (4)	18:43		20:41	22	20:12 (2)	21:33			22:01			
24	08:26		15:58 (5)	07:28		06:21			06:07			19:49 (2)		05:12	04:55			
	16:50	19	16:17 (5)	17:52	40	17:20 (4)	18:45		20:43	25	20:14 (2)	21:34			22:01			
25	08:24		15:59 (5)	07:25		06:18			06:05			19:49 (2)		05:11	04:55			
	16:52	20	16:19 (5)	17:54	40	17:19 (4)	18:47		20:44	26	20:15 (2)	21:36			22:01			
26	08:23		15:59 (5)	07:23		06:16			06:03			19:48 (2)		05:09	04:56			
	16:54	22	16:21 (5)	17:56	39	17:19 (4)	18:49		20:46	29	20:17 (2)	21:37			22:01			
27	08:22		15:59 (5)	07:21		06:13			06:01			19:48 (2)		05:08	04:56			
	16:56	24	16:23 (5)	17:58	37	17:18 (4)	18:51		20:48	31	20:19 (2)	21:39			22:01			
28	08:20		16:00 (5)	07:18		06:11			05:58			19:48 (2)		05:07	04:57			
	16:58	23	16:23 (5)	18:00	36	17:17 (4)	18:53		20:50	33	20:21 (2)	21:40			22:01			
29	08:18		16:01 (5)			07:08			05:56			19:48 (2)		05:06	04:57			
	17:00	22	16:23 (5)			19:54			20:52	34	20:22 (2)	21:41			22:01			
30	08:17		16:01 (5)			07:06			05:54			19:48 (2)		05:05	04:58			
	17:02	21	16:22 (5)			19:56			20:54	35	20:23 (2)	21:43			22:00			
31	08:15		16:02 (5)			07:04						05:04						
	17:04	19	16:21 (5)			19:58						21:44						
Potential sun hours	250			273			367		420			494			510			
Total, worst case		252		620			340		307		335							
Sun reduction		0.24		0.23			0.27		0.35		0.38							
Oper. time red.		1.00		1.00			1.00		1.00		1.00							
Wind dir. red.		0.66		0.67			0.67		0.65		0.65							
Total reduction		0.16		0.16			0.18		0.23		0.25							
Total, real		41		96			62		70		83							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MR - H356

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	15	20:07 (2) 20:22 (2)	06:33 20:18	07:26 19:05	18:17 (3) 18:36 (3)	07:24 16:54	8	16:15 (4) 16:23 (4)	08:19 16:10
2	04:59 22:00	05:40 21:23	20	20:05 (2) 20:25 (2)	06:35 20:16	07:28 19:02	18:17 (3) 18:33 (3)	07:26 16:52	5	16:16 (4) 16:21 (4)	08:21 16:09
3	05:00 21:59	05:42 21:21	22	20:03 (2) 20:25 (2)	06:36 20:13	07:30 19:00	18:17 (3) 18:31 (3)	07:28 16:50	1	16:18 (4) 16:19 (4)	08:22 16:08
4	05:01 21:59	05:44 21:19	25	20:02 (2) 20:27 (2)	06:38 20:11	07:31 18:57	18:17 (3) 18:29 (3)	07:30 16:48			08:24 16:08
5	05:02 21:58	05:45 21:17	27	20:00 (2) 20:27 (2)	06:40 20:09	07:33 18:55	18:18 (3) 18:26 (3)	07:32 16:46			08:25 16:07
6	05:03 21:58	05:47 21:15	28	20:00 (2) 20:28 (2)	06:42 20:06	07:35 18:52	18:18 (3) 18:24 (3)	07:34 16:44			08:26 16:07
7	05:04 21:57	05:49 21:13	31	19:59 (2) 20:30 (2)	06:43 20:04	07:37 18:50	18:18 (3) 18:21 (3)	07:36 16:43			08:28 16:06
8	05:05 21:56	05:51 21:12	32	19:58 (2) 20:30 (2)	06:45 20:01	07:39 18:48	17:27 (4) 17:40 (4)	07:38 16:41	9	15:38 (5) 15:47 (5)	08:29 16:06
9	05:06 21:55	05:52 21:10	32	19:58 (2) 20:30 (2)	06:47 19:59	07:41 18:45	17:23 (4) 17:43 (4)	07:40 16:39	15	15:35 (5) 15:50 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	34	19:56 (2) 20:30 (2)	06:49 19:56	07:42 18:43	17:20 (4) 17:46 (4)	07:42 16:37	17	15:35 (5) 15:52 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	35	19:56 (2) 20:31 (2)	06:50 19:54	07:44 18:40	17:18 (4) 17:47 (4)	07:44 16:35	19	15:34 (5) 15:53 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	35	19:56 (2) 20:31 (2)	06:52 19:51	07:46 18:38	17:17 (4) 17:48 (4)	07:45 16:34	21	15:33 (5) 15:54 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01	36	19:55 (2) 20:31 (2)	06:54 19:49	07:48 18:36	17:15 (4) 17:49 (4)	07:47 16:32	23	15:32 (5) 15:55 (5)	08:35 16:05
14	05:12 21:51	06:01 20:59	34	19:55 (2) 20:29 (2)	06:56 19:47	07:50 18:33	17:14 (4) 17:50 (4)	07:49 16:31	23	15:32 (5) 15:55 (5)	08:36 16:04
15	05:13 21:50	06:03 20:57	33	19:55 (2) 20:28 (2)	06:58 19:44	07:52 18:31	17:13 (4) 17:51 (4)	07:51 16:29	24	15:32 (5) 15:56 (5)	08:37 16:05
16	05:14 21:49	06:04 20:55	31	19:54 (2) 20:25 (2)	06:59 19:42	07:54 18:29	17:12 (4) 17:51 (4)	07:53 16:27	22	15:32 (5) 15:54 (5)	08:38 16:05
17	05:16 21:47	06:06 20:53	28	19:55 (2) 20:23 (2)	07:01 19:39	07:55 18:26	17:11 (4) 17:52 (4)	07:55 16:26	20	15:32 (5) 15:52 (5)	08:38 16:05
18	05:17 21:46	06:08 20:51	27	19:55 (2) 20:22 (2)	07:03 19:37	07:57 18:24	17:11 (4) 17:52 (4)	07:57 16:24	19	15:32 (5) 15:51 (5)	08:39 16:05
19	05:18 21:45	06:10 20:48	24	19:55 (2) 20:19 (2)	07:05 19:34	07:59 18:22	17:10 (4) 17:52 (4)	07:59 16:23	17	15:32 (5) 15:49 (5)	08:40 16:05
20	05:20 21:44	06:12 20:46	22	19:55 (2) 20:17 (2)	07:06 19:32	08:01 18:20	17:10 (4) 17:50 (4)	08:00 16:22	15	15:32 (5) 15:47 (5)	08:41 16:06
21	05:21 21:42	06:13 20:44	19	19:56 (2) 20:15 (2)	07:08 19:29	08:03 18:17	17:10 (4) 17:48 (4)	08:02 16:20	13	15:33 (5) 15:46 (5)	08:41 16:06
22	05:23 21:41	06:15 20:42	16	19:56 (2) 20:12 (2)	07:10 19:27	08:05 18:15	17:09 (4) 17:45 (4)	08:04 16:19	11	15:33 (5) 15:44 (5)	08:42 16:06
23	05:24 21:39	06:17 20:39	13	19:57 (2) 20:10 (2)	07:12 19:24	08:07 18:13	17:09 (4) 17:43 (4)	08:06 16:18	9	15:34 (5) 15:43 (5)	08:42 16:07
24	05:26 21:38	06:19 20:37	11	19:58 (2) 20:09 (2)	07:13 19:22	08:09 18:11	17:09 (4) 17:41 (4)	08:08 16:17	7	15:35 (5) 15:42 (5)	08:43 16:08
25	05:27 21:36	06:20 20:35	7	19:59 (2) 20:06 (2)	07:15 19:19	07:11 18:39 (3)	16:10 (4) 16:38 (4)	08:09 16:16	6	15:35 (5) 15:41 (5)	08:43 16:08
26	05:29 21:35	06:22 20:32	3	20:01 (2) 20:04 (2)	07:17 19:17	07:13 18:41 (3)	16:10 (4) 16:36 (4)	08:11 16:14	4	15:36 (5) 15:40 (5)	08:43 16:09
27	05:30 21:33	06:24 20:30		07:19 19:14	07:15 18:42 (3)	07:15 18:20 (3)	16:10 (4) 16:11 (4)	08:13 16:13	1	15:37 (5) 15:38 (5)	08:44 16:10
28	05:32 21:32	06:26 20:28		07:21 19:12	07:16 18:43 (3)	07:16 18:19 (3)	16:11 (4) 16:11 (4)	08:14 16:12			08:44 16:11
29	05:34 21:30	06:27 20:25		07:22 19:09	07:18 18:41 (3)	07:18 18:18 (3)	16:11 (4) 16:12 (4)	08:16 16:12			08:44 16:11
30	05:35 21:28	06:29 20:23		07:24 19:07	07:20 18:38 (3)	07:20 16:58	16:12 (4) 16:27 (4)	08:18 16:11			08:44 16:12
31	05:37 21:26	20:10 (2) 20:20 (2)	06:31 20:21			07:22 16:56	16:13 (4) 16:25 (4)				08:44 16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	10		640		124		791		309		
Sun reduction	0.32		0.34		0.32		0.29		0.27		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.65		0.65		0.67		0.67		0.66		
Total reduction	0.21		0.22		0.22		0.20		0.18		
Total, real	2		142		27		155		54		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: MS - H357

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

		January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	05:03		04:59	21:15 (4)	05:39	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:55	21:45		22:00	9	21:24 (4)	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	05:02		05:00		21:15 (4)	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	21:46		21:59	9	21:24 (4)	21:23	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48	05:01	21:11 (4)	05:00		21:15 (4)	05:42	06:36	07:30	07:28	08:22	
	16:17	17:10	18:05	20:04	20:59	21:47	2	21:13 (4)	21:59	8	21:23 (4)	21:21	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	05:00		21:10 (4)	05:01		21:15 (4)	05:44	06:38	07:31	07:30	08:23
	16:18	17:12	18:07	20:06	21:01	21:49	4	21:14 (4)	21:59	8	21:23 (4)	21:19	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	04:59		21:11 (4)	05:02		21:16 (4)	05:45	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07	21:02	21:50	4	21:15 (4)	21:58	7	21:23 (4)	21:17	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	04:59		21:10 (4)	05:03		21:17 (4)	05:47	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	21:51	6	21:16 (4)	21:57	5	21:22 (4)	21:15	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58		21:10 (4)	05:04		21:17 (4)	05:49	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	6	21:16 (4)	21:57	5	21:22 (4)	21:13	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	04:57		21:10 (4)	05:05		21:18 (4)	05:51	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	7	21:17 (4)	21:56	3	21:21 (4)	21:11	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	04:57		21:10 (4)	05:06		21:18 (4)	05:52	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	8	21:18 (4)	21:55	3	21:21 (4)	21:09	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34	04:56		21:10 (4)	05:07		21:19 (4)	05:54	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11	21:54	9	21:19 (4)	21:54	1	21:20 (4)	21:07	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33	04:56		21:10 (4)	05:08		05:56	06:50	07:44	07:43	08:32	
	16:28	17:26	18:21	20:18	21:13	21:55	10	21:20 (4)	21:54		21:05	19:54	18:40	16:35	16:05	
12	08:39	07:53	06:50	06:35	05:31	04:55		21:10 (4)	05:09		05:57	06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15	21:56	10	21:20 (4)	21:53		21:03	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29	04:55		21:10 (4)	05:11		05:59	06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17	21:57	11	21:21 (4)	21:52		21:01	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27	04:55		21:10 (4)	05:12		06:01	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18	21:57	12	21:22 (4)	21:51		20:59	19:46	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26	04:55		21:11 (4)	05:13		06:03	06:57	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20	21:58	11	21:22 (4)	21:50		20:57	19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24	04:54		21:11 (4)	05:14		06:04	06:59	07:54	07:53	08:37	
	16:36	17:36	18:30	20:28	21:22	21:59	12	21:23 (4)	21:48		20:55	19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22	04:54		21:11 (4)	05:16		06:06	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23	21:59	12	21:23 (4)	21:47		20:53	19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21	04:54		21:11 (4)	05:17		06:08	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	21:25	21:59	13	21:24 (4)	21:46		20:50	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:18	05:19	04:54		21:11 (4)	05:18		06:10	07:05	07:59	07:58	08:40	
	16:41	17:42	18:36	20:33	21:26	22:00	13	21:24 (4)	21:45		20:48	19:34	18:22	16:23	16:05	
20	08:31	07:36	06:31	06:16	05:18	04:54		21:12 (4)	05:20		06:12	07:06	08:01	08:00	08:40	
	16:43	17:44	18:38	20:35	21:28	22:00	12	21:24 (4)	21:43		20:46	19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16	04:54		21:12 (4)	05:21		06:13	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30	22:00	12	21:24 (4)	21:42		20:44	19:29	18:17	16:20	16:06	
22	08:28	07:32	06:26	06:12	05:15	04:55		21:13 (4)	05:23		06:15	07:10	08:05	08:04	08:42	
	16:47	17:48	18:41	20:39	21:31	22:01	12	21:25 (4)	21:41		20:41	19:27	18:15	16:19	16:06	
23	08:27	07:30	06:23	06:09	05:13	04:55		21:12 (4)	05:24		06:17	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	21:33	22:01	13	21:25 (4)	21:39		20:39	19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12	04:55		21:12 (4)	05:26		06:19	07:13	08:09	08:07	08:43	
	16:50	17:52	18:45	20:42	21:34	22:01	13	21:25 (4)	21:38		20:37	19:22	18:11	16:17	16:08	
25	08:24	07:25	06:18	06:05	05:11	04:56		21:13 (4)	05:27		06:20	07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	21:36	22:01	12	21:25 (4)	21:36		20:35	19:19	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:09	04:56		21:13 (4)	05:29		06:22	07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	21:37	22:01	12	21:25 (4)	21:35		20:32	19:17	17:06	16:15	16:09	
27	08:21	07:21	06:13	06:01	05:08	04:56		21:13 (4)	05:30		06:24	07:19	07:14	08:13	08:43	
	16:56	17:58	18:51	20:48	21:39	22:01	11	21:24 (4)	21:33		20:30	19:14	17:04	16:13	16:10	
28	08:20	07:18	06:11	05:58	05:07	04:57		21:14 (4)	05:32		06:26	07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	21:40	22:01	11	21:25 (4)	21:31		20:28	19:12	17:02	16:12	16:11	
29	08:18		07:08	05:56	05:06	04:58		21:14 (4)	05:34		06:27	07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	21:41	22:00	11	21:25 (4)	21:30		20:25	19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	05:05	04:58		21:14 (4)	05:35		06:29	07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	21:43	22:00	10	21:24 (4)	21:28		20:23	19:07	16:58	16:11	16:12	
31	08:15		07:04		05:04				05:37		06:31			07:22	08:44	
	17:04		19:58		21:44				21:26		20:21			16:56	16:13	
Potential sun hours	250	273	367	420	494	510		512		460	382	328	259	233		
Total, worst case							279		58							
Sun reduction							0.32		0.32							
Oper. time red.							1.00		1.00							
Wind dir. red.							0.61		0.61							
Total reduction							0.19		0.20							
Total, real							54		11							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MT - H358

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:34 (5)	08:14	16:11 (4)	07:16	17:27 (3)	07:01	05:52	19:33 (2)	05:03	
	16:15	3	15:37 (5)	17:06	24	16:35 (4)	18:02	7	17:34 (3)	20:00	
2	08:44	15:35 (5)	08:12	16:10 (4)	07:14	17:25 (3)	06:59		05:50	34	20:07 (2)
	16:16	4	15:39 (5)	17:08	27	16:37 (4)	18:04	11	17:36 (3)	20:02	21:45
3	08:44	15:34 (5)	08:10	16:10 (4)	07:12	17:25 (3)	06:56		05:48	32	20:06 (2)
	16:17	5	15:39 (5)	17:10	29	16:39 (4)	18:06	13	17:38 (3)	20:04	21:46
4	08:43	15:35 (5)	08:08	16:09 (4)	07:09	17:25 (3)	06:54		05:48	29	20:04 (2)
	16:18	6	15:41 (5)	17:12	32	16:41 (4)	18:07	16	17:41 (3)	20:06	21:48
5	08:43	15:35 (5)	08:07	16:09 (4)	07:07	17:24 (3)	06:51		05:46	27	20:03 (2)
	16:19	7	15:42 (5)	17:14	34	16:43 (4)	18:09	18	17:42 (3)	20:07	21:49
6	08:43	15:35 (5)	08:05	16:09 (4)	07:04	17:24 (3)	06:49		05:44	25	20:02 (2)
	16:21	9	15:44 (5)	17:16	36	16:45 (4)	18:11	21	17:45 (3)	20:09	21:50
7	08:42	15:35 (5)	08:03	16:09 (4)	07:02	17:23 (3)	06:47		05:42	22	20:00 (2)
	16:22	10	15:45 (5)	17:18	38	16:47 (4)	18:13	23	17:46 (3)	20:11	21:51
8	08:42	15:35 (5)	08:01	16:09 (4)	07:00	17:24 (3)	06:44		05:40	18	19:59 (2)
	16:24	11	15:46 (5)	17:20	41	16:50 (4)	18:15	24	17:48 (3)	20:13	21:52
9	08:41	15:36 (5)	07:59	16:09 (4)	06:57	17:24 (3)	06:42		05:38	13	19:56 (2)
	16:25	13	15:49 (5)	17:22	43	16:52 (4)	18:17	24	17:48 (3)	20:15	21:53
10	08:40	15:36 (5)	07:57	16:09 (4)	06:55	17:25 (3)	06:39		05:36		04:57
	16:26	14	15:50 (5)	17:24	44	16:53 (4)	18:19	1	19:48 (2)	05:34	21:54
11	08:40	15:36 (5)	07:55	16:09 (4)	06:52	17:26 (3)	06:37		05:33		04:56
	16:28	16	15:52 (5)	17:26	44	16:53 (4)	18:21	6	19:45 (2)	05:33	21:55
12	08:39	15:37 (5)	07:53	16:09 (4)	06:50	17:27 (3)	06:35		05:31		04:55
	16:30	17	15:54 (5)	17:28	43	16:52 (4)	18:23	11	19:53 (2)	05:31	21:56
13	08:38	15:37 (5)	07:51	16:09 (4)	06:48	17:29 (3)	06:32		05:29		04:55
	16:31	18	15:55 (5)	17:30	43	16:52 (4)	18:25	14	19:54 (2)	05:29	21:57
14	08:37	15:37 (5)	07:49	16:10 (4)	06:45	17:33 (3)	06:30		05:27		04:55
	16:33	20	15:57 (5)	17:32	42	16:52 (4)	18:27	18	19:56 (2)	05:27	21:58
15	08:36	15:38 (5)	07:47	16:10 (4)	06:43	17:38 (3)	06:28		05:26		04:54
	16:34	21	15:59 (5)	17:34	41	16:51 (4)	18:28	21	19:58 (2)	05:26	21:58
16	08:35	15:37 (5)	07:45	16:11 (4)	06:40		06:25		05:24		04:54
	16:36	23	16:00 (5)	17:36	40	16:51 (4)	18:30	24	20:00 (2)	05:24	21:59
17	08:34	15:38 (5)	07:43	16:12 (4)	06:38		06:23		05:22		04:54
	16:38	25	16:03 (5)	17:38	38	16:50 (4)	18:32	27	20:01 (2)	05:22	21:59
18	08:33	15:39 (5)	07:41	16:12 (4)	06:35		06:21		05:21		04:54
	16:40	24	16:03 (5)	17:40	37	16:49 (4)	18:34	29	20:03 (2)	05:21	22:00
19	08:32	15:40 (5)	07:39	16:14 (4)	06:33		06:18		05:19		04:54
	16:41	24	16:04 (5)	17:42	34	16:48 (4)	18:36	32	20:05 (2)	05:19	22:00
20	08:31	15:40 (5)	07:36	16:15 (4)	06:31		06:16		05:18		04:54
	16:43	23	16:03 (5)	17:44	32	16:47 (4)	18:38	34	20:07 (2)	05:18	22:00
21	08:30	15:41 (5)	07:34	16:17 (4)	06:28		06:14		05:16		04:54
	16:45	22	16:03 (5)	17:46	29	16:46 (4)	18:40	36	20:08 (2)	05:16	22:01
22	08:29	15:41 (5)	07:32	16:18 (4)	06:26		06:12		05:15		04:55
	16:47	21	16:02 (5)	17:48	25	16:43 (4)	18:42	39	20:10 (2)	05:15	22:01
23	08:27	15:43 (5)	07:30	16:21 (4)	06:23		06:09		05:13		04:55
	16:49	20	16:03 (5)	17:50	20	16:41 (4)	18:43	40	20:11 (2)	05:13	22:01
24	08:26	15:43 (5)	07:28	16:25 (4)	06:21		06:07		05:12		04:55
	16:50	19	16:02 (5)	17:52	12	16:37 (4)	18:45	39	20:10 (2)	05:12	22:01
25	08:24	15:45 (5)	07:25		06:18		06:05		05:11		04:55
	16:52	19	16:19 (4)	17:54			06:04		05:11		04:55
26	08:23	15:47 (5)	07:23		06:16		06:03		05:10		22:01
	16:54	19	16:21 (4)	17:56			06:02		05:09		04:56
27	08:22	15:49 (5)	07:21	17:30 (3)	06:13		06:01		05:08		22:01
	16:56	19	16:23 (4)	17:58	1	17:31 (3)	18:51	37	20:09 (2)	05:08	04:56
28	08:20	16:13 (4)	07:18	17:28 (3)	06:11		05:58		05:07		22:01
	16:58	13	16:26 (4)	18:00	4	17:32 (3)	18:53	37	20:09 (2)	05:07	04:57
29	08:18	16:12 (4)			07:08		05:56		05:06		22:01
	17:00	16	16:28 (4)		19:54		05:54		05:05		04:57
30	08:17	16:11 (4)			07:06		05:54		05:04		22:01
	17:02	19	16:30 (4)		19:56		05:54		05:04		04:58
31	08:15	16:11 (4)			07:04		05:54		05:04		22:00
	17:04	20	16:31 (4)		19:58				05:04		
Potential sun hours	250		273		367		420		494		510
Total, worst case	500		833		238		594		200		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.66		0.68		0.65		0.65		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	80		128		44		136		50		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: MT - H358

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December				
1	04:59 22:00	05:39 21:25	06:33 20:18	19:44 (2) 19:50 (2)	07:26 19:05	18:06 (3) 18:23 (3)	07:24 16:54	15:39 (4) 16:23 (4)	08:19 16:10	15:18 (5) 15:34 (5)
2	04:59 22:00	05:40 21:23	06:35 20:16		07:28 19:02	18:04 (3) 18:24 (3)	07:26 16:52	15:38 (4) 16:21 (4)	08:21 16:09	15:18 (5) 15:33 (5)
3	05:00 21:59	05:42 21:21	06:36 20:13		07:30 19:00	18:03 (3) 18:25 (3)	07:28 16:50	15:38 (4) 16:19 (4)	08:22 16:08	15:19 (5) 15:32 (5)
4	05:01 21:59	05:44 21:19	19:56 (2) 20:03 (2)	06:38 20:11	07:31 18:57	18:02 (3) 18:26 (3)	07:30 16:48	15:38 (4) 16:17 (4)	08:24 16:08	15:20 (5) 15:32 (5)
5	05:02 21:58	05:45 21:17	19:52 (2) 20:06 (2)	06:40 20:09	07:33 18:55	18:01 (3) 18:26 (3)	07:32 16:46	15:39 (4) 16:15 (4)	08:25 16:07	15:20 (5) 15:30 (5)
6	05:03 21:58	05:47 21:15	19:50 (2) 20:09 (2)	06:42 20:06	07:35 18:52	18:00 (3) 18:24 (3)	07:34 16:44	15:39 (4) 16:12 (4)	08:26 16:07	15:21 (5) 15:30 (5)
7	05:04 21:57	05:49 21:13	19:48 (2) 20:11 (2)	06:43 20:04	07:37 18:50	17:59 (3) 18:21 (3)	07:36 16:43	15:39 (4) 16:10 (4)	08:28 16:06	15:22 (5) 15:29 (5)
8	05:05 21:56	05:51 21:12	19:46 (2) 20:12 (2)	06:45 20:01	07:39 18:48	17:59 (3) 18:18 (3)	07:38 16:41	15:40 (4) 16:08 (4)	08:29 16:06	15:22 (5) 15:28 (5)
9	05:06 21:55	05:52 21:10	19:45 (2) 20:13 (2)	06:47 19:59	07:41 18:45	17:59 (3) 18:16 (3)	07:40 16:39	15:40 (4) 16:06 (4)	08:30 16:05	15:23 (5) 15:28 (5)
10	05:07 21:55	05:54 21:07	19:43 (2) 20:13 (2)	06:49 19:56	07:42 18:43	17:59 (3) 18:14 (3)	07:42 16:37	15:42 (4) 16:05 (4)	08:31 16:05	15:24 (5) 15:28 (5)
11	05:08 21:54	05:56 21:05	19:42 (2) 20:14 (2)	06:50 19:54	07:44 18:40	17:59 (3) 18:11 (3)	07:44 16:35	15:42 (4) 16:03 (4)	08:33 16:05	15:24 (5) 15:27 (5)
12	05:09 21:53	05:57 21:03	19:42 (2) 20:15 (2)	06:52 19:51	07:46 18:38	17:59 (3) 18:09 (3)	07:45 16:34	15:43 (4) 16:01 (4)	08:34 16:05	15:25 (5) 15:27 (5)
13	05:10 21:52	05:59 21:01	19:40 (2) 20:15 (2)	06:54 19:49	07:48 18:36	18:00 (3) 18:07 (3)	07:47 16:32	15:44 (4) 15:59 (4)	08:35 16:05	15:25 (5) 15:27 (5)
14	05:12 21:51	06:01 20:59	19:40 (2) 20:16 (2)	06:56 19:47	07:50 18:33	18:01 (3) 18:04 (3)	07:49 16:31	15:45 (4) 15:58 (4)	08:36 16:04	
15	05:13 21:50	06:03 20:57	19:39 (2) 20:17 (2)	06:58 19:44	07:52 18:31		07:51 16:29	15:52 (5) 15:56 (4)	08:37 16:05	
16	05:14 21:49	06:04 20:55	19:38 (2) 20:16 (2)	06:59 19:42	07:54 18:29		07:53 16:27	15:20 (5) 15:54 (4)	08:38 16:05	
17	05:16 21:47	06:06 20:53	19:38 (2) 20:17 (2)	07:01 19:39	07:55 18:26		07:55 16:26	15:18 (5) 15:52 (4)	08:38 16:05	
18	05:17 21:46	06:08 20:51	19:38 (2) 20:17 (2)	07:03 19:37	07:57 18:24	16:55 (4) 17:10 (4)	07:57 16:24	15:17 (5) 15:36 (5)	08:39 16:05	
19	05:18 21:45	06:10 20:48	19:37 (2) 20:16 (2)	07:05 19:34	07:59 18:22	16:51 (4) 17:13 (4)	07:59 16:23	15:17 (5) 15:37 (5)	08:40 16:05	
20	05:20 21:44	06:12 20:46	19:37 (2) 20:16 (2)	07:06 19:32	08:01 18:20	16:49 (4) 17:15 (4)	08:00 16:22	15:16 (5) 15:37 (5)	08:41 16:06	
21	05:21 21:42	06:13 20:44	19:37 (2) 20:15 (2)	07:08 19:29	08:03 18:17	16:47 (4) 17:16 (4)	08:02 16:20	15:16 (5) 15:38 (5)	08:41 16:06	
22	05:23 21:41	06:15 20:42	19:36 (2) 20:12 (2)	07:10 19:27	08:05 18:15	16:45 (4) 17:18 (4)	08:04 16:19	15:16 (5) 15:39 (5)	08:42 16:06	
23	05:24 21:39	06:17 20:39	19:37 (2) 20:10 (2)	07:12 19:24	08:07 18:13	16:44 (4) 17:19 (4)	08:06 16:18	15:16 (5) 15:40 (5)	08:42 16:07	
24	05:26 21:38	06:19 20:37	19:37 (2) 20:09 (2)	07:13 19:22	08:09 18:11	16:42 (4) 17:19 (4)	08:08 16:17	15:16 (5) 15:40 (5)	08:43 16:08	
25	05:27 21:36	06:20 20:35	19:37 (2) 20:06 (2)	07:15 19:19	07:11 17:09	15:41 (4) 16:20 (4)	08:09 16:16	15:16 (5) 15:41 (5)	08:43 16:08	
26	05:29 21:35	06:22 20:32	19:37 (2) 20:04 (2)	07:17 19:17	07:13 17:06	15:40 (4) 16:21 (4)	08:11 16:14	15:16 (5) 15:40 (5)	08:43 16:09	
27	05:30 21:33	06:24 20:30	19:38 (2) 20:02 (2)	07:19 19:14	07:15 17:04	15:40 (4) 16:21 (4)	08:13 16:13	15:17 (5) 15:38 (5)	08:44 16:10	
28	05:32 21:32	06:26 20:28	19:38 (2) 19:59 (2)	07:21 19:12	07:16 17:02	15:39 (4) 16:21 (4)	08:14 16:12	15:17 (5) 15:37 (5)	08:44 16:11	
29	05:34 21:30	06:27 20:25	19:39 (2) 19:57 (2)	07:22 19:09	07:18 17:00	15:39 (4) 16:22 (4)	08:16 16:12	15:17 (5) 15:36 (5)	08:44 16:11	
30	05:35 21:28	06:29 20:23	19:41 (2) 19:55 (2)	07:24 19:07	18:09 (3) 18:20 (3)	15:38 (4) 16:22 (4)	08:18 16:11	15:18 (5) 15:35 (5)	08:44 16:12	15:33 (5) 15:34 (5)
31	05:37 21:27	06:31 20:21	19:41 (2) 19:52 (2)		07:22 16:56	15:38 (4) 16:22 (4)		08:44 16:13		15:34 (5) 15:35 (5)
Potential sun hours	512	460	382		328		259		233	
Total, worst case		798		17	728		747		106	
Sun reduction		0.34		0.32	0.29		0.27		0.21	
Oper. time red.		1.00		1.00	1.00		1.00		1.00	
Wind dir. red.		0.65		0.67	0.66		0.66		0.66	
Total reduction		0.22		0.21	0.19		0.17		0.14	
Total, real		177		4	142		131		15	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MU - H359

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MV - H360

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MW - H361

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MX - H362

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:54	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MY - H363

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: MZ - H364

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26		18:23 (4)	07:24	08:19
	16:15	17:06	18:02		20:00	20:55	21:45	22:00	21:25	20:18		19:05	13	18:36 (4)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	04:59	05:40	06:35		07:28		18:24 (4)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:46	22:00	21:23	20:16		19:02	9	18:33 (4)	16:52	16:09
3	08:43	08:10	07:11		06:56	05:48	05:01	05:00	05:42	06:36		07:30		18:24 (4)	07:28	08:22
	16:17	17:10	18:05		20:04	20:59	21:48	21:59	21:21	20:13		19:00	7	18:31 (4)	16:50	16:08
4	08:43	08:08	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:31		18:25 (4)	07:30	08:24
	16:18	17:12	18:07		20:06	21:01	21:49	21:59	21:19	20:11		18:57	4	18:29 (4)	16:48	16:08
5	08:43	08:07	07:07		06:51	05:44	04:59	05:02	05:45	06:40		07:33			07:32	08:25
	16:19	17:14	18:09		20:07	21:03	21:50	21:58	21:17	20:09		18:55			16:46	16:07
6	08:42	08:05	07:04		06:49	05:42	04:58	05:03	05:47	06:42		07:35			07:34	08:26
	16:21	17:16	18:11		20:09	21:04	21:51	21:57	21:15	20:06		18:52			16:44	16:07
7	08:42	08:03	07:02		06:47	05:40	04:58	05:04	05:49	06:43		07:37			07:36	08:28
	16:22	17:18	18:13		20:11	21:06	21:52	21:57	21:13	20:04		18:50			16:43	16:06
8	08:41	08:01	07:00		06:44	05:38	04:57	05:05	05:50	06:45		07:39			07:38	08:29
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:11	20:01		18:48			16:41	16:06
9	08:41	07:59	06:57		17:48 (4)	06:42	05:36	04:57	05:06	05:52		07:41			07:40	08:30
	16:25	17:22	18:17	2	17:50 (4)	20:15	21:10	21:54	21:55	21:09		18:45			16:39	16:05
10	08:40	07:57	06:55		17:47 (4)	06:39	05:34	04:56	05:07	05:54		07:42			07:42	08:31
	16:26	17:24	18:19	5	17:52 (4)	20:17	21:11	21:55	21:57	21:07		18:43			16:37	16:05
11	08:40	07:55	06:52		17:45 (4)	06:37	05:32	04:56	05:08	05:56		07:44			07:43	08:33
	16:28	17:26	18:21	9	17:54 (4)	20:18	21:13	21:55	21:54	21:05		18:40			16:35	16:05
12	08:39	07:53	06:50		17:45 (4)	06:35	05:31	04:55	05:09	05:57		07:46			07:45	08:34
	16:30	17:28	18:23	11	17:56 (4)	20:20	21:15	21:56	21:53	21:03		18:38			16:34	16:05
13	08:38	07:51	06:48		17:44 (4)	06:32	05:29	04:55	05:10	05:59		07:48			07:47	08:35
	16:31	17:30	18:25	14	17:58 (4)	20:22	21:17	21:57	21:52	21:01		18:36			16:32	16:04
14	08:37	07:49	06:45		17:44 (4)	06:30	05:27	04:55	05:12	06:01		07:50			07:49	08:36
	16:33	17:32	18:26	16	18:00 (4)	20:24	21:18	21:57	21:51	20:59		18:33			16:30	16:04
15	08:36	07:47	06:43		17:44 (4)	06:28	05:25	04:54	05:13	06:03		07:52			07:51	08:37
	16:34	17:34	18:28	18	18:02 (4)	20:26	21:20	21:58	21:50	20:57		18:31			16:29	16:04
16	08:35	07:45	06:40		17:43 (4)	06:25	05:24	04:54	05:14	06:04		07:54			07:53	08:38
	16:36	17:36	18:30	21	18:04 (4)	20:28	21:22	21:59	21:48	20:55		18:29			16:27	16:05
17	08:34	07:43	06:38		17:44 (4)	06:23	05:22	04:54	05:16	06:06		07:55			07:55	08:38
	16:38	17:38	18:32	22	18:06 (4)	20:30	21:23	21:59	21:47	20:53		18:26			16:26	16:05
18	08:33	07:41	06:35		17:44 (4)	06:21	05:21	04:54	05:17	06:08		07:57			07:57	08:39
	16:40	17:40	18:34	20	18:04 (4)	20:31	21:25	22:00	21:46	20:50		18:24			16:24	16:05
19	08:32	07:39	06:33		17:46 (4)	06:18	05:19	04:54	05:18	06:10		07:59			07:59	08:40
	16:41	17:42	18:36	17	18:03 (4)	20:33	21:27	22:00	21:45	20:48		18:22			16:23	16:05
20	08:31	07:36	06:31		17:47 (4)	06:16	05:18	04:54	05:20	06:12		08:01			08:00	08:41
	16:43	17:44	18:38	13	18:00 (4)	20:35	21:28	22:00	21:44	20:46		18:20			16:22	16:06
21	08:30	07:34	06:28		17:50 (4)	06:14	05:16	04:54	05:21	06:13		08:03			08:02	08:41
	16:45	17:46	18:40	8	17:58 (4)	20:37	21:30	22:00	21:42	20:44		18:17			16:20	16:06
22	08:28	07:32	06:26		06:11	05:15	04:55	05:23	06:15	07:10		08:05			08:04	08:42
	16:47	17:48	18:41		20:39	21:31	22:01	21:41	20:42	19:27	5	18:41 (4)			16:19	16:06
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12		18:32 (4)			08:06	08:42
	16:49	17:50	18:43		20:41	21:33	22:01	21:39	20:39	19:24	12	18:44 (4)			16:18	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:13		18:30 (4)			08:07	08:43
	16:50	17:52	18:45		20:42	21:34	22:01	21:38	20:37	19:22	16	18:46 (4)			16:17	16:08
25	08:24	07:25	06:18		06:05	05:11	04:55	05:27	06:20	07:15		18:27 (4)			08:09	08:43
	16:52	17:54	18:47		20:44	21:36	22:01	21:36	20:35	19:19	19	18:46 (4)			16:16	16:08
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17		18:26 (4)			08:11	08:43
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:32	19:17	21	18:47 (4)			16:14	16:09
27	08:21	07:21	06:13		06:00	05:08	04:56	05:30	06:24	07:19		18:25 (4)			08:13	08:44
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:14	21	18:46 (4)			16:13	16:10
28	08:20	07:18	06:11		05:58	05:07	04:57	05:32	06:26	07:21		18:25 (4)			08:14	08:44
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	19	18:44 (4)			16:12	16:10
29	08:18		07:08		05:56	05:06	04:57	05:34	06:27	07:22		18:24 (4)			08:16	08:44
	17:00		19:54		20:52	21:41	22:01	21:30	20:25	19:09	17	18:41 (4)			16:11	16:11
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		18:23 (4)			08:17	08:44
	17:02		19:56		20:53	21:43	22:00	21:28	20:23	19:07	15	18:38 (4)			16:11	16:12
31	08:15		07:04			05:04		05:37	06:31			07:22				08:44
	17:04		19:58			21:44		21:26	20:21			16:56				16:13
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case				176						145		33				
Sun reduction				0.27						0.32		0.29				
Oper. time red.				1.00						1.00		1.00				
Wind dir. red.				0.67						0.67		0.67				
Total reduction				0.18						0.22		0.20				
Total, real				32						31		6				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NA - H365

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	21:08 (4)	04:59	21:11 (4)	05:39	06:33	07:26	07:24	08:19
2	16:15	17:06	18:02	20:00	20:55	21:45	21:10 (4)	22:00	21:24 (4)	21:25	20:18	19:05	16:54	16:10
	08:44	08:12	07:14	06:59	05:50	05:02	21:08 (4)	05:00	21:12 (4)	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:46	21:12 (4)	21:59	21:24 (4)	21:23	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48	05:01	21:08 (4)	05:00	21:12 (4)	05:42	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48	21:13 (4)	21:59	21:23 (4)	21:21	20:13	19:00	16:50	16:08
	08:43	08:08	07:09	06:54	05:46	05:00	21:07 (4)	05:01	21:12 (4)	05:44	06:38	07:31	07:30	08:23
4	16:18	17:12	18:07	20:06	21:01	21:49	21:14 (4)	21:59	21:23 (4)	21:19	20:11	18:57	16:48	16:08
	08:43	08:07	07:07	06:51	05:44	04:59	21:08 (4)	05:02	21:13 (4)	05:45	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07	21:02	21:50	21:15 (4)	21:58	21:23 (4)	21:17	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	04:59	21:07 (4)	05:03	21:13 (4)	05:47	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	21:51	21:16 (4)	21:57	21:22 (4)	21:15	20:06	18:52	16:44	16:07
	08:42	08:03	07:02	06:47	05:40	04:58	21:07 (4)	05:04	21:14 (4)	05:49	06:43	07:37	07:36	08:28
8	16:22	17:18	18:13	20:11	21:06	21:52	21:16 (4)	21:57	21:22 (4)	21:13	20:04	18:50	16:43	16:06
	08:41	08:01	07:00	06:44	05:38	04:57	21:07 (4)	05:05	21:14 (4)	05:51	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	21:17 (4)	21:56	21:21 (4)	21:11	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	04:57	21:06 (4)	05:06	21:15 (4)	05:52	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	21:18 (4)	21:55	21:21 (4)	21:09	19:59	18:45	16:39	16:05
	08:40	07:57	06:55	06:39	05:34	04:56	21:07 (4)	05:07	21:15 (4)	05:54	06:49	07:42	07:42	08:31
10	16:27	17:24	18:19	20:17	21:11	21:54	21:19 (4)	21:54	21:20 (4)	21:07	19:56	18:43	16:37	16:05
	08:40	07:55	06:52	06:37	05:33	04:56	21:07 (4)	05:08	21:16 (4)	05:56	06:50	07:44	07:43	08:32
	16:28	17:26	18:21	20:18	21:13	21:55	21:20 (4)	21:54	21:19 (4)	21:05	19:54	18:40	16:35	16:05
12	08:39	07:53	06:50	06:35	05:31	04:55	21:07 (4)	05:09	21:16 (4)	05:57	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15	21:56	21:20 (4)	21:53	21:18 (4)	21:03	19:51	18:38	16:34	16:05
	08:38	07:51	06:48	06:32	05:29	04:55	21:07 (4)	05:11	21:15 (4)	05:59	06:54	07:48	07:47	08:35
14	16:31	17:30	18:25	20:22	21:17	21:57	21:21 (4)	21:52	21:01	21:49	19:49	18:36	16:32	16:05
	08:37	07:49	06:45	06:30	05:27	04:55	21:07 (4)	05:12	21:01	21:49	19:49	18:36	16:32	16:05
	16:33	17:32	18:27	20:24	21:18	21:57	21:22 (4)	21:51	20:59	21:46	19:46	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26	04:55	21:08 (4)	05:13	20:59	21:46	19:46	18:33	16:31	16:05
	16:34	17:34	18:28	20:26	21:20	21:58	21:22 (4)	21:50	20:57	21:44	19:44	18:31	16:29	16:05
	08:35	07:45	06:40	06:25	05:24	04:54	21:08 (4)	05:14	20:59	21:46	19:44	18:31	16:29	16:05
16	16:36	17:36	18:30	20:28	21:22	21:59	21:23 (4)	21:48	20:55	21:42	19:42	18:29	16:27	16:05
	08:34	07:43	06:38	06:23	05:22	04:54	21:08 (4)	05:16	20:56	21:43	19:41	18:28	16:26	16:05
	16:38	17:38	18:32	20:30	21:23	21:59	21:23 (4)	21:47	20:53	21:39	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	05:21	04:54	21:08 (4)	05:17	20:50	21:44	19:37	18:24	16:25	16:05
	16:40	17:40	18:34	20:31	21:25	21:59	21:24 (4)	21:46	20:50	21:37	19:37	18:24	16:25	16:05
	08:32	07:39	06:33	06:18	05:19	04:54	21:08 (4)	05:18	20:48	21:41	19:34	18:22	16:23	16:05
20	16:41	17:42	18:36	20:33	21:26	22:00	21:24 (4)	21:45	20:48	21:34	19:34	18:22	16:23	16:05
	08:31	07:36	06:31	06:16	05:18	04:54	21:08 (4)	05:20	20:46	21:37	19:32	18:20	16:22	16:06
	16:43	17:44	18:38	20:35	21:28	22:00	21:24 (4)	21:43	20:46	21:32	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	04:54	21:09 (4)	05:21	20:44	21:34	19:30	18:17	16:20	16:06
	16:45	17:46	18:40	20:37	21:30	22:00	21:24 (4)	21:42	20:44	21:30	19:29	18:17	16:20	16:06
	08:28	07:32	06:26	06:12	05:15	04:55	21:09 (4)	05:23	20:41	21:32	19:27	18:15	16:19	16:06
23	16:47	17:48	18:41	20:39	21:31	22:01	21:25 (4)	21:41	20:41	21:27	19:27	18:15	16:19	16:06
	08:27	07:30	06:23	06:09	05:13	04:55	21:09 (4)	05:24	20:39	21:24	19:24	18:13	16:18	16:07
	16:49	17:50	18:43	20:41	21:33	22:01	21:25 (4)	21:39	20:39	21:24	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	04:55	21:09 (4)	05:26	20:39	21:24	19:24	18:13	16:18	16:07
	16:51	17:52	18:45	20:42	21:34	22:01	21:25 (4)	21:38	20:37	21:22	19:22	18:11	16:17	16:08
	08:24	07:25	06:18	06:05	05:11	04:56	21:10 (4)	05:27	20:30	21:15	19:15	18:09	16:16	16:08
25	16:52	17:54	18:47	20:44	21:36	22:01	21:25 (4)	21:36	20:35	21:19	19:19	18:11	16:16	16:08
	08:23	07:23	06:16	06:03	05:09	04:56	21:10 (4)	05:29	20:35	21:19	19:19	18:11	16:16	16:08
	16:54	17:56	18:49	20:46	21:37	22:01	21:25 (4)	21:35	20:32	21:17	19:17	18:09	16:15	16:09
27	08:21	07:21	06:13	06:01	05:08	04:56	21:10 (4)	05:30	20:32	21:17	19:17	18:09	16:15	16:09
	16:56	17:58	18:51	20:48	21:39	22:01	21:24 (4)	21:33	20:30	21:14	19:14	18:06	16:13	16:10
	08:20	07:18	06:11	05:58	05:07	04:57	21:11 (4)	05:32	20:28	21:16	19:16	18:08	16:14	16:11
28	16:58	18:00	18:53	20:50	21:40	22:01	21:25 (4)	21:32	20:28	21:12	19:12	18:04	16:12	16:11
	08:18		07:08	05:56	05:06	04:58	21:11 (4)	05:34	20:27	21:10	19:10	18:02	16:10	16:11
	17:00		19:54	20:52	21:41	22:00	21:25 (4)	21:30	20:25	21:09	19:09	18:00	16:12	16:11
30	08:17		07:06	05:54	05:05	04:58	21:11 (4)	05:35	20:25	21:09	19:09	18:00	16:12	16:11
	17:02		19:56	20:53	21:43	22:00	21:24 (4)	21:28	20:23	21:07	19:07	18:00	16:12	16:11
	08:15		07:04		05:04	21:08 (4)		05:37	20:23	21:07	19:07	18:00	16:12	16:11
31	17:04		19:58		21:44	1	21:09 (4)	21:26	20:21	21:07	19:07	18:00	16:12	16:11
Potential sun hours	250	273	367	420	494	510		512	460	382	328	259	233	
Total, worst case					1	372		97						
Sun reduction					0.38	0.32		0.32						
Oper. time red.					1.00	1.00		1.00						
Wind dir. red.					0.61	0.61		0.61						
Total reduction					0.23	0.19		0.20						
Total, real					0	72		19						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NB - H366

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	05:03 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:54	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: NC - H367

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		15:40 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24					08:19		15:20 (2)			
	16:15		17:06	29	16:09 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54							16:10	14	15:34 (2)	
2	08:44		08:12		15:41 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26					08:21		15:21 (2)			
	16:16		17:08	28	16:09 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52					16:09	11	15:32 (2)			
3	08:44		08:10		15:42 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28				15:23 (2)	08:22		15:22 (2)			
	16:17		17:10	26	16:08 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50				15:28 (2)	16:08	10	15:32 (2)			
4	08:43		08:08		15:43 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30				15:19 (2)	08:24		15:24 (2)			
	16:18		17:12	24	16:07 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48				15:32 (2)	16:08	8	15:32 (2)			
5	08:43		08:07		15:45 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32				15:16 (2)	08:25		15:25 (2)			
	16:19		17:14	21	16:06 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46				15:34 (2)	16:07	5	15:30 (2)			
6	08:43		08:05		15:47 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34				15:14 (2)	08:26		15:27 (2)			
	16:21	3	15:41 (2)	17	16:04 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44				15:36 (2)	16:07	3	15:30 (2)			
7	08:42		08:03		15:49 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				15:13 (2)	08:28		15:27 (2)			
	16:22	5	15:45 (2)	13	16:02 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				15:37 (2)	16:06		15:27 (2)			
8	08:42		08:01		15:39 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38				15:12 (2)	08:29		15:27 (2)			
	16:24	7	15:46 (2)		15:46 (2)	17:20	18:15	20:13	21:08	21:53	21:12	20:01	18:48	16:41				15:38 (2)	16:06	26	15:38 (2)			
9	08:41		07:59		15:39 (2)	06:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41				15:12 (2)	08:30		15:30 (2)			
	16:25	10	15:49 (2)		15:49 (2)	17:22	18:17	20:15	21:10	21:54	21:10	19:59	18:45	16:39				15:40 (2)	16:05	28	15:40 (2)			
10	08:40		07:57		15:39 (2)	06:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42				15:11 (2)	08:32		15:32 (2)			
	16:26	11	15:50 (2)		15:50 (2)	17:24	18:19	20:17	21:11	21:55	21:08	19:56	18:43	16:37				15:40 (2)	16:05	29	15:40 (2)			
11	08:40		07:55		15:38 (2)	06:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44				15:11 (2)	08:33		15:33 (2)			
	16:28	14	15:52 (2)		15:52 (2)	17:26	18:21	20:19	21:13	21:55	21:05	19:54	18:40	16:35				15:41 (2)	16:05	30	15:41 (2)			
12	08:39		07:53		15:38 (2)	06:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46				15:10 (2)	08:34		15:34 (2)			
	16:29	16	15:54 (2)		15:54 (2)	17:28	18:23	20:20	21:15	21:56	21:03	19:51	18:38	16:34				15:41 (2)	16:05	31	15:41 (2)			
13	08:38		07:51		15:37 (2)	06:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48				15:10 (2)	08:35		15:35 (2)			
	16:31	18	15:55 (2)		15:55 (2)	17:30	18:25	20:22	21:17	21:57	21:01	19:49	18:36	16:32				15:42 (2)	16:04	32	15:42 (2)			
14	08:37		07:49		15:37 (2)	06:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50				15:10 (2)	08:36		15:36 (2)			
	16:33	20	15:57 (2)		15:57 (2)	17:32	18:27	20:24	21:18	21:58	21:01	19:49	18:33	16:31				15:42 (2)	16:04	32	15:42 (2)			
15	08:36		07:47		15:37 (2)	06:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52				15:10 (2)	08:37		15:37 (2)			
	16:34	22	15:59 (2)		15:59 (2)	17:34	18:28	20:26	21:20	21:58	21:04	19:52	18:39	16:34				15:42 (2)	16:04	32	15:42 (2)			
16	08:35		07:45		15:36 (2)	06:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54				15:10 (2)	08:38		15:38 (2)			
	16:36	24	16:00 (2)		16:00 (2)	17:36	18:30	20:28	21:22	21:59	21:05	19:42	18:29	16:27				15:42 (2)	16:05	32	15:42 (2)			
17	08:34		07:43		15:36 (2)	06:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55				15:10 (2)	08:38		15:38 (2)			
	16:38	26	16:02 (2)		16:02 (2)	17:38	18:32	20:30	21:23	21:59	21:07	19:44	18:31	16:29				15:43 (2)	16:05	33	15:43 (2)			
18	08:33		07:41		15:36 (2)	06:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57				15:10 (2)	08:39		15:39 (2)			
	16:40	29	16:05 (2)		16:05 (2)	17:40	18:34	20:31	21:25	22:00	21:06	19:43	18:30	16:24				15:43 (2)	16:05	33	15:43 (2)			
19	08:32		07:39		15:37 (2)	06:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59				15:10 (2)	08:40		15:40 (2)			
	16:41	30	16:07 (2)		16:07 (2)	17:42	18:36	20:33	21:27	22:00	21:08	19:45	18:32	16:23				15:43 (2)	16:05	33	15:43 (2)			
20	08:31		07:36		15:36 (2)	06:36	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01				15:11 (2)	08:41		15:41 (2)			
	16:43	31	16:07 (2)		16:07 (2)	17:44	18:38	20:35	21:28	22:00	21:08	19:46	18:33	16:22				15:43 (2)	16:06	32	15:43 (2)			
21	08:30		07:34		15:36 (2)	06:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03				15:11 (2)	08:41		15:41 (2)			
	16:45	32	16:08 (2)		16:08 (2)	17:46	18:40	20:37	21:30	22:01	21:09	19:47	18:34	16:20				15:43 (2)	16:06	32	15:43 (2)			
22	08:29		07:32		15:36 (2)	06:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05				15:12 (2)	08:42		15:42 (2)			
	16:47	32	16:08 (2)		16:08 (2)	17:48	18:42	20:39	21:31	22:01	21:09	19:47	18:34	16:20				15:43 (2)	16:06	31	15:43 (2)			
23	08:27		07:30		15:36 (2)	06:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07				15:13 (2)	08:42		15:42 (2)			
	16:49	33	16:09 (2)		16:09 (2)	17:50	18:43	20:41	21:33	22:01	21:09	19:47	18:34	16:20				15:43 (2)	16:07	30	15:43 (2)			
24	08:26		07:28		15:36 (2)	06:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09				15:13 (2)	08:43		15:43 (2)			
	16:50	33	16:09 (2)		16:09 (2)	17:52	18:45	20:43	21:34	22:01	21:09	19:47	18:34	16:20				15:43 (2)	16:07	29	15:42 (2)			
25	08:25		07:25		15:37 (2)	06:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11				15:14 (2)	08:43		15:43 (2)			
	16:52	33	16:10 (2)		16:10 (2)	17:54	18:47	20:44	21:36	22:01	21:09	19:47	18:34	16:20				15:43 (2)	16:07	27	15:41 (2)			
26	08:23		07:23		15:37 (2)	06:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13				15:15 (2)	08:43		15:43 (2)			
	16:54	32	16:09 (2)		16:09 (2)	17:56	18:49	20:46	21:37	22:01	21:09	19:47	18:34	16:20				15:43 (2)	16:07	24	15:39 (2)			
27	08:22		07:21		15:37 (2)	06:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15				15:16 (2)	08:44		15:44 (2)			
	16:56	32	16:09 (2)		16:09 (2)	17:58	18:51	20:48	21:39	22:01	21:09	19:47	18:34	16:20				15:43 (2)	16:10	22	15:38 (2)			
28	08:20		07:18		15:38 (2)	06:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16				15:17 (2)	08:44		15:44 (2)			
	16:58	32	16:10 (2)		16:10 (2)	18:00	18:53	20:50	21:40	22:01	21:09	19:47	18:34	16:20				15:43 (2)	16:10	20	15:37 (2)			
29	08:19		07:18		15:38 (2)	06:18	07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18				15:17 (2)	08:44		15:44 (2)			
	17:00	32	16:10 (2)		16:10 (2)	18:02	19:55	20:52	21:41	22:01	21:09	19:47	18:34	16:20				15:43 (2)	16:11	18	15:35 (2)			
30	08:17		07:17		15:38 (2)	06:17	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20				15:19 (2)	08:44		15:44 (2)			
	17:02	31	16:09 (2)		16:09 (2)	18:04	19:56	20:54	21:43	22:00	21:09	19:47	18:34	16:20				15:43 (2)	16:12	16	15:35 (2)			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: ND - H368

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NE - H369

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	08:14	16:08 (5)	07:16	16:49 (4)	07:01	05:52	19:50 (2)	05:03		
	16:15	17:06	21	16:29 (5)	18:02	37	17:26 (4)	20:00	20:55	33	20:23 (2)
2	08:44	08:12	16:09 (5)	07:14	16:49 (4)	06:59	05:50	19:50 (2)	05:02		
	16:16	17:08	19	16:28 (5)	18:04	35	17:24 (4)	20:02	20:57	33	20:23 (2)
3	08:44	08:10	16:10 (5)	07:12	16:50 (4)	06:56	05:48	19:50 (2)	05:01		
	16:17	17:10	17	16:27 (5)	18:06	34	17:24 (4)	20:04	20:59	32	20:22 (2)
4	08:43	08:08	16:11 (5)	07:09	16:52 (4)	06:54	05:46	19:51 (2)	05:00		
	16:18	17:12	15	16:26 (5)	18:07	31	17:23 (4)	20:06	21:01	30	20:21 (2)
5	08:43	08:07	16:14 (5)	07:07	16:52 (4)	06:51	05:44	19:51 (2)	04:59		
	16:19	17:14	10	16:24 (5)	18:09	29	17:21 (4)	20:07	21:03	29	20:20 (2)
6	08:42	08:05	16:15 (4)	07:04	16:55 (4)	06:49	05:42	19:52 (2)	04:59		
	16:21	17:16		18:11	24	17:19 (4)	20:09	21:04	27	20:19 (2)	21:51
7	08:42	08:03	16:16 (4)	07:02	16:56 (4)	06:47	05:40	19:53 (2)	04:58		
	16:22	17:18		18:13	20	17:16 (4)	20:11	21:06	26	20:19 (2)	21:52
8	08:42	08:01	16:17 (4)	07:00	17:00 (4)	06:44	05:38	19:54 (2)	04:57		
	16:24	17:20		18:15	15	17:48 (3)	20:13	21:08	24	20:18 (2)	21:53
9	08:41	07:59	16:18 (4)	06:57	17:45 (3)	06:42	05:36	19:55 (2)	04:57		
	16:25	17:22		18:17	5	17:50 (3)	20:15	21:10	21	20:16 (2)	21:54
10	08:40	07:57	16:19 (4)	06:55	17:44 (3)	06:39	05:34	19:56 (2)	04:56		
	16:26	17:24		18:19	8	17:52 (3)	20:17	21:11	19	20:15 (2)	21:55
11	08:40	07:55	16:20 (4)	06:52	17:44 (3)	06:37	05:33	19:59 (2)	04:56		
	16:28	17:26		18:21	11	17:55 (3)	20:19	21:13	14	20:13 (2)	21:55
12	08:39	07:53	16:21 (4)	06:50	17:43 (3)	06:35	05:31	20:01 (2)	04:55		
	16:30	17:28	2	16:58 (4)	18:23	13	17:56 (3)	20:20	21:15	9	20:10 (2)
13	08:38	07:51	16:22 (4)	06:48	17:43 (3)	06:32	05:29		04:55		
	16:31	17:30	5	17:00 (4)	18:25	15	17:58 (3)	20:22	21:17		21:57
14	08:37	07:49	16:23 (4)	06:45	17:42 (3)	06:30	05:27		04:55		
	16:33	17:32	8	17:02 (4)	18:27	18	18:00 (3)	20:24	21:18		21:58
15	08:36	07:47	16:24 (4)	06:43	17:43 (3)	06:28	05:26		04:54		
	16:34	17:34	12	17:05 (4)	18:28	19	18:02 (3)	20:26	21:20		21:58
16	08:35	07:45	16:25 (4)	06:40	17:42 (3)	06:25	05:24		04:54		
	16:36	17:36	15	17:07 (4)	18:30	22	18:04 (3)	20:28	21:22		21:59
17	08:34	07:43	16:26 (4)	06:38	17:43 (3)	06:23	05:22		04:54		
	16:38	17:38	18	17:09 (4)	18:32	22	18:05 (3)	20:30	21:23		21:59
18	08:33	07:41	16:27 (4)	06:35	17:44 (3)	06:21	19:59 (2)	05:21	04:54		
	16:40	17:40	21	17:11 (4)	18:34	19	18:03 (3)	20:31	21:25		22:00
19	08:32	16:06 (5)	07:39	16:49 (4)	06:33	17:46 (3)	06:18	19:57 (2)	05:19		04:54
	16:41	16:07 (5)	24	17:13 (4)	18:36	15	18:01 (3)	20:33	21:27		22:00
20	08:31	16:05 (5)	07:36	16:49 (4)	06:31	17:47 (3)	06:16	19:56 (2)	05:18		04:54
	16:43	16:08 (5)	27	17:16 (4)	18:38	11	17:58 (3)	20:35	21:28		22:00
21	08:30	16:05 (5)	07:34	16:49 (4)	06:28	06:14	19:54 (2)	05:16	04:54		
	16:45	16:11 (5)	29	17:18 (4)	18:40	20:37	20:08 (2)	21:30	22:01		
22	08:29	16:04 (5)	07:32	16:48 (4)	06:26	06:12	19:53 (2)	05:15	04:55		
	16:47	16:12 (5)	31	17:19 (4)	18:42	20:39	20:10 (2)	21:31	22:01		
23	08:27	16:05 (5)	07:30	16:48 (4)	06:23	06:09	19:52 (2)	05:13	04:55		
	16:49	16:15 (5)	34	17:22 (4)	18:43	20:41	20:12 (2)	21:33	22:01		
24	08:26	16:04 (5)	07:28	16:48 (4)	06:21	06:07	19:51 (2)	05:12	04:55		
	16:50	16:17 (5)	36	17:24 (4)	18:45	20:42	20:14 (2)	21:34	22:01		
25	08:24	16:05 (5)	07:25	16:47 (4)	06:18	06:05	19:51 (2)	05:11	04:55		
	16:52	16:19 (5)	39	17:26 (4)	18:47	20:44	20:15 (2)	21:36	22:01		
26	08:23	16:05 (5)	07:23	16:48 (4)	06:16	06:03	19:50 (2)	05:09	04:56		
	16:54	16:21 (5)	40	17:28 (4)	18:49	20:46	20:17 (2)	21:37	22:01		
27	08:22	16:05 (5)	07:21	16:49 (4)	06:13	06:01	19:50 (2)	05:08	04:56		
	16:56	16:23 (5)	39	17:28 (4)	18:51	20:48	20:19 (2)	21:39	22:01		
28	08:20	16:06 (5)	07:18	16:48 (4)	06:11	05:58	19:50 (2)	05:07	04:57		
	16:58	16:26 (5)	38	17:26 (4)	18:53	20:50	20:21 (2)	21:40	22:01		
29	08:18	16:06 (5)		07:08	18:54	05:56	19:50 (2)	05:06	04:57		
	17:00	16:28 (5)		19:54	20:52	32	20:22 (2)	21:41	22:01		
30	08:17	16:06 (5)		07:06	18:55	05:54	19:50 (2)	05:05	04:58		
	17:02	16:29 (5)		19:56	20:53	34	20:24 (2)	21:43	22:00		
31	08:15	16:06 (5)		07:04	18:56		05:04				
	17:04	16:29 (5)		19:58			21:44				
Potential sun hours	250		273		367		420		494		510
Total, worst case	177		500		403		274		297		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.67		0.67		0.65		0.65		
Total reduction	0.16		0.16		0.18		0.23		0.25		
Total, real	28		78		73		63		73		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: NE - H369

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September		October		November		December
1	04:59 22:00	05:39 21:25	20:10 (2)	06:33	07:26	18:21 (3)	07:24		08:19 16:10
2	04:59 22:00	05:40 21:23	20:08 (2)	06:35	07:28	18:21 (3)	07:26		08:21 16:09
3	05:00 21:59	05:42 21:21	20:06 (2)	06:36	07:30	18:22 (3)	07:28		08:22 16:08
4	05:01 21:59	05:44 21:19	20:05 (2)	06:38	07:31	18:22 (3)	07:30		08:24 16:08
5	05:02 21:58	05:45 21:17	20:03 (2)	06:40	07:33	17:40 (4)	07:32	15:47 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	20:02 (2)	06:42	07:35	17:35 (4)	07:34	15:43 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	20:02 (2)	06:43	07:37	17:31 (4)	07:36	15:41 (5)	08:28 16:06
8	05:05 21:56	05:50 21:12	20:00 (2)	06:45	07:39	17:29 (4)	07:38	15:40 (5)	08:29 16:06
9	05:06 21:55	05:52 21:10	20:00 (2)	06:47	07:41	17:27 (4)	07:40	15:39 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	19:59 (2)	06:49	07:42	17:25 (4)	07:42	15:39 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	19:58 (2)	06:50	07:44	17:24 (4)	07:44	15:38 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	19:58 (2)	06:52	07:46	17:23 (4)	07:45	15:38 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01	19:57 (2)	06:54	07:48	17:22 (4)	07:47	15:38 (5)	08:35 16:05
14	05:12 21:51	06:01 20:59	19:57 (2)	06:56	07:50	17:21 (4)	07:49	15:37 (5)	08:36 16:04
15	05:13 21:50	06:03 20:57	19:58 (2)	06:58	07:52	17:20 (4)	07:51	15:37 (5)	08:37 16:05
16	05:14 21:49	06:04 20:55	19:57 (2)	06:59	07:54	17:20 (4)	07:53	15:38 (5)	08:38 16:05
17	05:16 21:47	06:06 20:53	19:57 (2)	07:01	07:55	17:20 (4)	07:55	15:38 (5)	08:38 16:05
18	05:17 21:46	06:08 20:51	19:58 (2)	07:03	07:57	17:19 (4)	07:57	15:38 (5)	08:39 16:05
19	05:18 21:45	06:10 20:48	19:57 (2)	07:05	07:59	17:19 (4)	07:59	15:39 (5)	08:40 16:05
20	05:20 21:44	06:12 20:46	19:58 (2)	07:06	08:01	17:19 (4)	08:00	15:39 (5)	08:41 16:06
21	05:21 21:42	06:13 20:44	19:59 (2)	07:08	08:03	17:19 (4)	08:02	15:40 (5)	08:41 16:06
22	05:23 21:41	06:15 20:42	19:58 (2)	07:10	08:05	17:19 (4)	08:04	15:41 (5)	08:42 16:06
23	05:24 21:39	06:17 20:39	20:00 (2)	07:12	18:33 (3)	18:07	08:06	15:42 (5)	08:42 16:07
24	05:26 21:38	06:19 20:37	20:01 (2)	07:13	18:30 (3)	08:09	08:08		08:43 16:08
25	05:27 21:36	06:20 20:35	20:02 (2)	07:15	18:27 (3)	07:11	16:21 (4)	08:09	08:43 16:08
26	05:29 21:35	06:22 20:32	20:06 (2)	07:17	18:25 (3)	07:13	16:21 (4)	08:11	08:43 16:09
27	05:30 21:33	06:24 20:30		19:17	18:46 (3)	17:06	16:36 (4)	16:14	16:09 08:44
28	05:32 21:32	06:26 20:28		07:19	18:24 (3)	07:15	16:22 (4)	08:13	08:44 16:10
29	05:34 21:30	06:27 20:25		19:14	18:46 (3)	17:04	16:34 (4)	16:13	16:10 08:44
30	05:35 21:28	06:29 20:23		07:21	18:24 (3)	07:16	16:23 (4)	08:14	08:44 16:11
31	05:37 21:26	06:31 20:21		19:12	18:44 (3)	17:02	8	16:31 (4)	16:12 08:44
				07:22	18:23 (3)	07:18	16:25 (4)	08:16	08:44 16:11
				19:09	18:41 (3)	17:00	4	16:29 (4)	16:12 08:44
				07:24	18:22 (3)	07:20	16:26 (4)	08:18	08:44 16:12
				19:07	18:38 (3)	16:58	1	16:27 (4)	16:11 08:44
						07:22			08:44 16:13
Potential sun hours	512	460		382		328		259	233
Total, worst case		578		138		697		265	
Sun reduction		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00	
Wind dir. red.		0.65		0.67		0.67		0.66	
Total reduction		0.22		0.22		0.20		0.18	
Total, real		128		30		137		47	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NF - H370

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NG - H371

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NH - H372

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NI - H373

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NJ - SAINT PATRICK'S NATIONAL SCHOOL

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: NK - H374

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

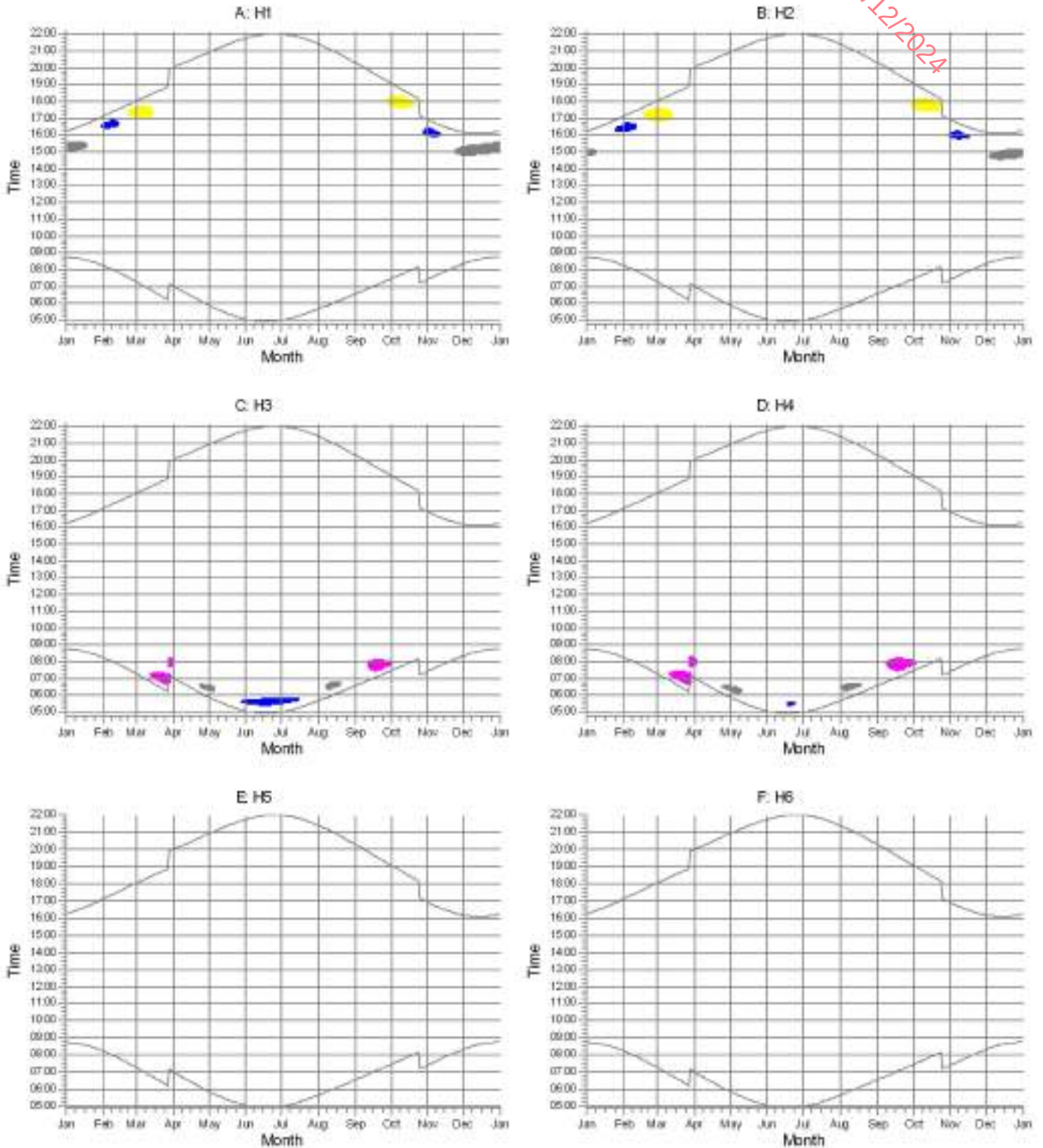
	January	February	March	April	May	June	July	August	September	October	November	December																																																																																													
1	08:44 08:14 07:16 07:01 05:52 05:03 20:01 (5) 04:59 20:06 (5) 05:39 20:24 (5) 06:33 07:26 07:24 08:19	16:15 17:06 18:02 20:00 20:55 21:45 21:09 (5) 22:00 21:17 (5) 21:25 20:53 (5) 20:18 19:05 16:54 16:10	2	08:44 08:12 07:14 06:59 05:50 05:02 20:01 (5) 05:00 20:06 (5) 05:40 20:26 (5) 06:35 07:28 07:26 08:21	16:16 17:08 18:04 20:02 20:57 21:46 21:10 (5) 22:00 21:18 (5) 21:23 20:52 (5) 20:16 19:02 16:52 16:09	3	08:43 08:10 07:12 06:56 05:48 05:01 20:01 (5) 05:00 20:06 (5) 05:42 20:27 (5) 06:36 07:30 07:28 08:22	16:17 17:10 18:06 20:04 20:59 21:48 21:11 (5) 21:59 21:17 (5) 21:21 20:50 (5) 20:13 19:00 16:50 16:08	4	08:43 08:08 07:09 06:54 05:46 05:00 20:01 (5) 05:01 20:06 (5) 05:44 20:30 (5) 06:38 07:31 07:30 08:24	16:18 17:12 18:08 20:06 21:01 21:49 21:11 (5) 21:59 21:17 (5) 21:19 20:48 (5) 20:11 18:57 16:48 16:08	5	08:43 08:07 07:07 06:51 05:44 04:59 20:01 (5) 05:02 20:07 (5) 05:45 20:32 (5) 06:40 07:33 07:32 08:25	16:20 17:14 18:09 20:07 21:03 21:50 21:12 (5) 21:58 21:18 (5) 21:17 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08:33	11	08:40 07:55 06:53 06:37 05:33 04:56 20:01 (5) 05:08 20:09 (5) 05:56 20:51 07:44 07:44 08:33	16:28 17:26 18:21 20:19 21:13 21:57 21:13 (5) 21:54 21:18 (5) 21:05 20:49 07:46 07:45 08:34	12	08:39 07:53 06:50 06:35 05:31 04:55 20:02 (5) 05:09 20:09 (5) 05:58 20:52 07:46 07:45 08:34	16:30 17:28 18:23 20:20 21:15 30 20:43 (5) 21:56 21:14 (5) 21:53 21:18 (5) 21:03 20:51 07:48 07:47 08:35	13	08:38 07:51 06:48 06:32 05:29 04:55 20:01 (5) 05:11 20:09 (5) 05:59 20:54 07:48 07:47 08:35	16:31 17:30 18:25 20:22 21:17 33 20:45 (5) 21:57 21:13 (5) 21:52 21:17 (5) 21:01 20:56 07:50 07:49 08:36	14	08:37 07:49 06:45 06:30 05:27 04:55 20:02 (5) 05:12 20:10 (5) 06:01 20:56 07:50 07:49 08:36	16:33 17:32 18:27 20:24 21:18 37 20:47 (5) 21:57 21:14 (5) 21:51 21:16 (5) 20:59 20:56 07:51 07:50 08:37	15	08:36 07:47 06:43 06:28 05:26 04:55 20:02 (5) 05:13 20:10 (5) 06:03 20:58 07:52 07:51 08:37	16:35 17:34 18:28 20:26 21:20 39 20:48 (5) 21:58 21:14 (5) 21:50 21:15 (5) 20:57 20:54 07:53 07:52 08:38	16	08:35 07:45 06:40 06:25 05:24 04:54 20:08 (5) 05:14 20:12 (5) 06:05 20:59 07:54 07:53 08:38	16:36 17:36 18:30 20:28 21:22 42 20:50 (5) 21:59 21:14 (5) 21:49 21:15 (5) 20:55 20:52 07:55 07:54 08:39	17	08:34 07:43 06:38 06:23 05:22 04:54 20:07 (5) 05:16 20:11 (5) 06:06 20:57 07:55 07:54 08:39	16:38 17:38 18:32 20:30 21:23 44 20:51 (5) 21:59 21:15 (5) 21:47 21:14 (5) 20:53 20:50 07:56 07:55 08:40	18	08:33 07:41 06:36 06:21 05:21 04:54 20:06 (5) 05:17 20:10 (5) 06:08 20:53 07:57 07:56 08:40	16:40 17:40 18:34 20:31 21:25 46 20:52 (5) 22:00 21:15 (5) 21:46 21:12 (5) 20:51 20:48 07:58 07:57 08:41	19	08:32 07:39 06:33 06:18 05:19 04:54 20:03 (5) 05:19 20:12 (5) 06:10 20:54 07:59 07:58 08:41	16:41 17:42 18:36 20:33 21:27 48 20:54 (5) 22:00 21:15 (5) 21:45 21:11 (5) 20:48 20:45 07:59 07:58 08:42	20	08:31 07:36 06:31 06:16 05:18 04:54 20:03 (5) 05:20 20:13 (5) 06:12 20:55 07:59 07:58 08:42	16:43 17:44 18:38 20:35 21:28 50 20:55 (5) 22:00 21:15 (5) 21:44 21:10 (5) 20:46 20:43 07:59 07:58 08:43	21	08:30 07:34 06:28 06:14 05:16 04:55 20:03 (5) 05:21 20:13 (5) 06:13 20:56 07:59 07:58 08:43	16:45 17:46 18:40 20:37 21:30 53 20:57 (5) 22:01 21:15 (5) 21:42 21:09 (5) 20:44 20:41 07:59 07:58 08:44	22	08:28 07:32 06:26 06:12 05:15 04:55 20:04 (5) 05:23 20:14 (5) 06:15 20:57 07:59 07:58 08:44	16:47 17:48 18:42 20:39 21:31 55 20:59 (5) 22:01 21:16 (5) 21:41 21:07 (5) 20:42 20:39 07:59 07:58 08:44	23	08:27 07:30 06:23 06:09 05:13 04:55 20:03 (5) 05:24 20:15 (5) 06:17 20:58 07:59 07:58 08:44	16:49 17:50 18:43 20:41 21:33 56 20:59 (5) 22:01 21:16 (5) 21:39 21:07 (5) 20:39 20:36 07:59 07:58 08:44	24	08:26 07:28 06:21 06:07 05:12 04:55 20:03 (5) 05:26 20:16 (5) 06:19 20:59 07:59 07:58 08:44	16:51 17:52 18:45 20:43 21:34 58 21:01 (5) 22:01 21:16 (5) 21:38 21:05 (5) 20:37 20:34 07:59 07:58 08:44	25	08:24 07:25 06:18 06:05 05:11 04:56 20:02 (5) 05:27 20:17 (5) 06:20 20:60 07:59 07:58 08:44	16:52 17:54 18:47 20:44 21:36 60 21:02 (5) 22:01 21:17 (5) 21:36 21:04 (5) 20:35 20:32 07:59 07:58 08:44	26	08:23 07:23 06:16 06:03 05:09 04:56 20:02 (5) 05:29 20:17 (5) 06:22 20:61 07:59 07:58 08:44	16:54 17:56 18:49 20:46 21:37 61 21:03 (5) 22:01 21:16 (5) 21:35 21:02 (5) 20:32 20:29 07:59 07:58 08:44	27	08:22 07:21 06:13 06:01 05:08 04:56 20:02 (5) 05:31 20:19 (5) 06:24 20:62 07:59 07:58 08:44	16:56 17:58 18:51 20:48 21:39 63 21:05 (5) 22:01 21:17 (5) 21:33 21:01 (5) 20:30 20:27 07:59 07:58 08:44	28	08:20 07:18 06:11 05:58 05:07 04:57 20:02 (5) 05:32 20:19 (5) 06:26 20:63 07:59 07:58 08:44	16:58 18:00 18:53 20:50 21:40 64 21:06 (5) 22:01 21:17 (5) 21:32 21:02 (5) 20:28 20:25 07:59 07:58 08:44	29	08:18 07:09 05:56 05:06 04:56 20:01 (5) 05:34 20:21 (5) 06:28 20:64 07:59 07:58 08:44	17:00 19:55 20:52 21:41 66 21:07 (5) 22:01 21:17 (5) 21:30 20:58 (5) 20:25 20:22 07:59 07:58 08:44	30	08:17 07:06 05:54 05:05 04:56 20:01 (5) 05:35 20:21 (5) 06:29 20:65 07:59 07:58 08:44	17:02 19:56 20:54 21:43 67 21:08 (5) 22:00 21:17 (5) 21:28 20:56 (5) 20:23 20:20 07:59 07:58 08:44	31	08:15 07:04 05:50 05:04 04:55 20:01 (5) 05:37 20:23 (5) 06:31 20:66 07:59 07:58 08:44	17:04 19:58 21:44 68 21:09 (5) 21:26 32 20:55 (5) 20:21 20:67 07:59 07:58 08:44	Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					1135	2144	1835	118																																																																																																	
Sun reduction					0.38	0.32	0.32	0.34																																																																																																	
Oper. time red.					1.00	1.00	1.00	1.00																																																																																																	
Wind dir. red.					0.63	0.63	0.63	0.63																																																																																																	
Total reduction					0.24	0.20	0.20	0.21																																																																																																	
Total, real					272	431	373	25																																																																																																	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

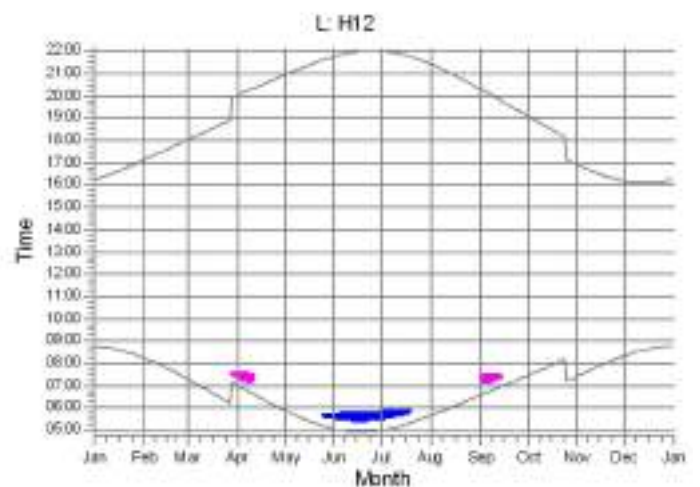
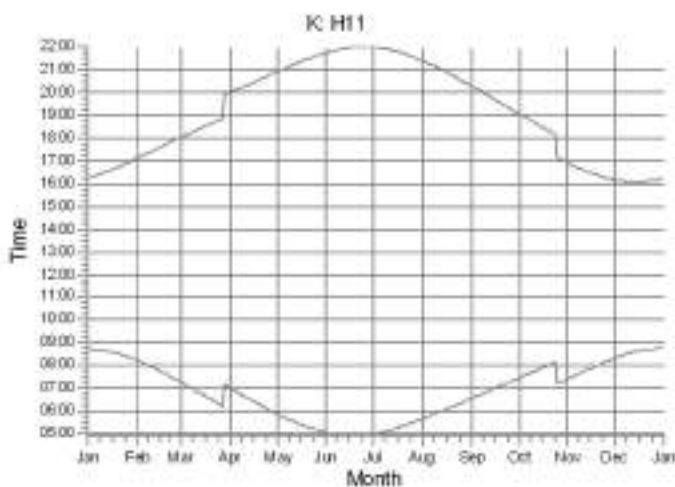
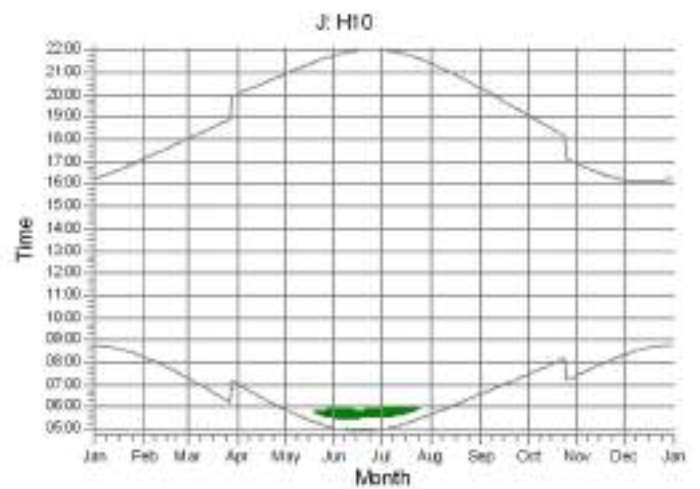
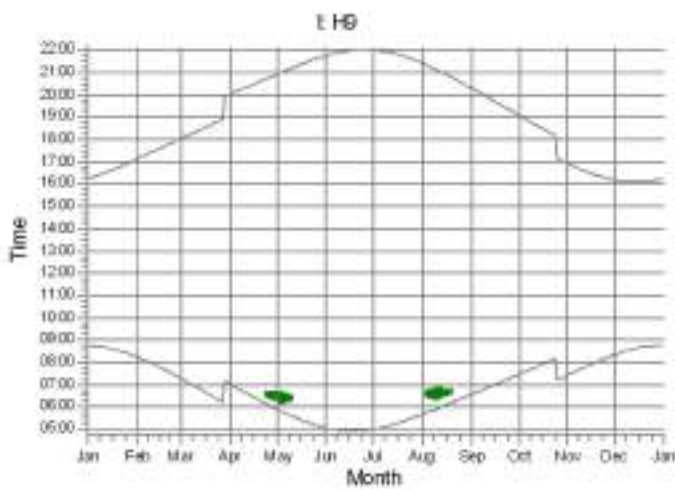
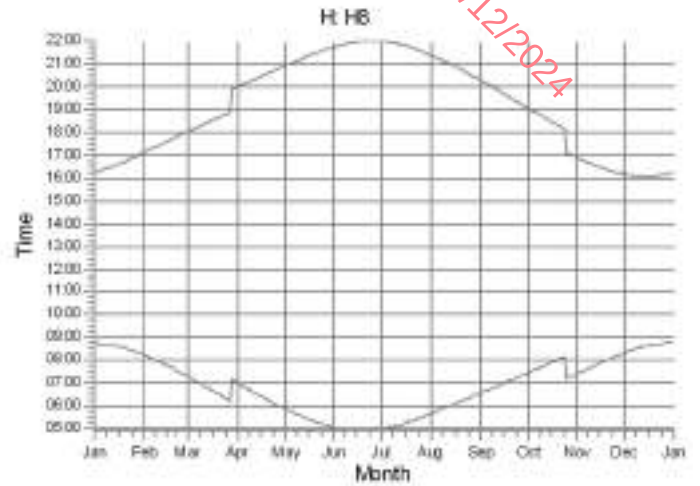
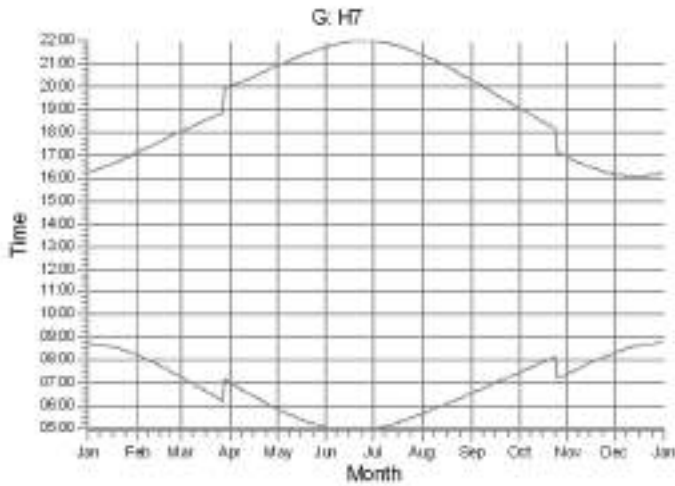


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

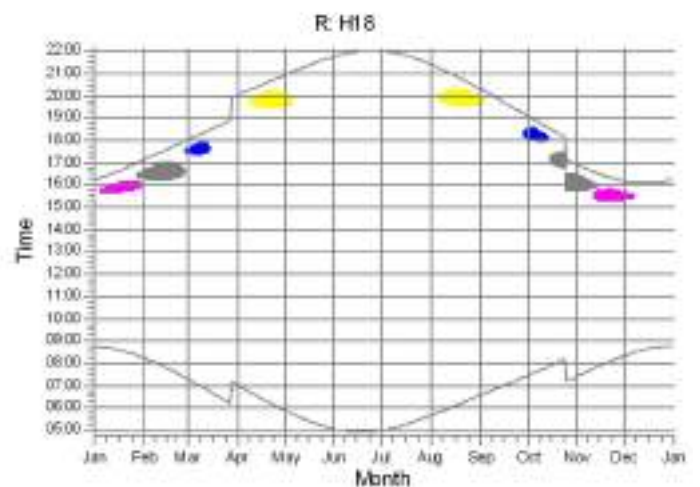
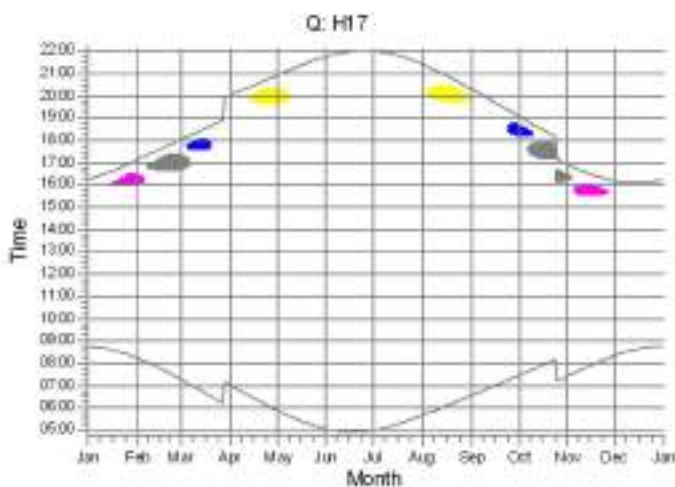
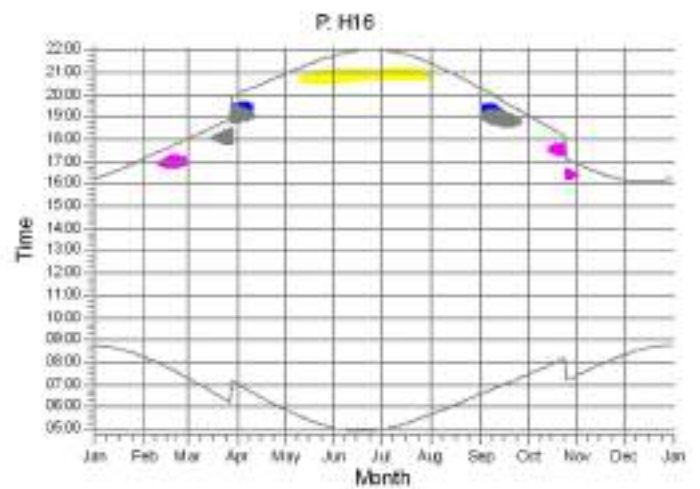
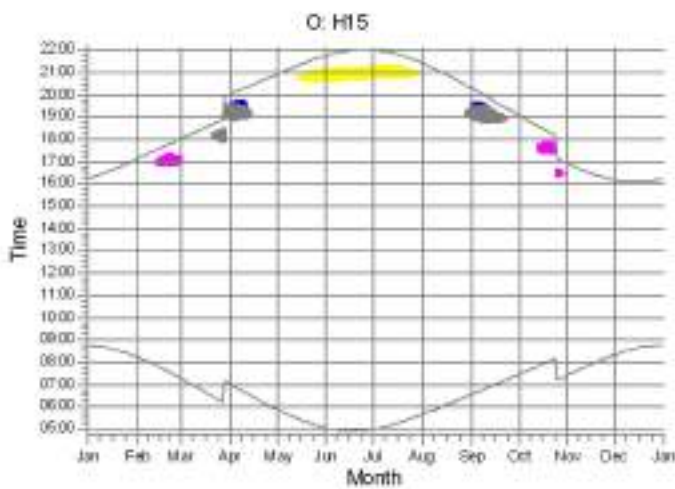
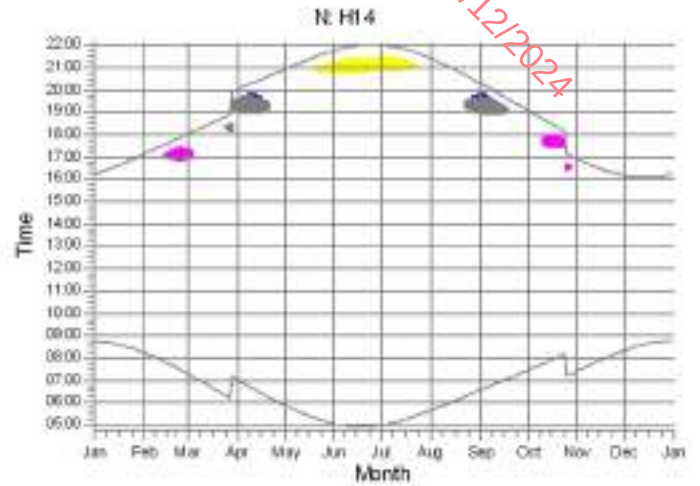
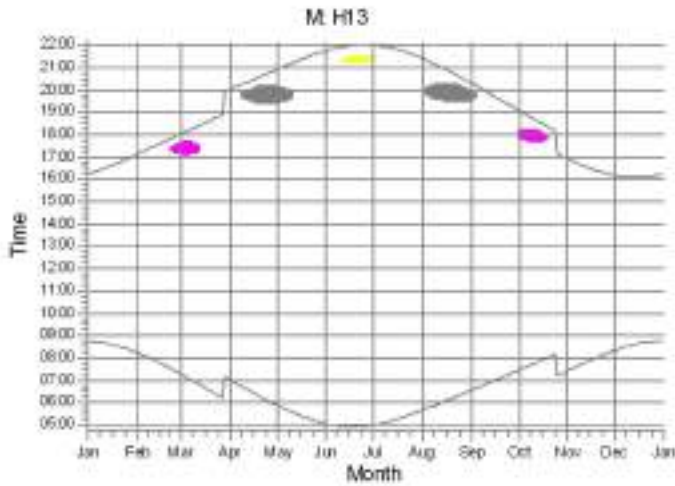


WTGs

1: T01 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

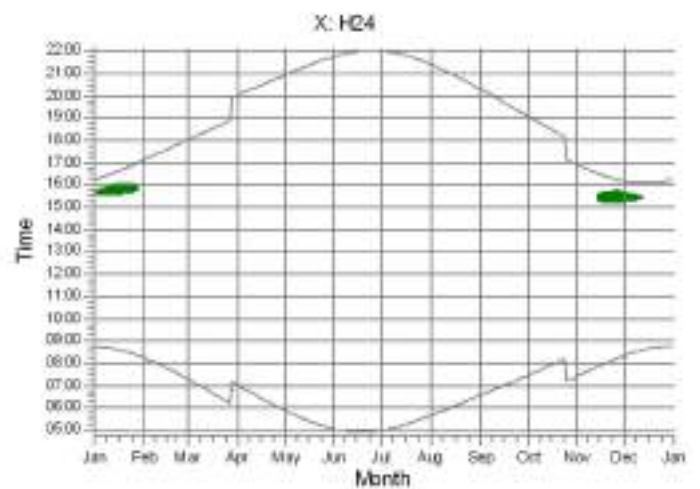
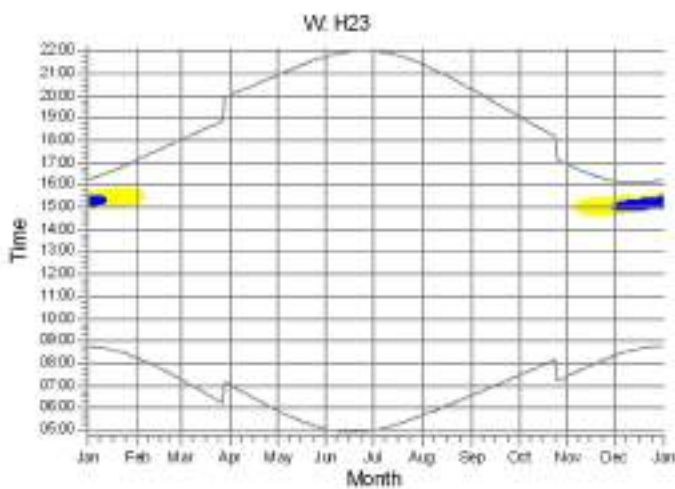
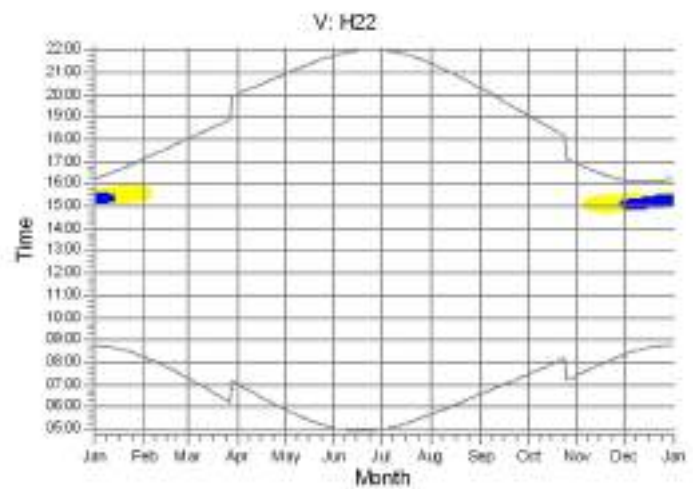
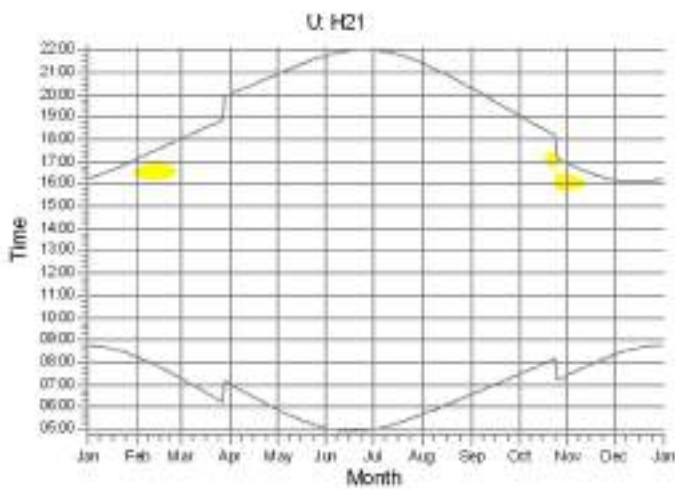
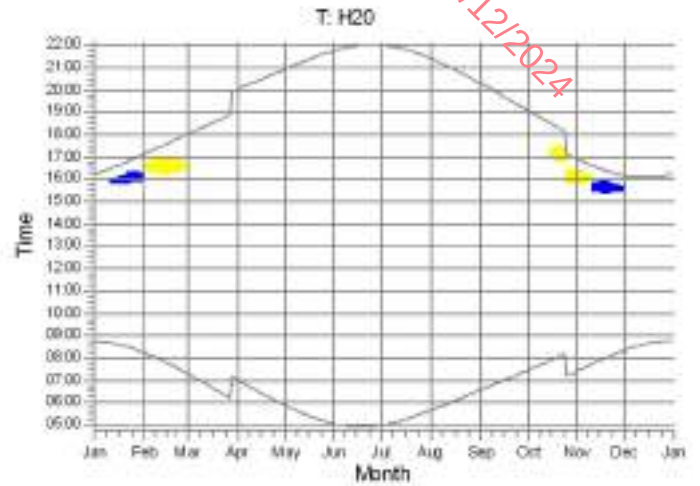
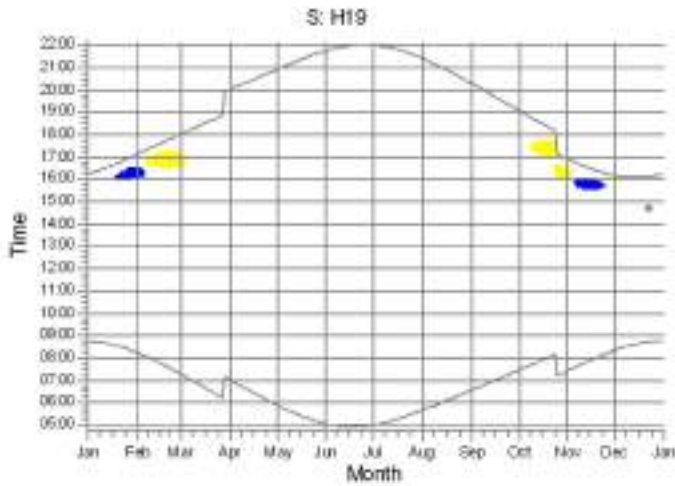


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

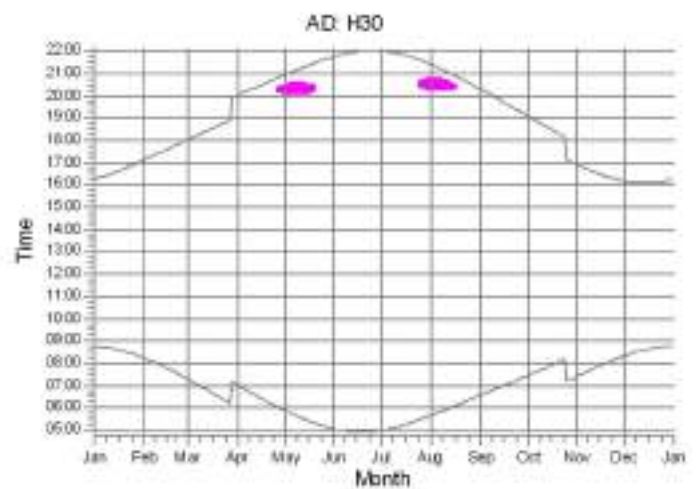
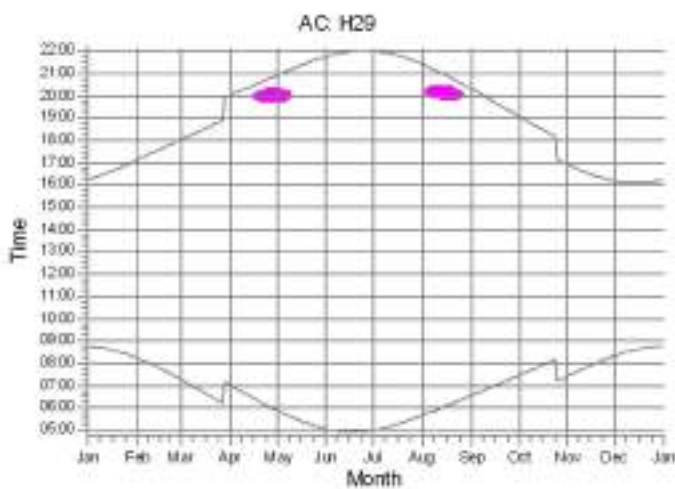
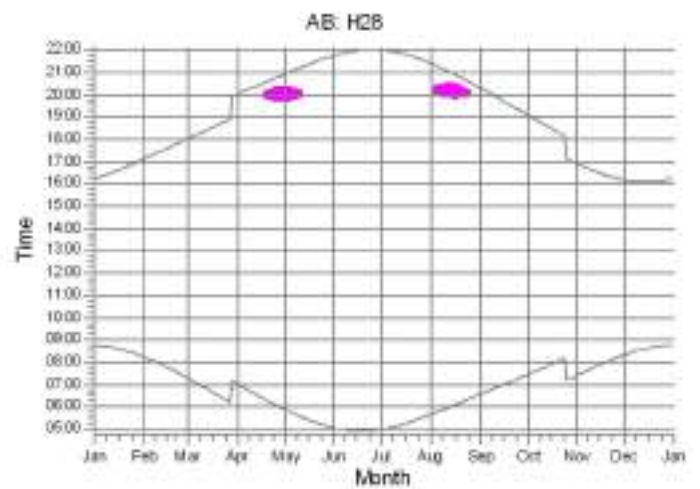
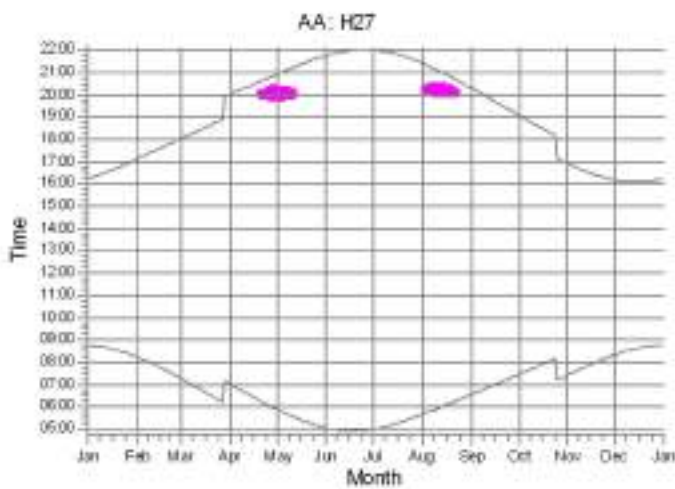
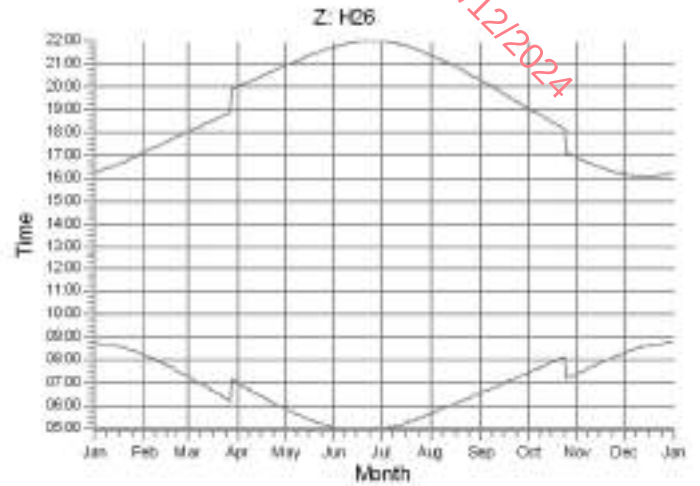
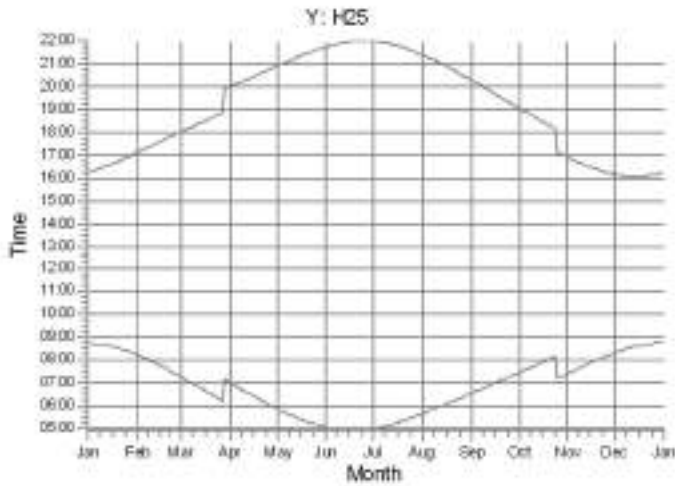


WTGs

1: T01 2: T02 3: T03 4: T04

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

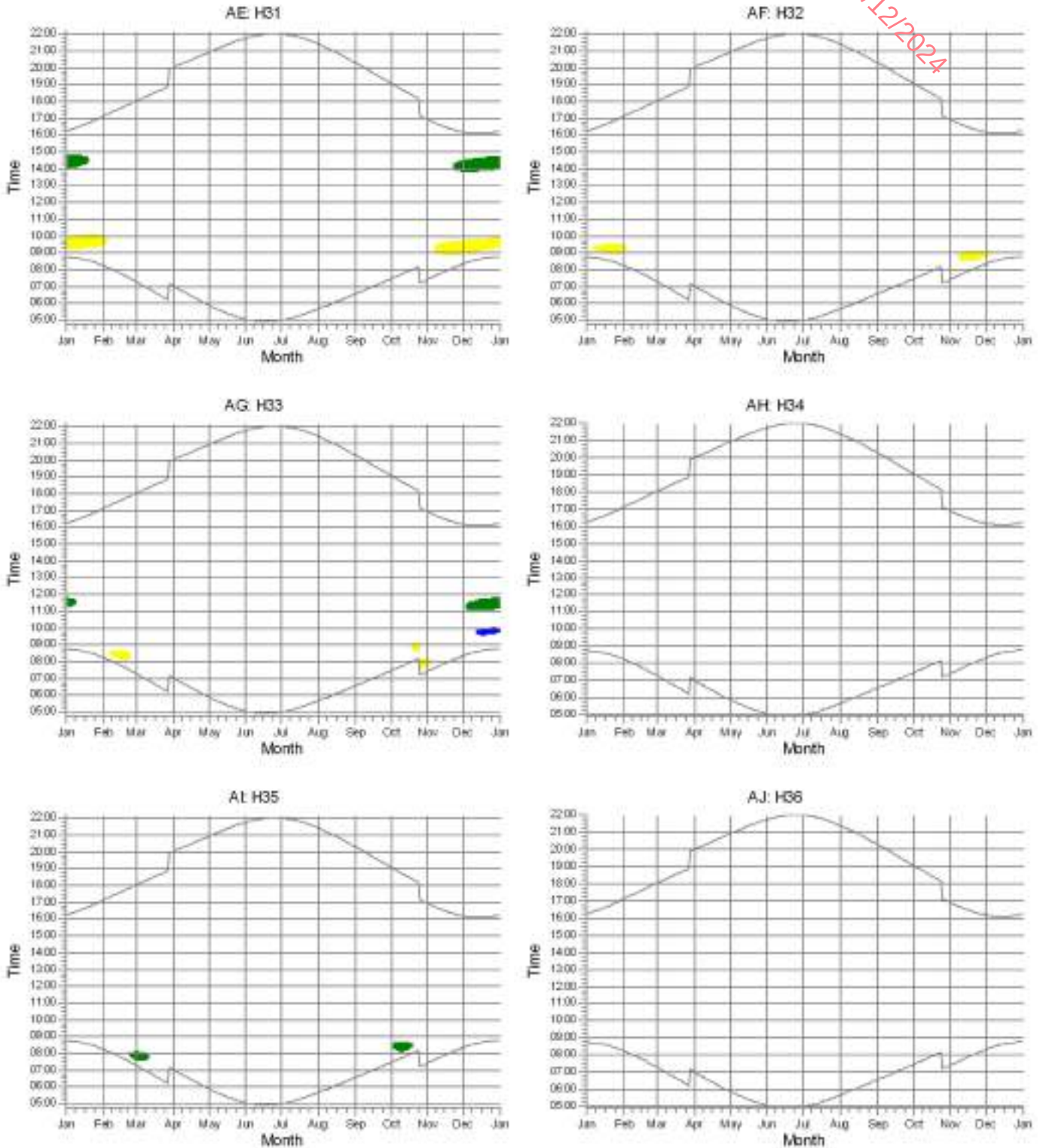


WTGs

5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case



WTGs

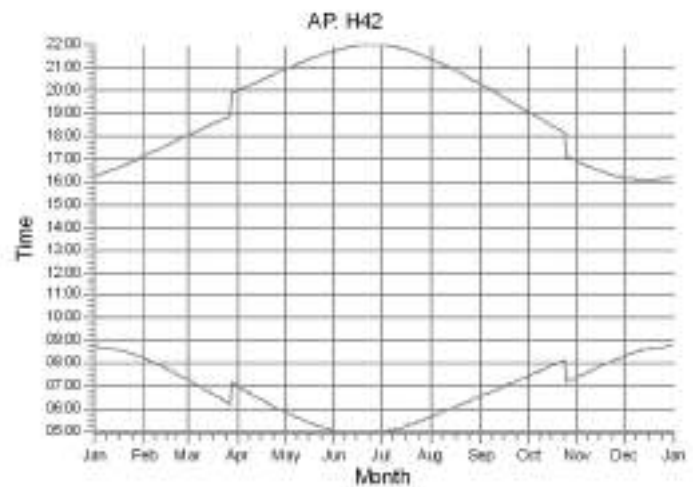
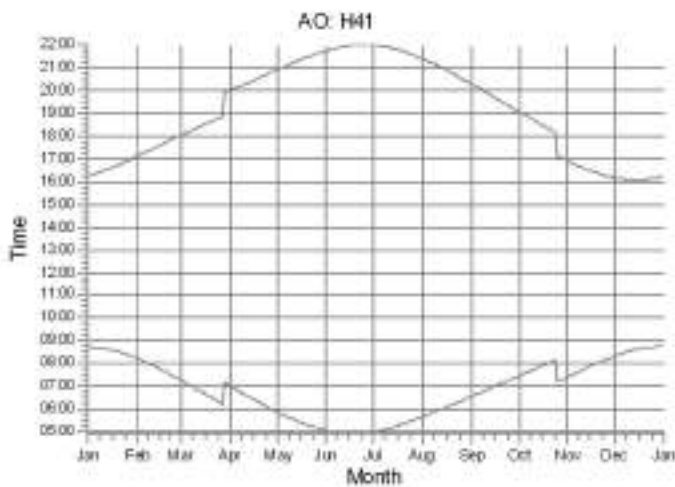
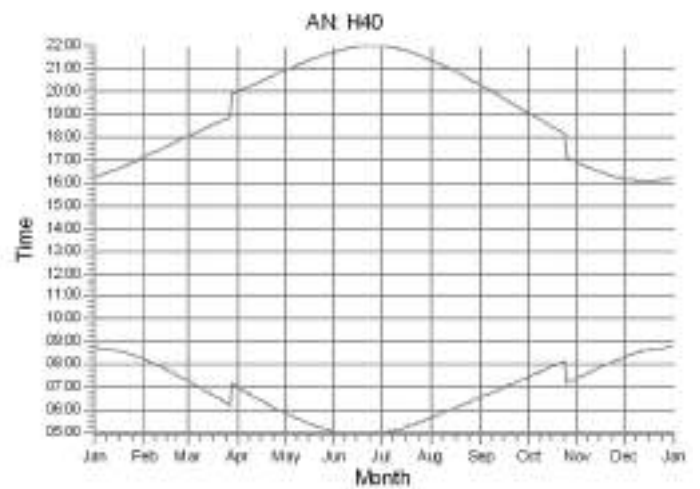
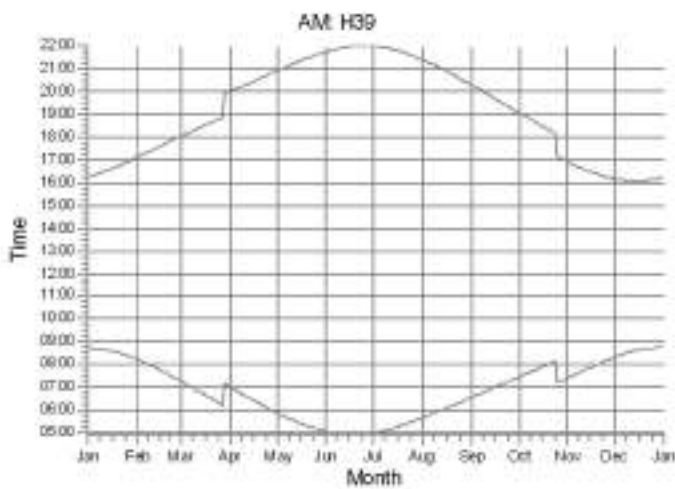
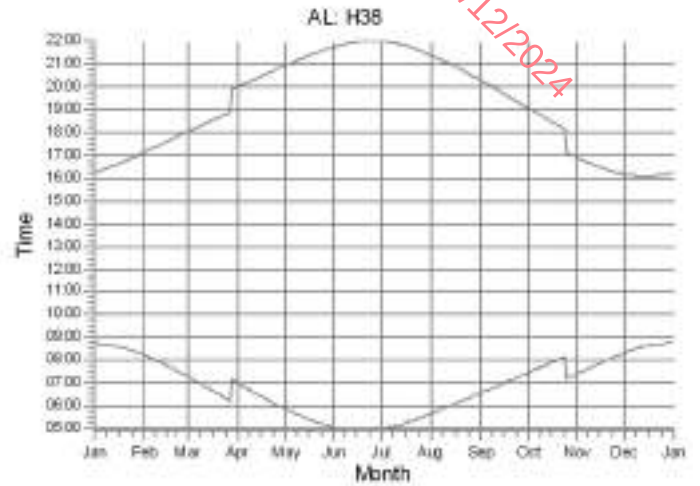
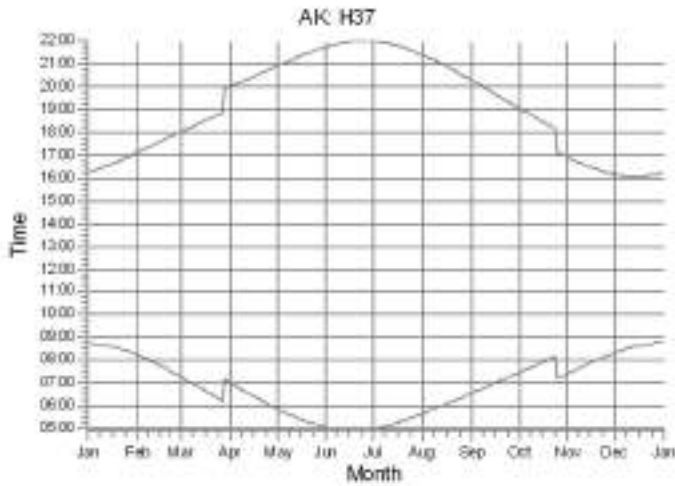
1: T01 2: T02 3: T03

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar, graphical

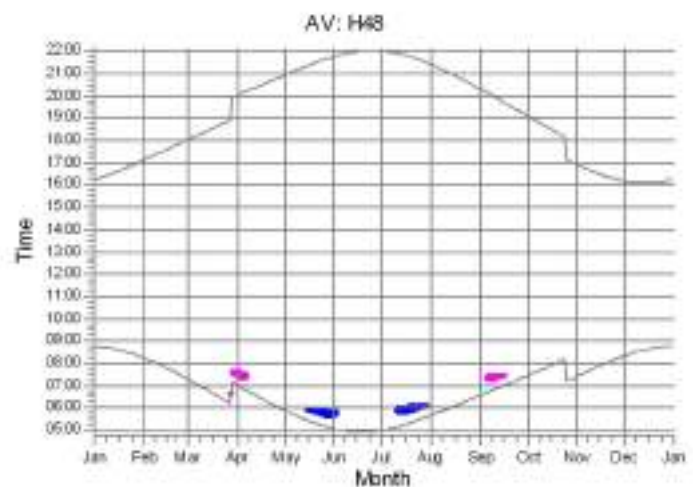
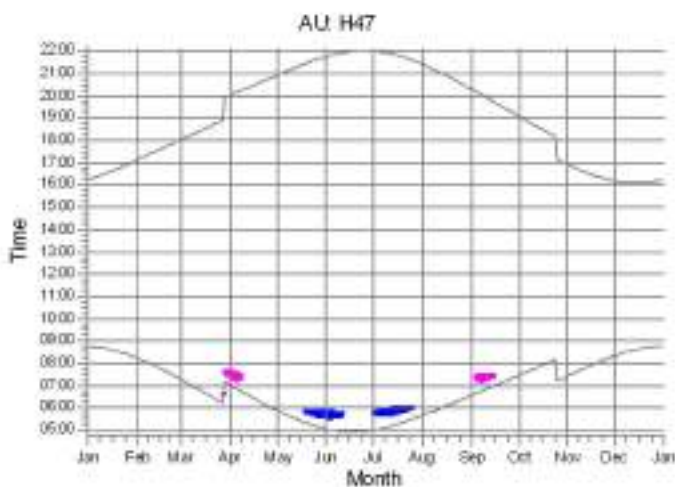
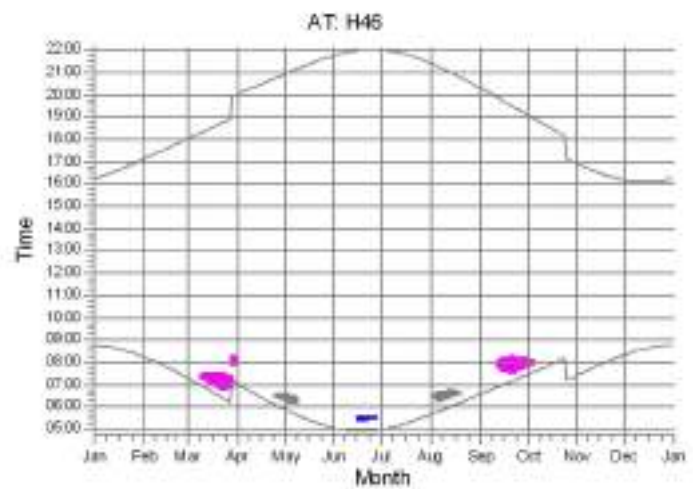
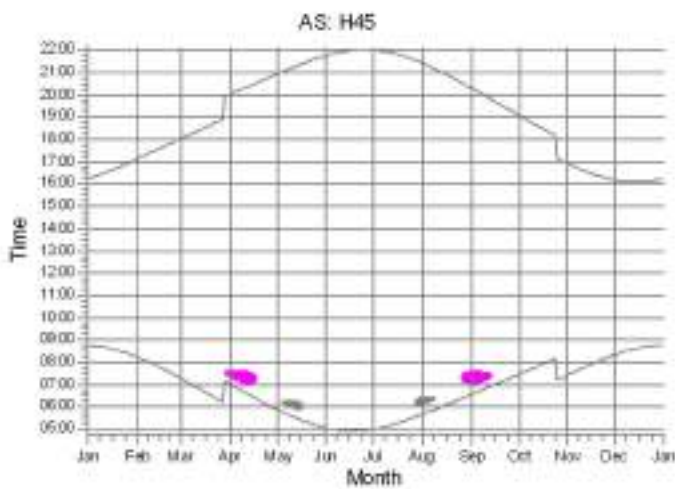
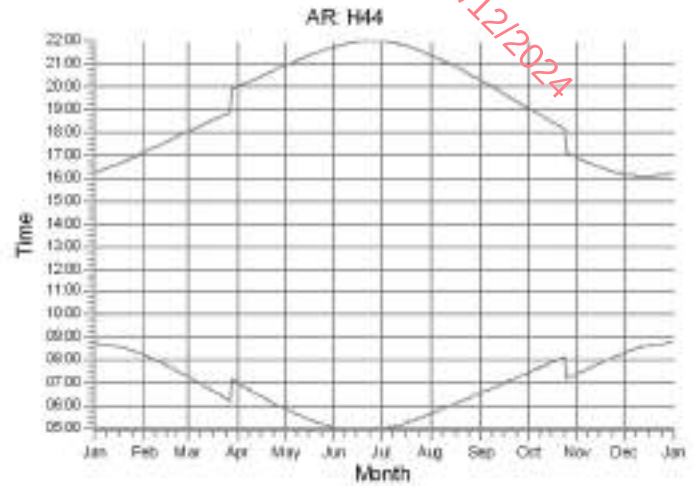
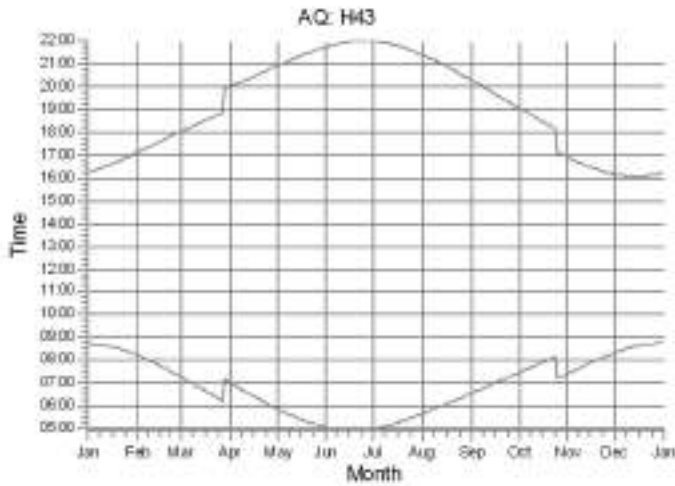
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

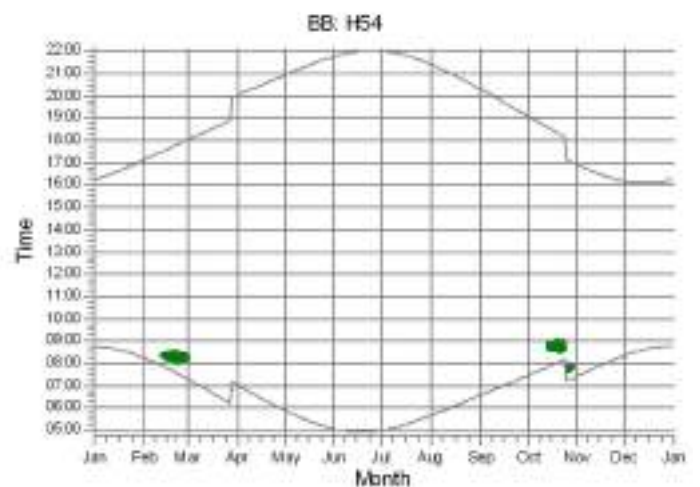
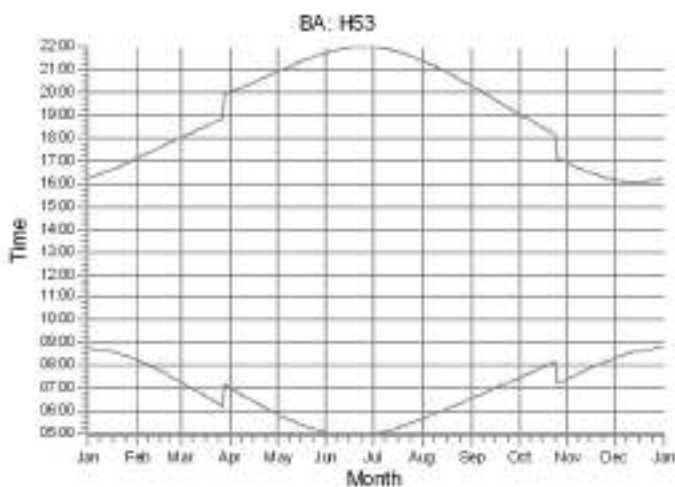
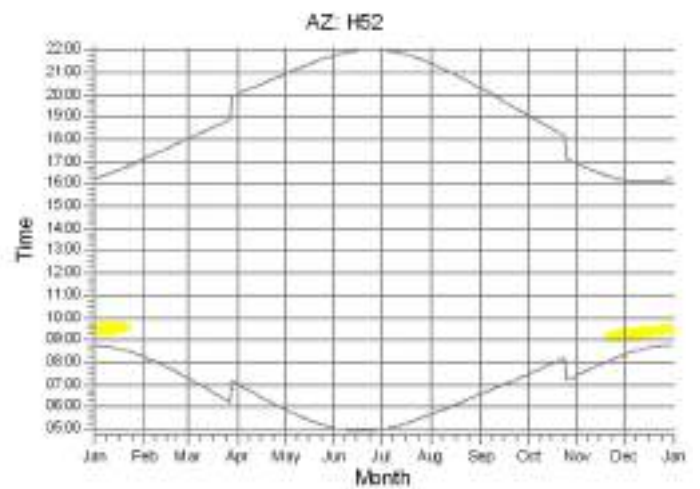
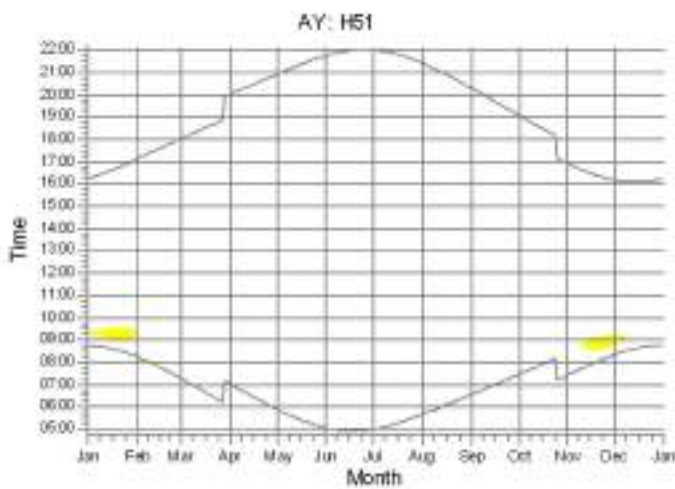
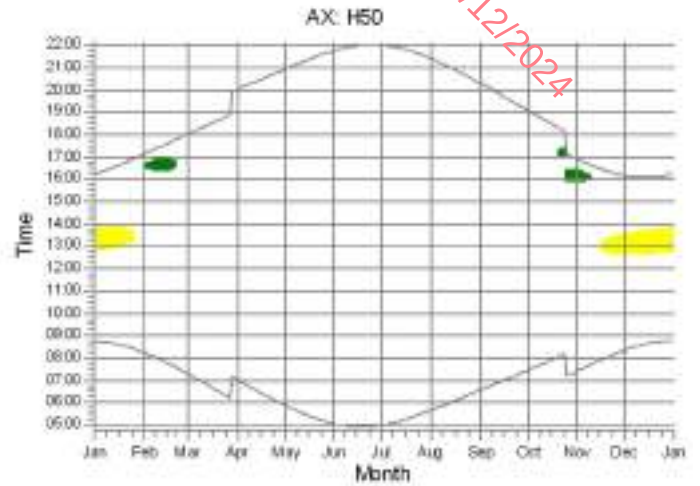
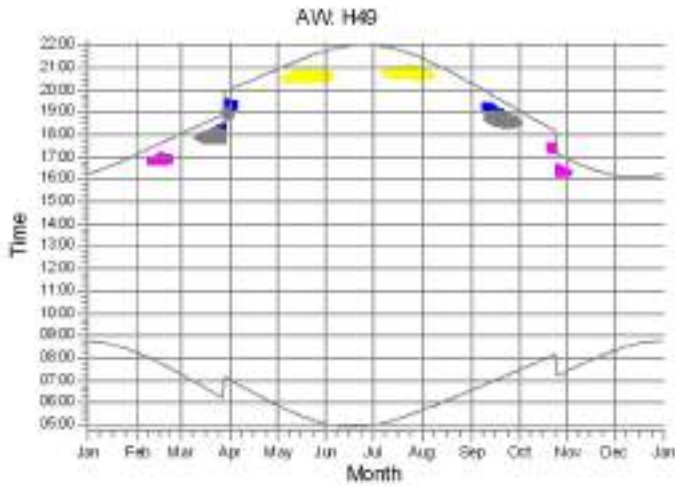


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

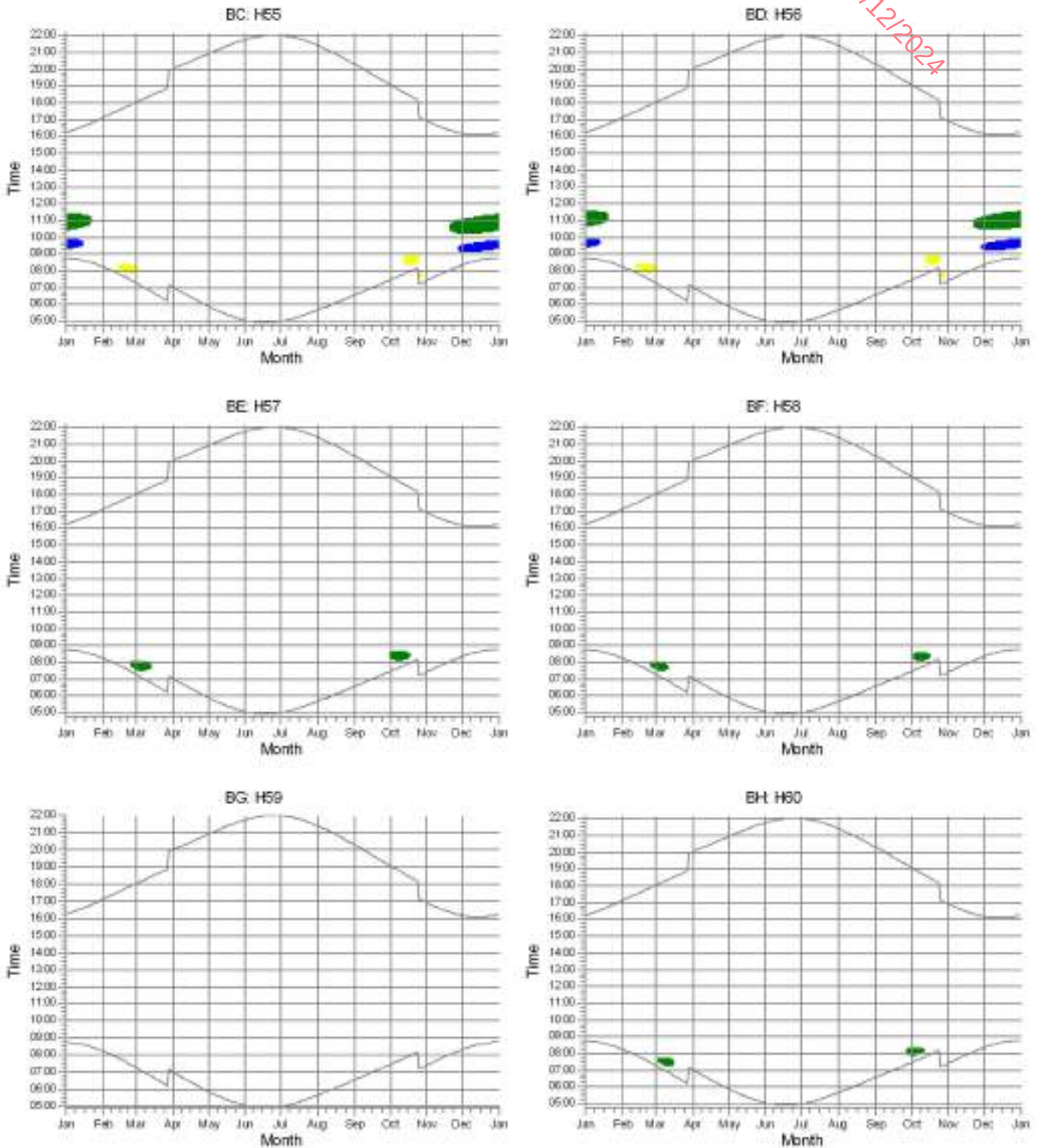


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

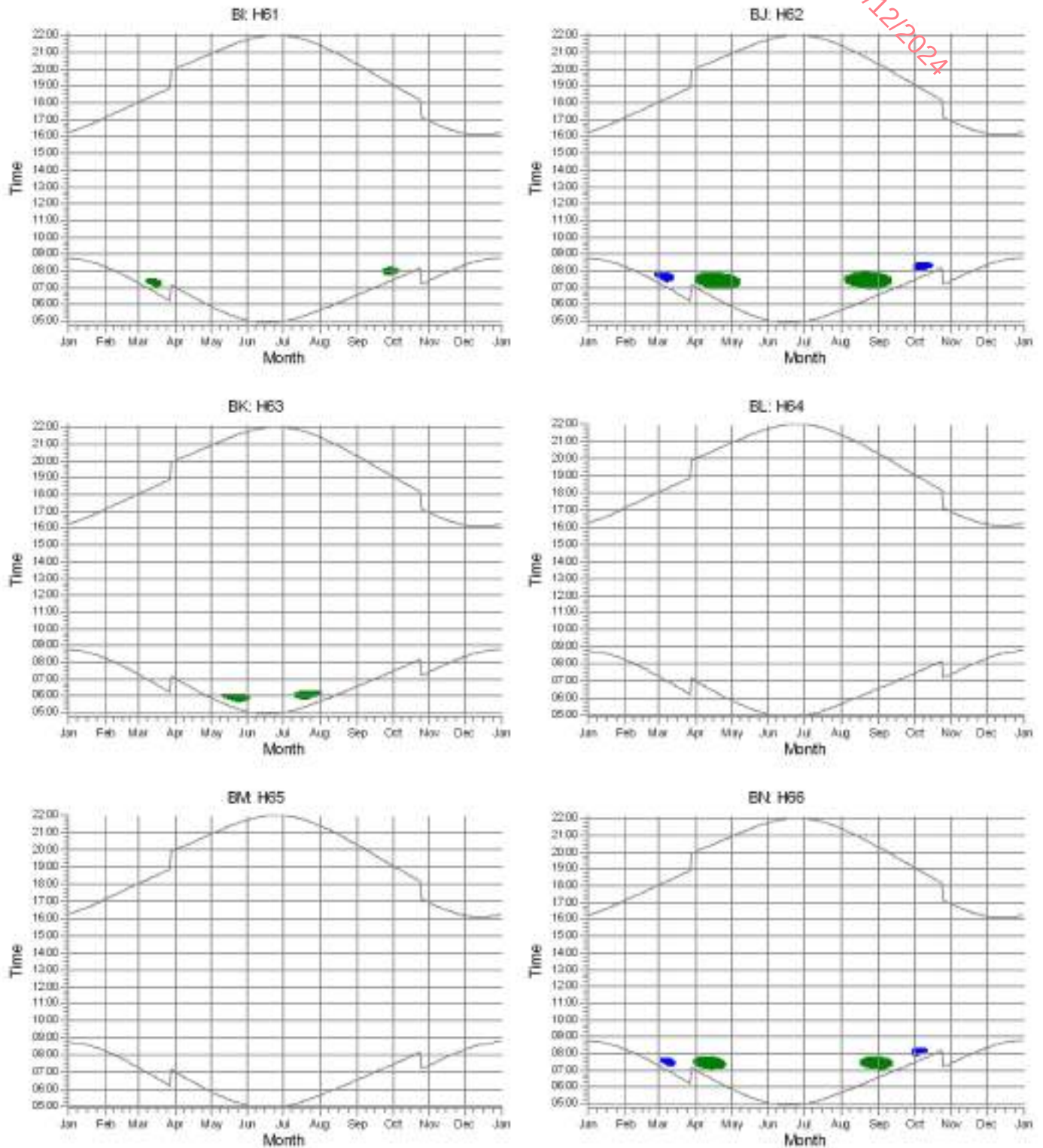


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

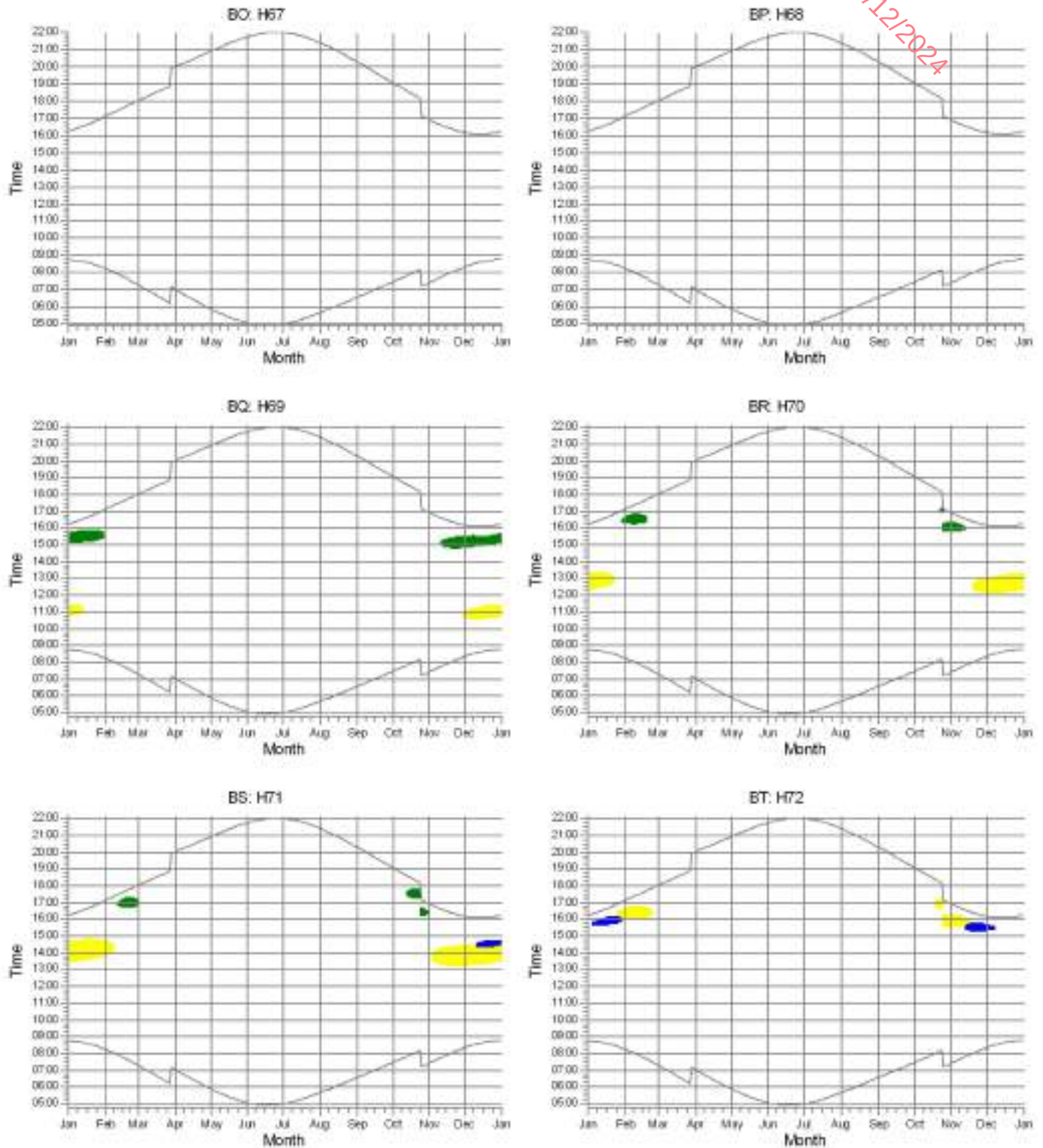


WTGs

1: T01 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

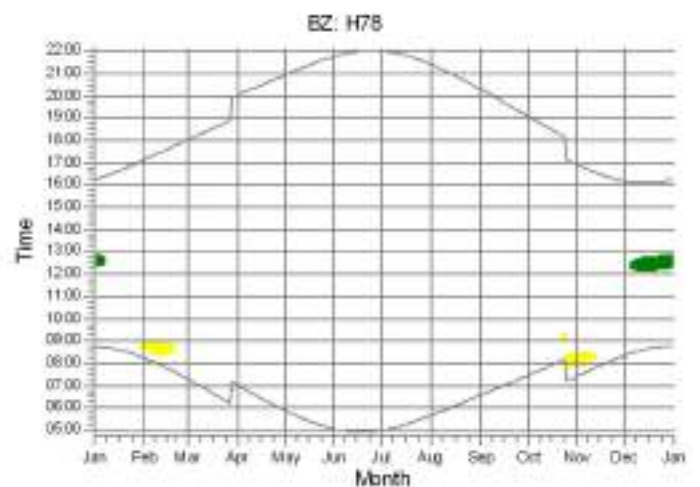
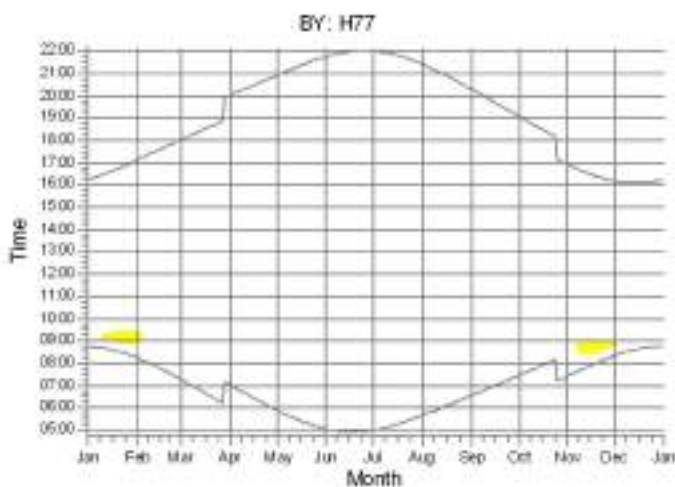
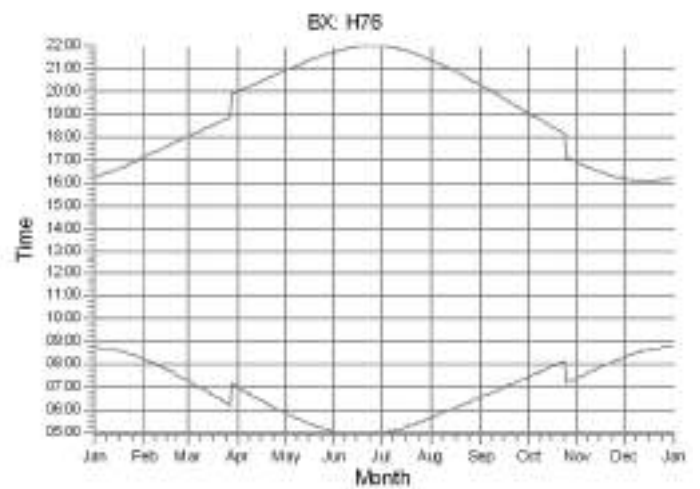
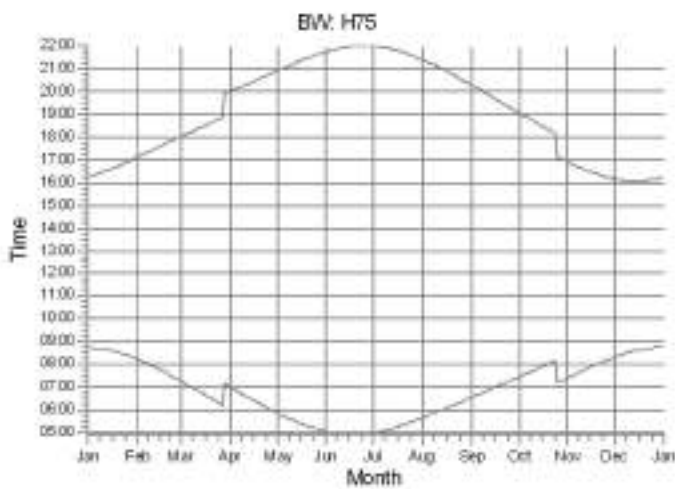
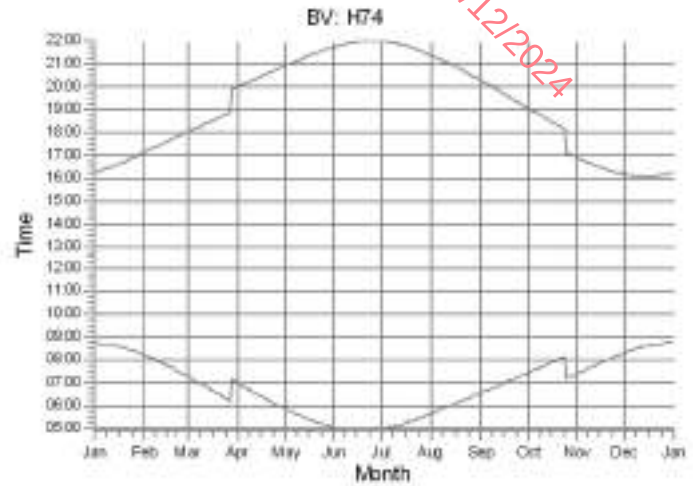
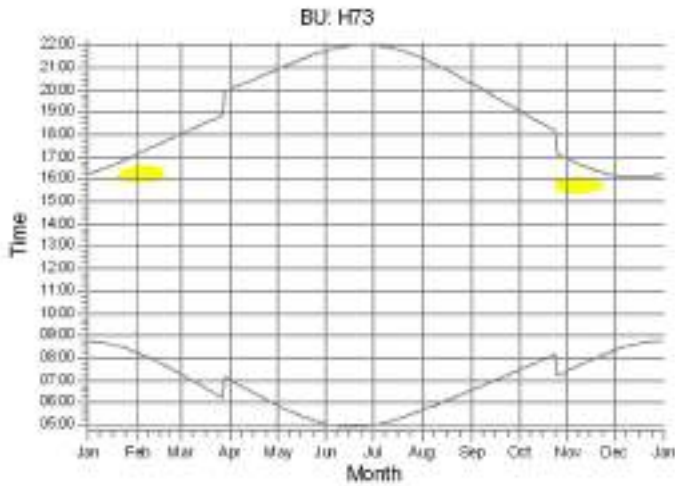


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

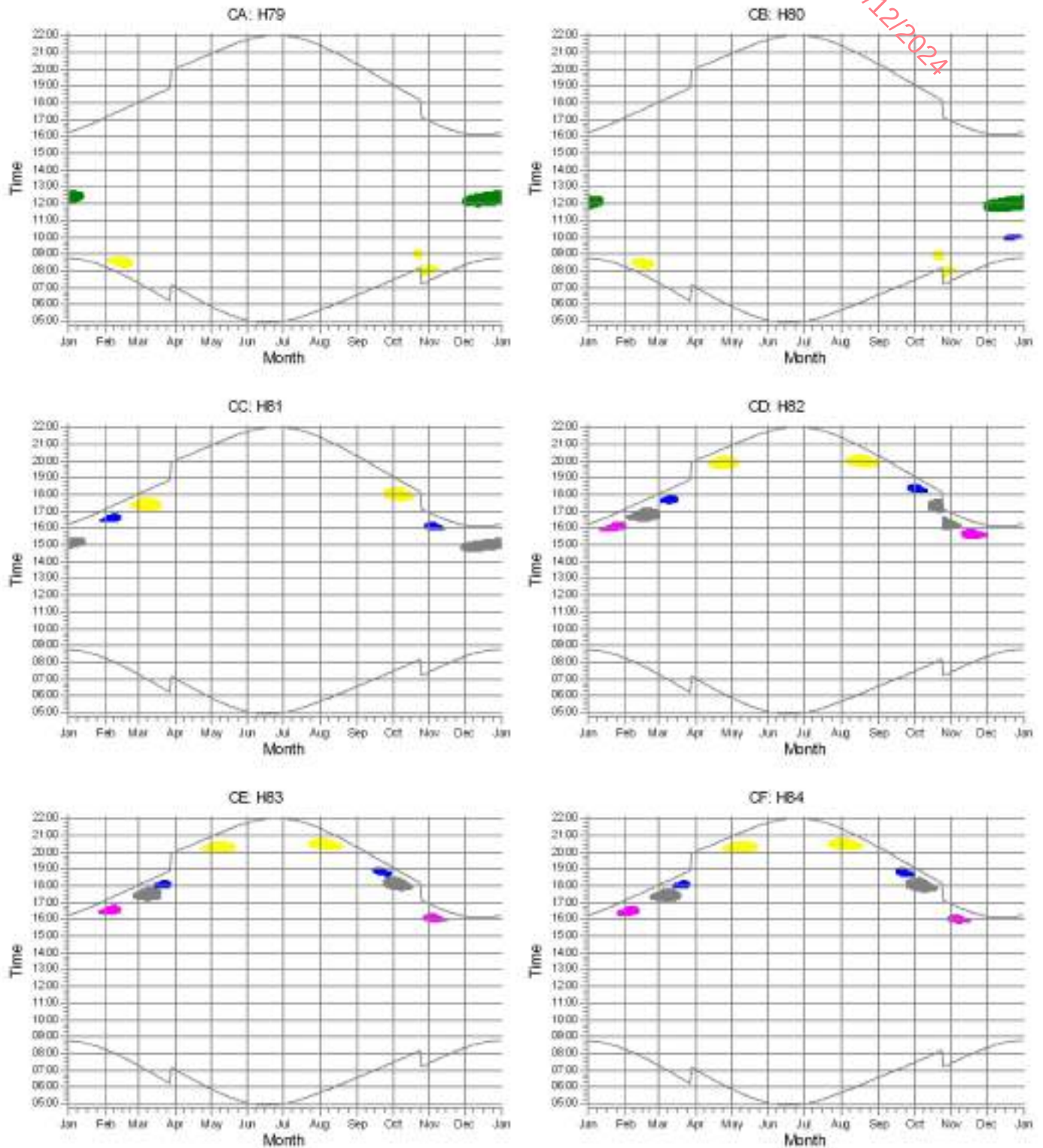


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

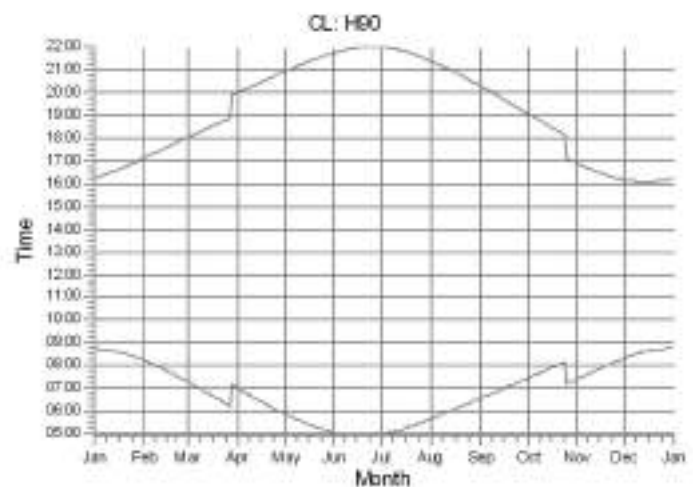
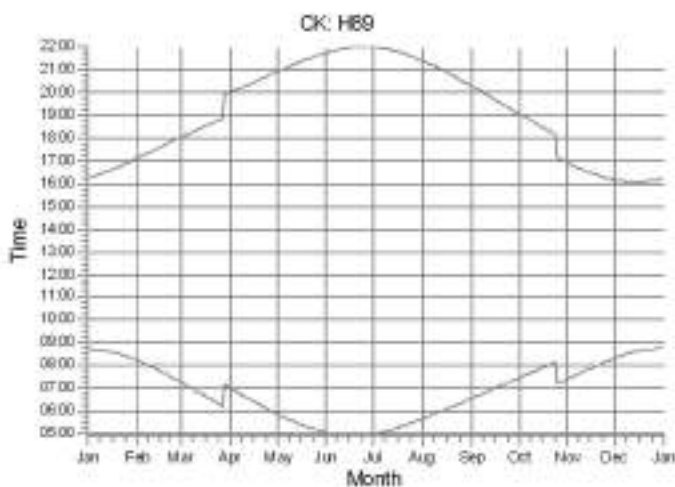
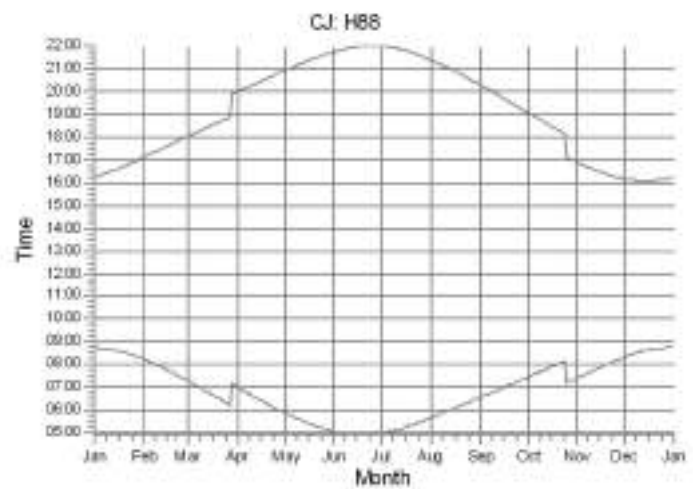
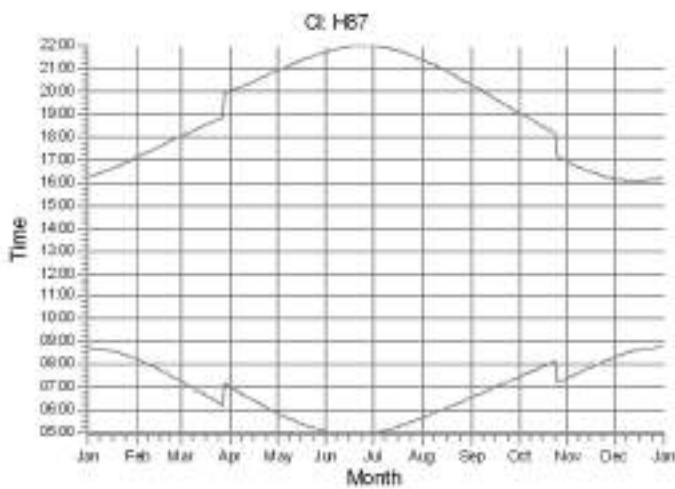
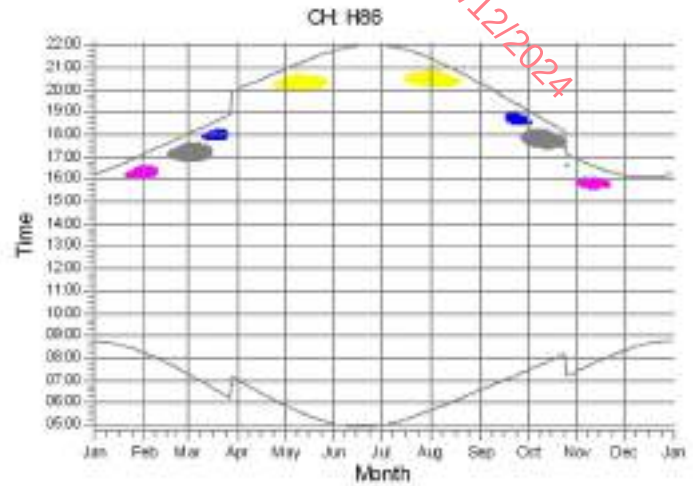
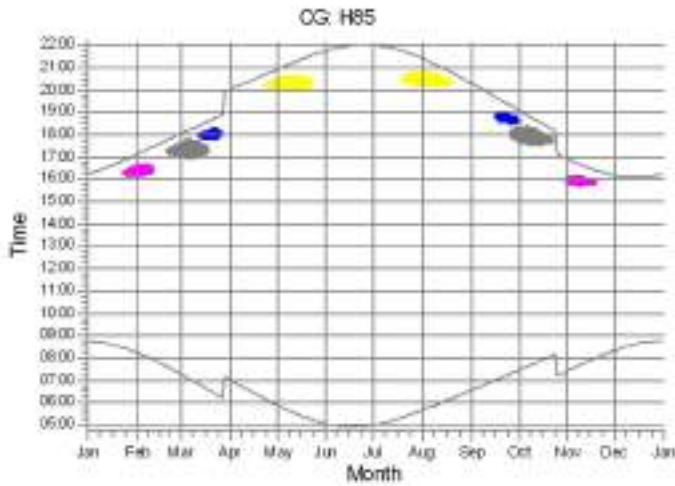


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case



WTGs

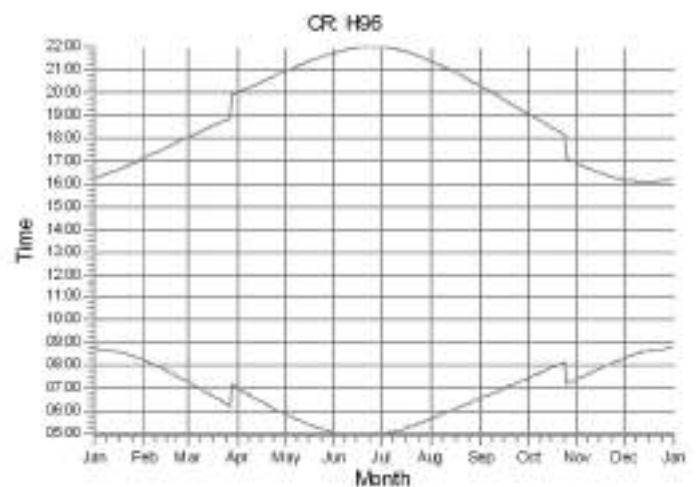
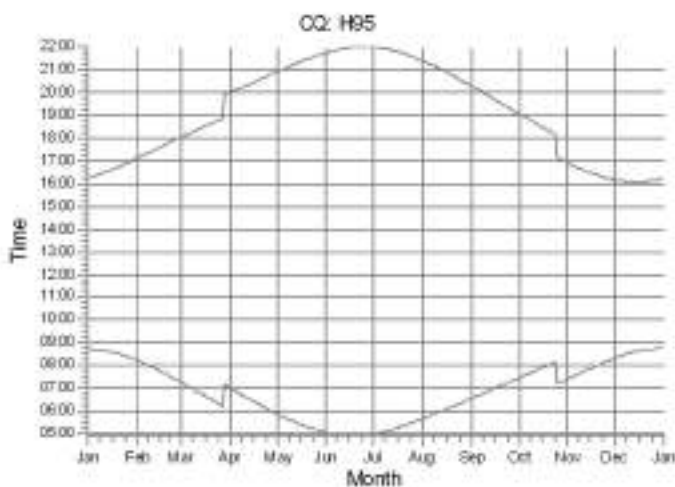
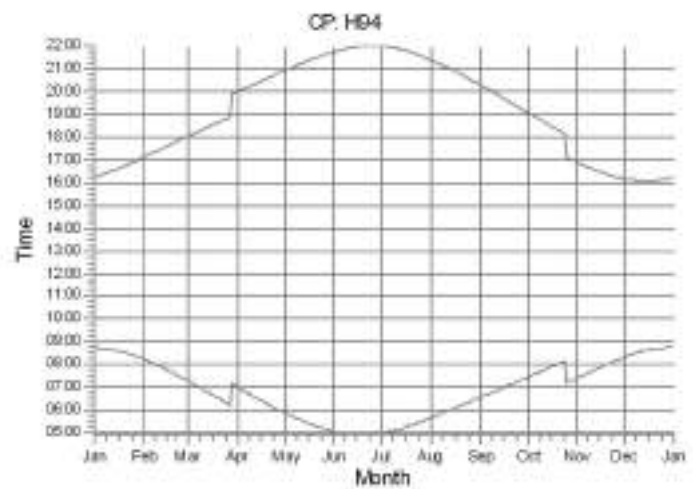
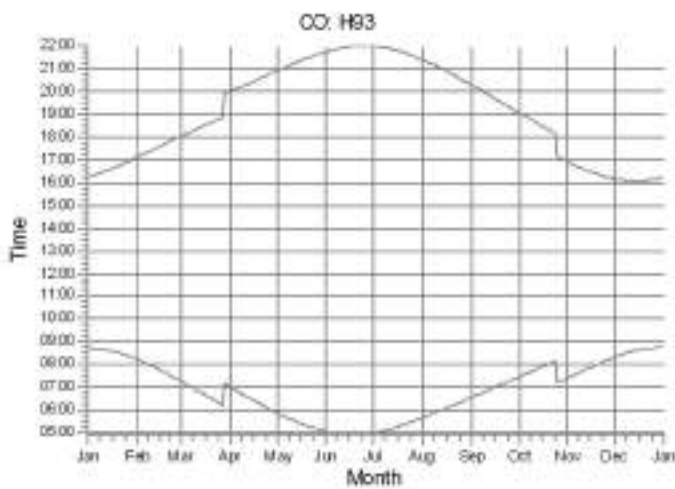
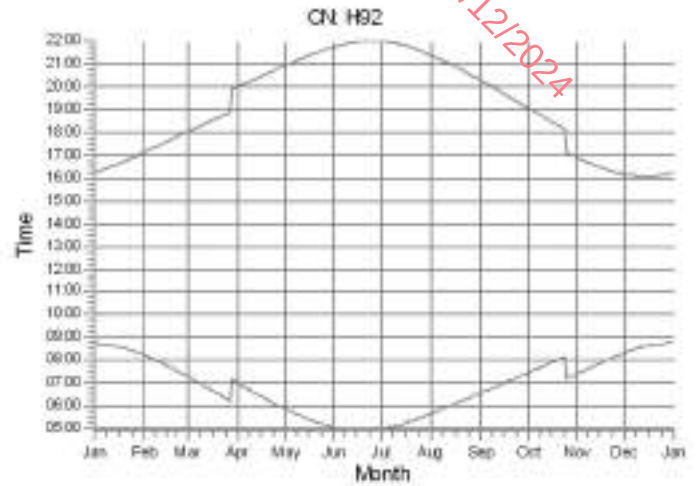
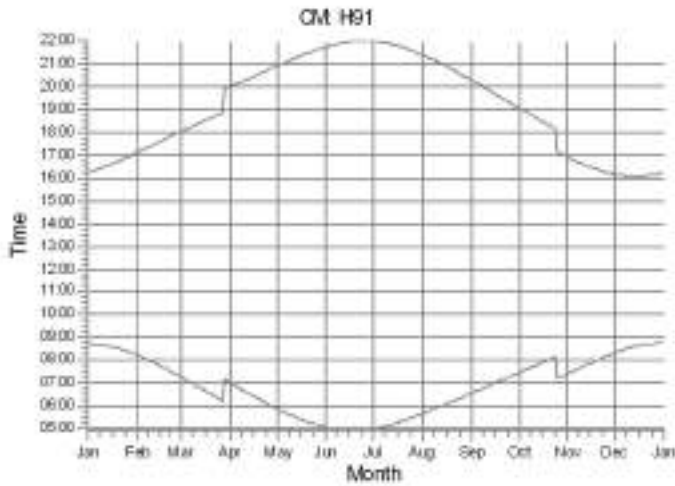
2: T02 3: T03 4: T04 5: T05

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar, graphical

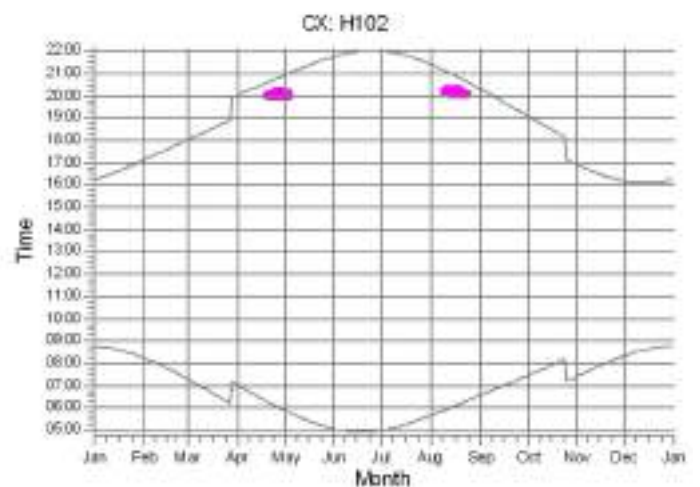
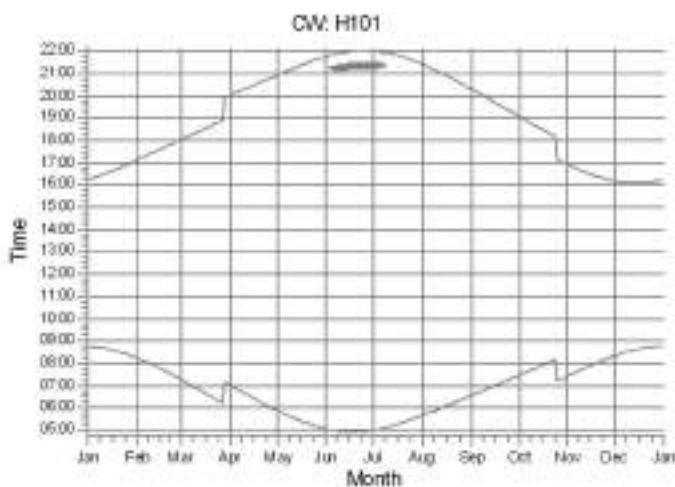
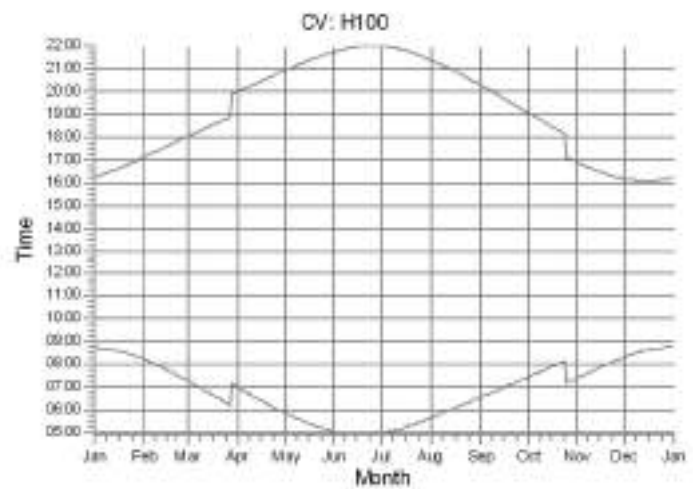
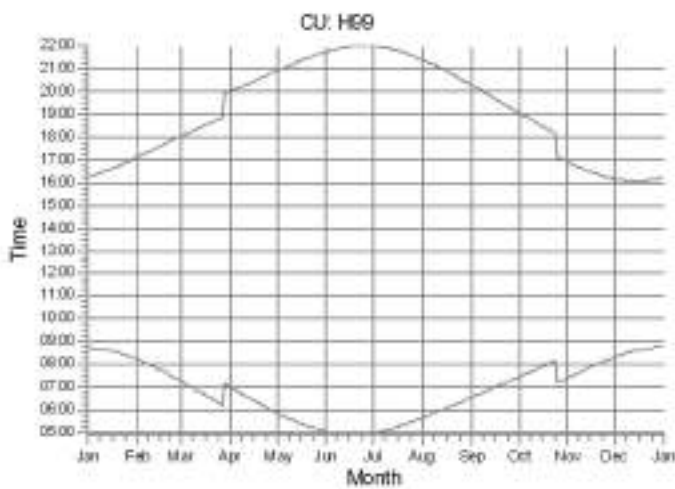
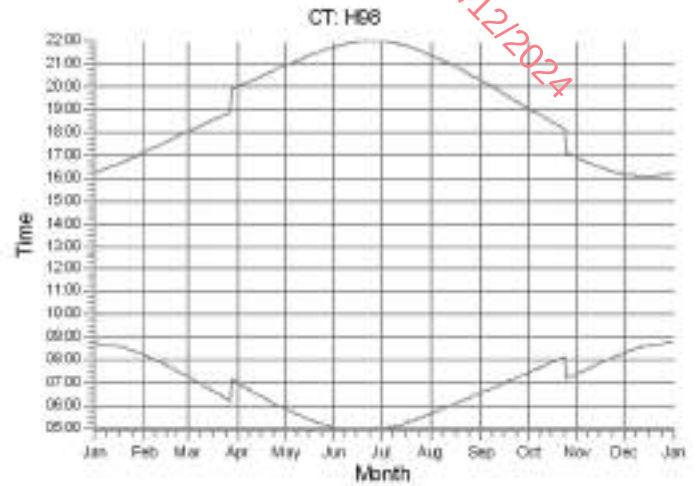
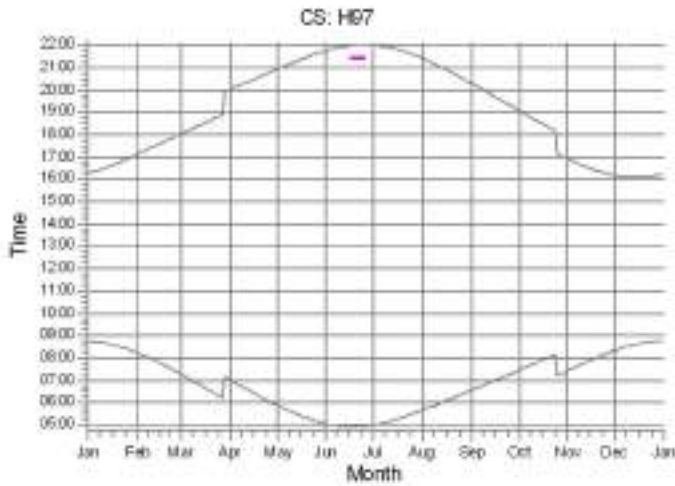
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

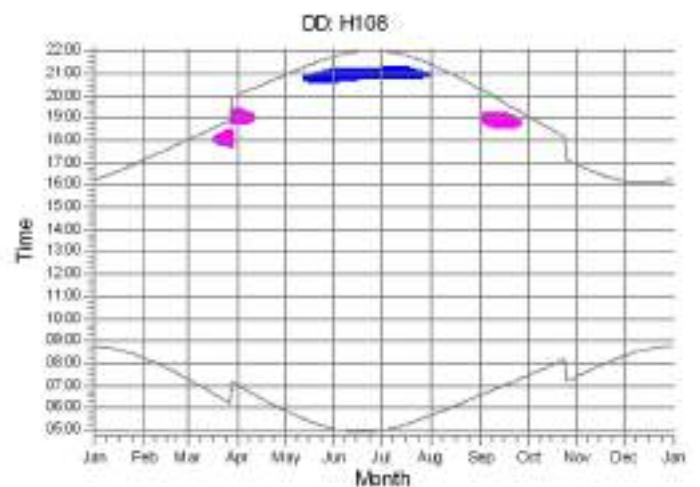
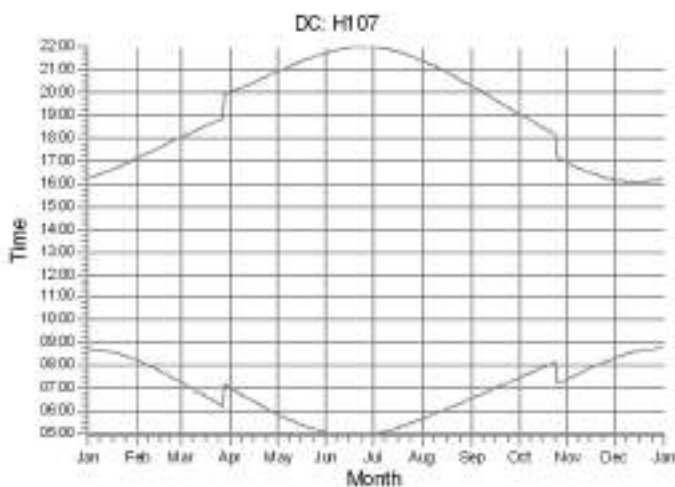
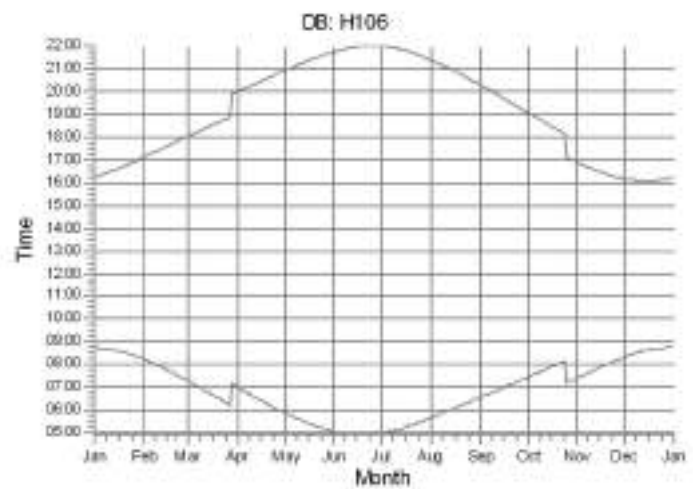
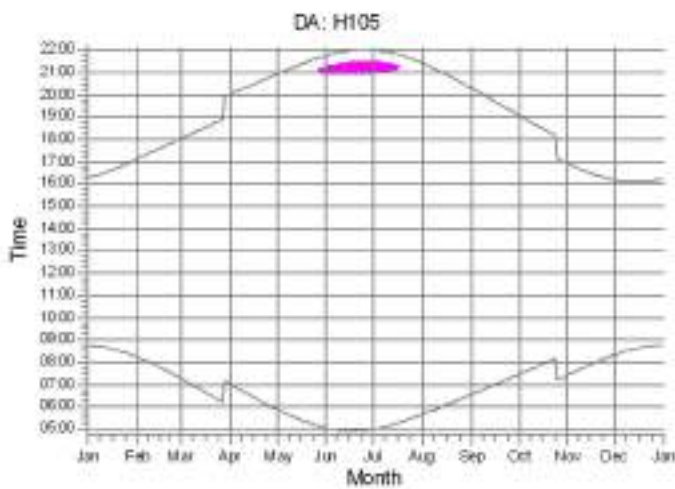
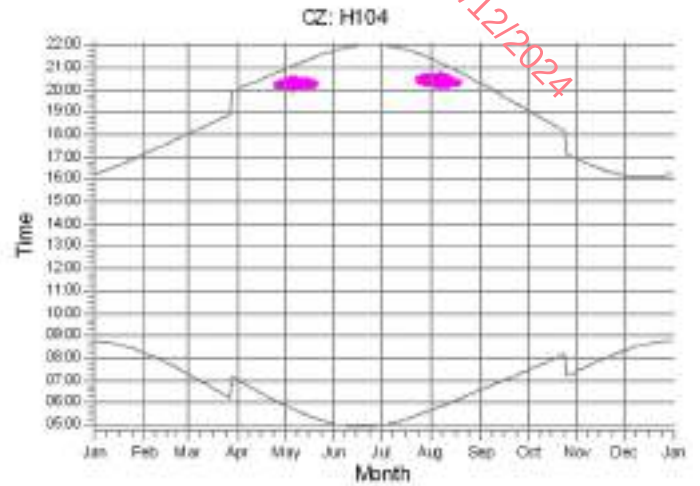
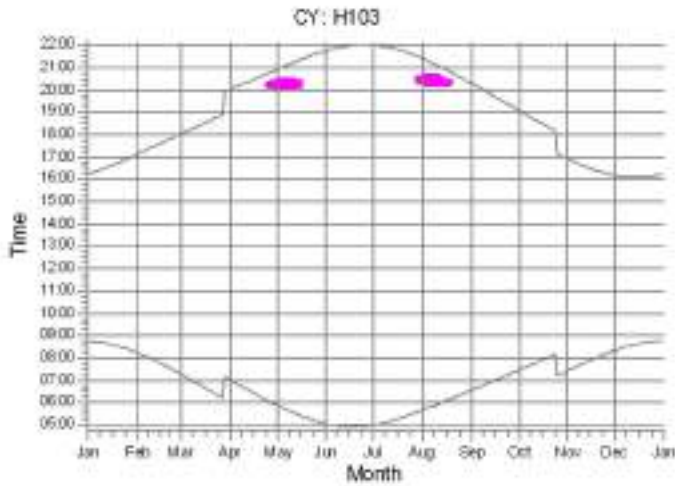


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

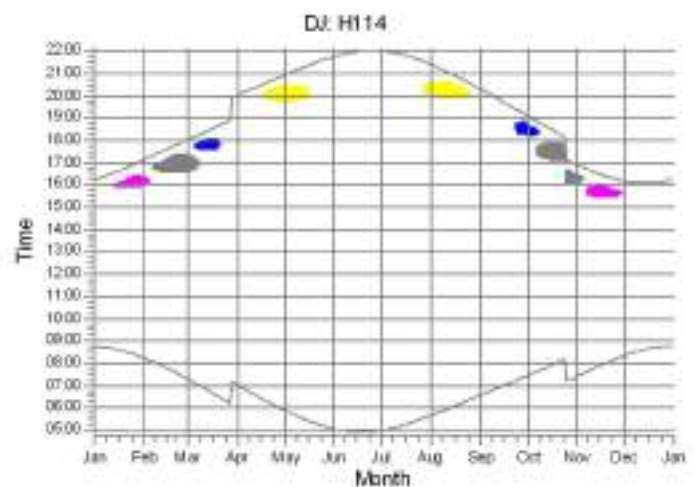
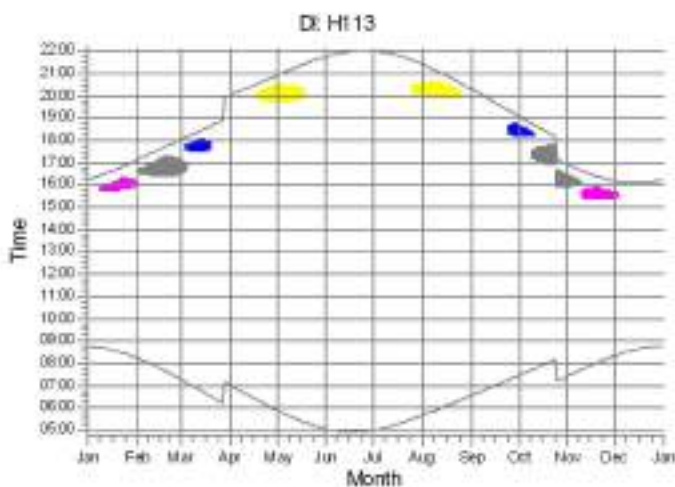
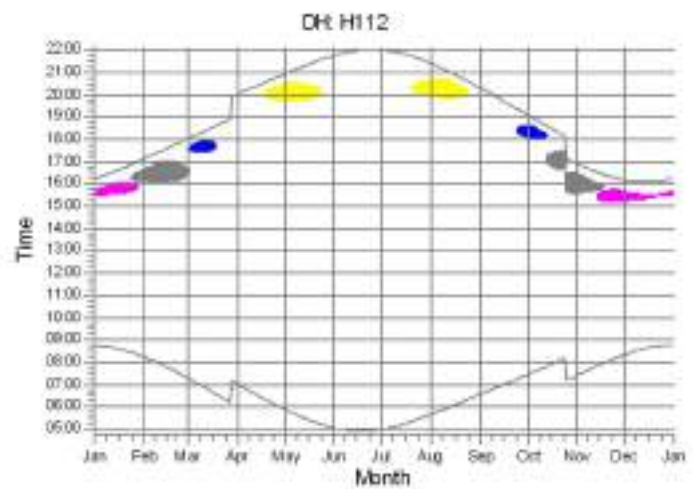
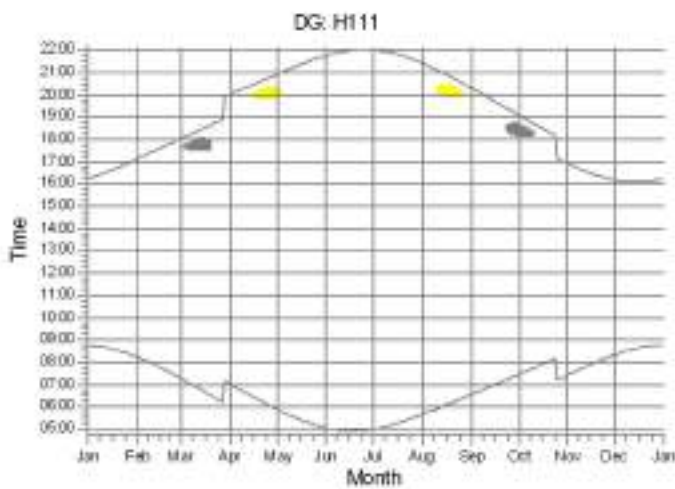
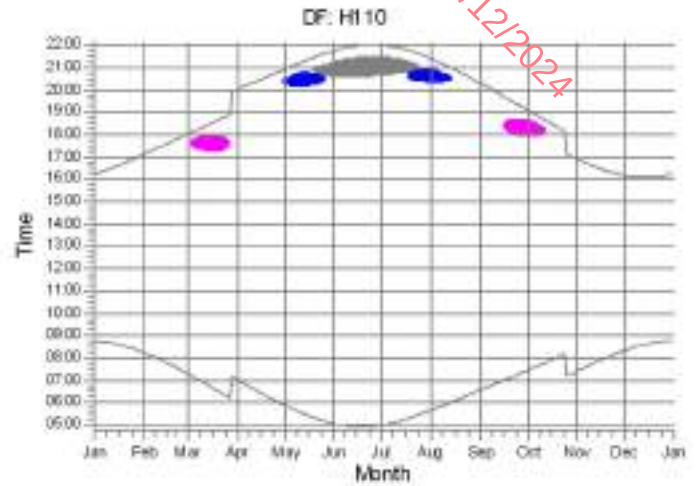
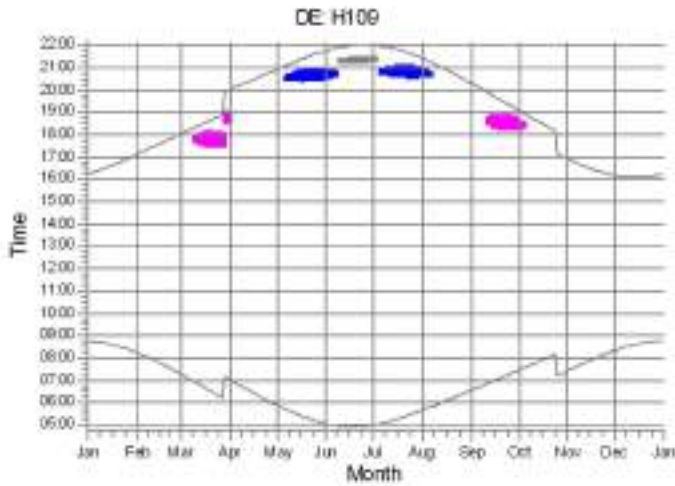


WTGs

3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

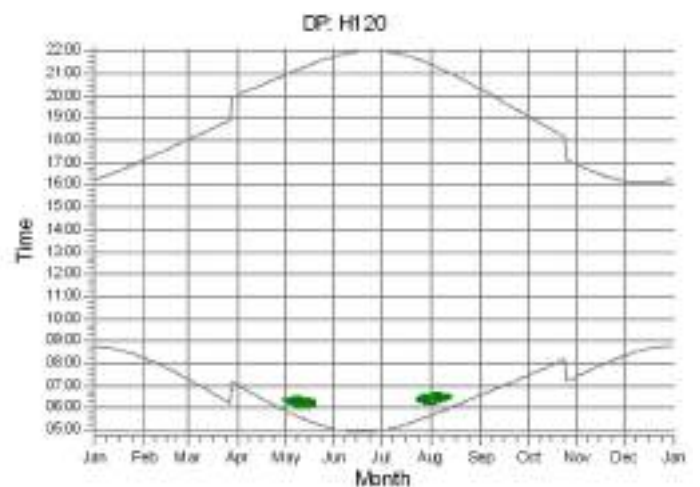
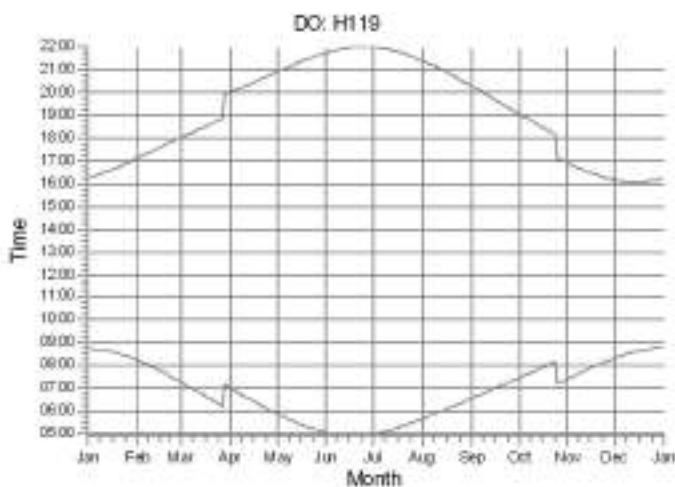
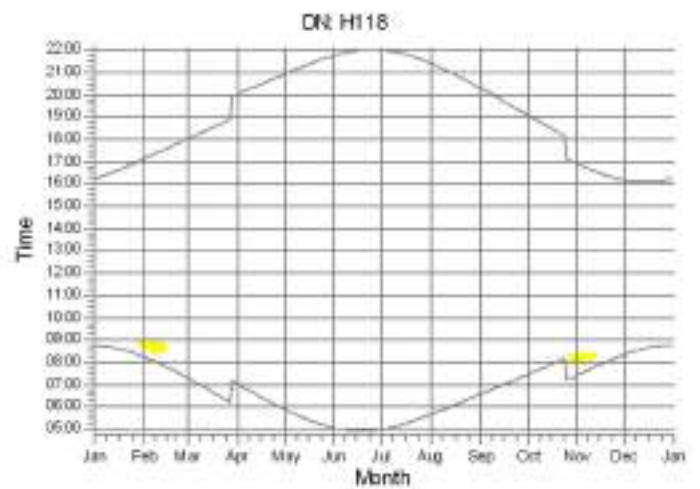
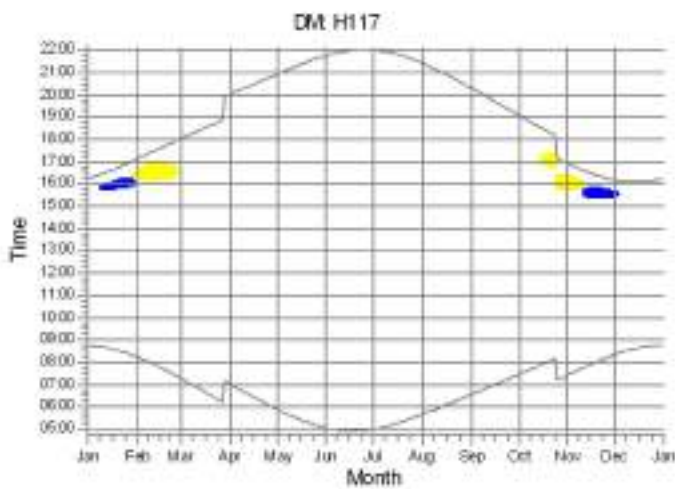
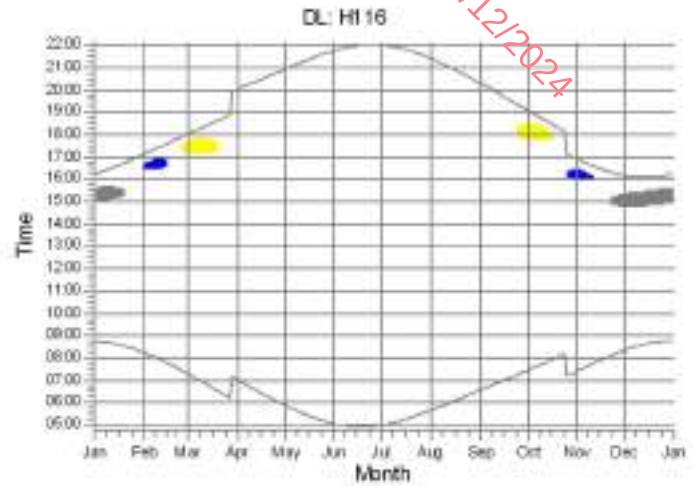
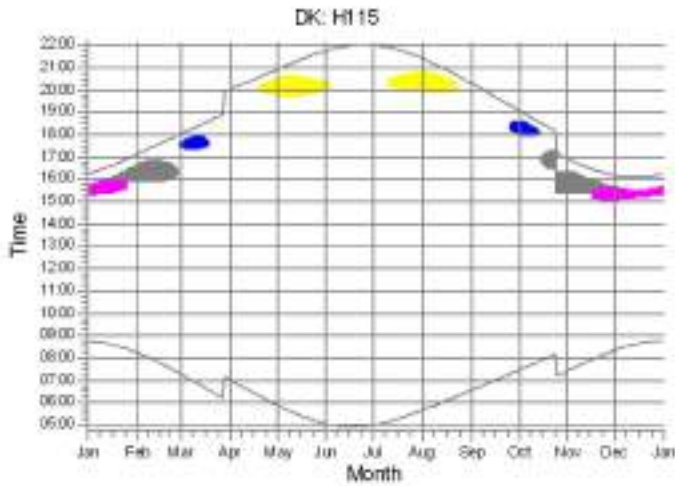


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

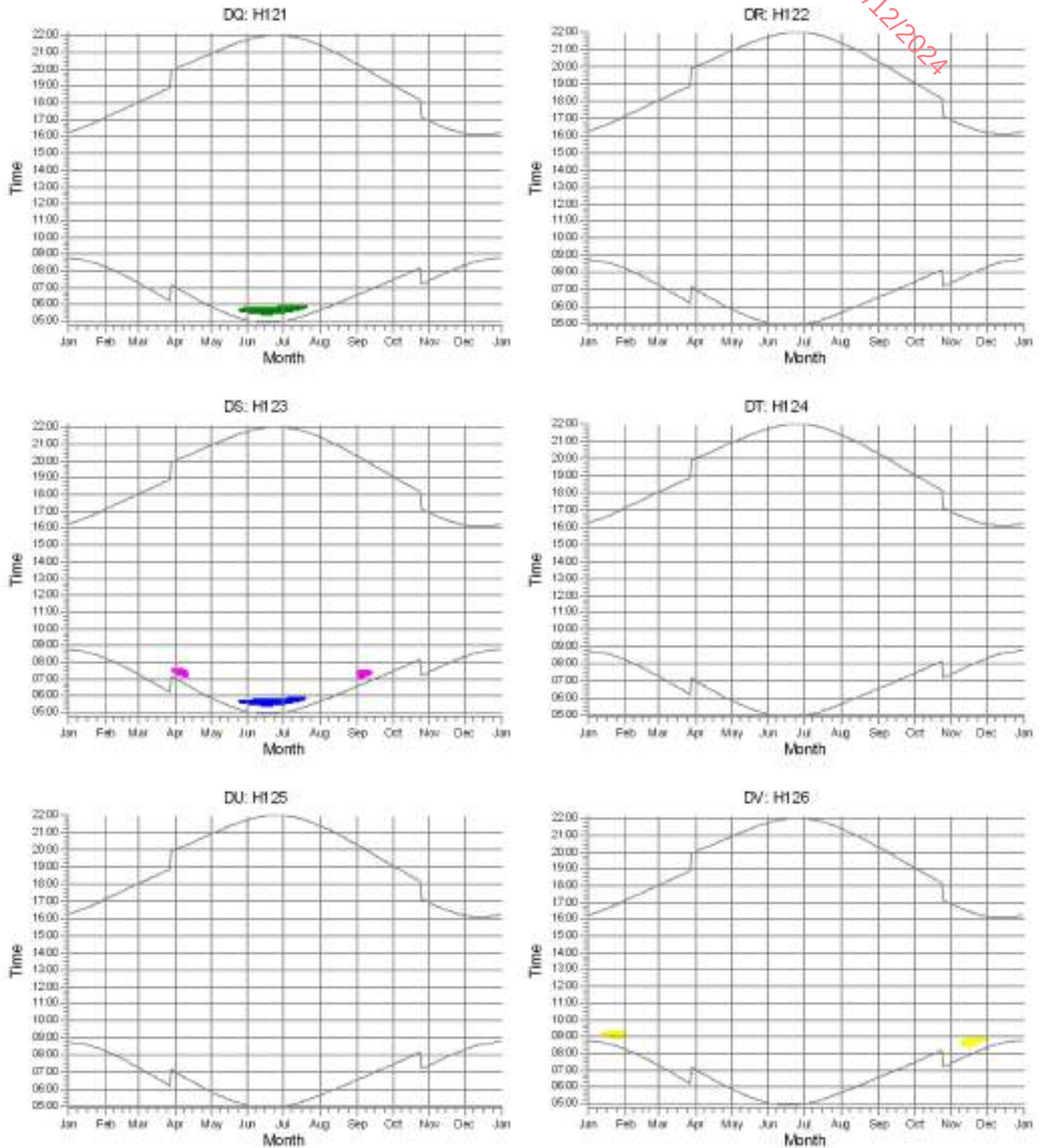


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

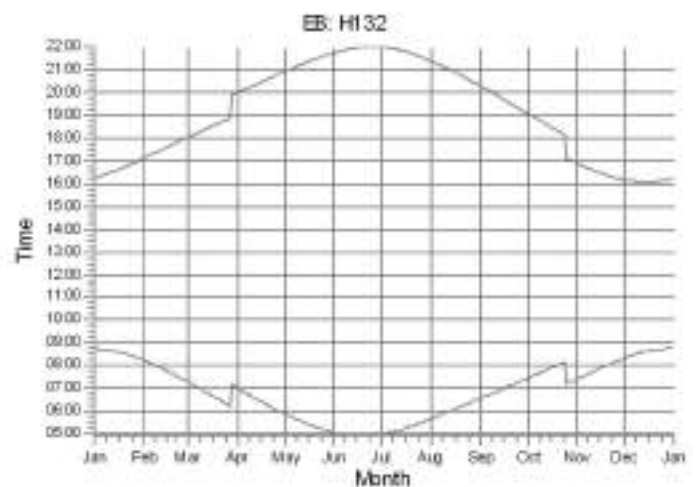
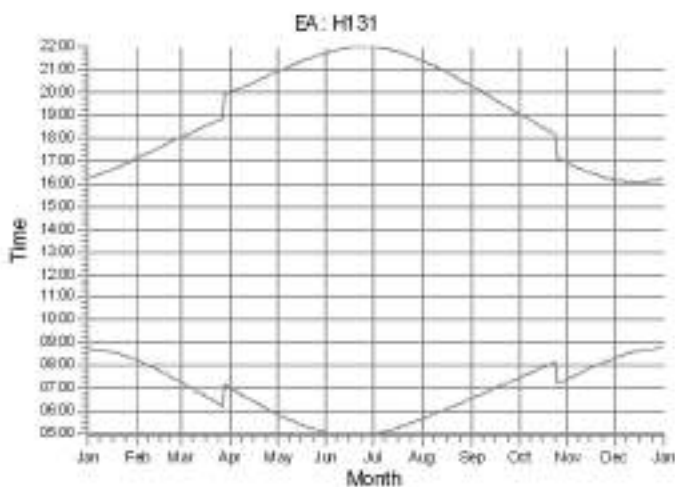
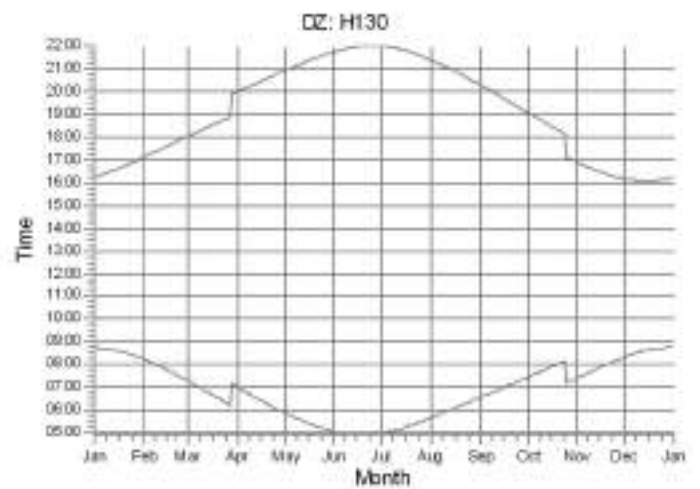
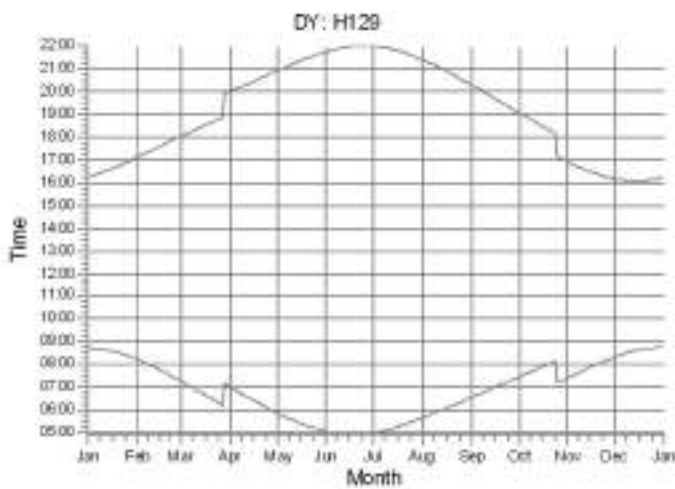
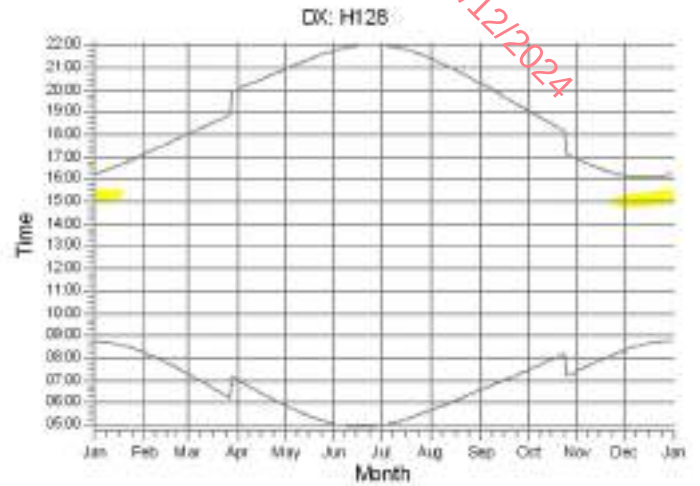
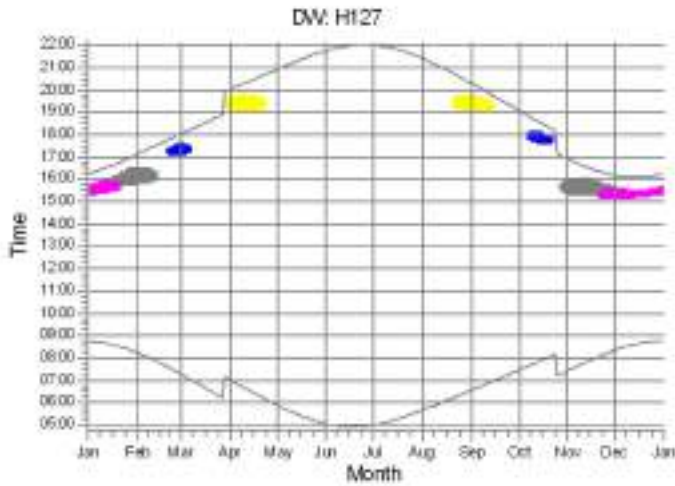


WTGs

1: T01 2: T02 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case



WTGs

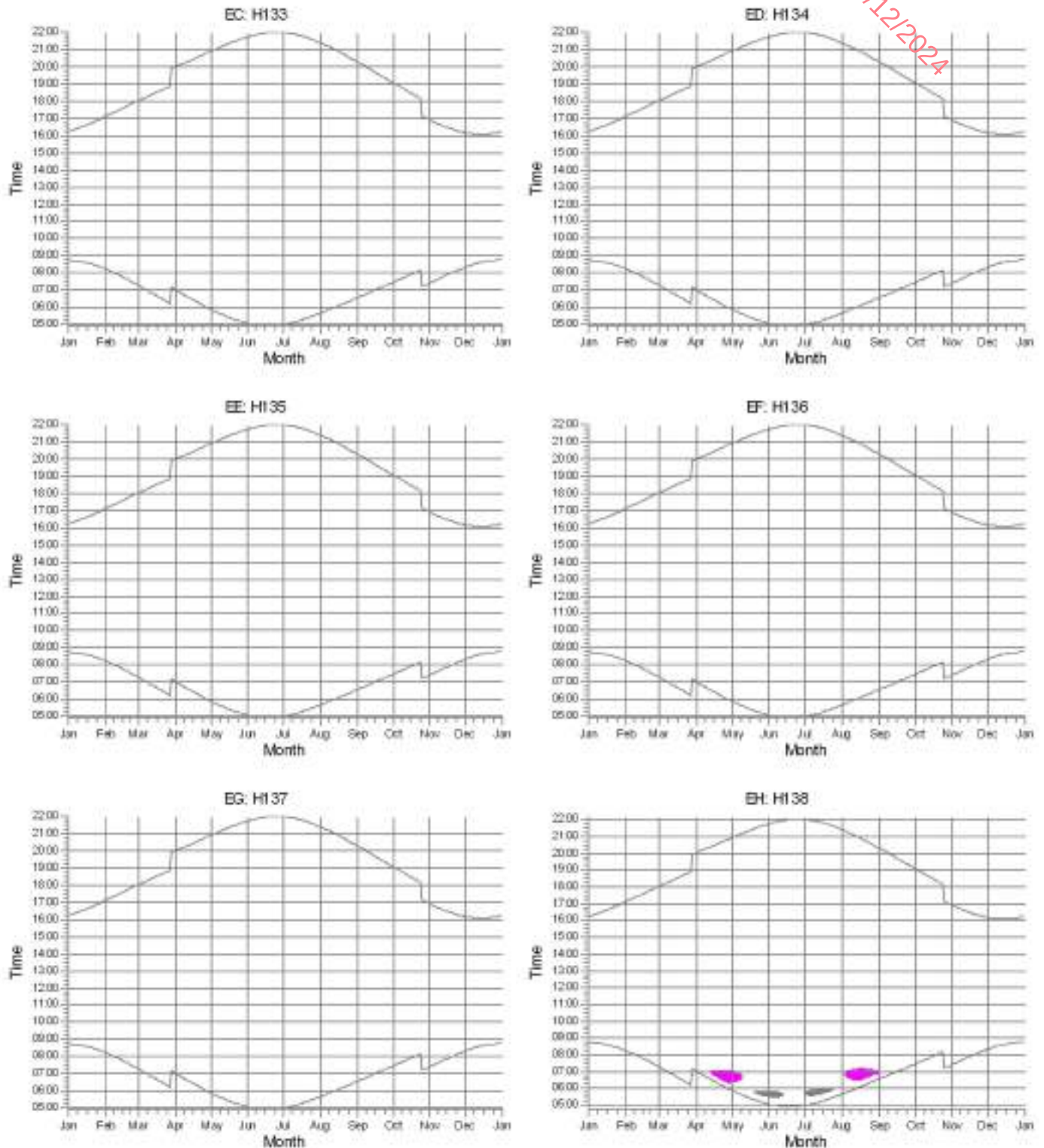
2: T02 3: T03 4: T04 5: T05

Project: 6918 Kellystown
 Description: 5 no. turbine Wind Farm, Co. Louth

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 abyryne / abyryne@jodireland.com
 Calculated:
 11/07/2024 11:15/4.0.547

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

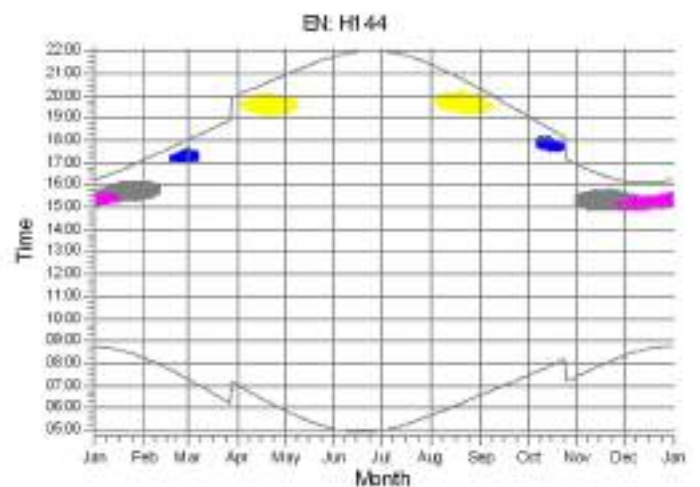
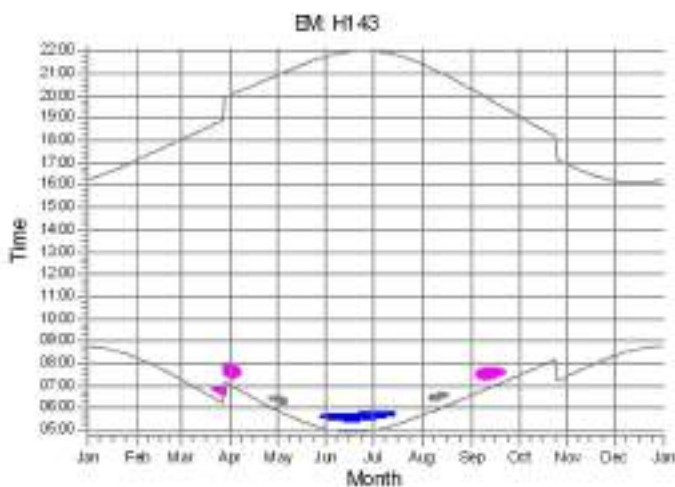
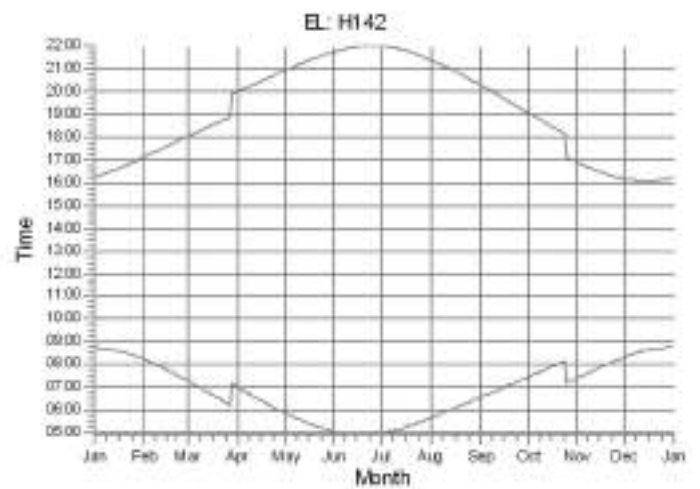
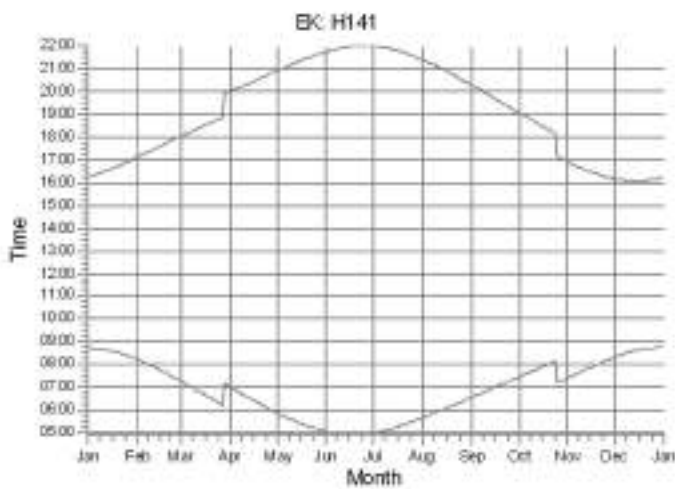
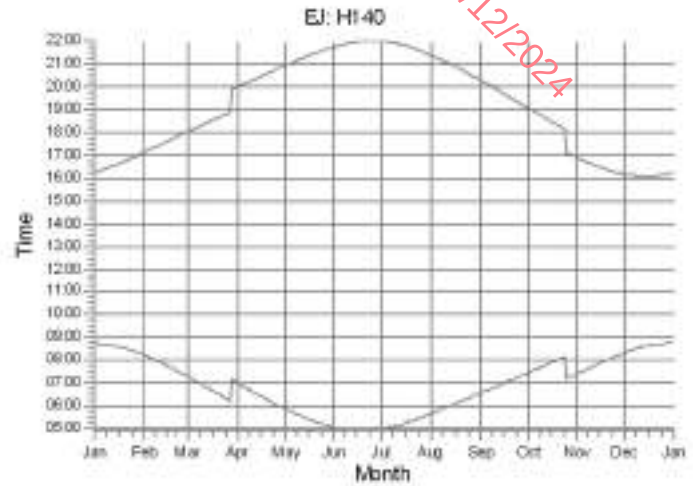
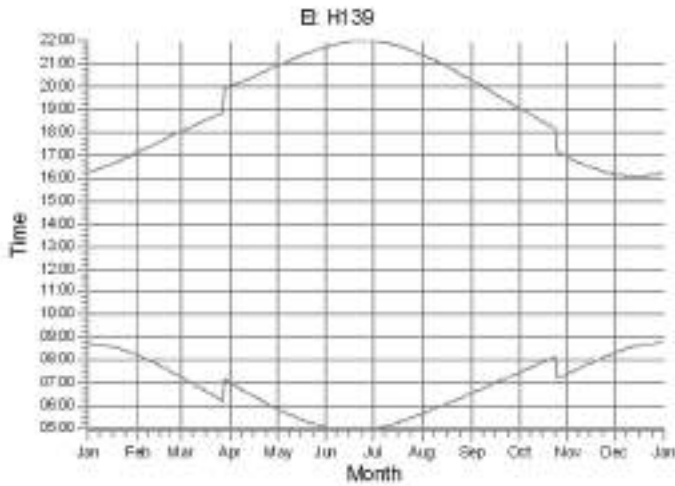


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

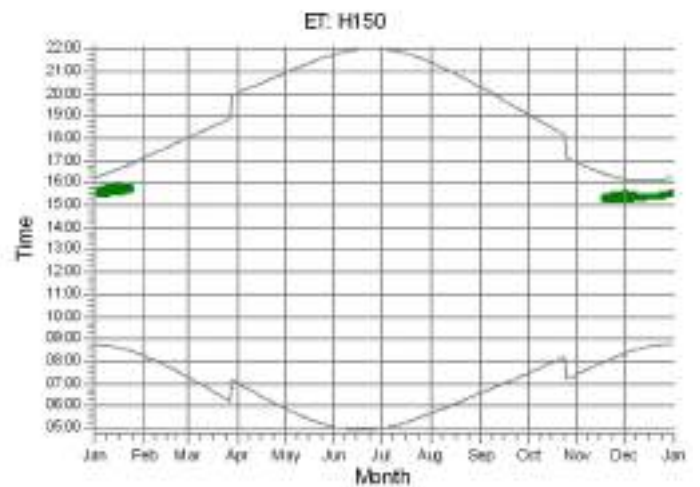
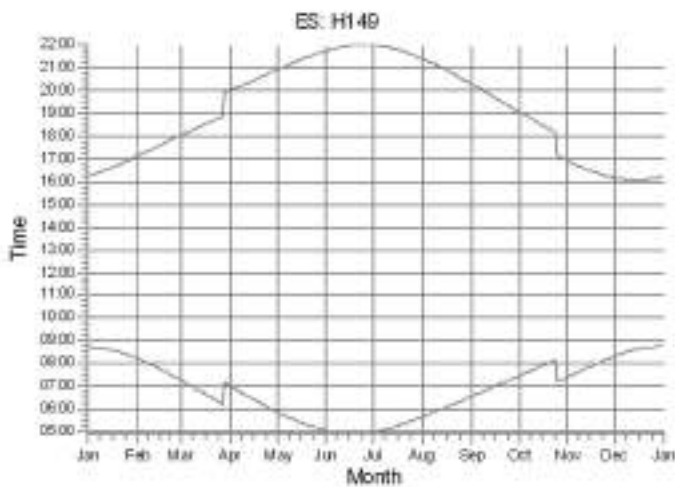
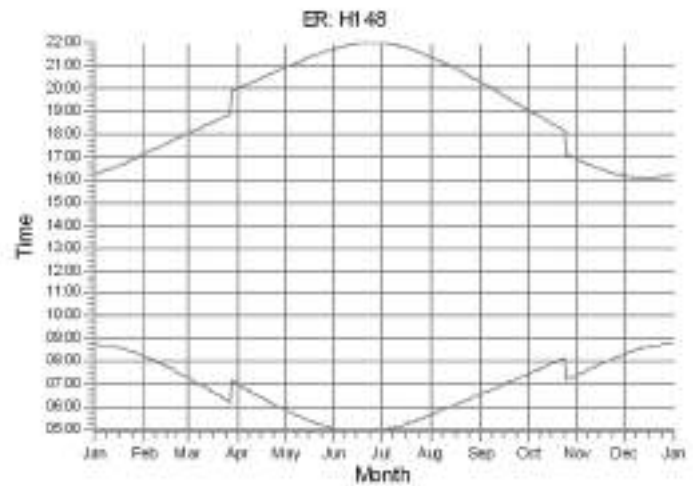
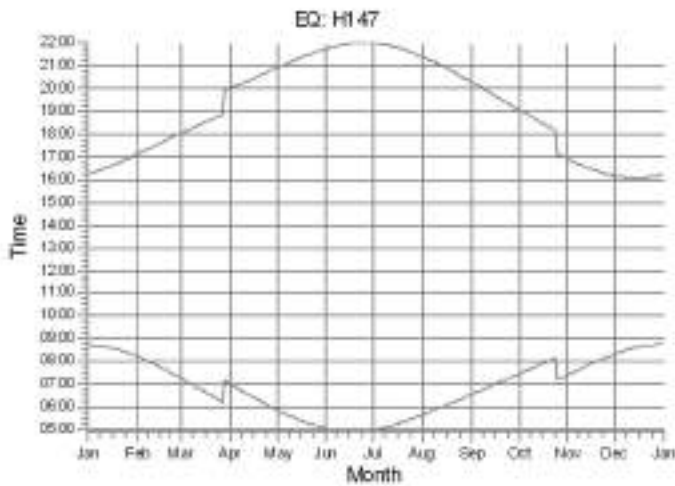
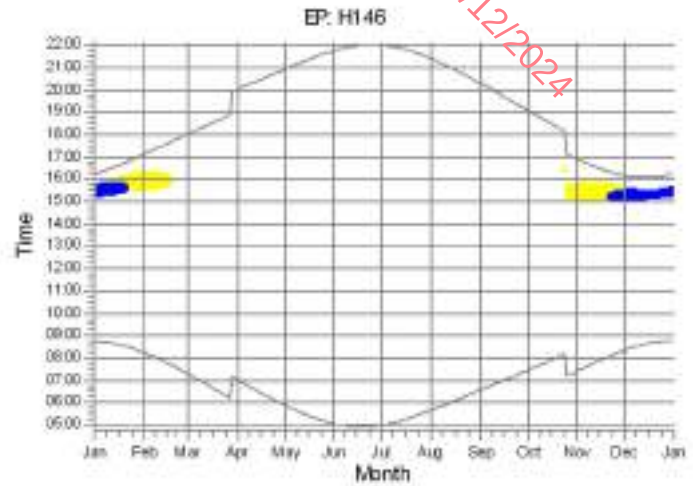
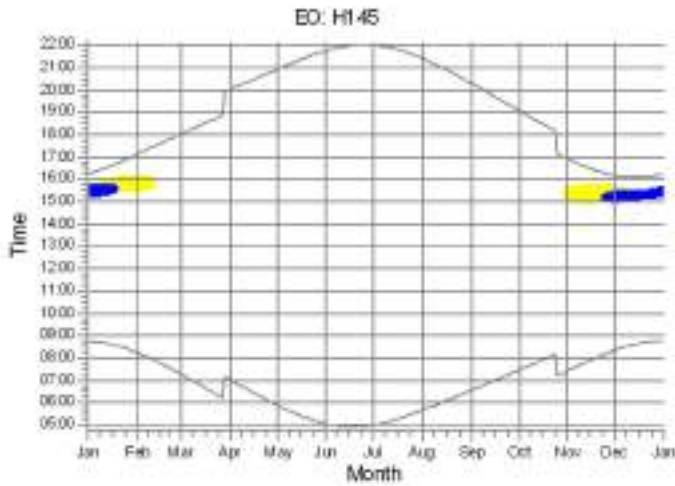


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

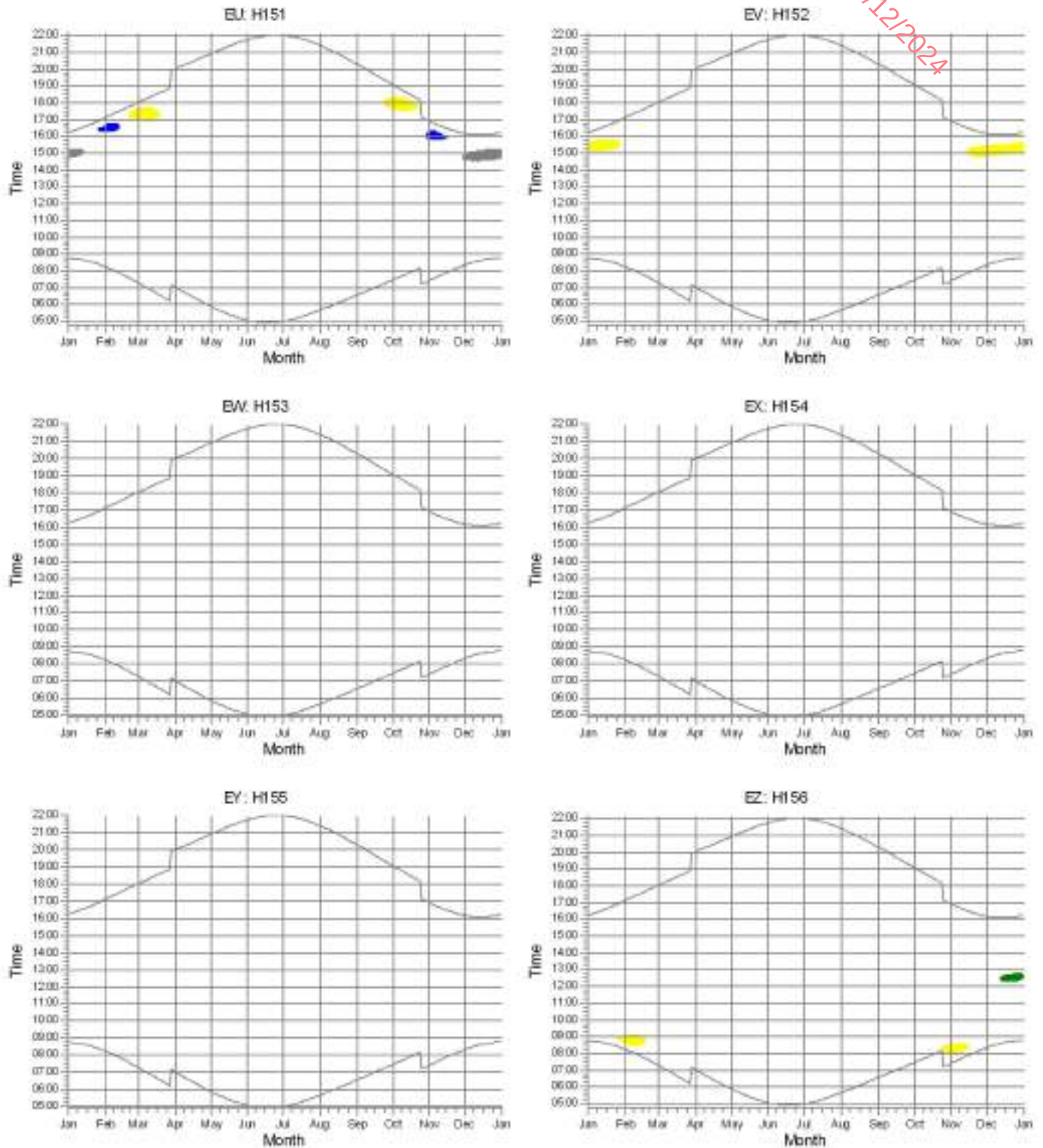


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

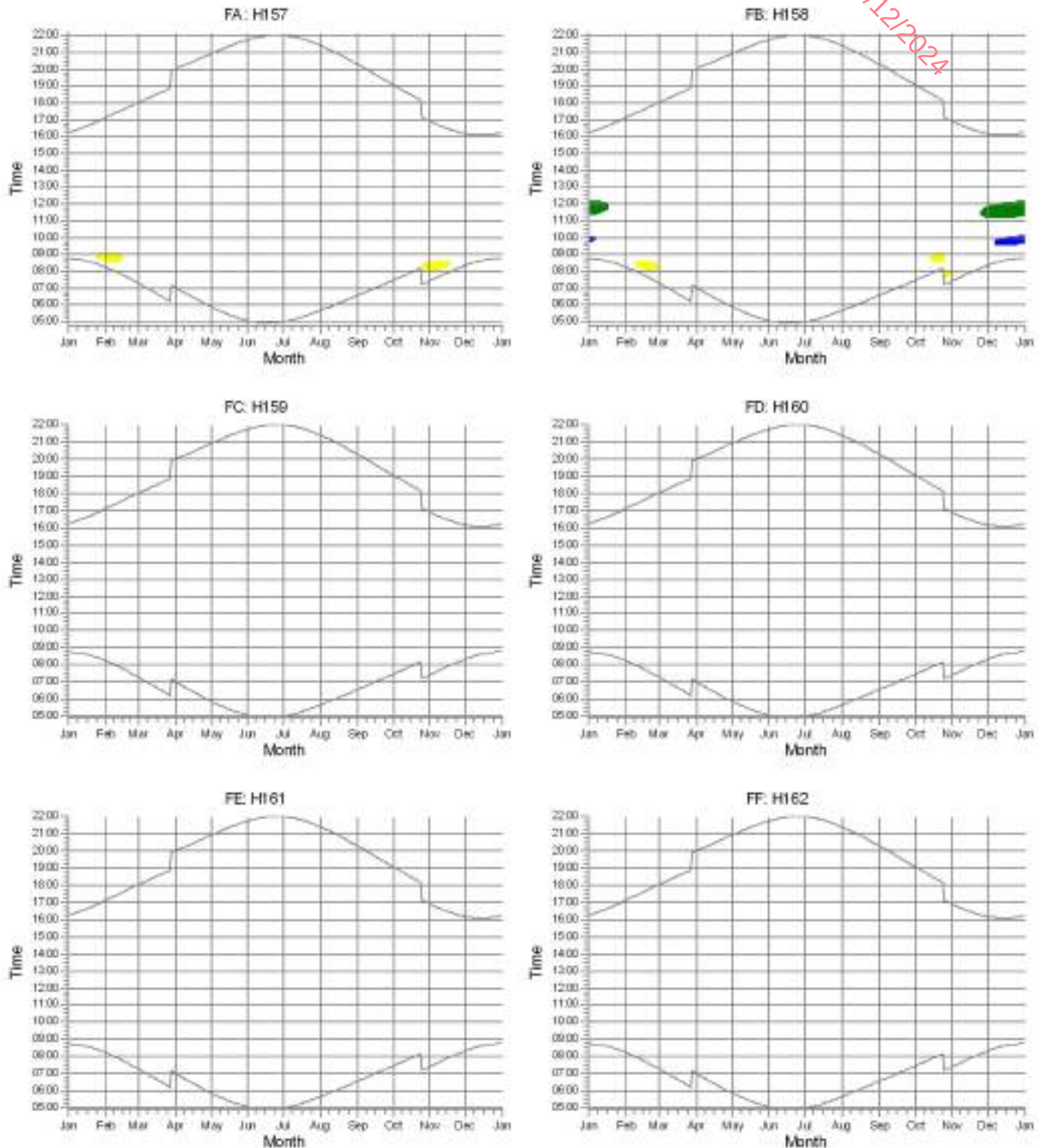


WTGs

1: T01 2: T02 3: T03 4: T04

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

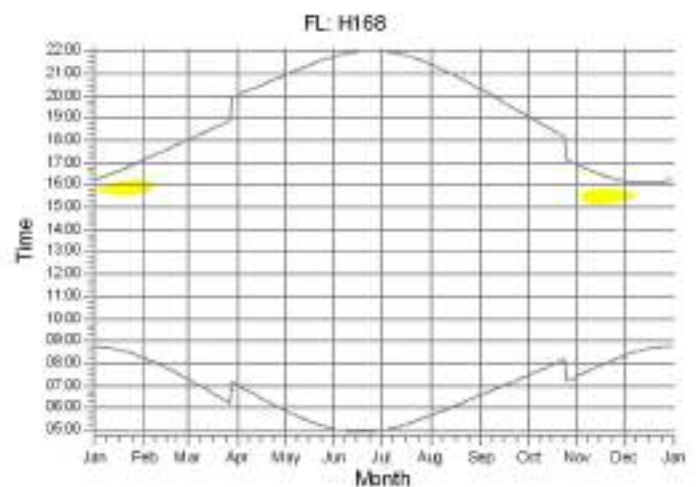
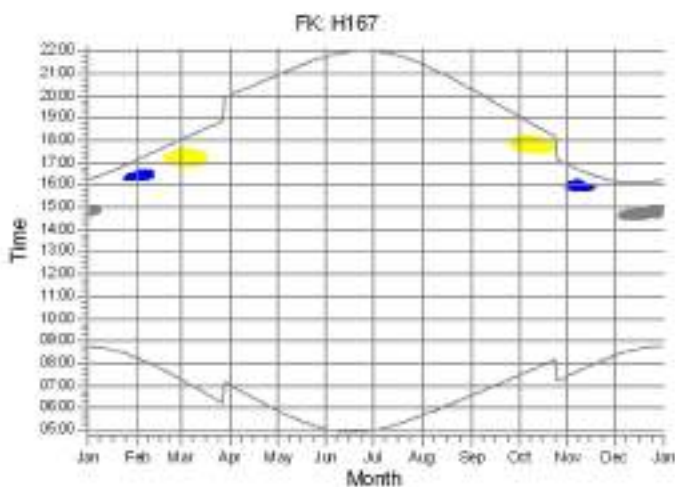
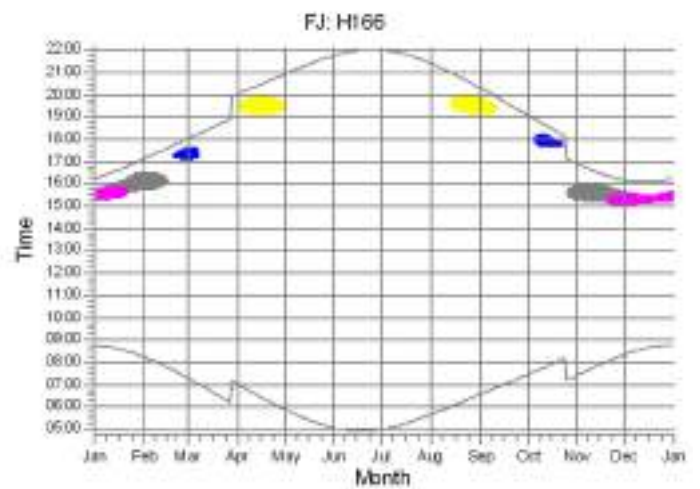
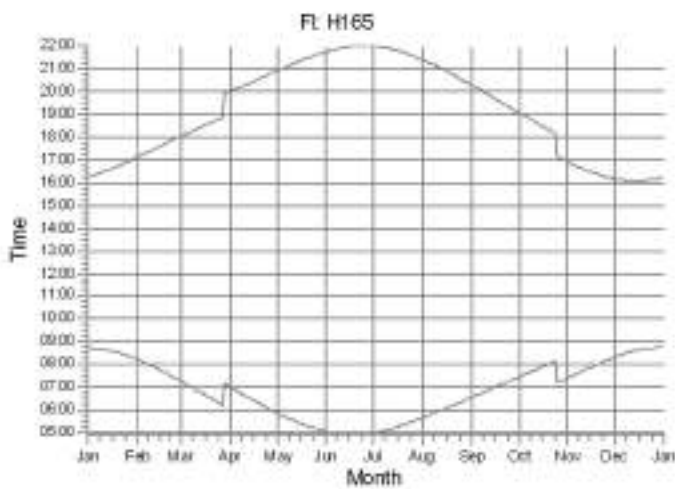
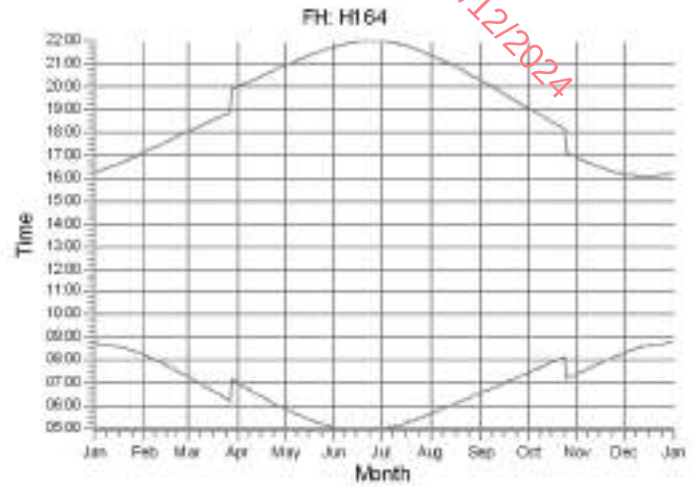
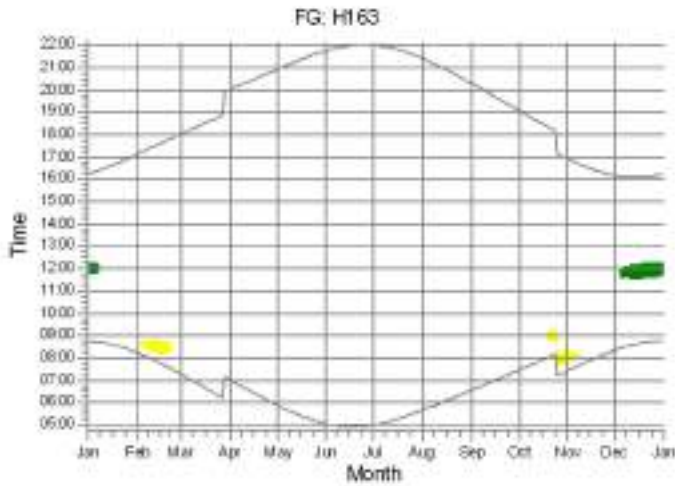


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

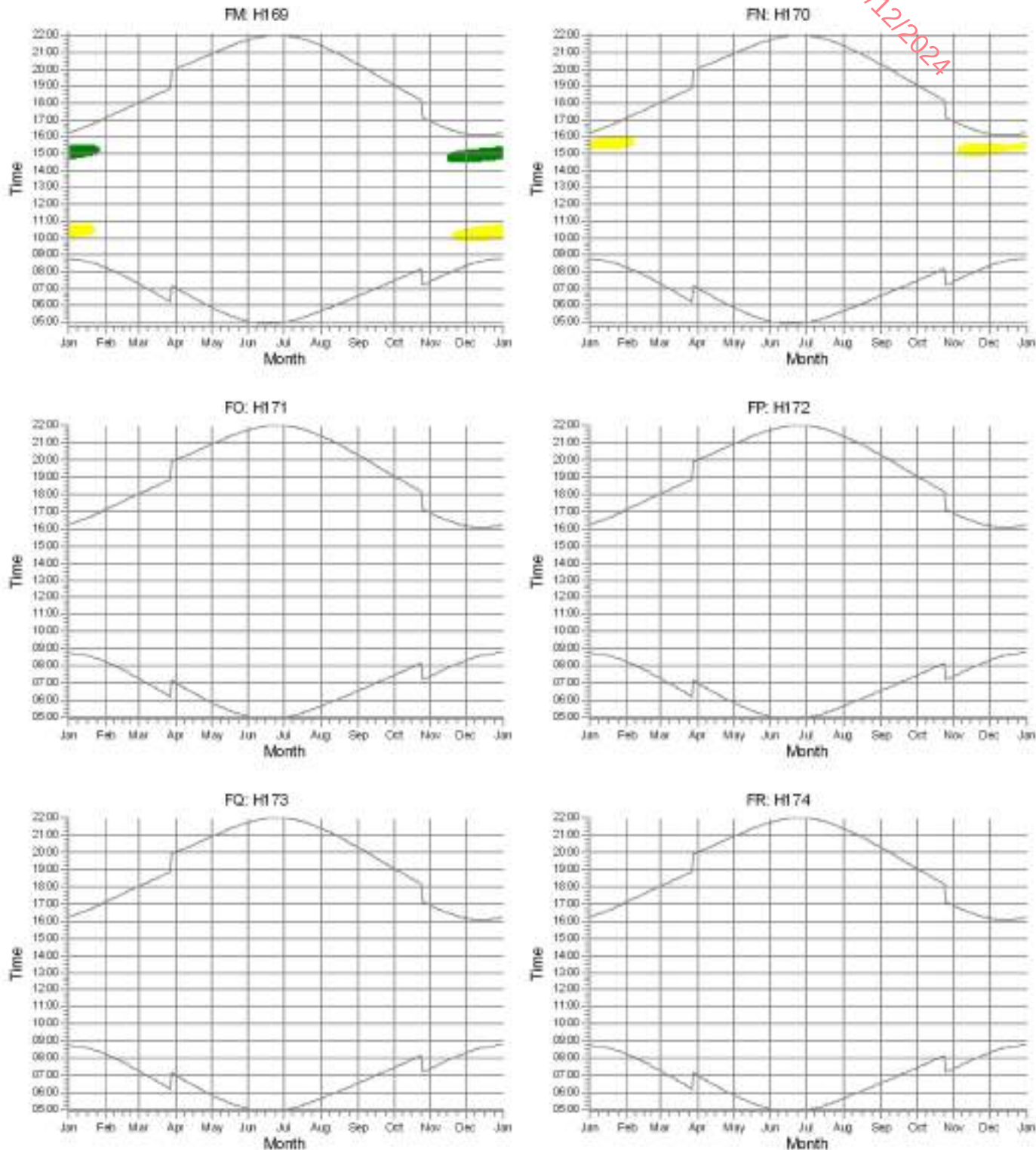


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

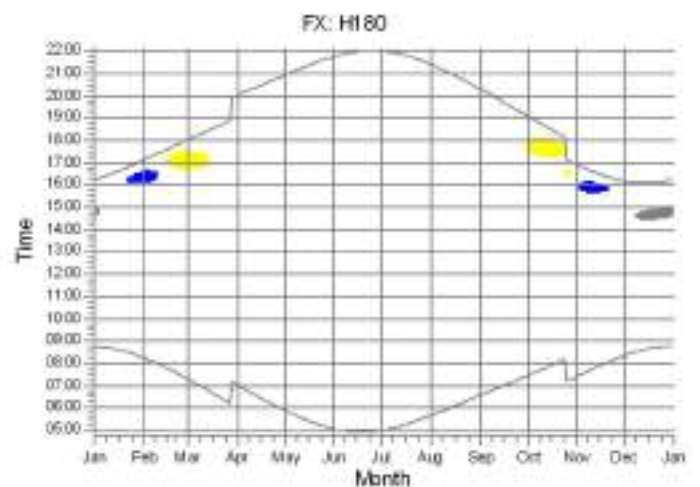
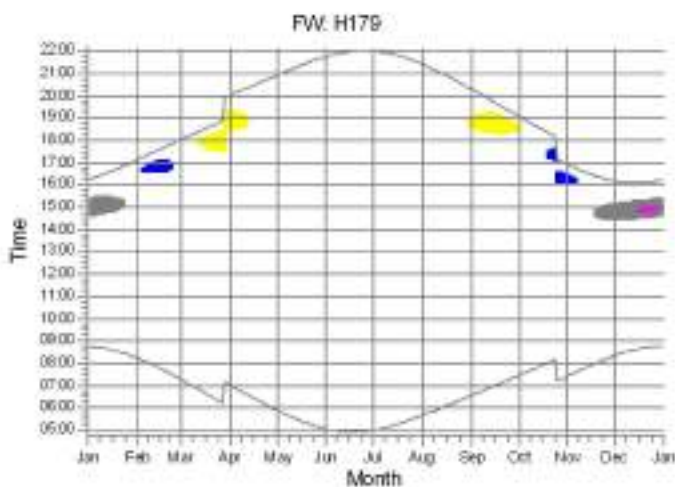
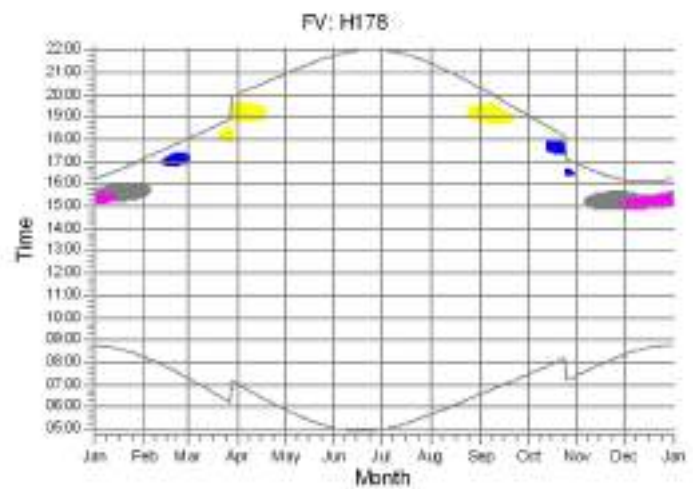
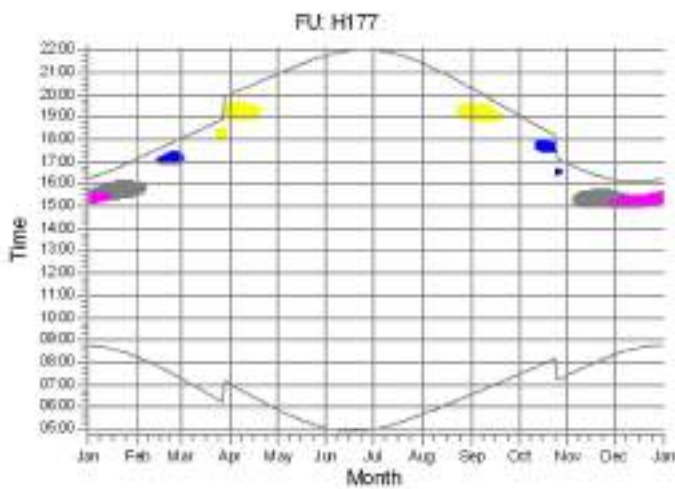
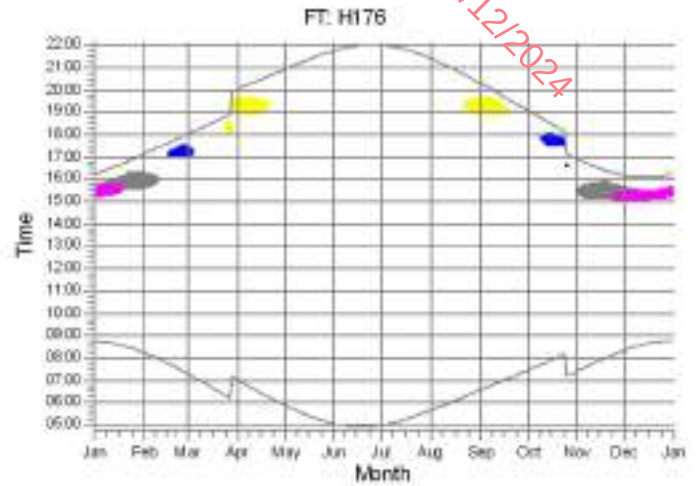
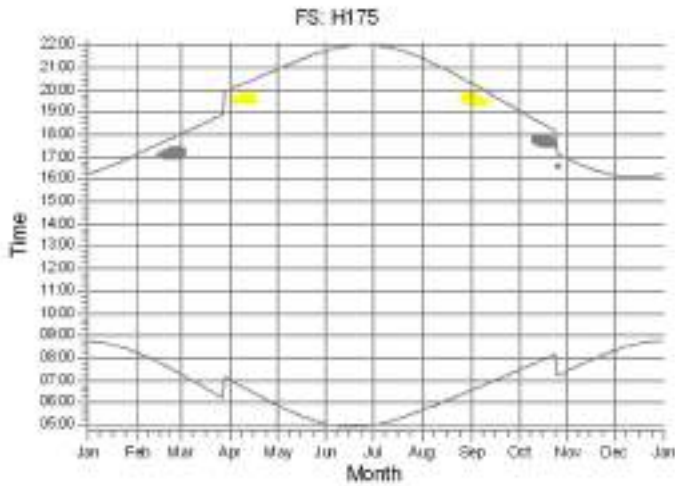


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

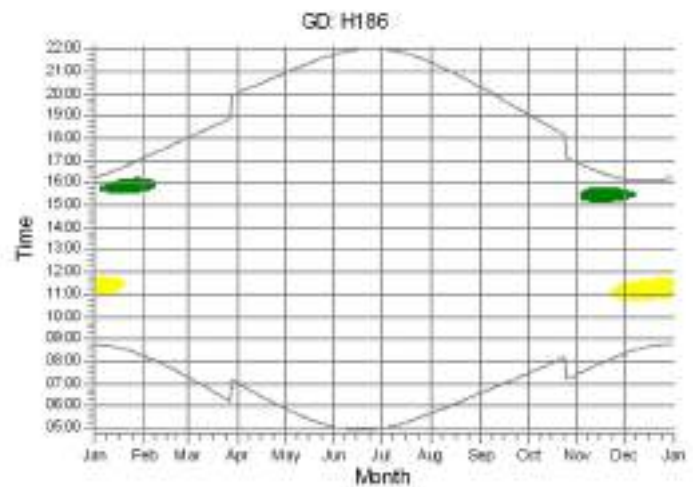
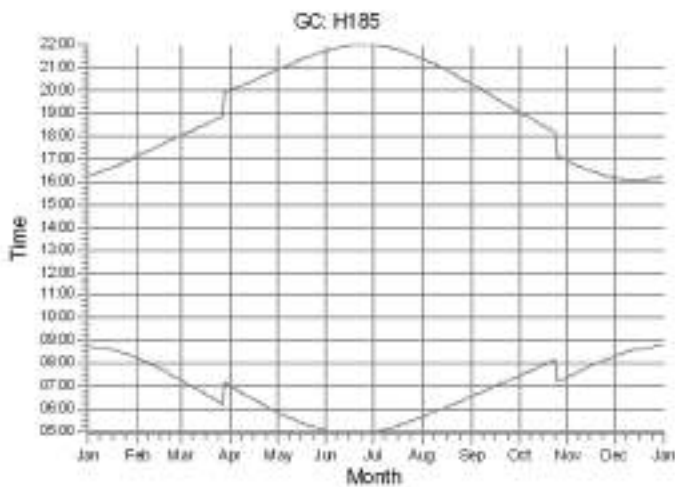
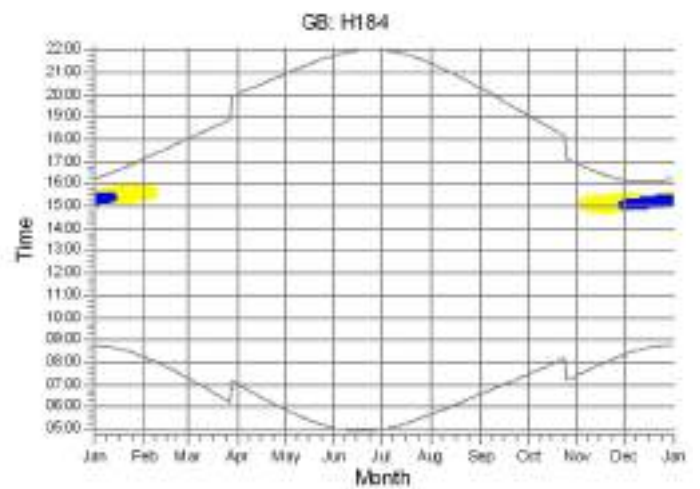
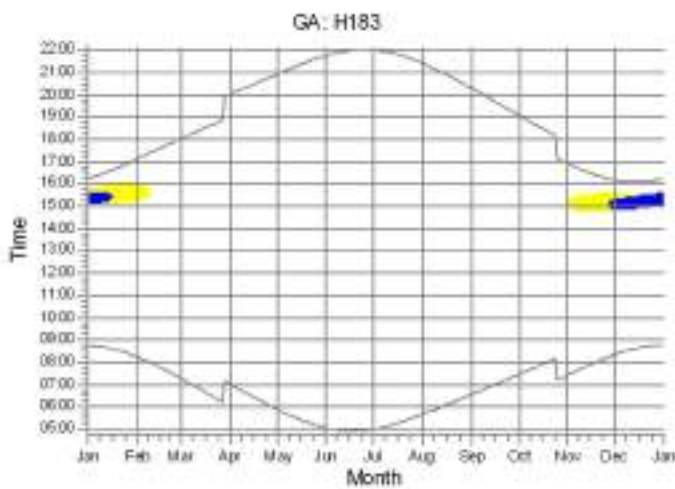
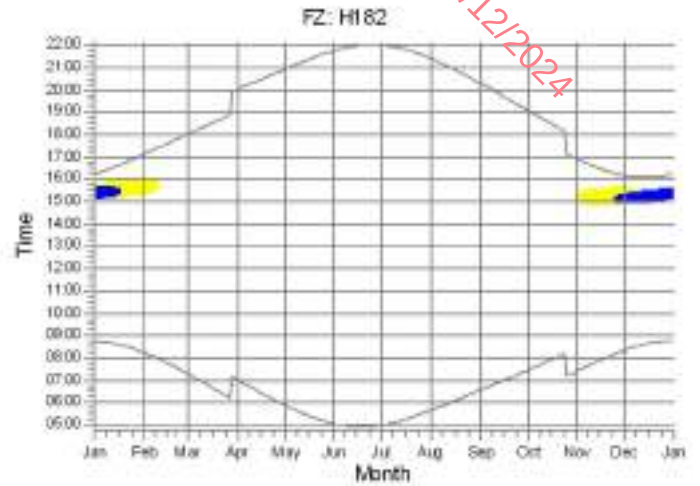
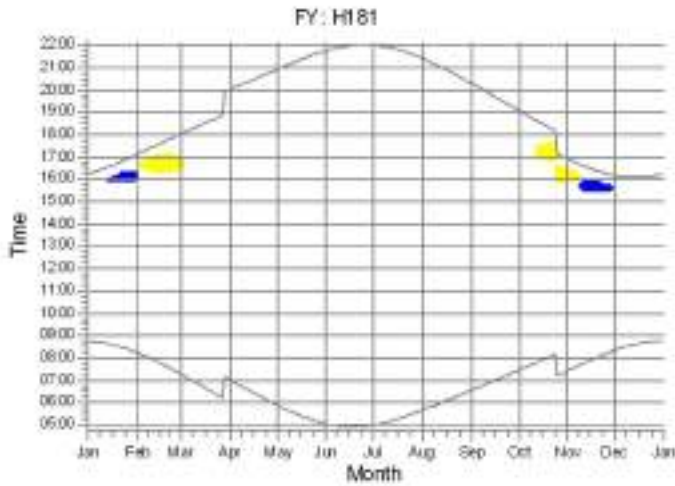


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

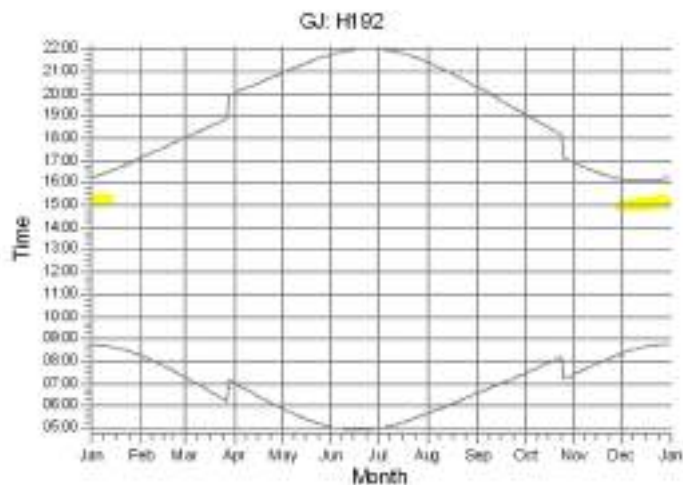
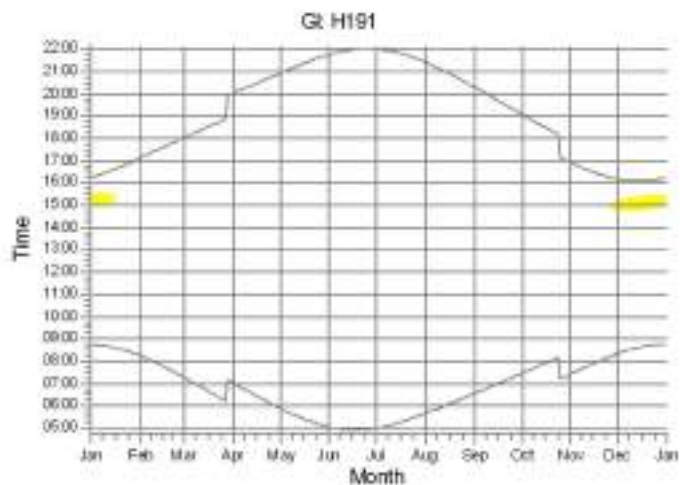
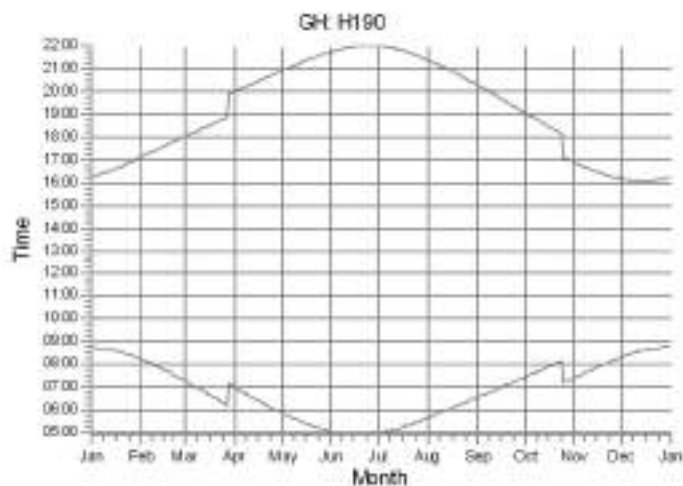
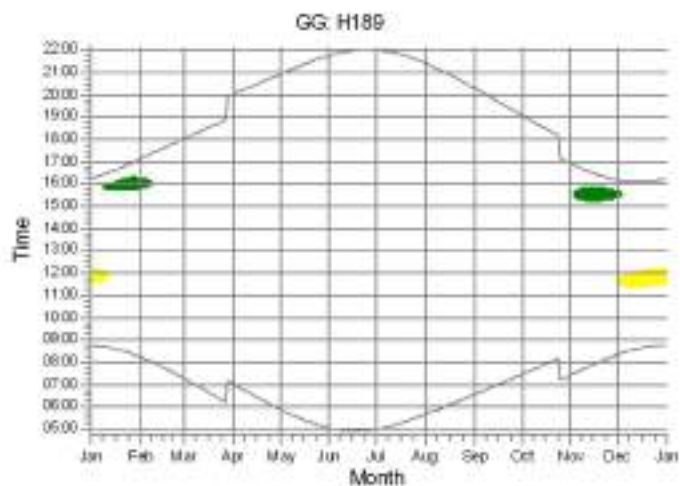
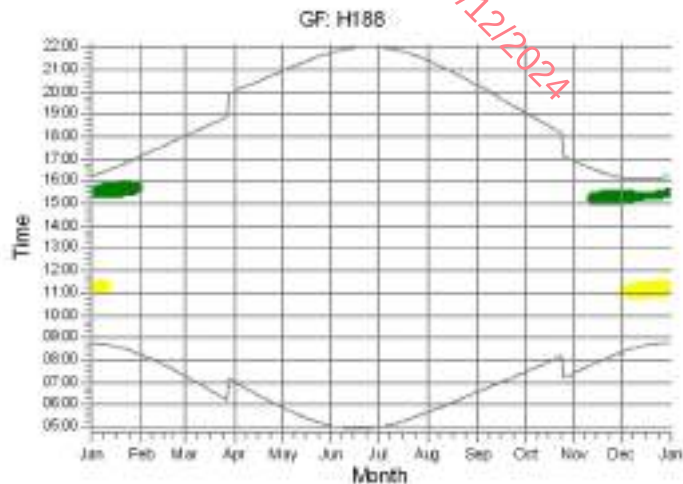
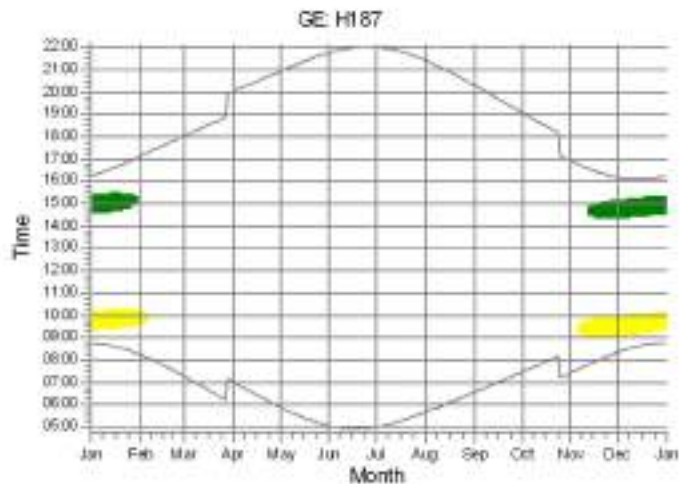


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

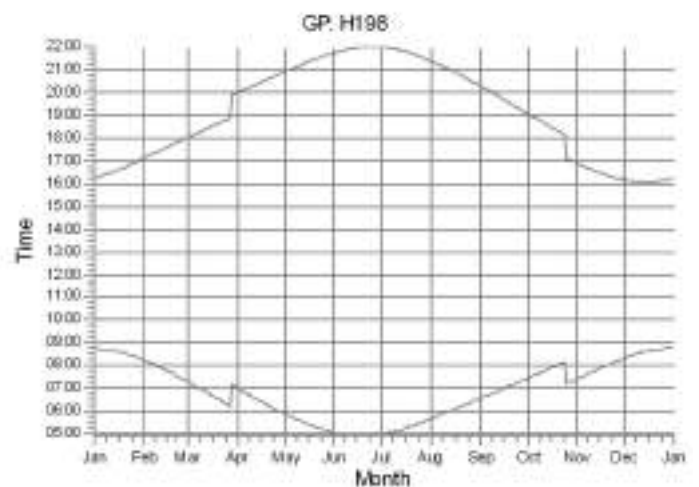
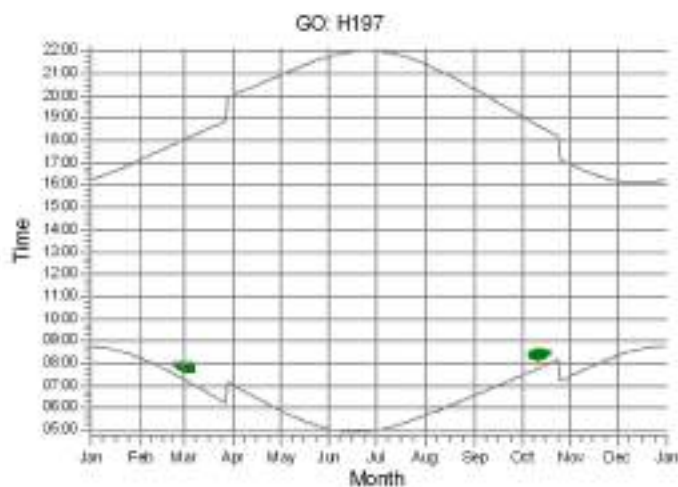
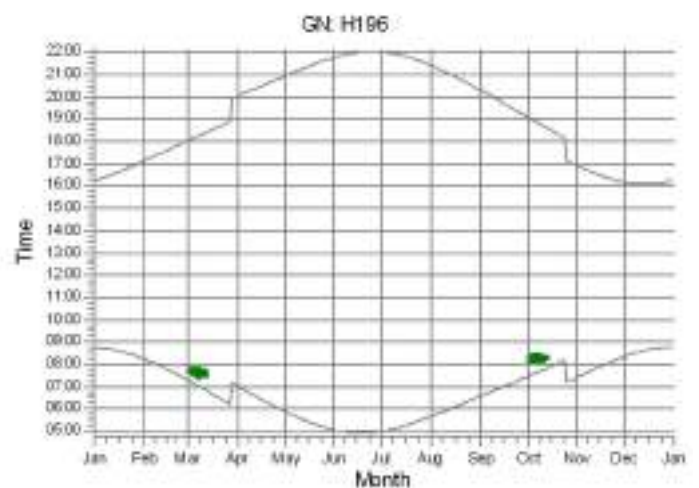
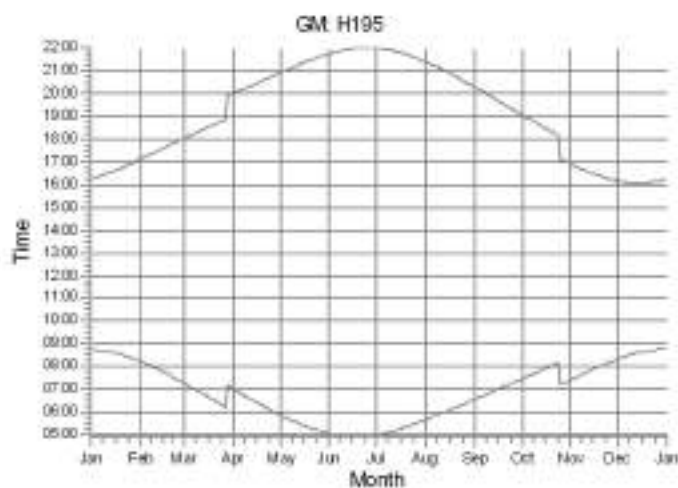
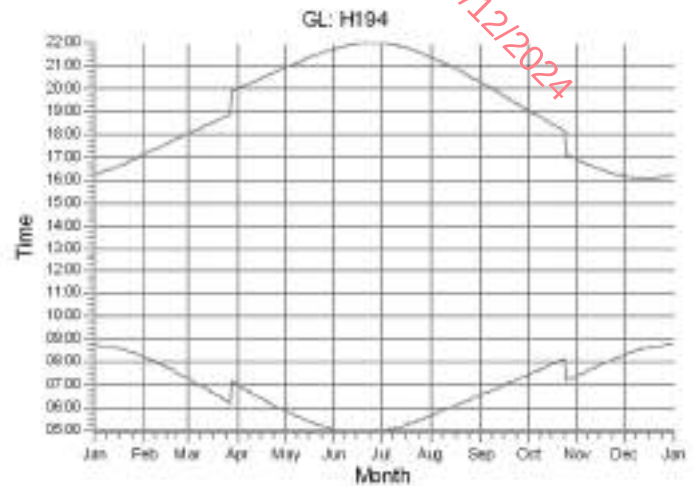
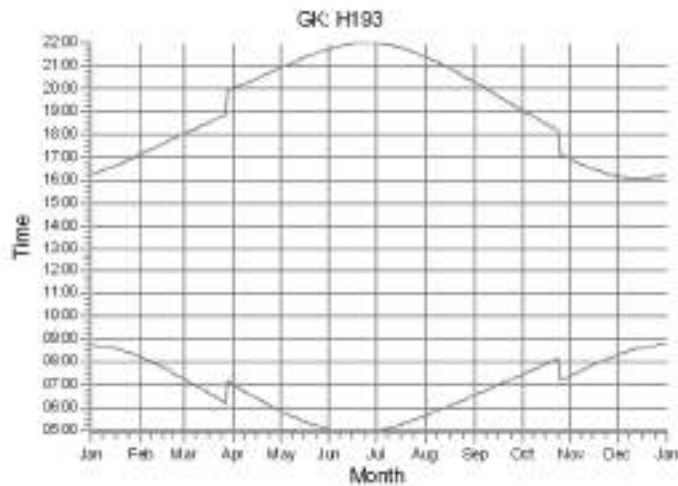


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

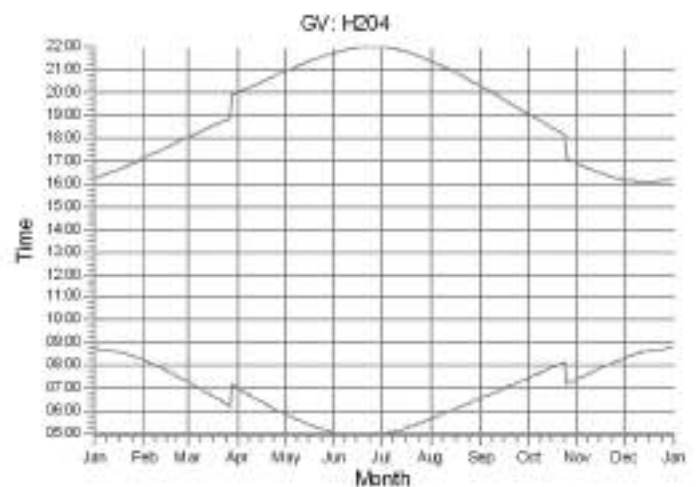
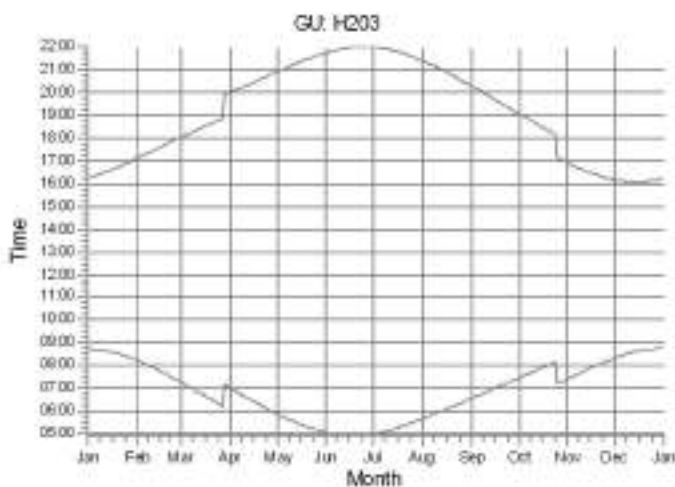
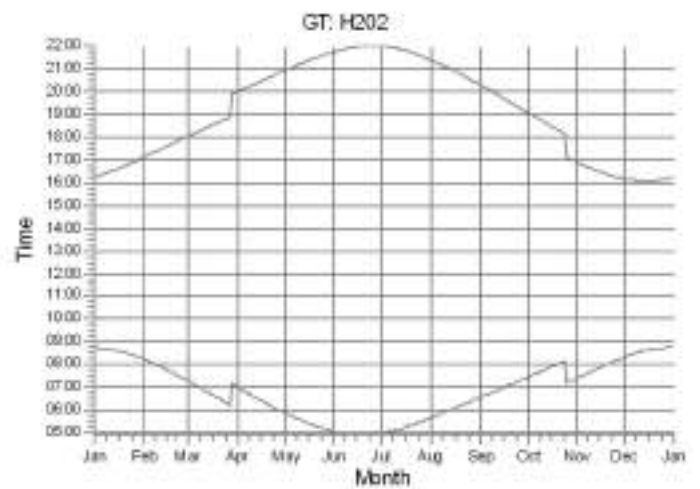
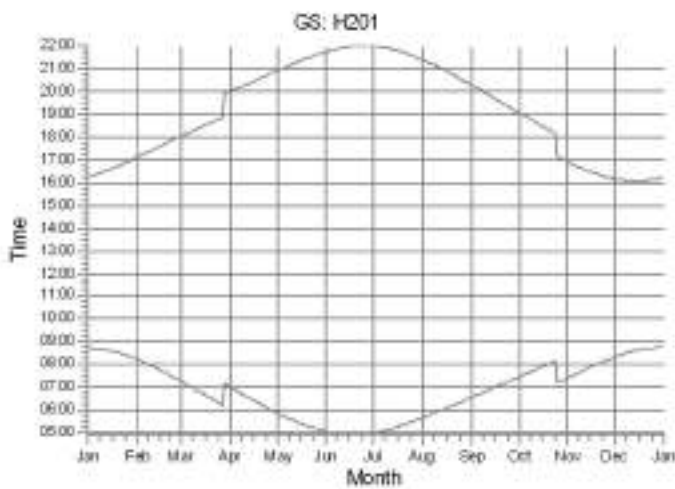
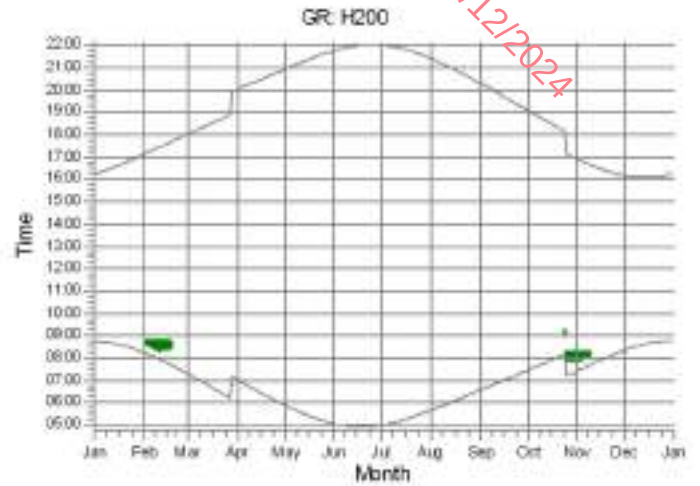
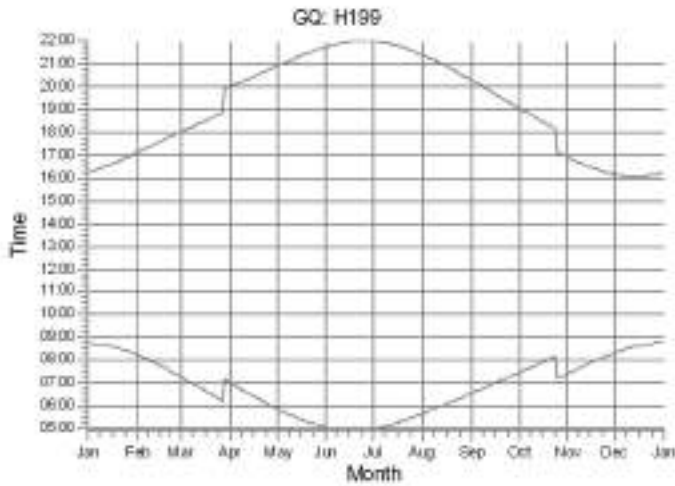


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case



WTGs

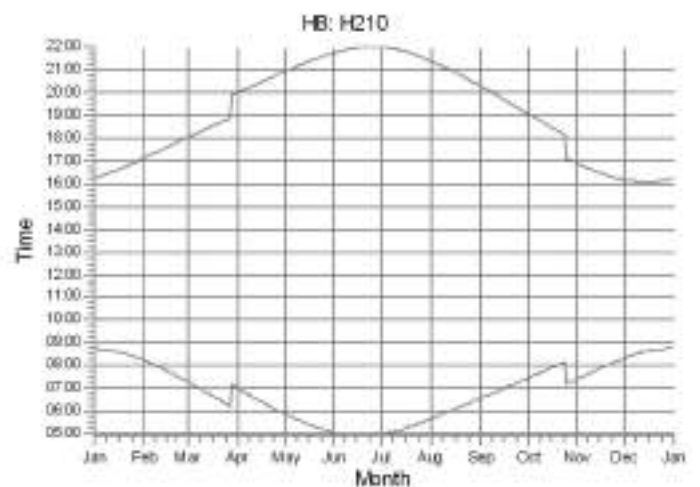
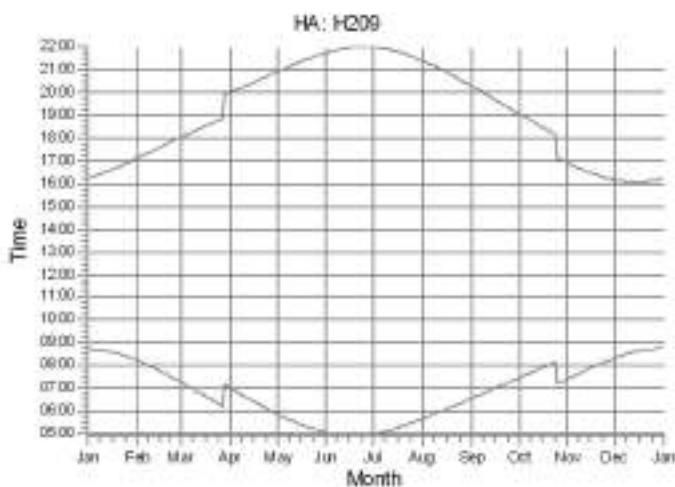
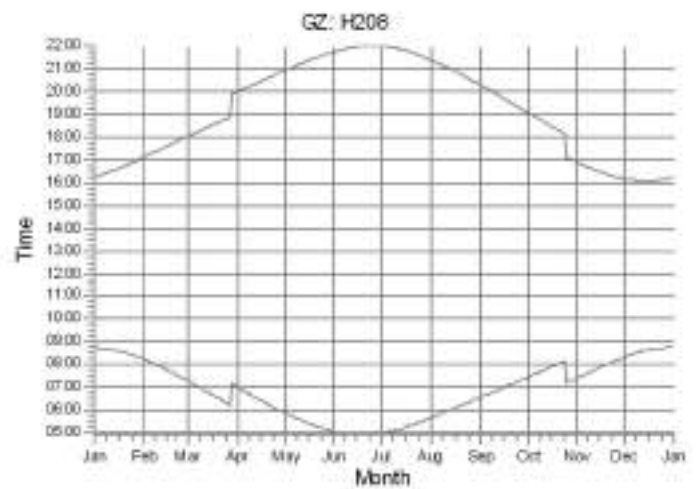
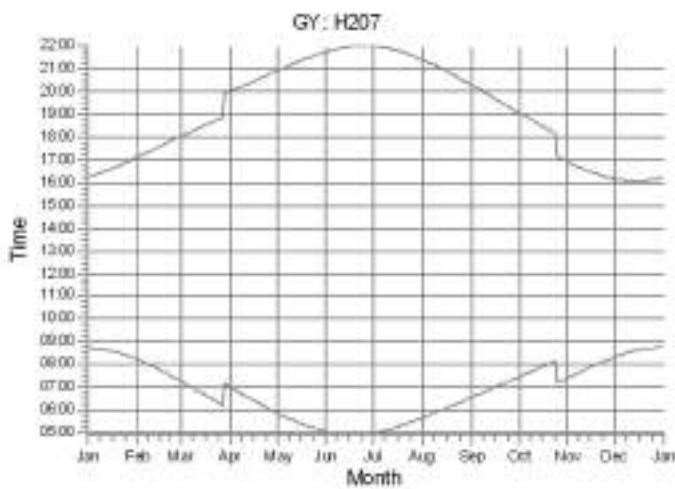
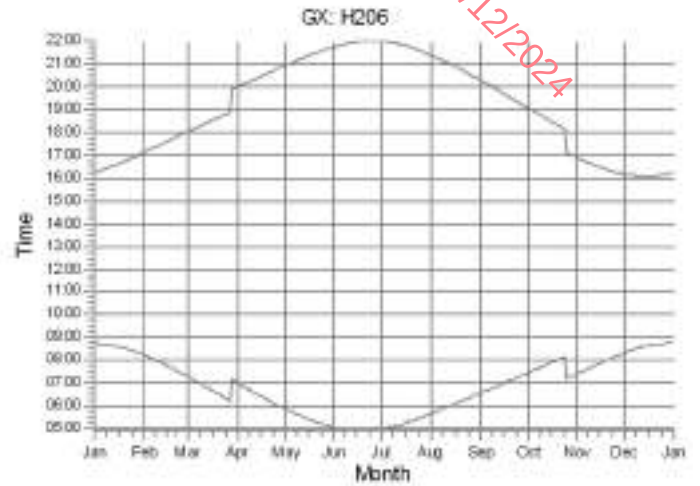
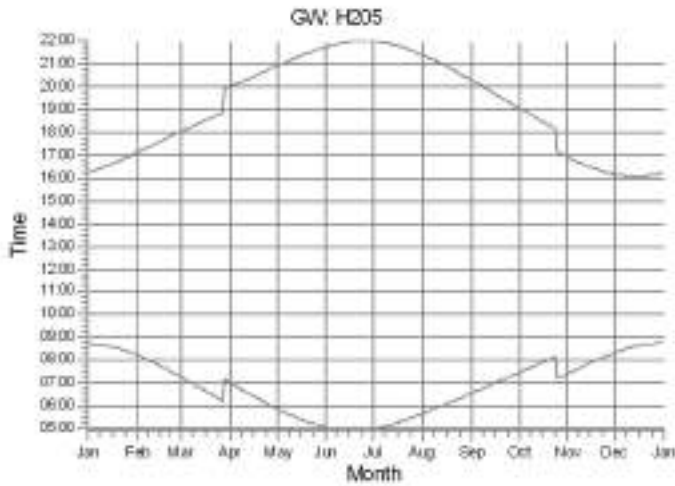
1: T01

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

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SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case



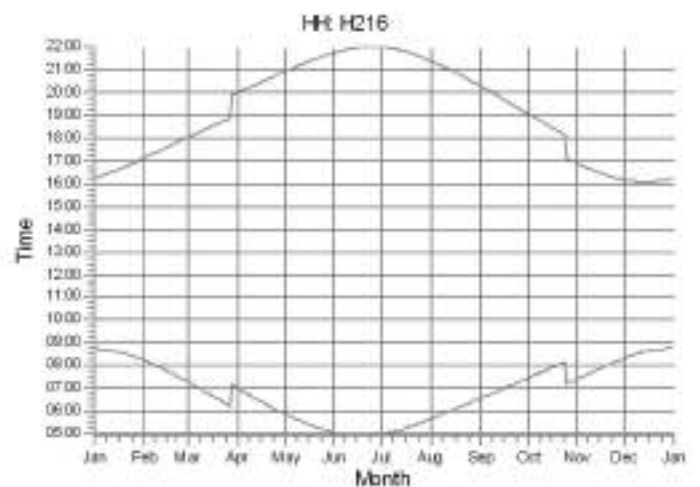
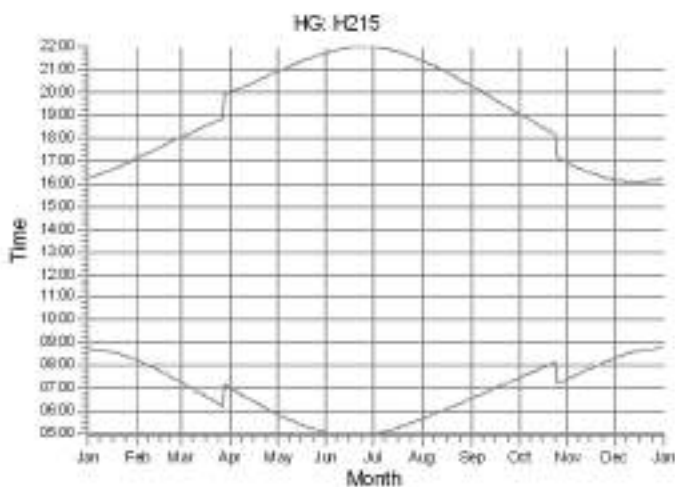
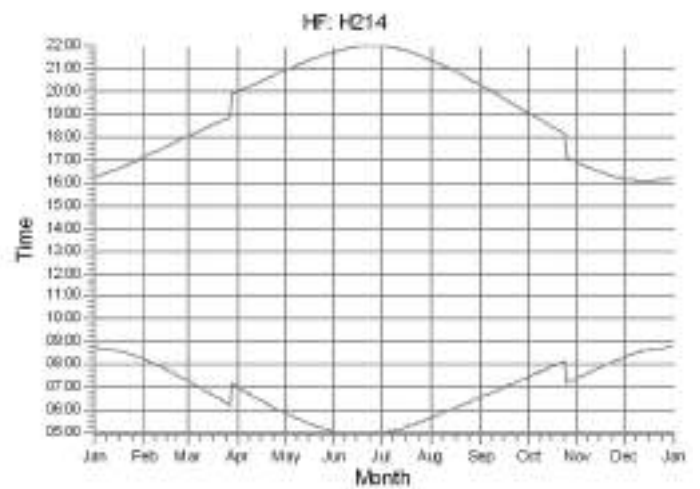
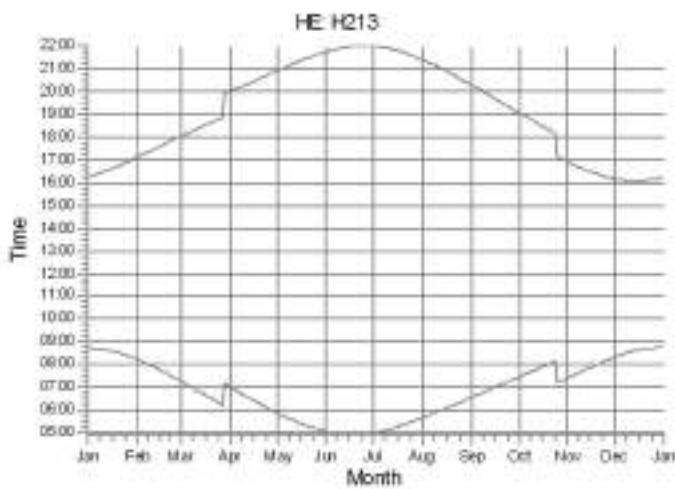
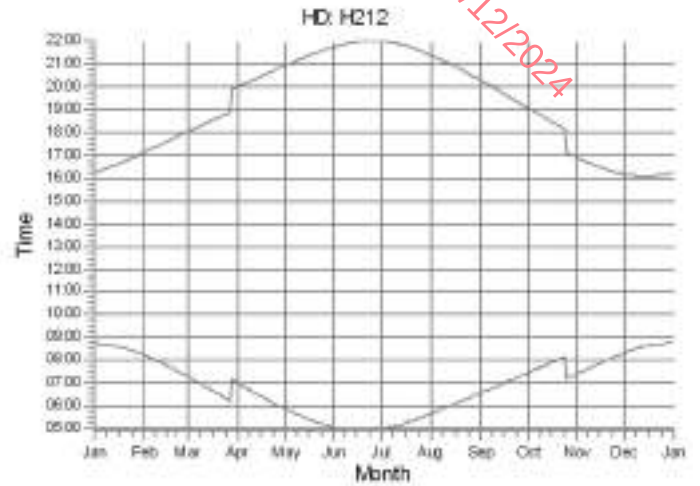
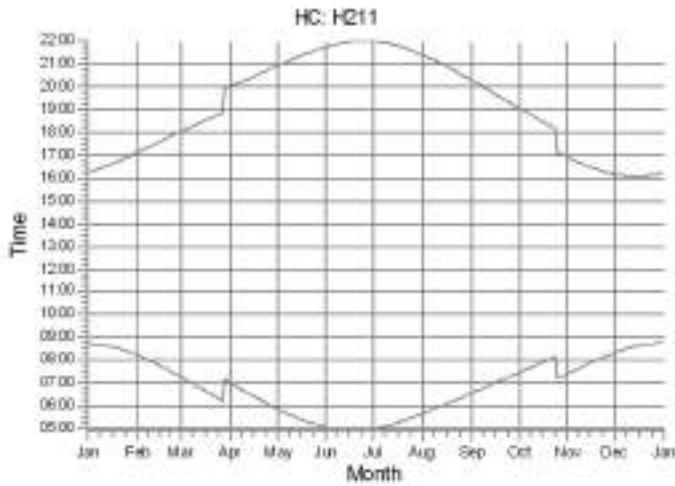
WTGs

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SHADOW - Calendar, graphical

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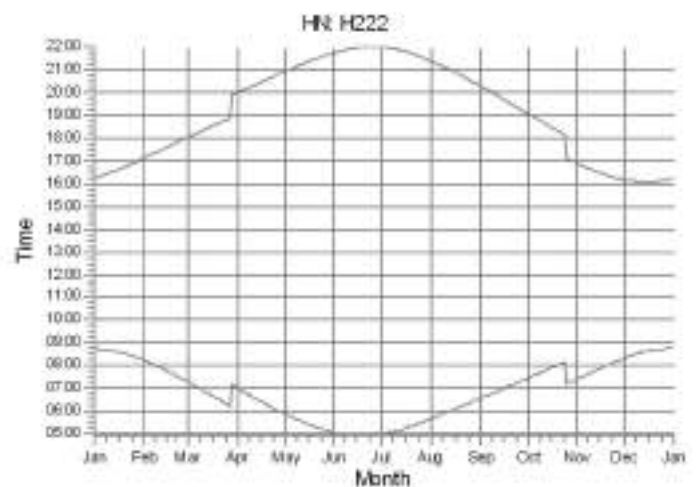
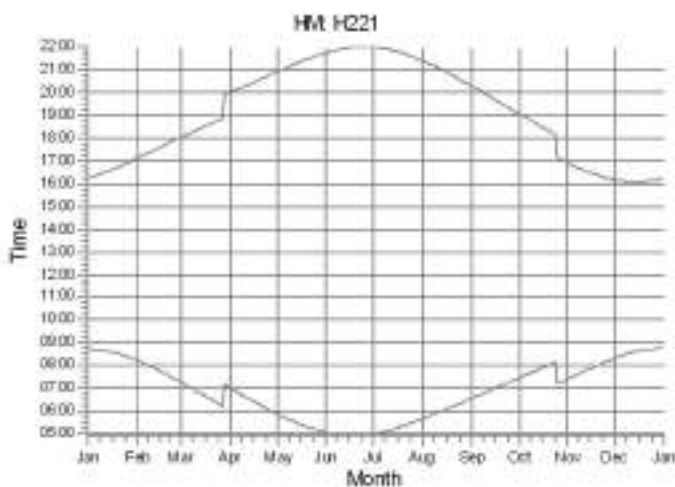
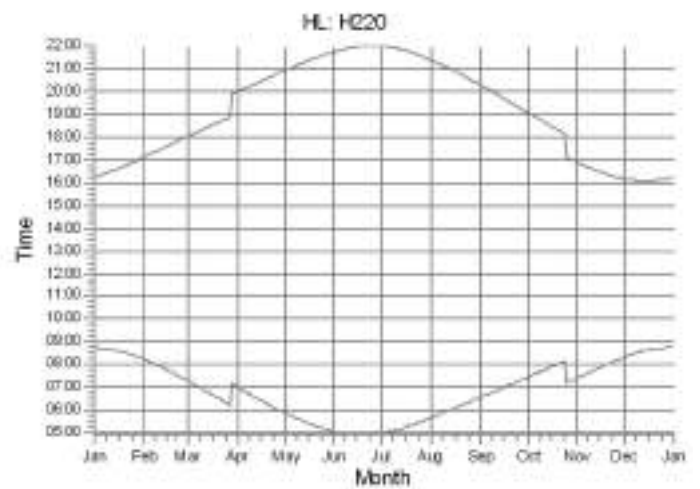
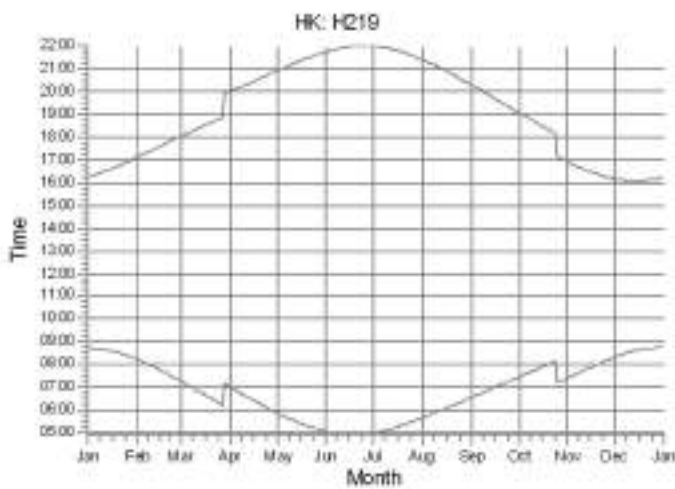
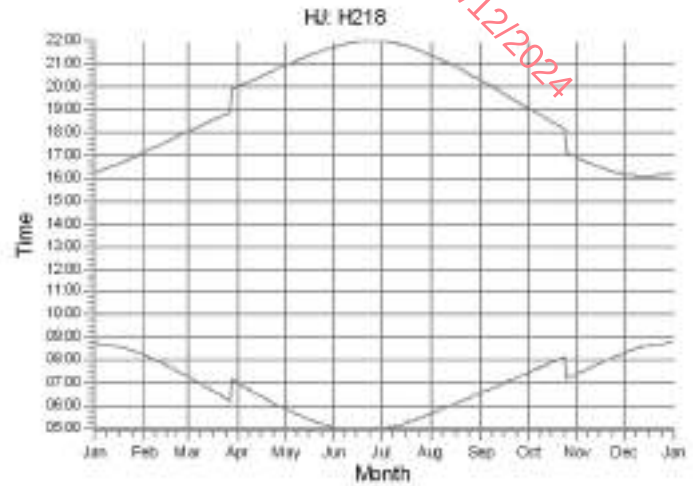
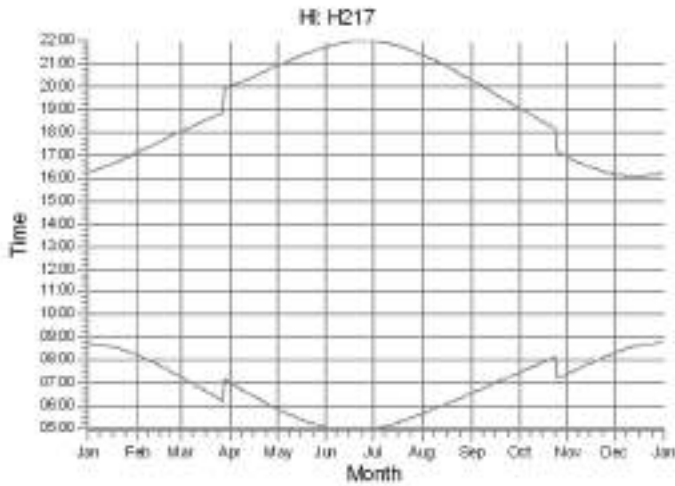
WTGs

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SHADOW - Calendar, graphical

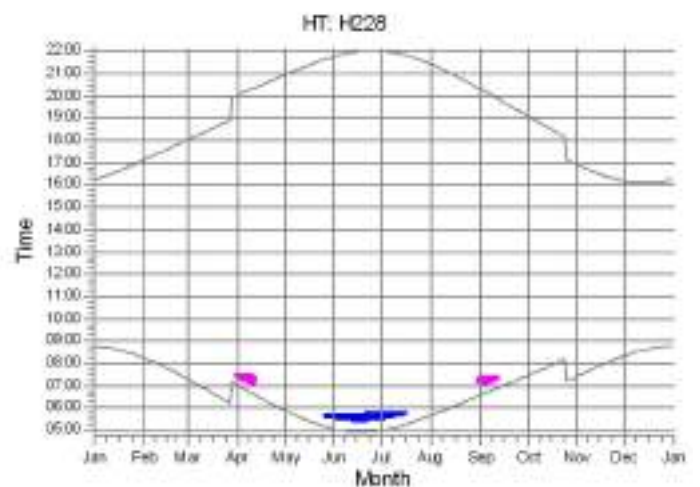
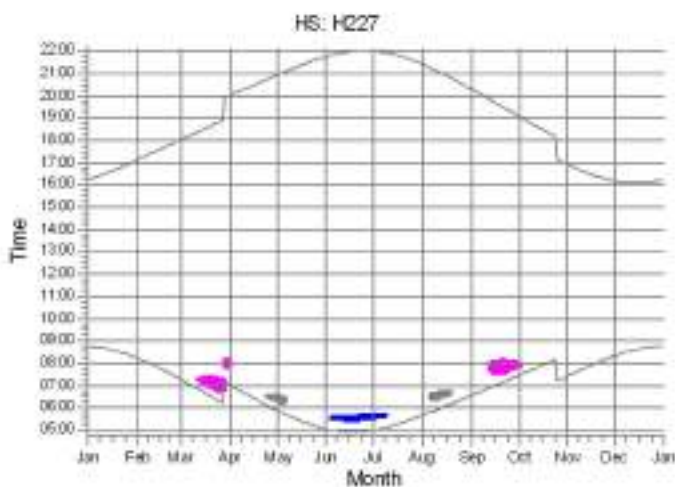
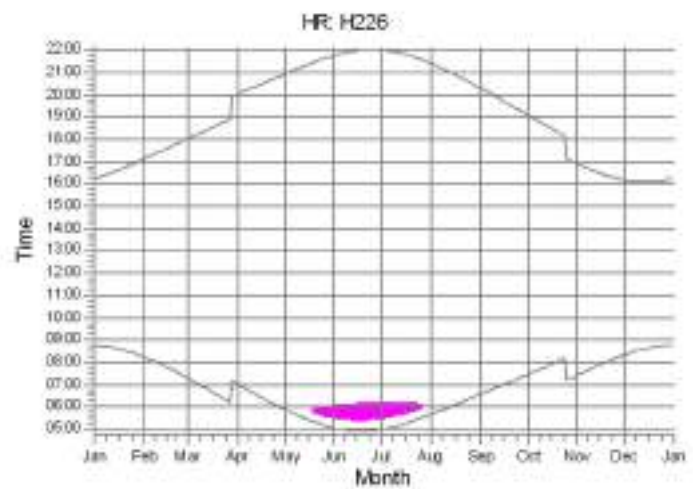
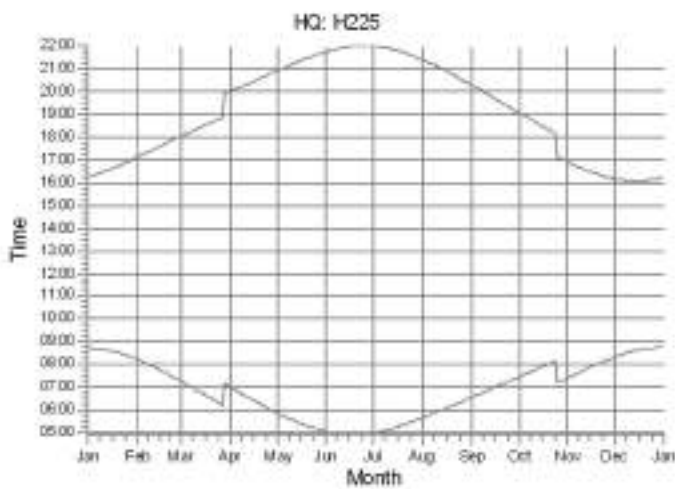
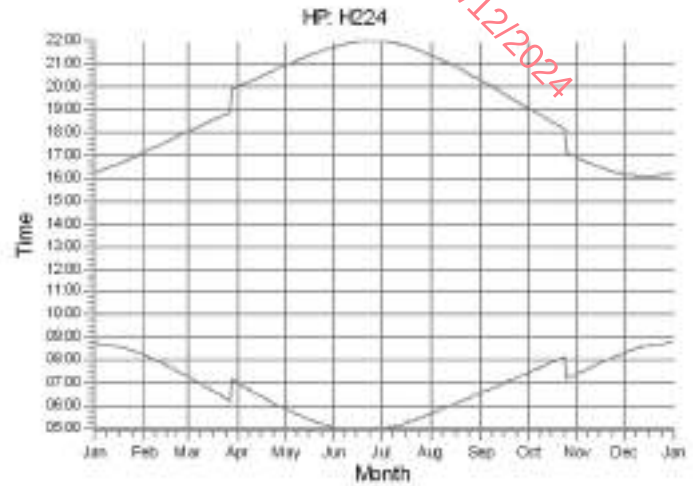
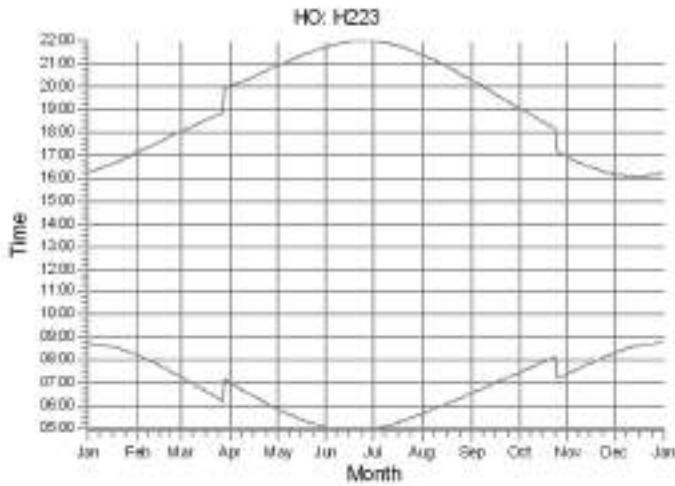
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

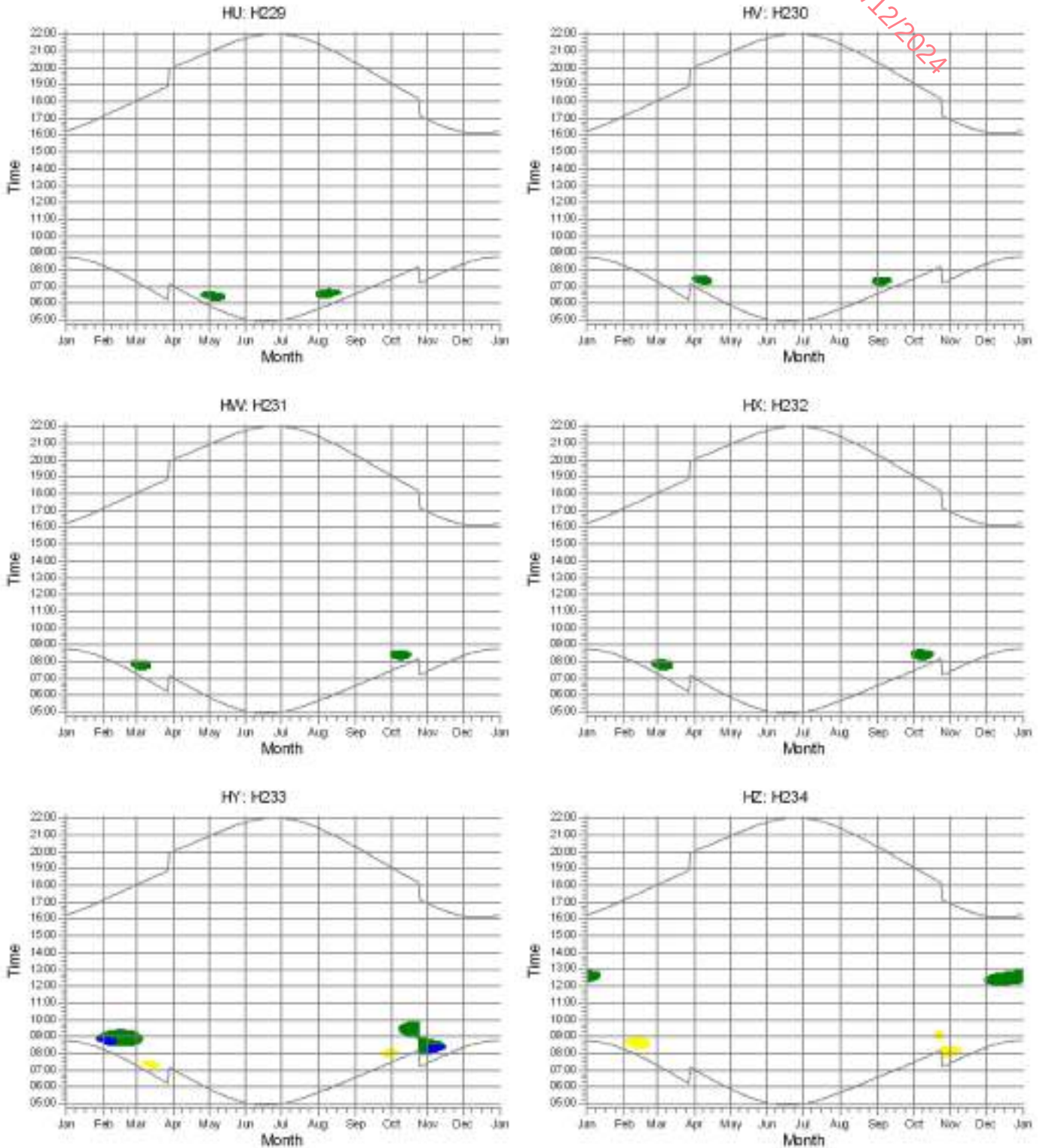


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

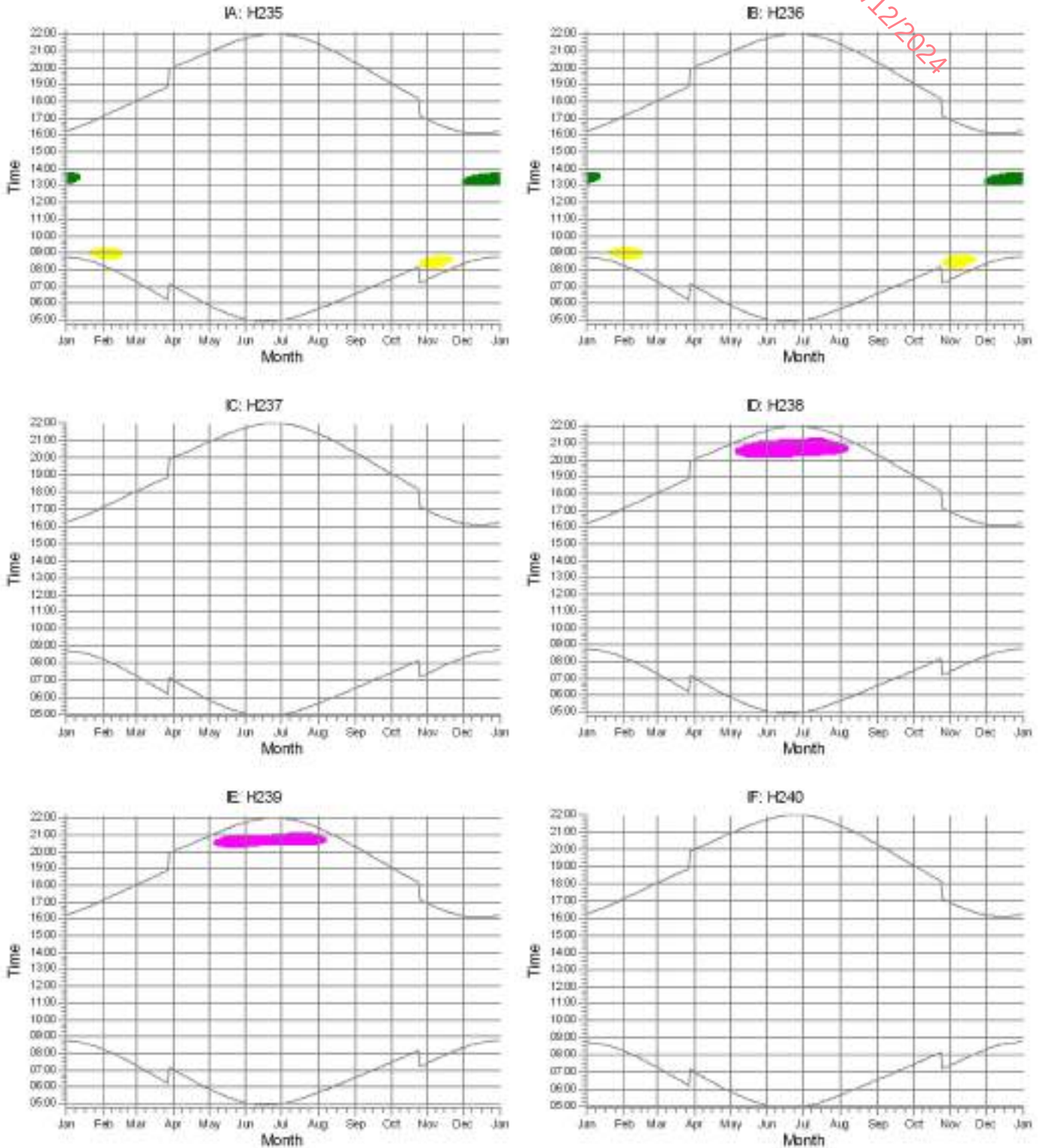


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

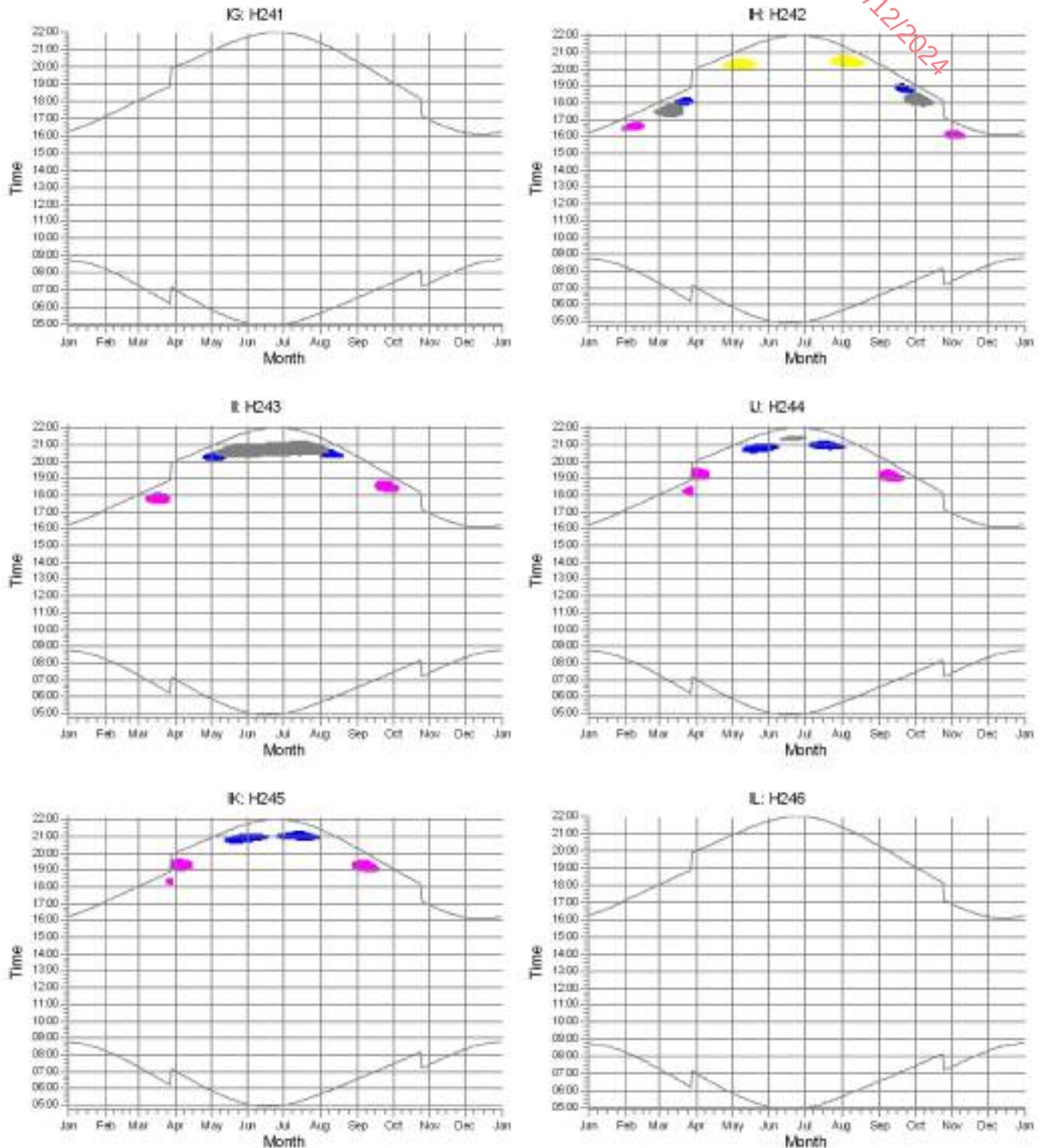


WTGs

1: T01 2: T02 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

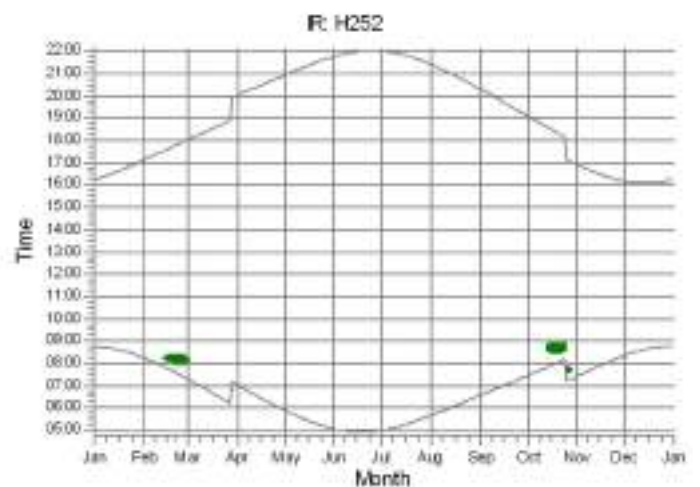
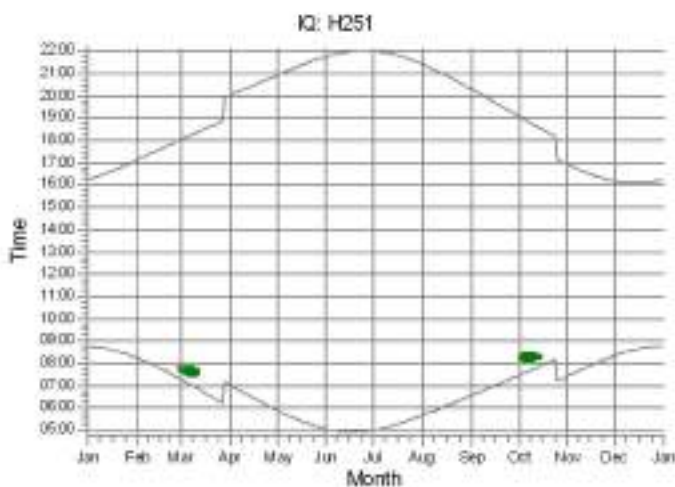
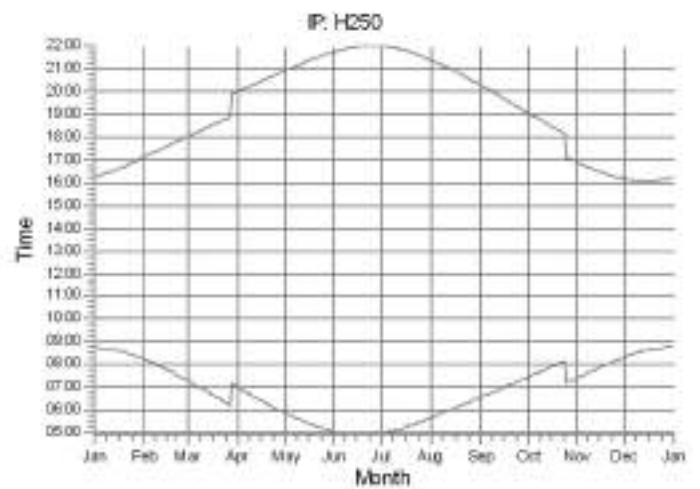
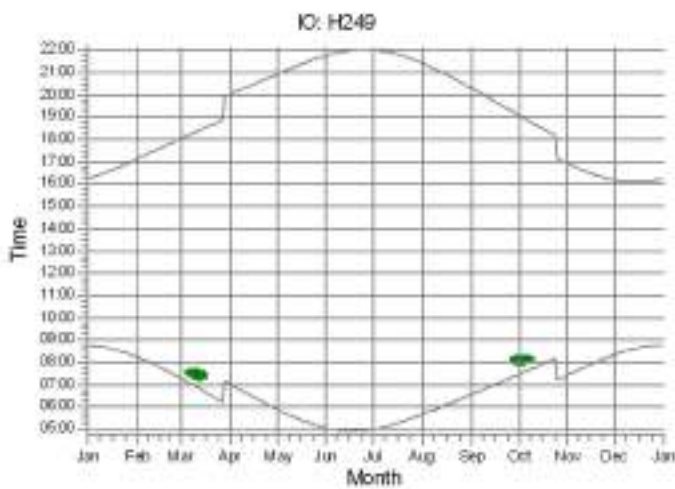
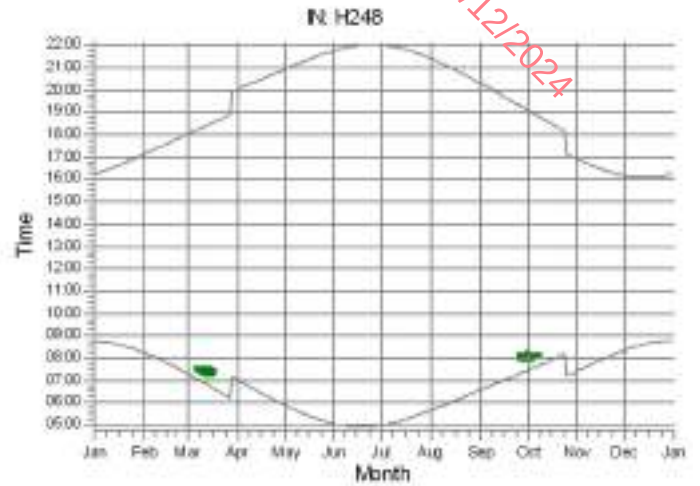
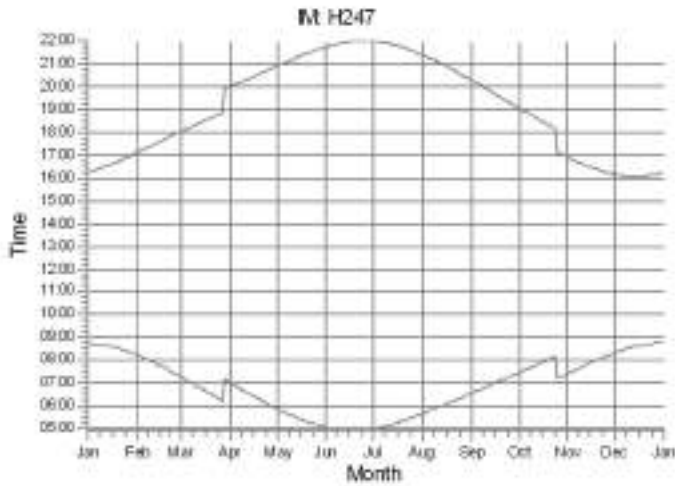


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

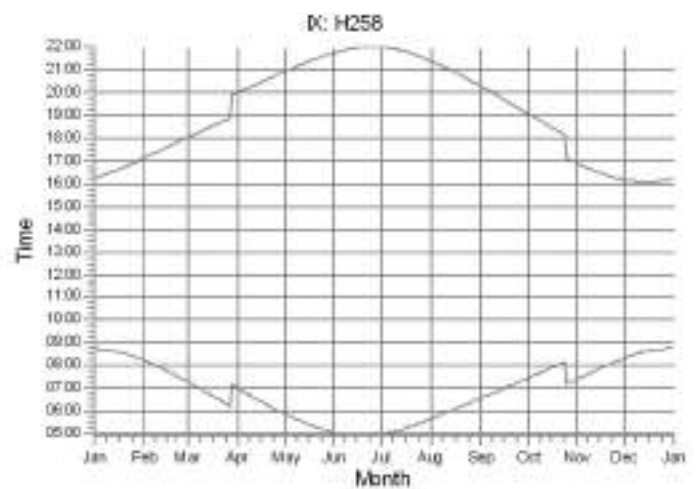
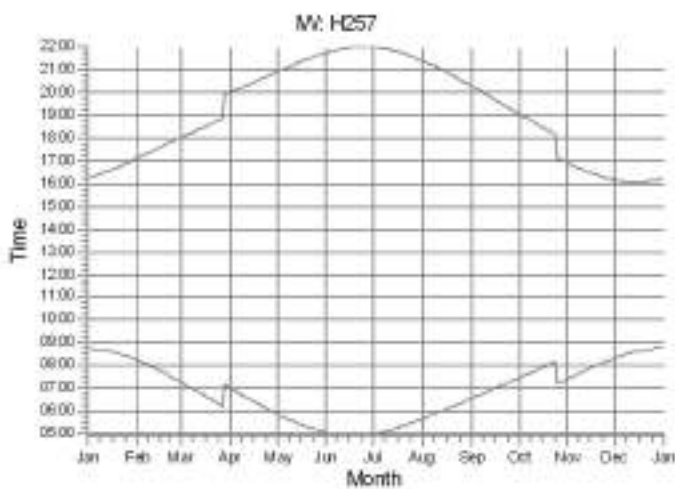
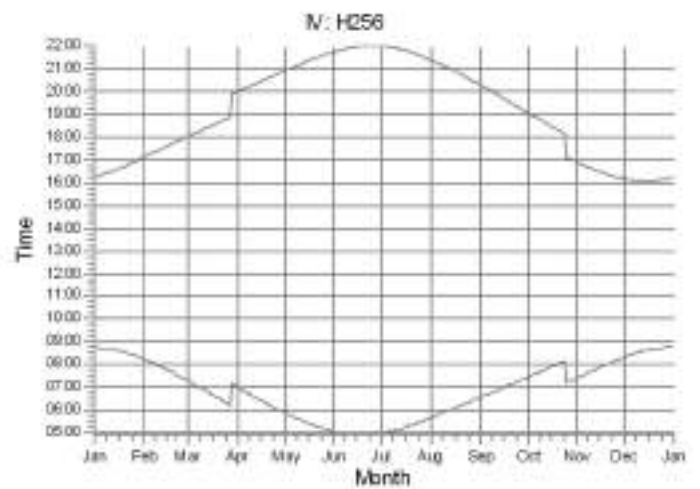
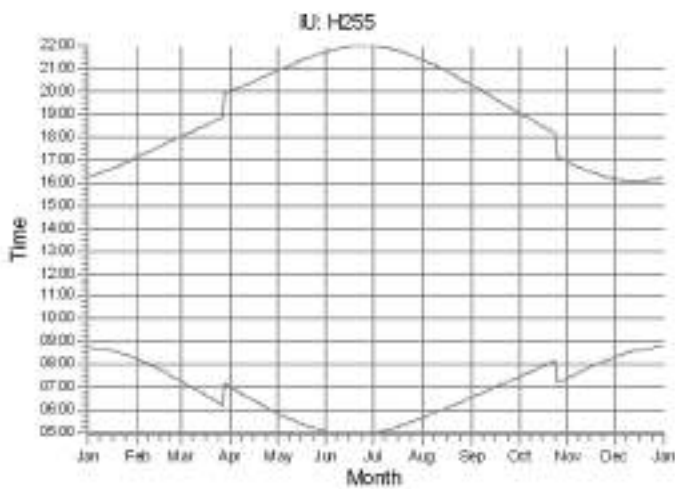
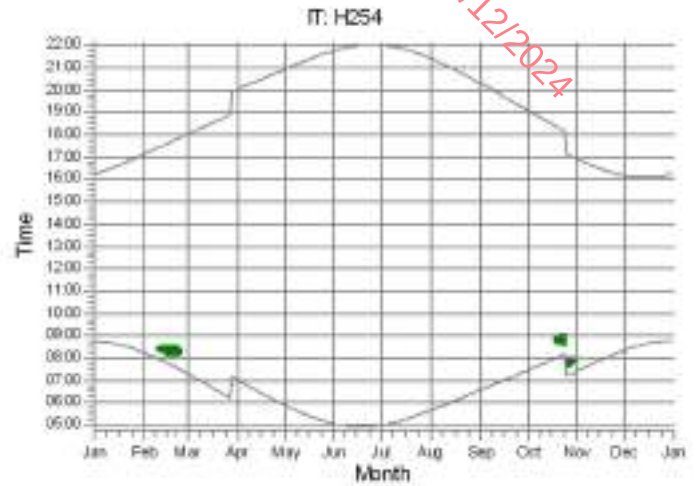
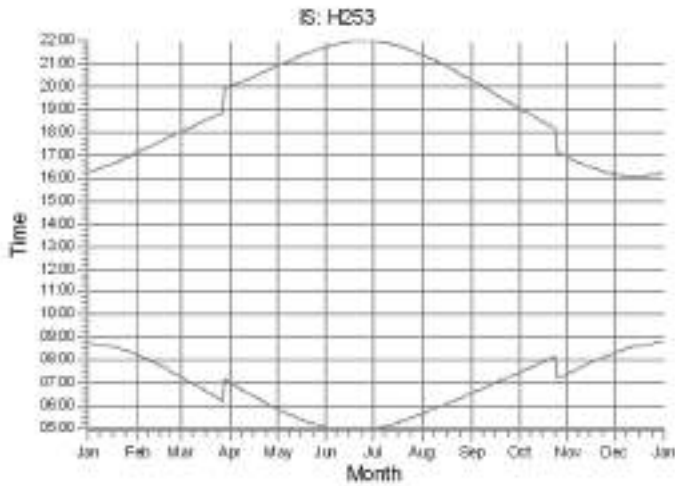


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case



WTGs



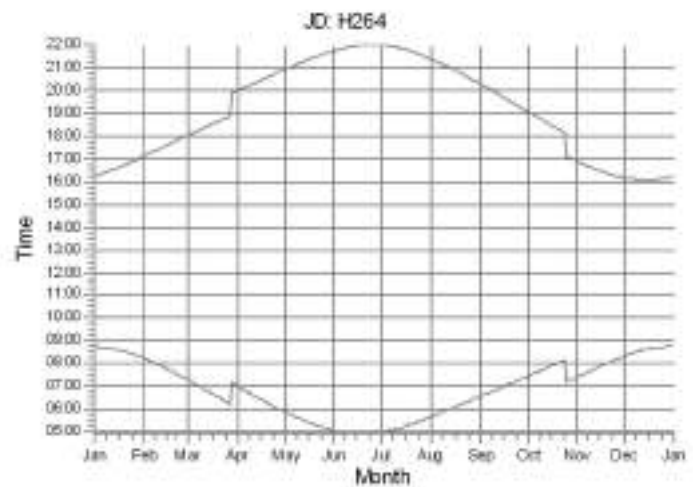
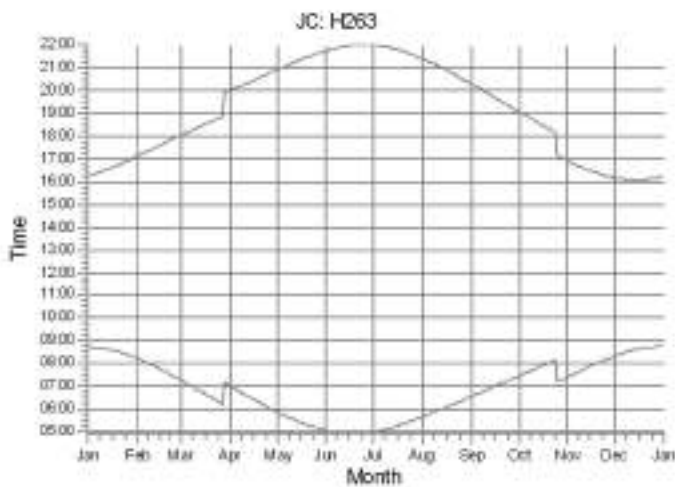
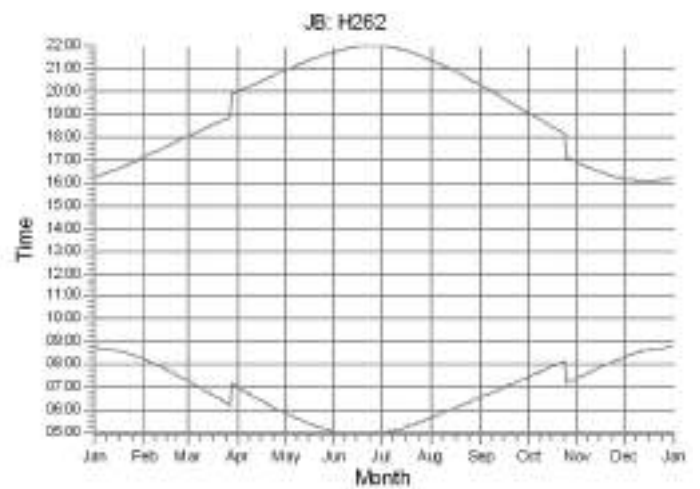
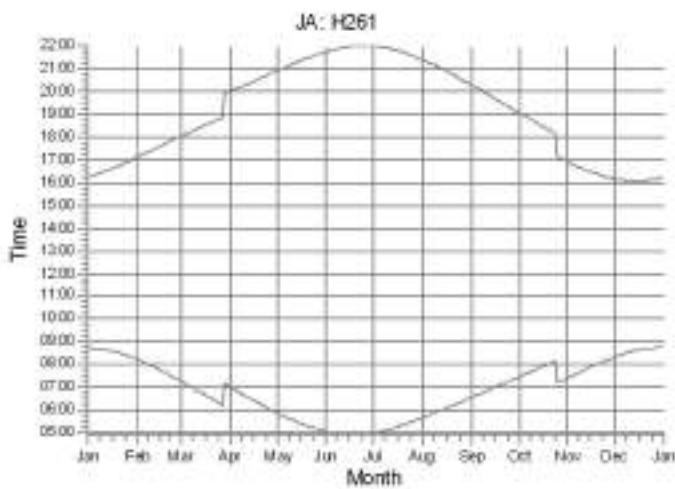
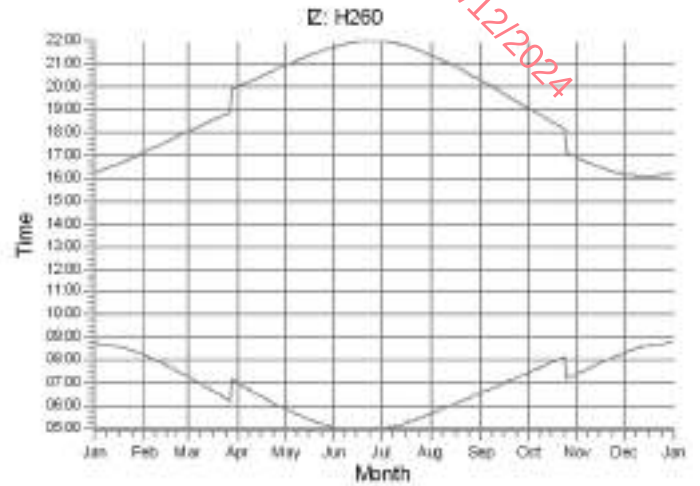
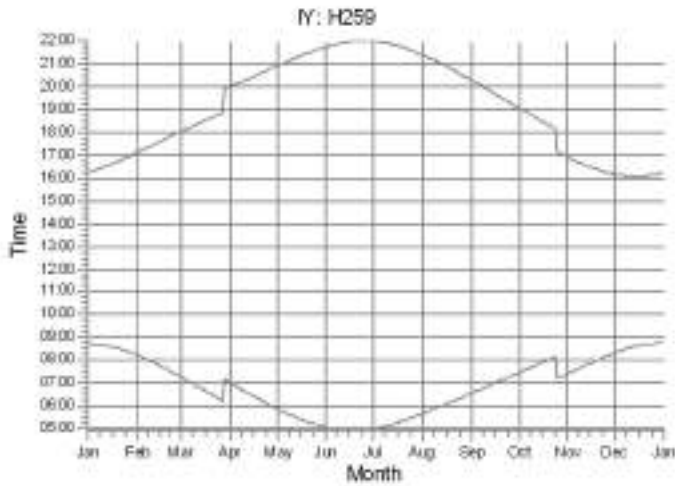
1: T01

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

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SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case



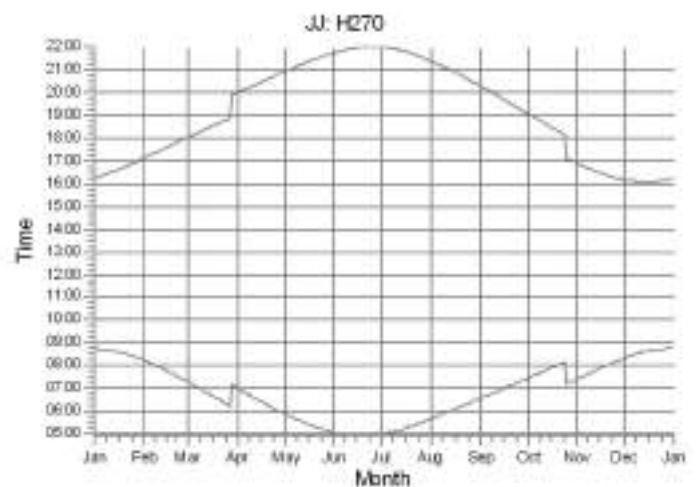
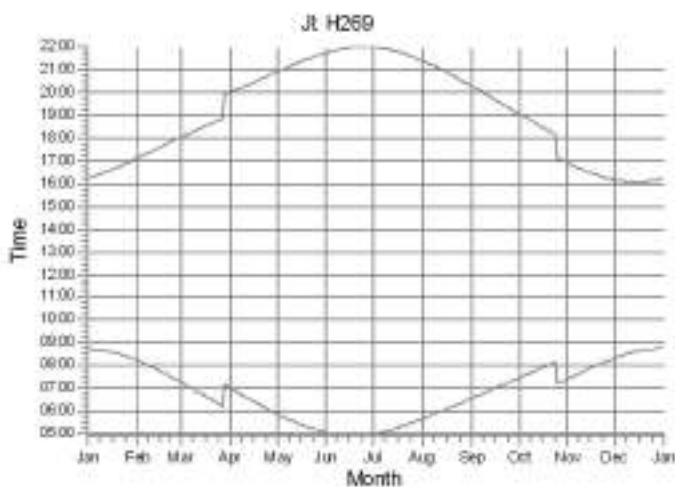
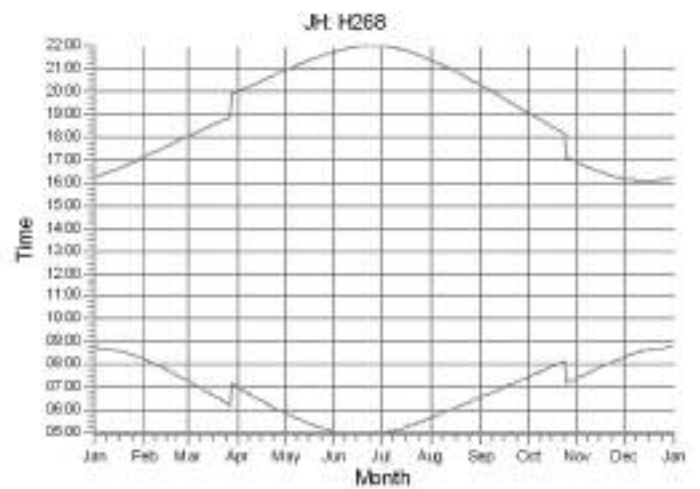
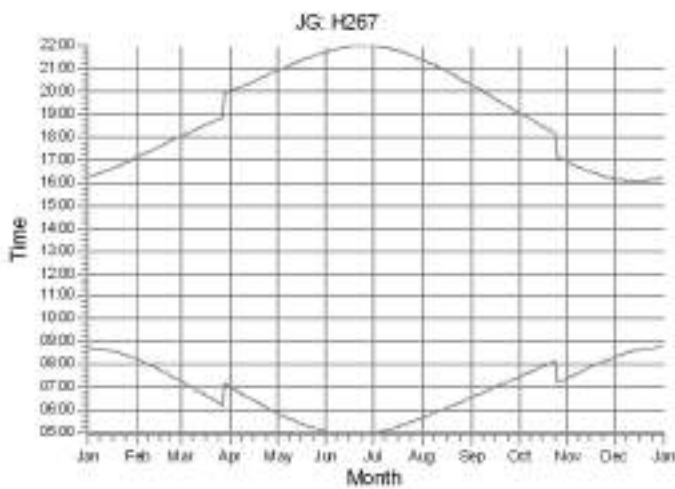
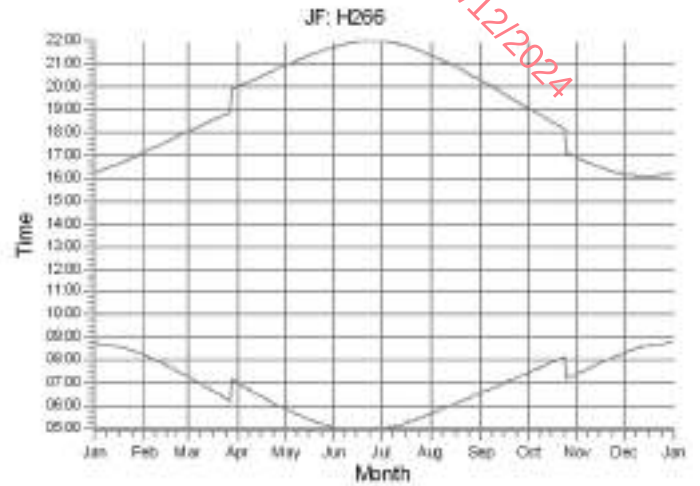
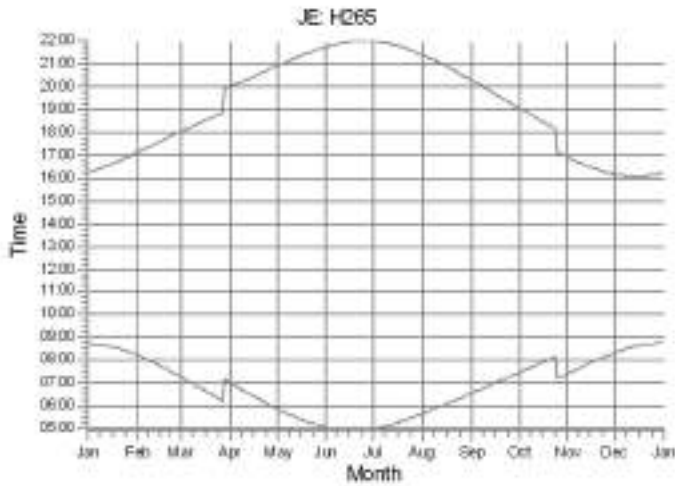
WTGs

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SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case



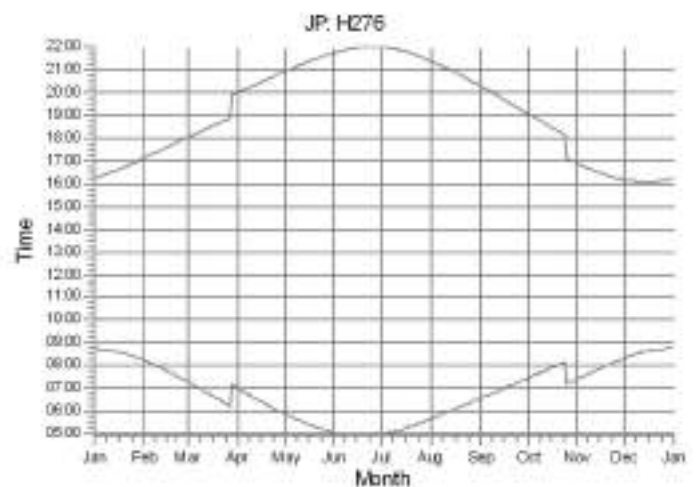
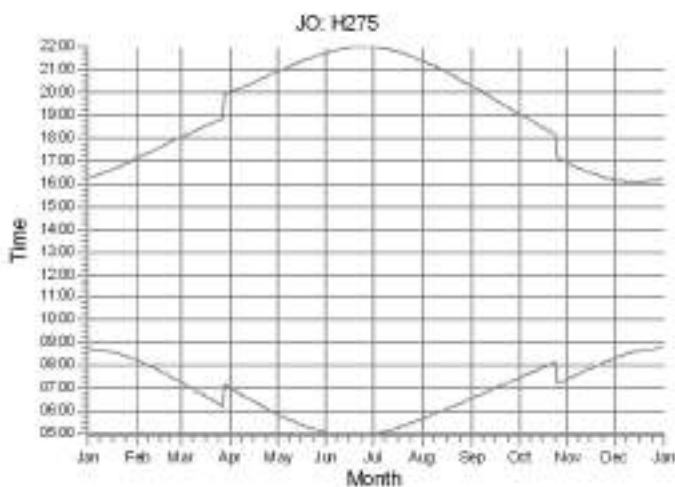
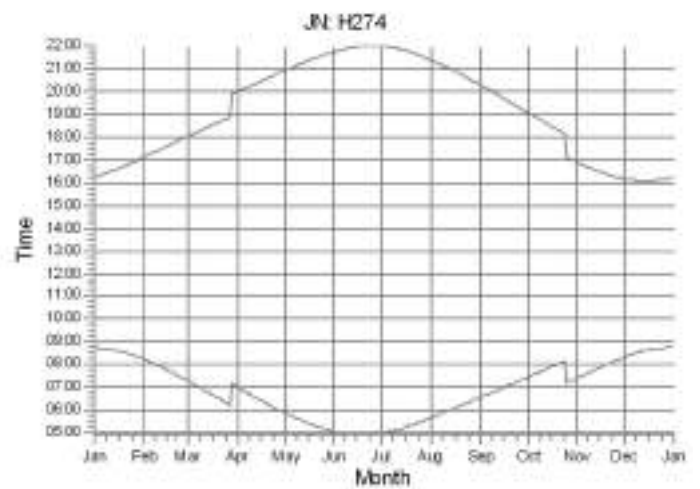
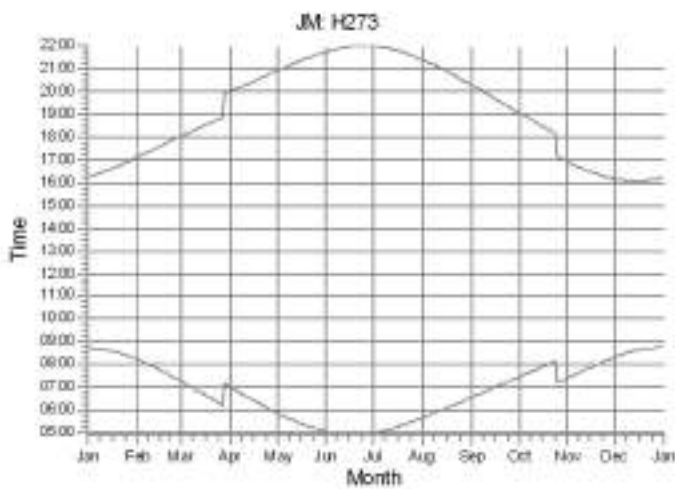
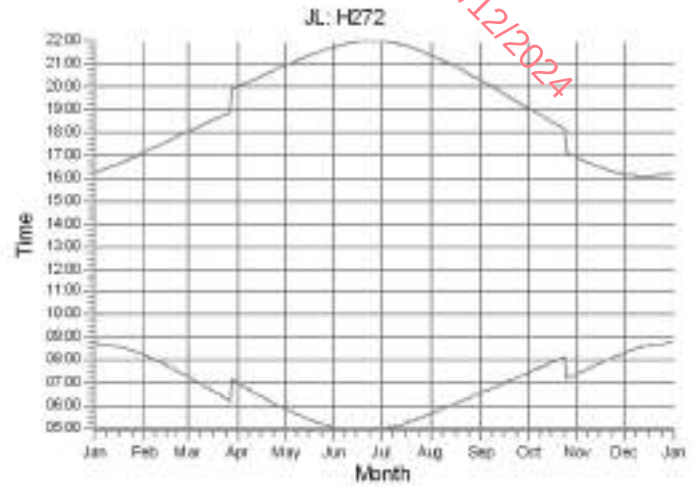
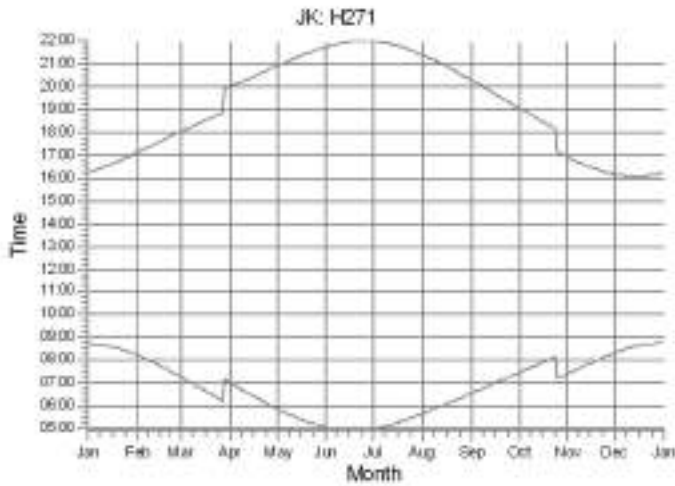
WTGs

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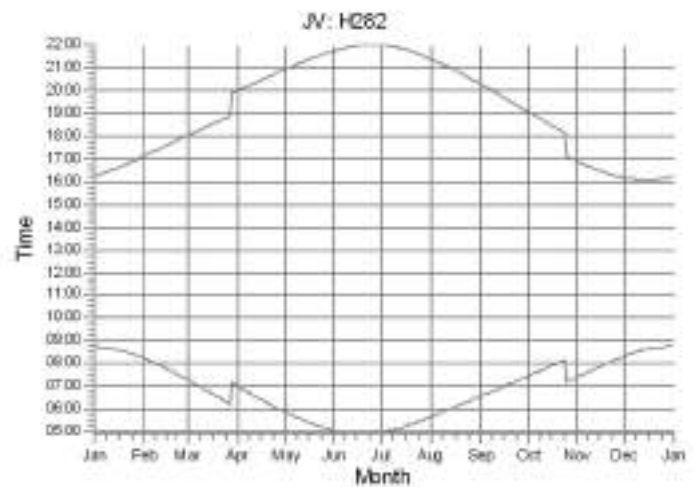
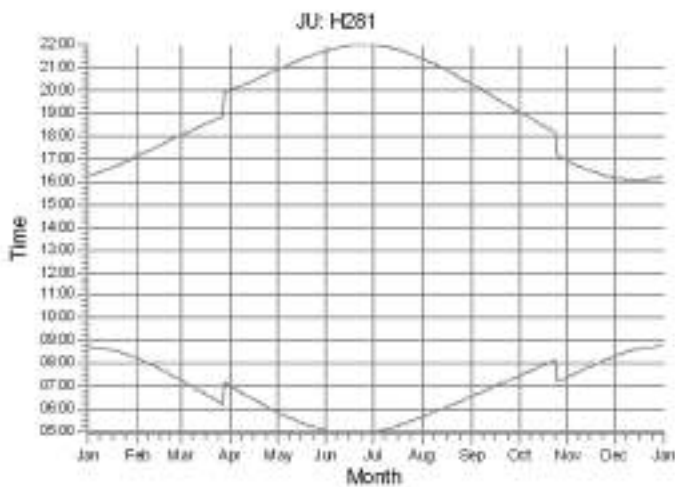
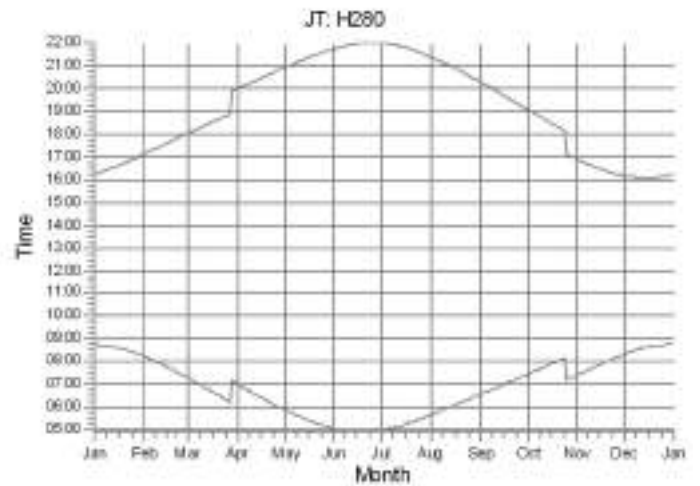
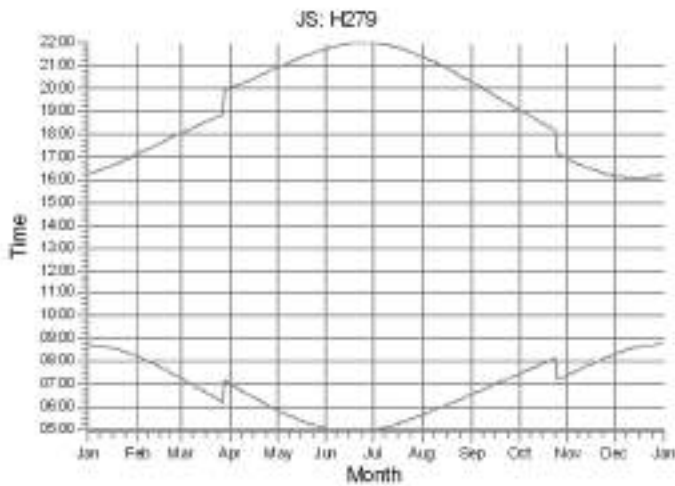
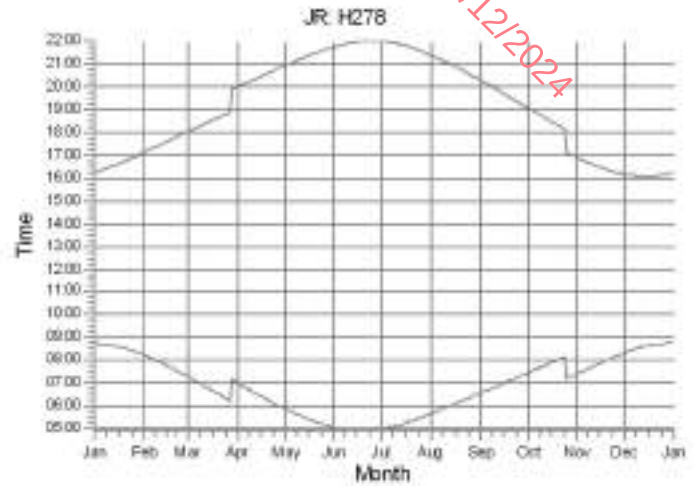
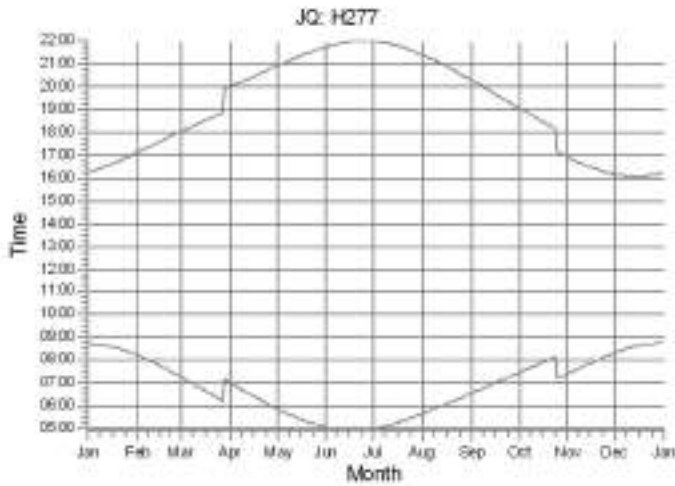
WTGs

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SHADOW - Calendar, graphical

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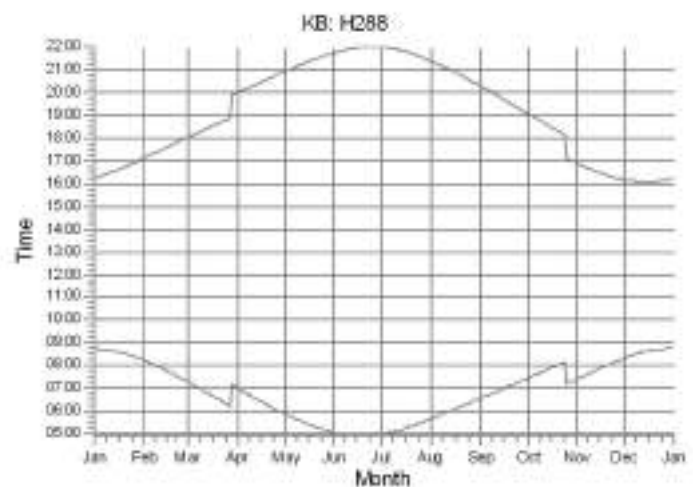
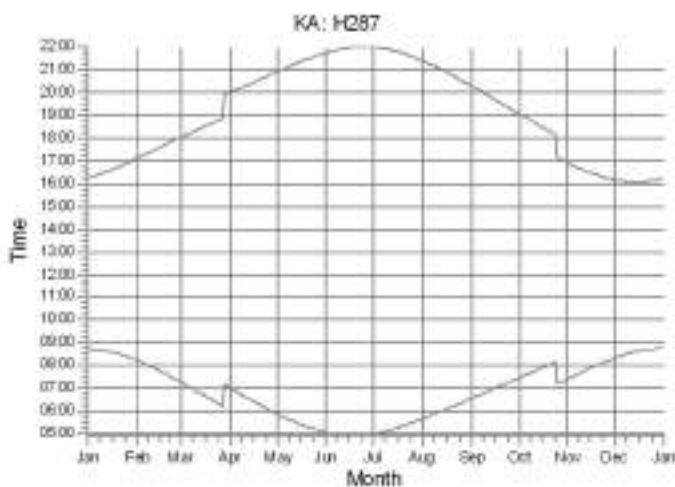
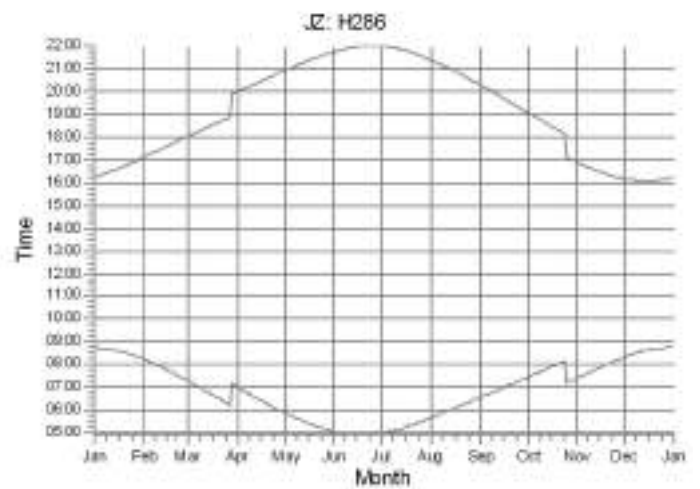
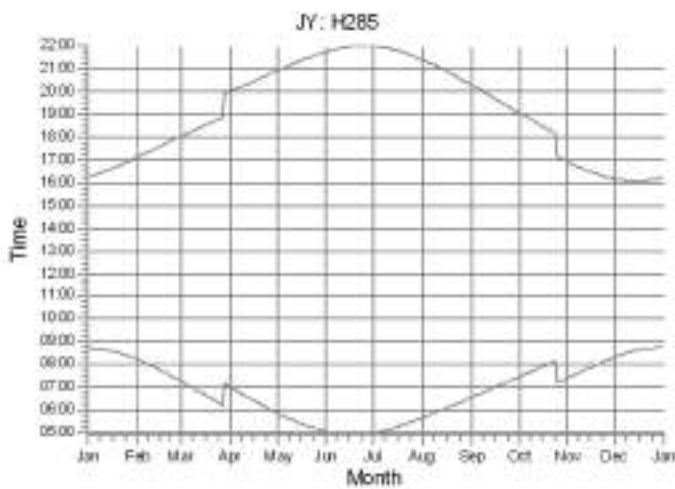
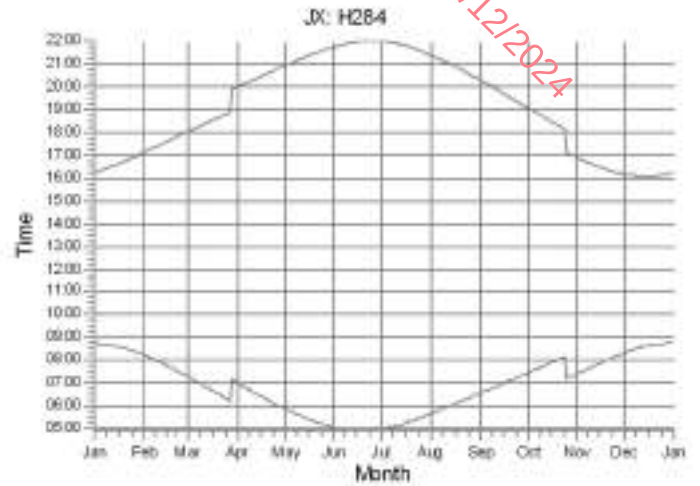
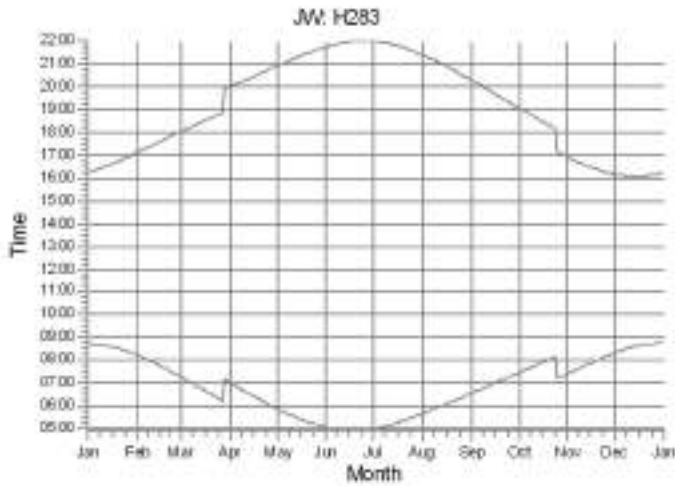
WTGs

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SHADOW - Calendar, graphical

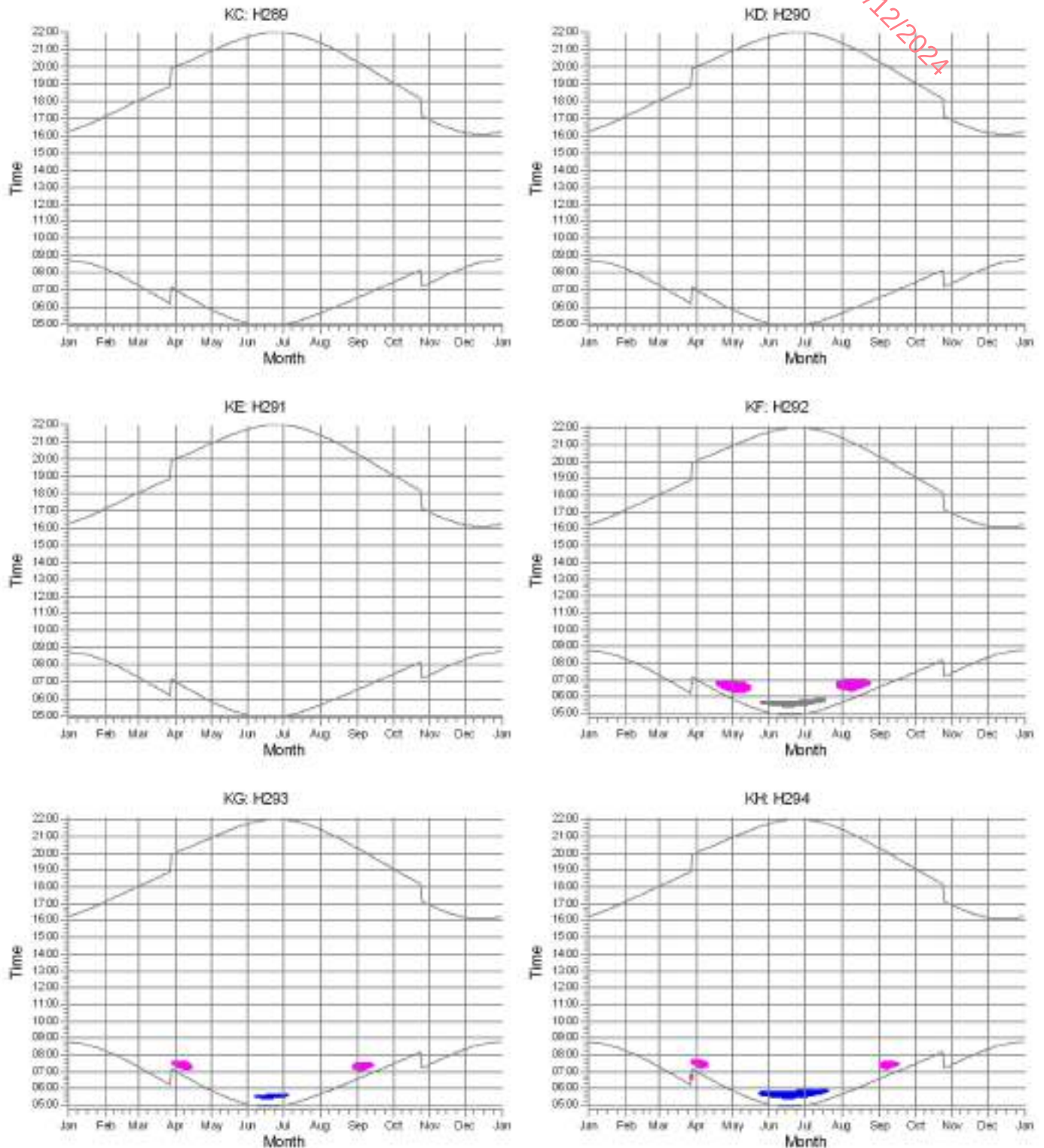
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

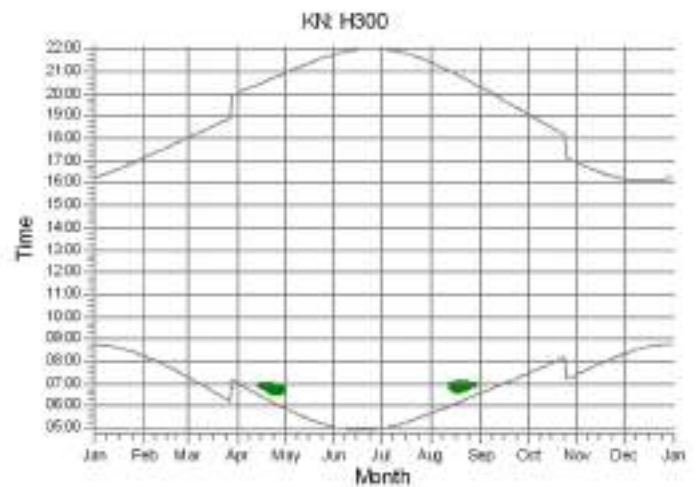
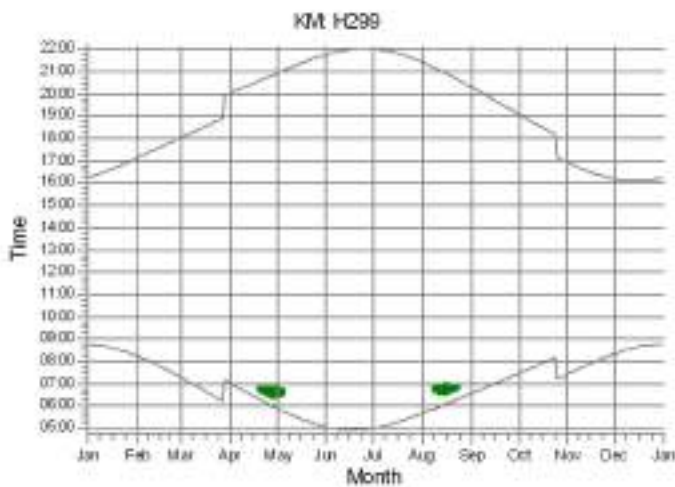
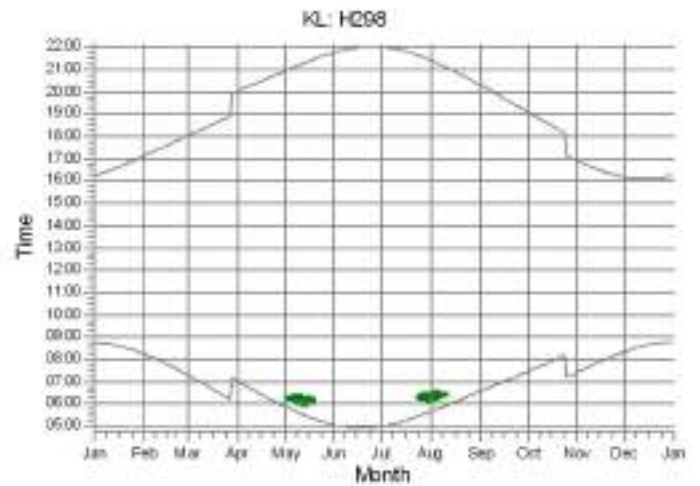
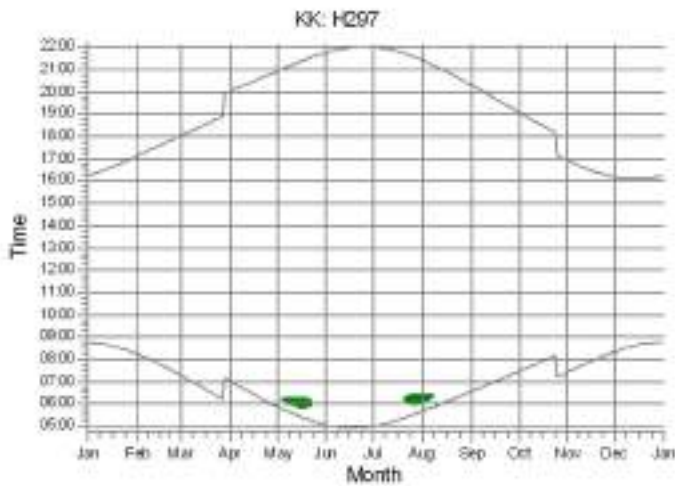
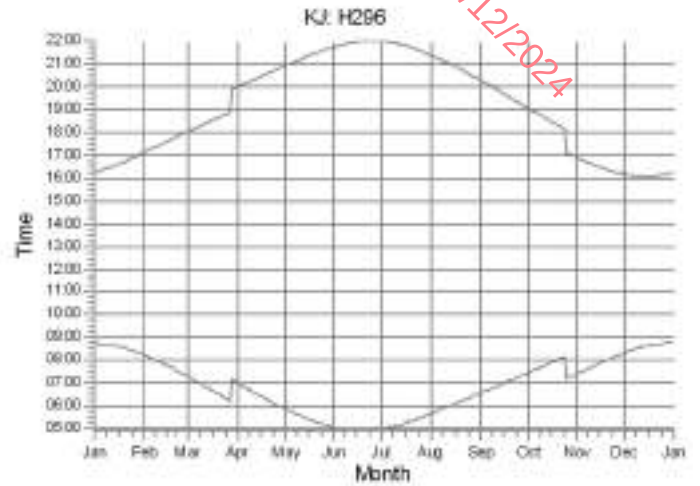
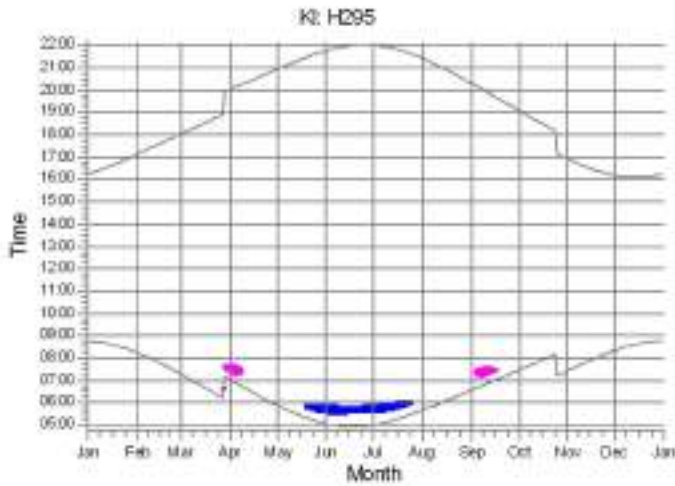


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

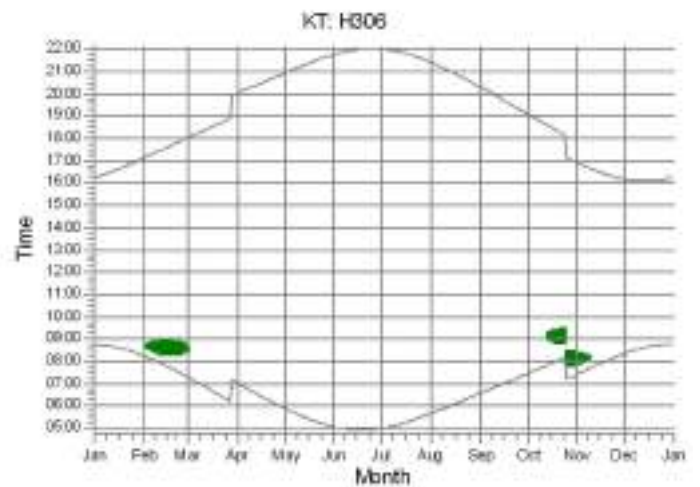
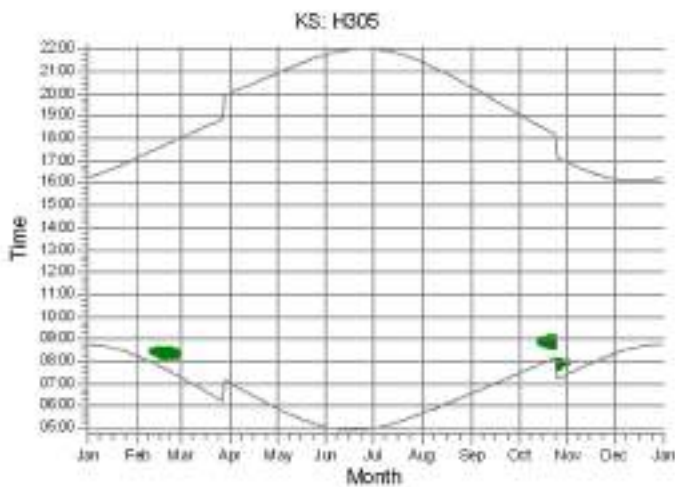
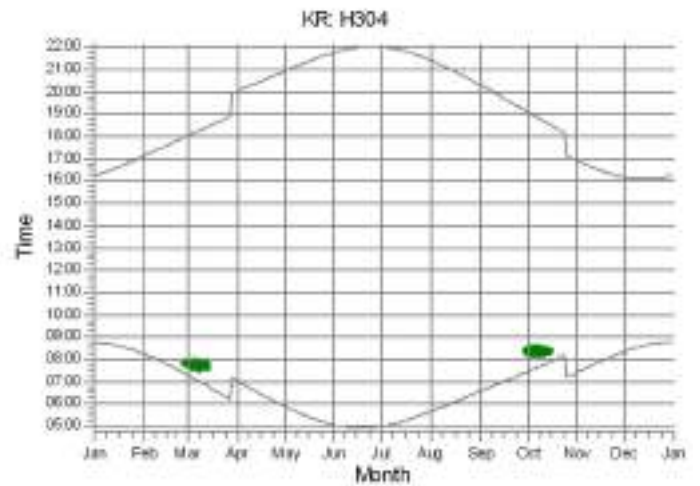
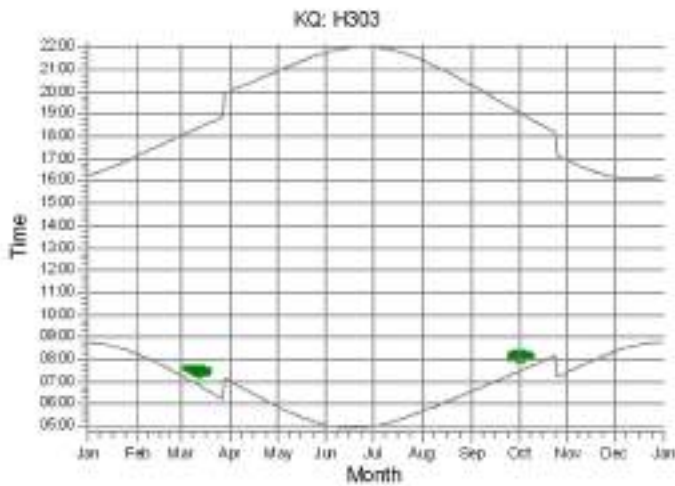
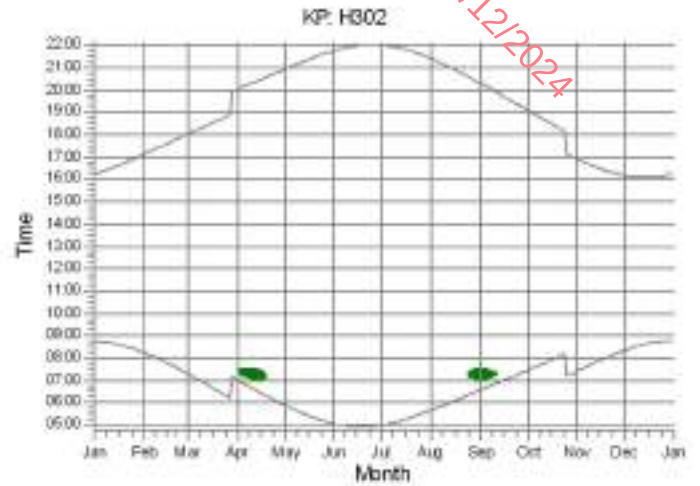
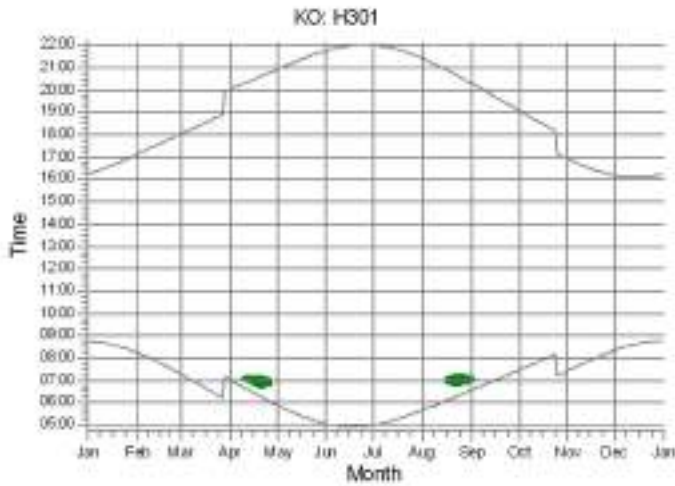


WTGs

1: T01 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

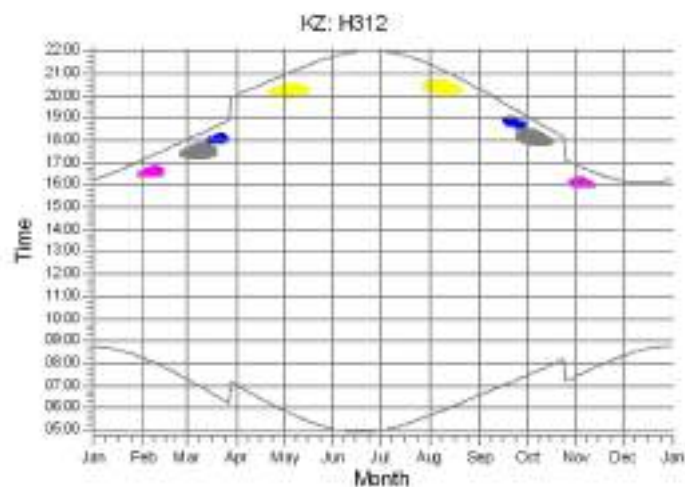
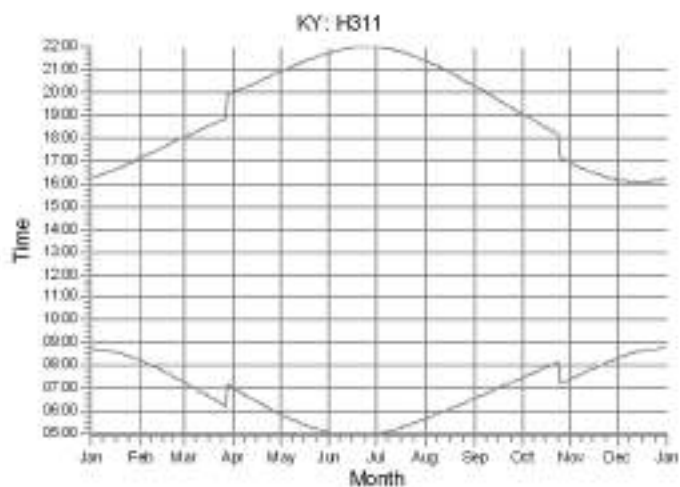
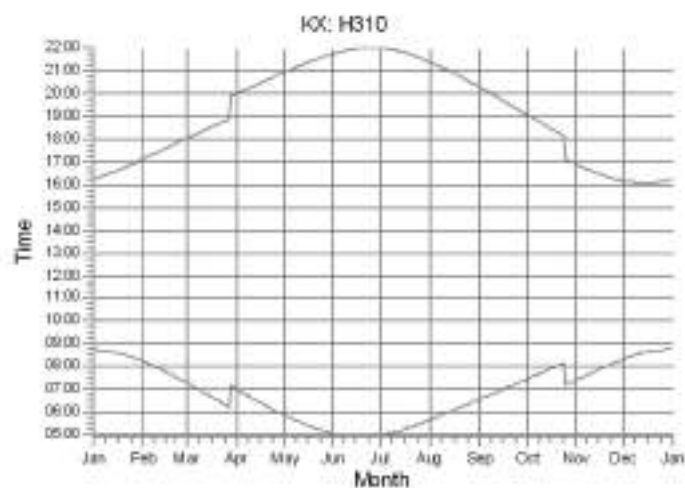
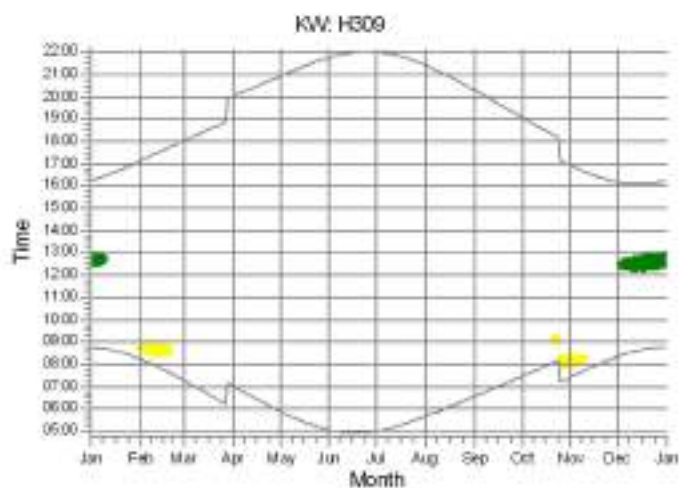
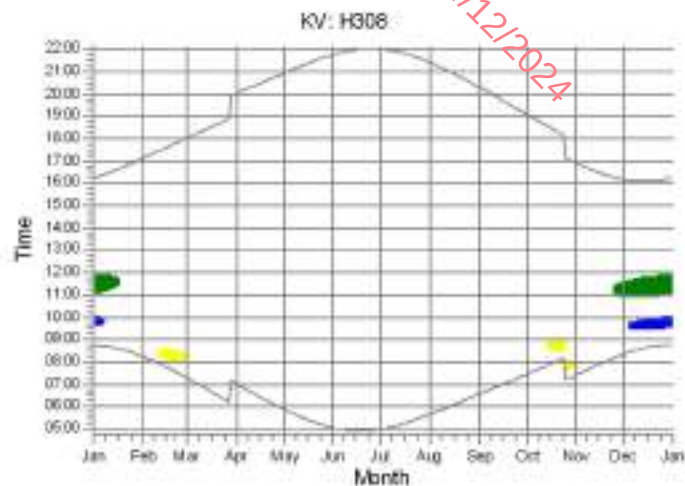
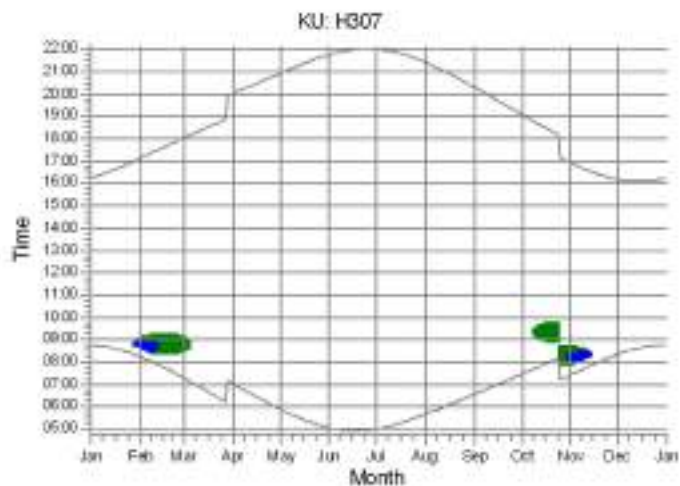


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

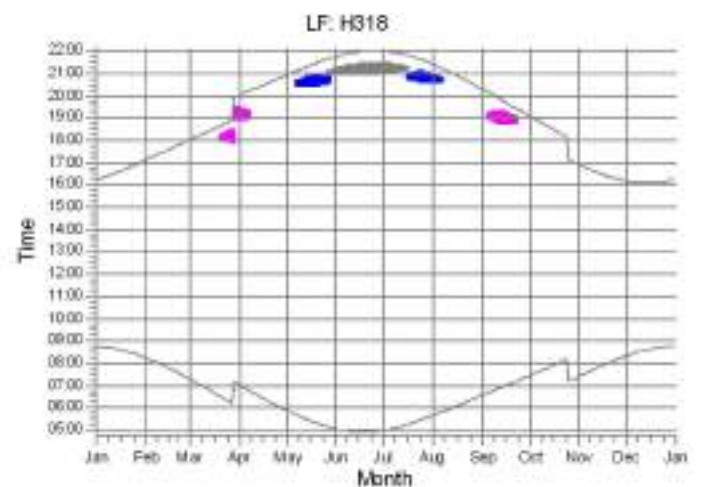
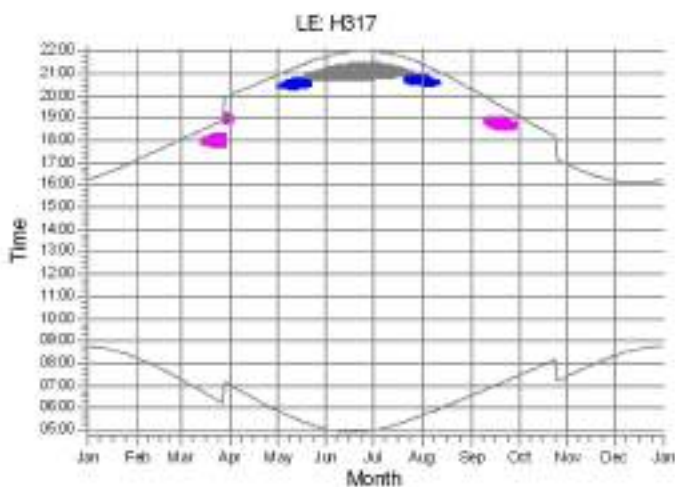
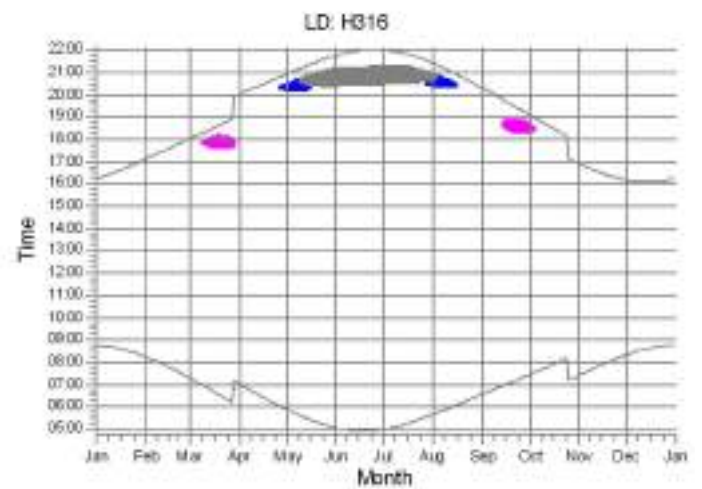
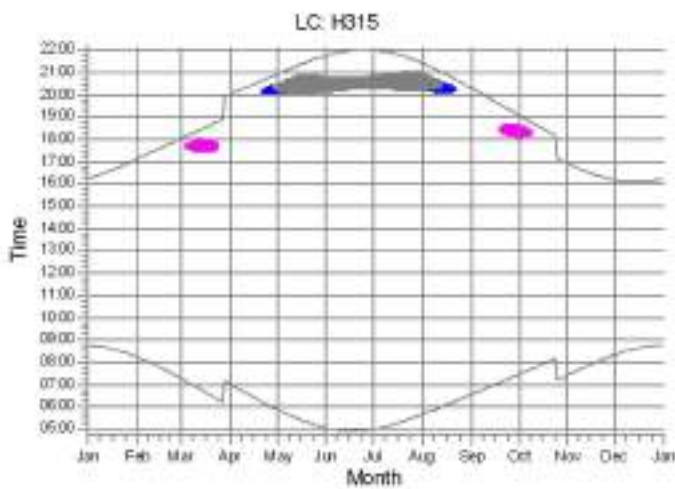
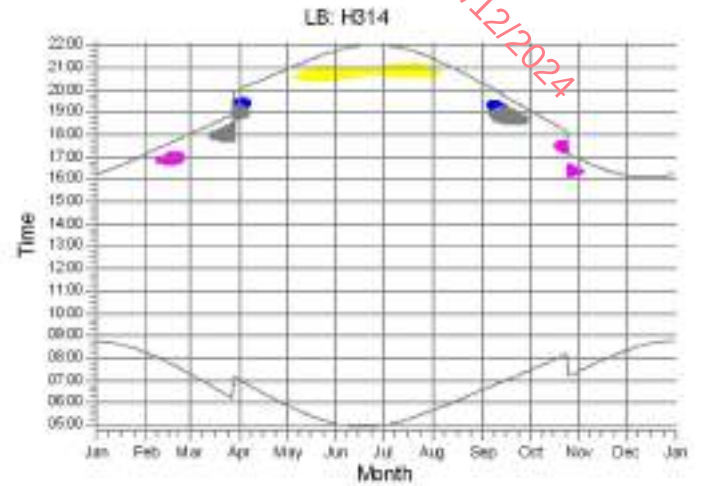
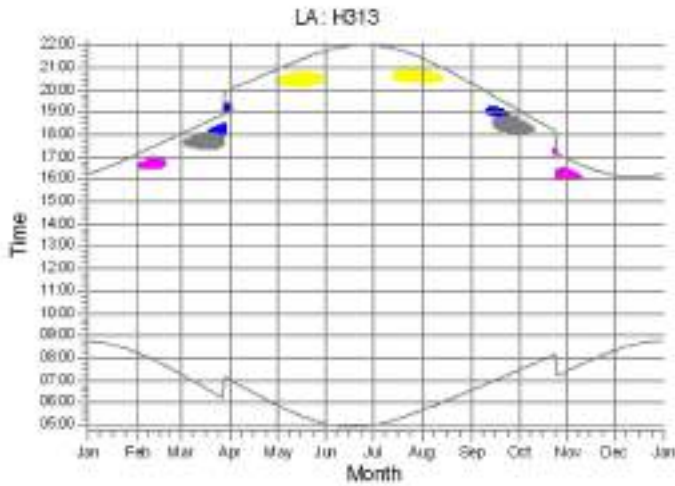


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

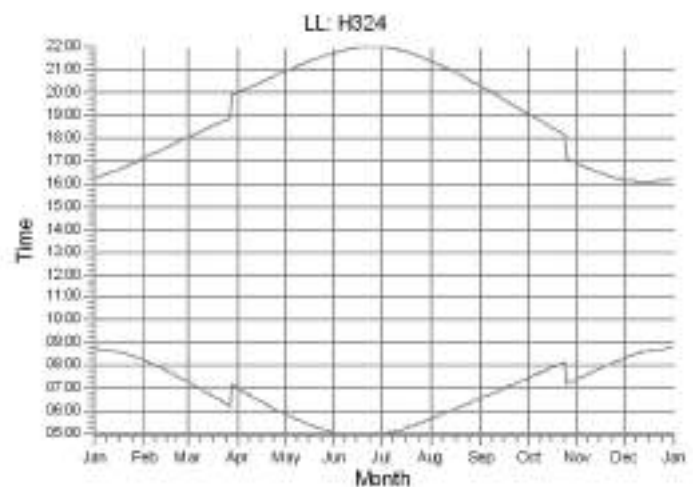
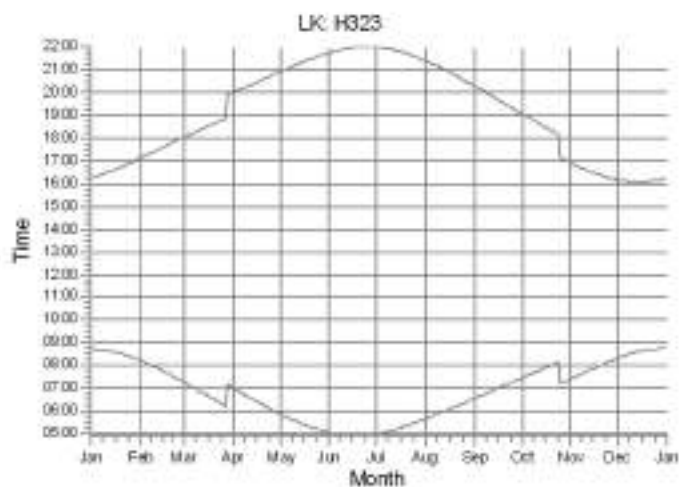
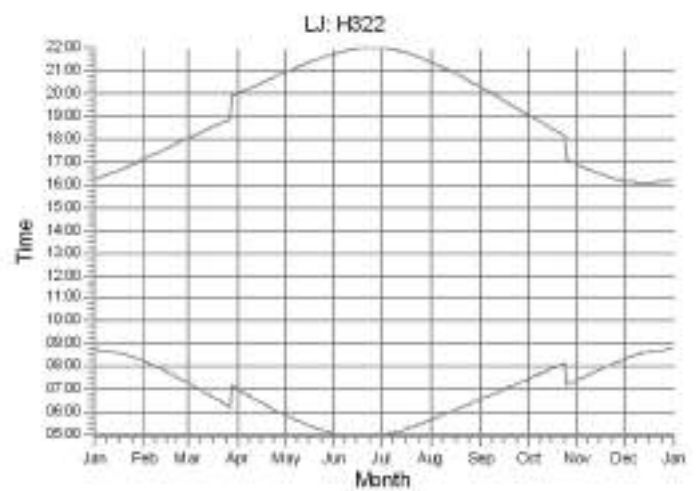
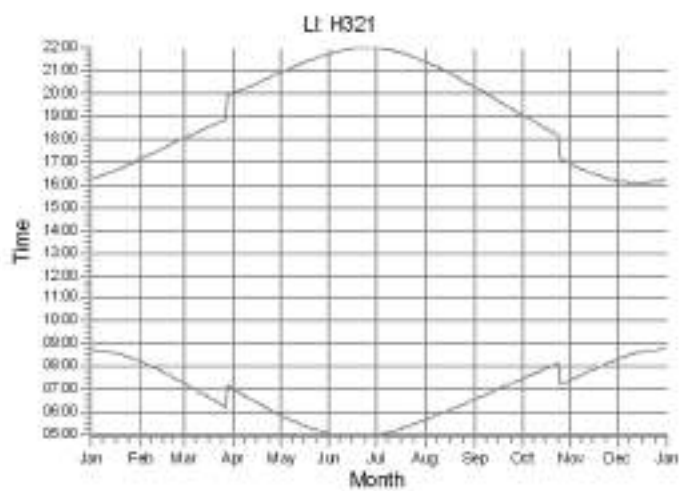
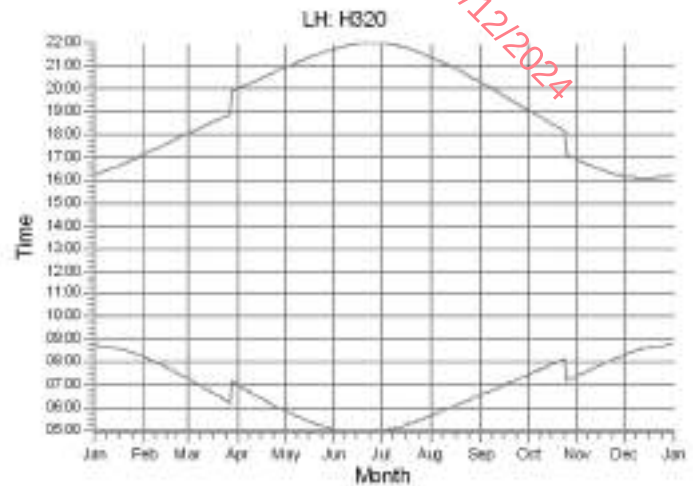
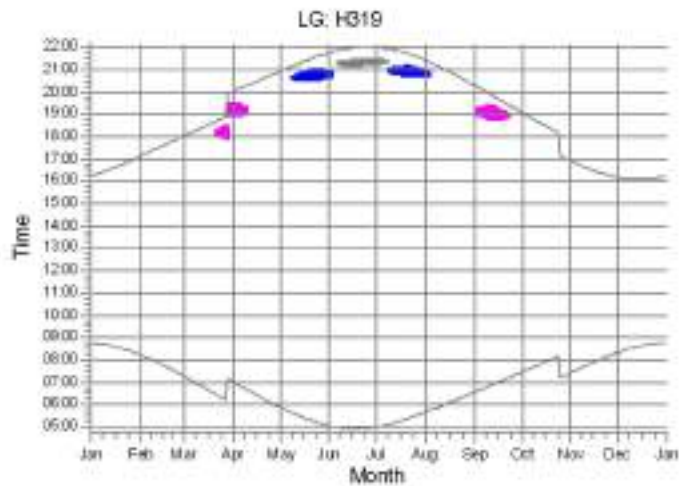


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

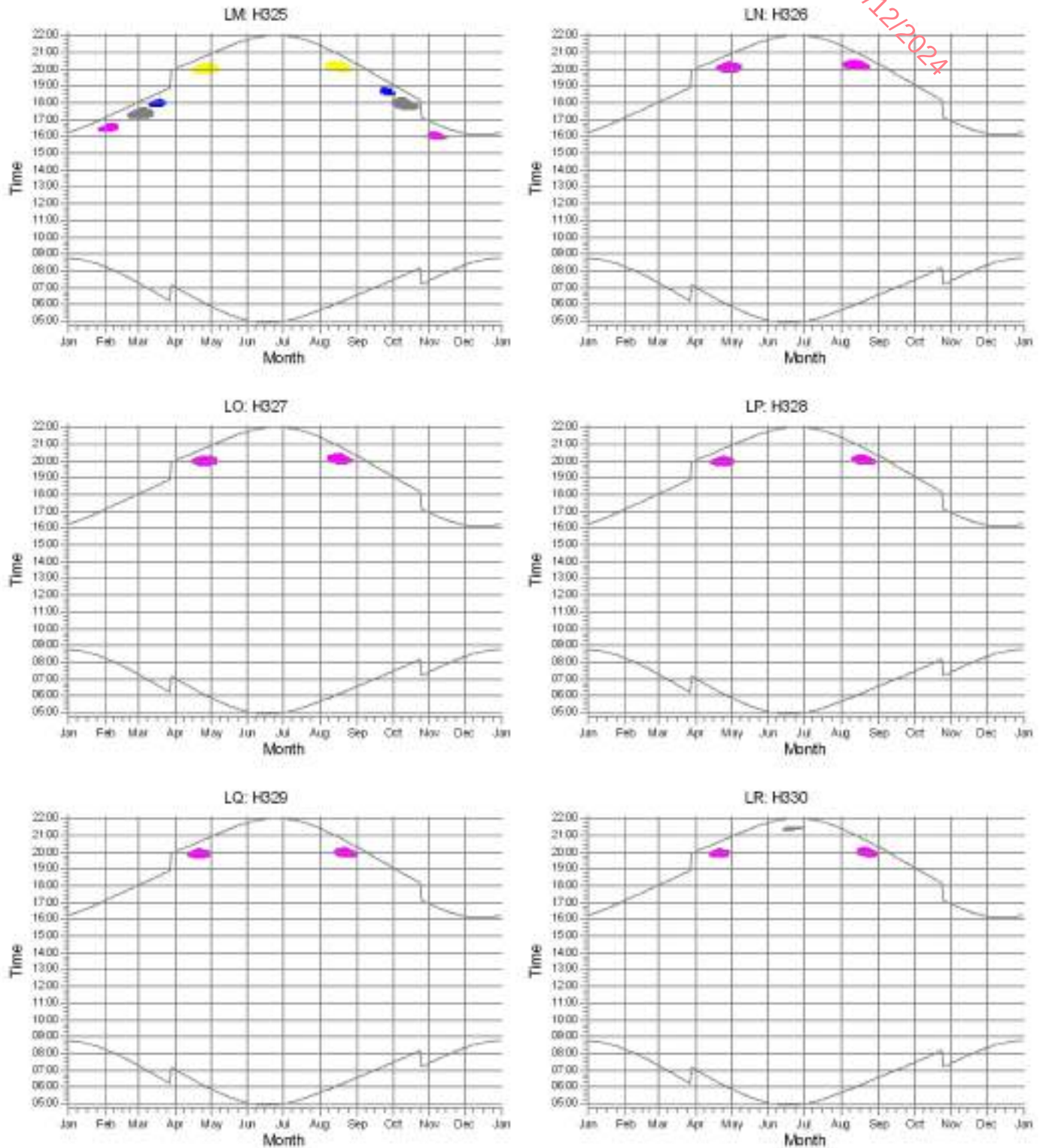


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

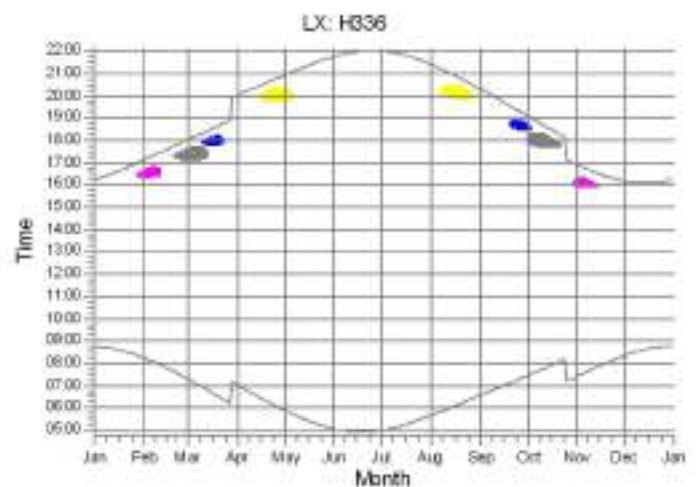
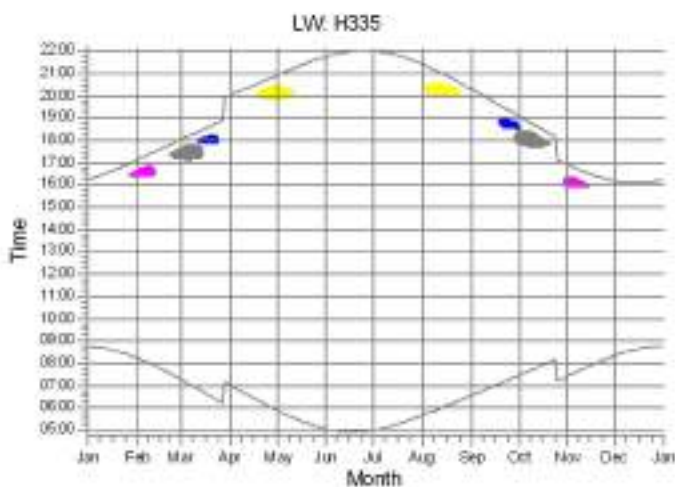
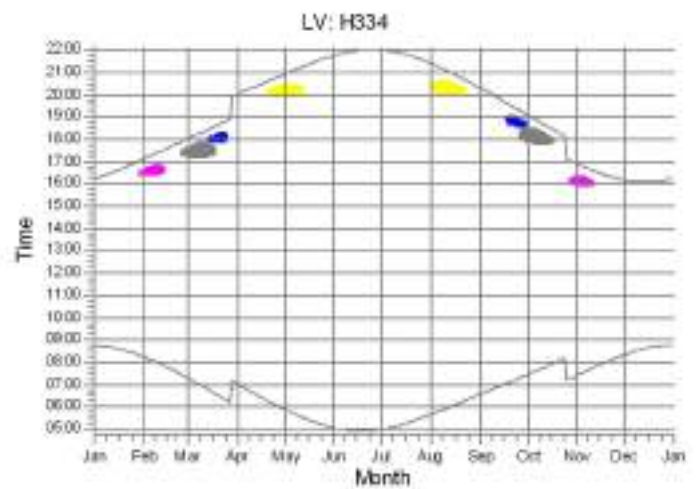
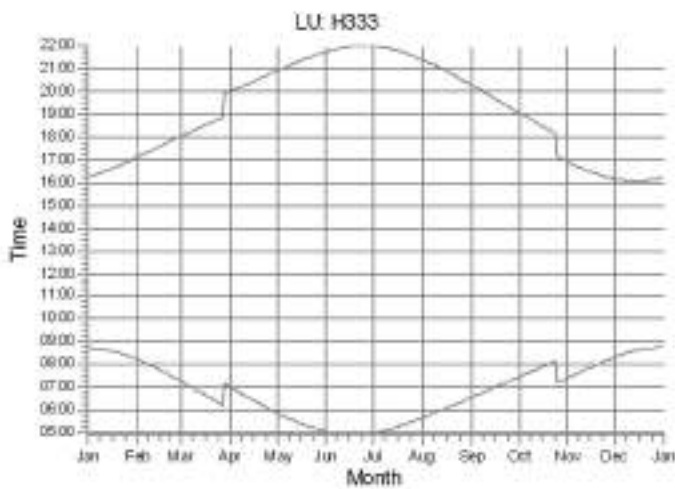
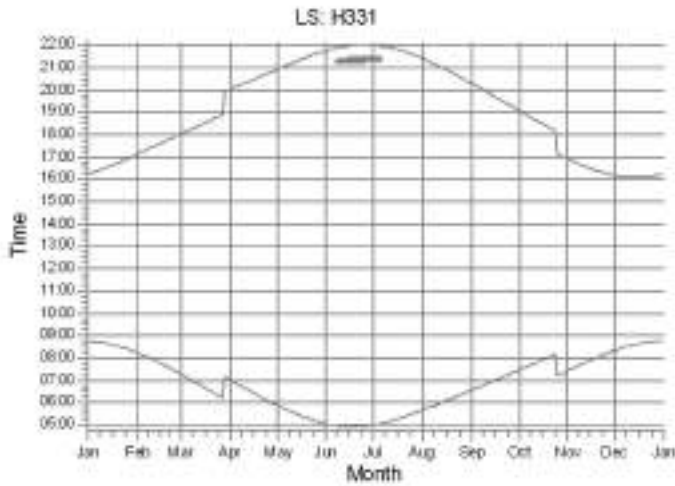


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

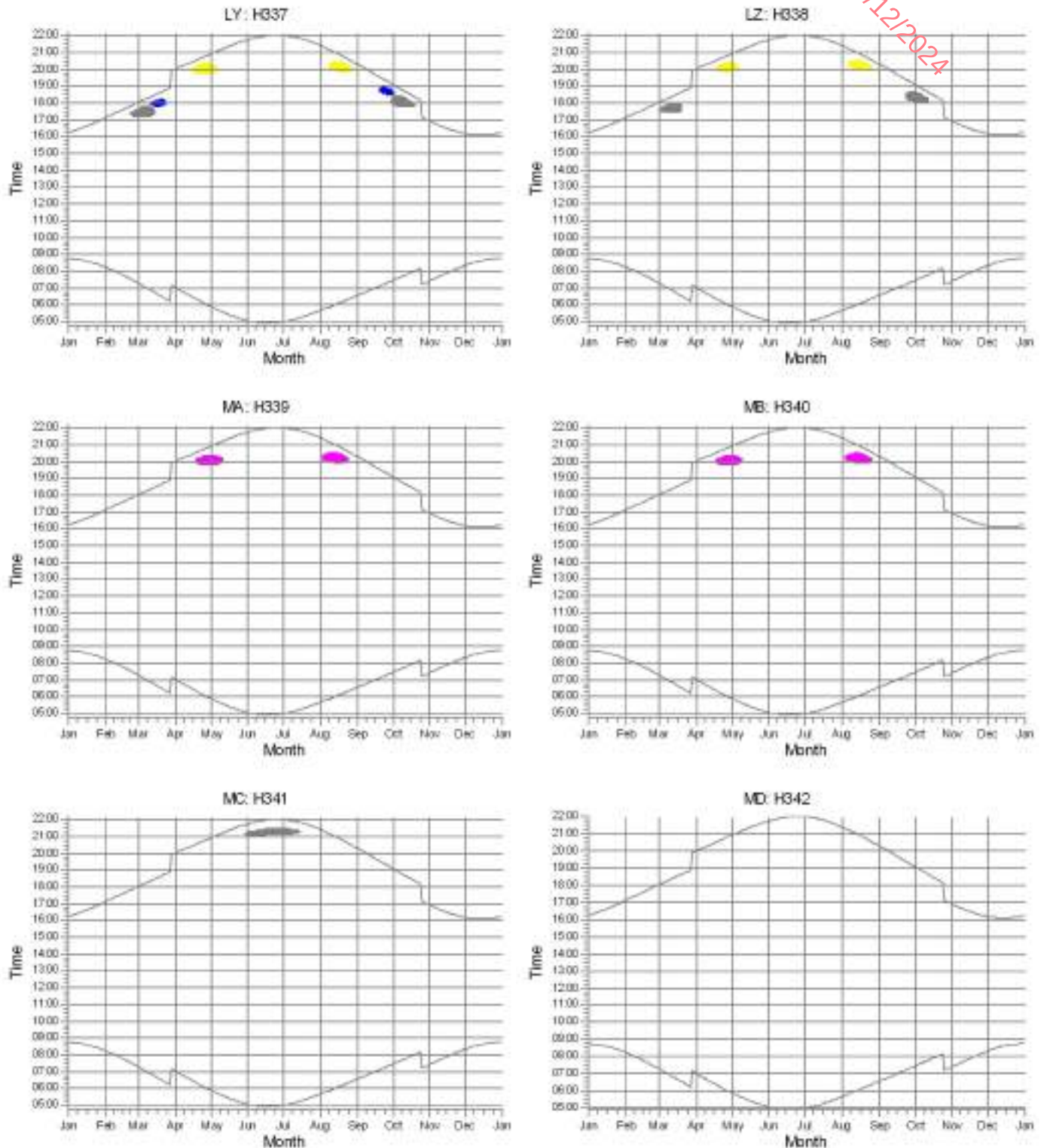


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case



WTGs

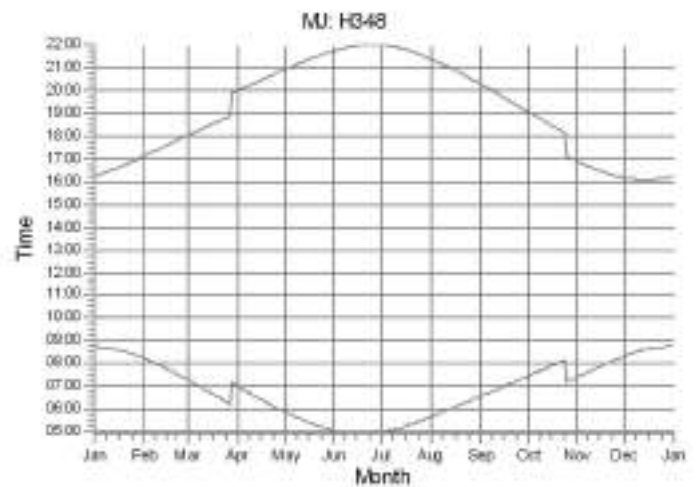
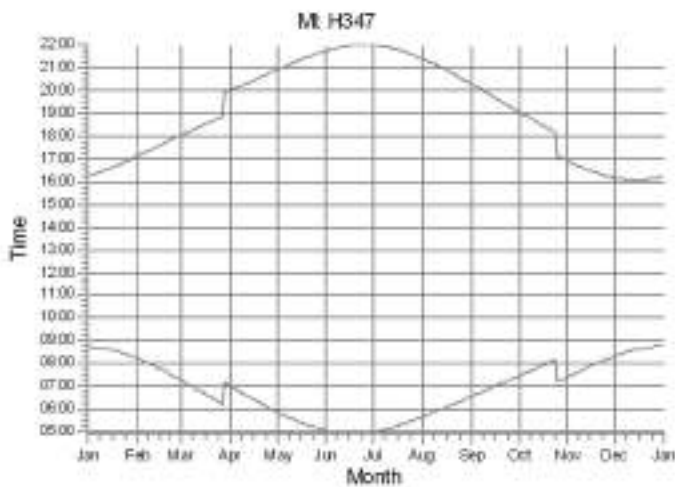
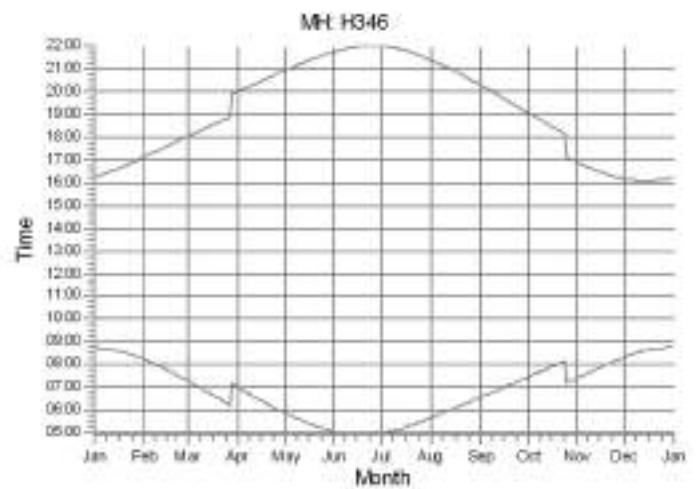
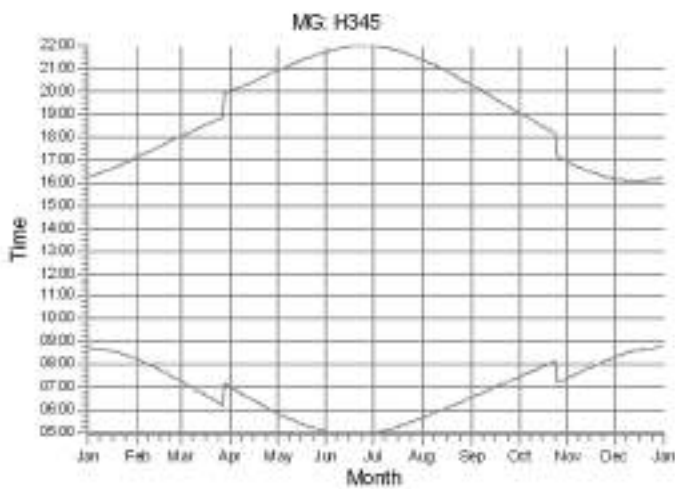
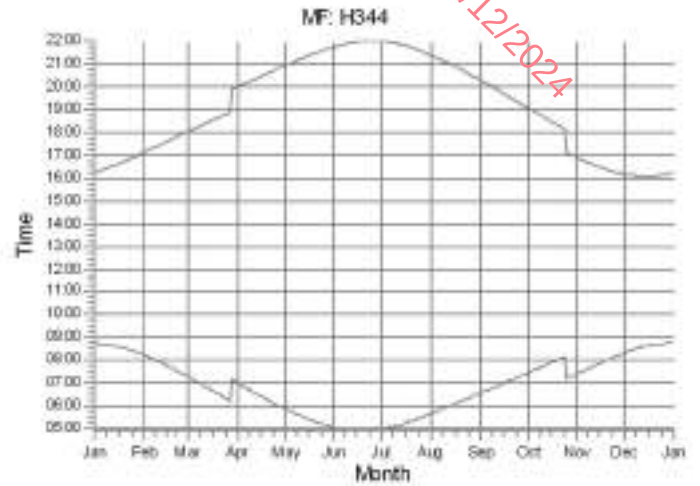
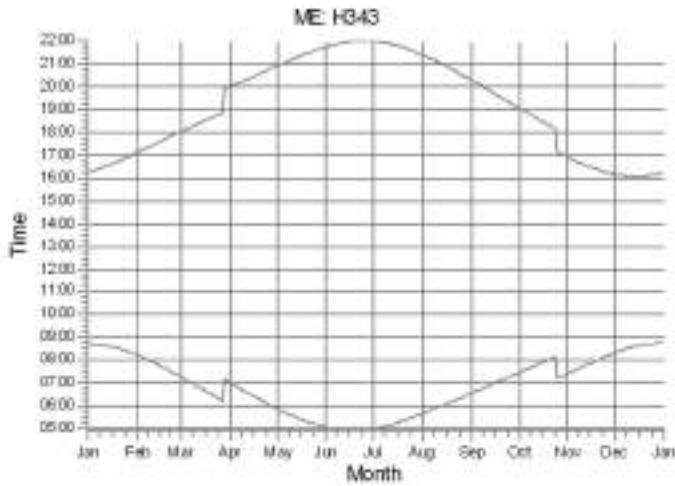
2: T02 3: T03 4: T04 5: T05

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar, graphical

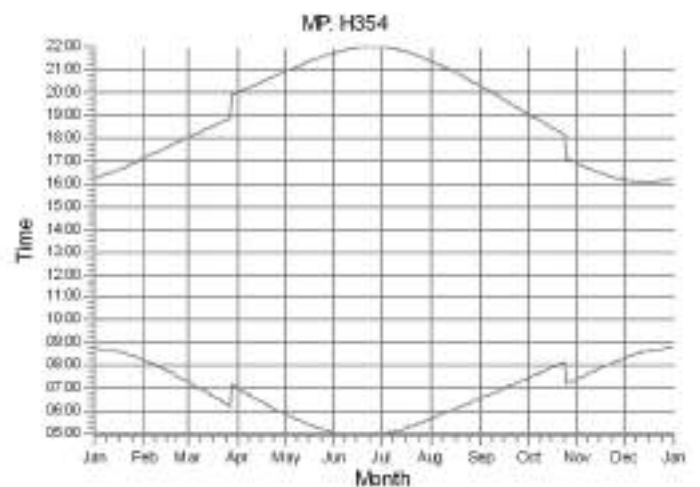
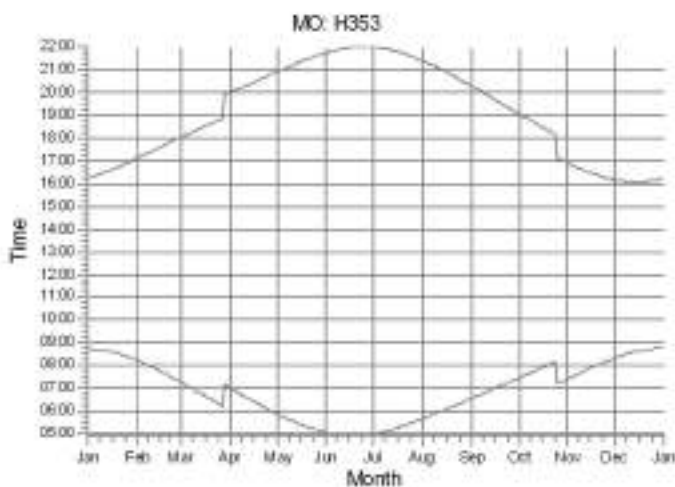
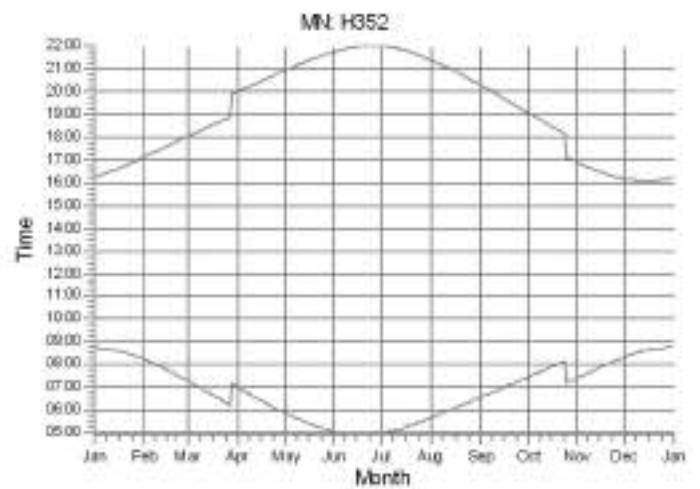
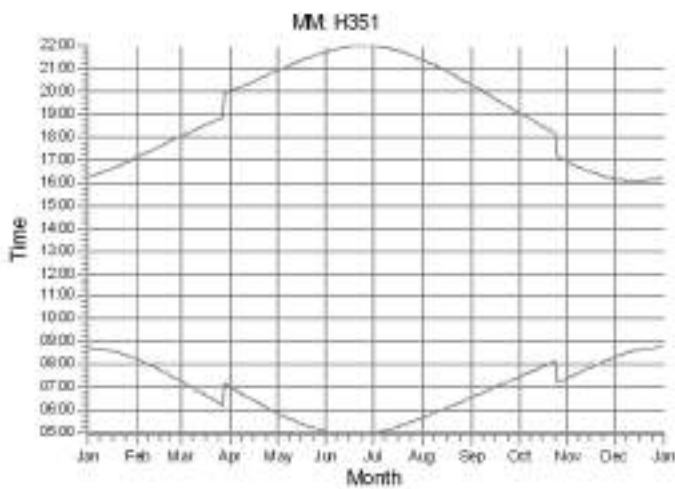
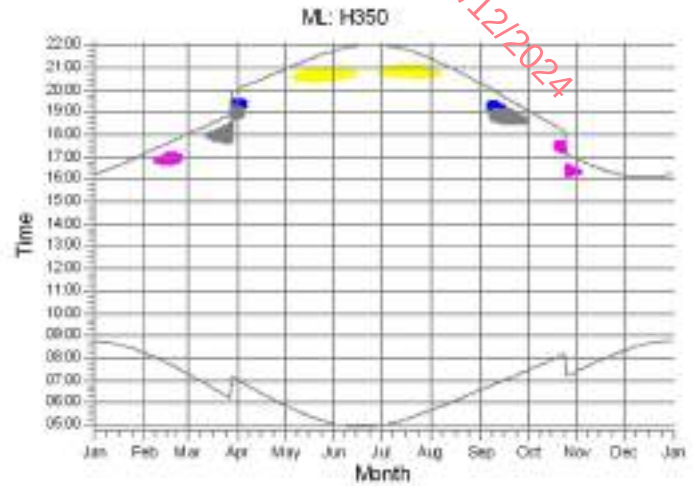
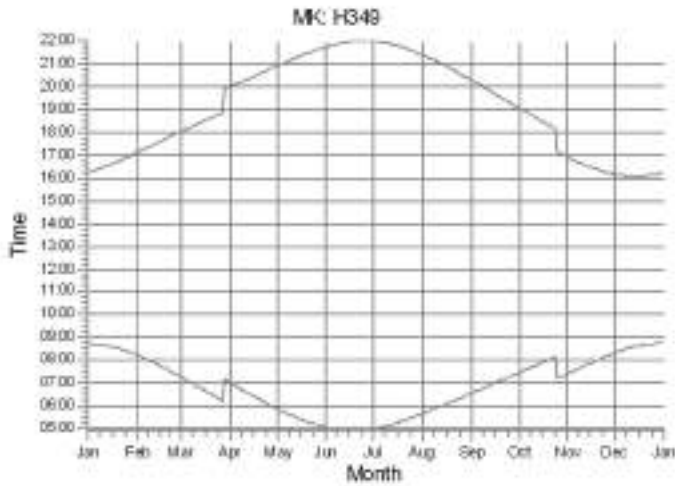
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

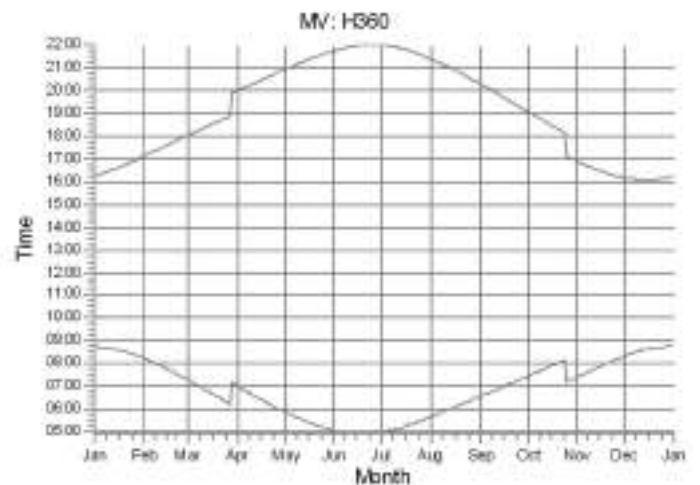
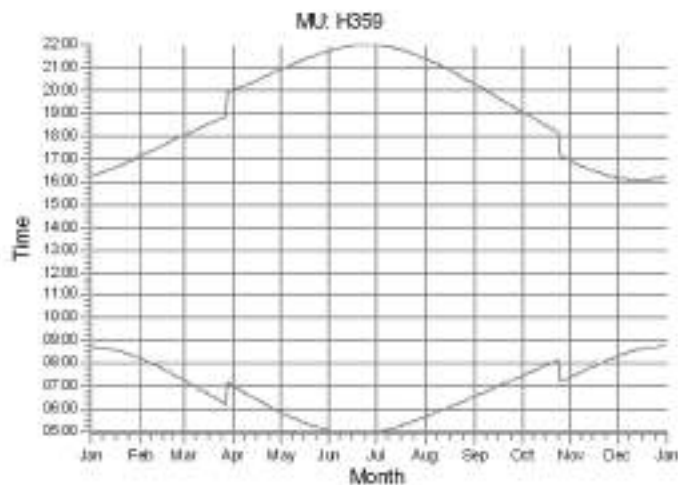
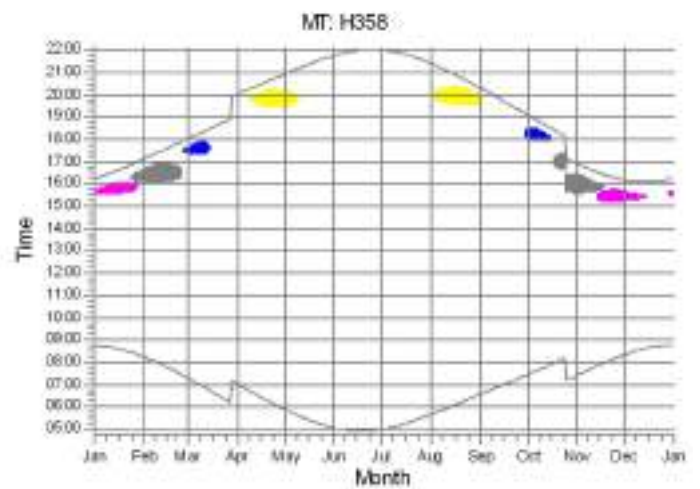
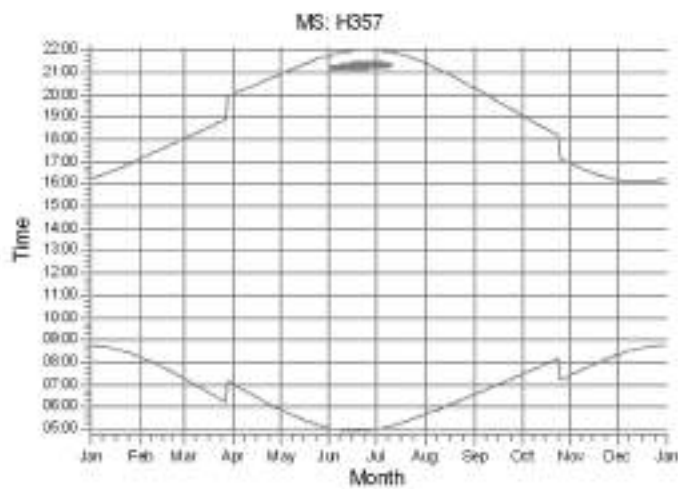
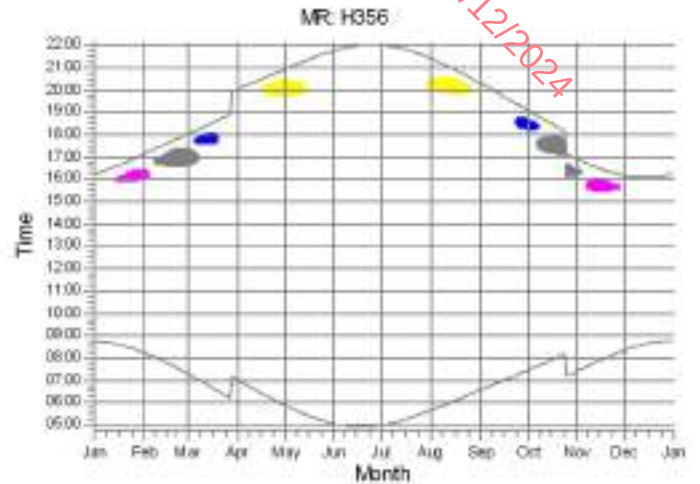
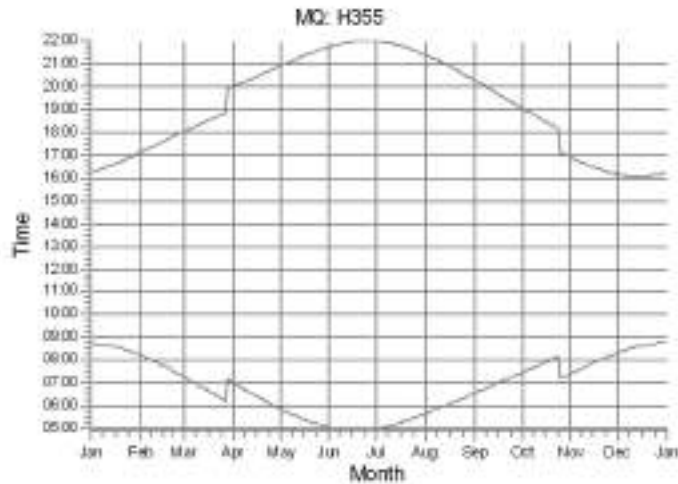


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

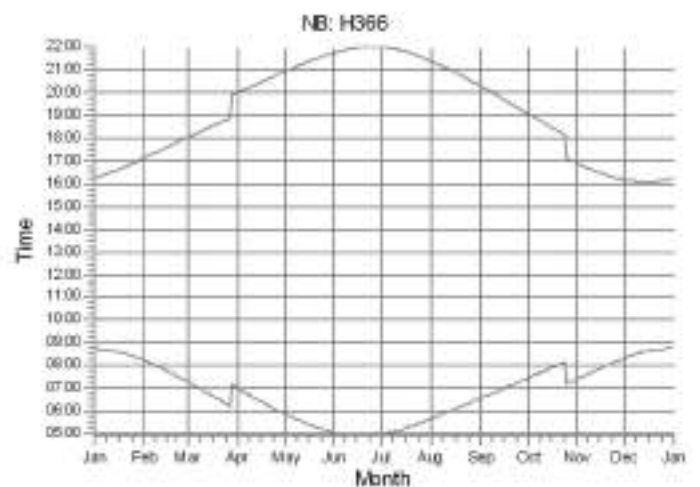
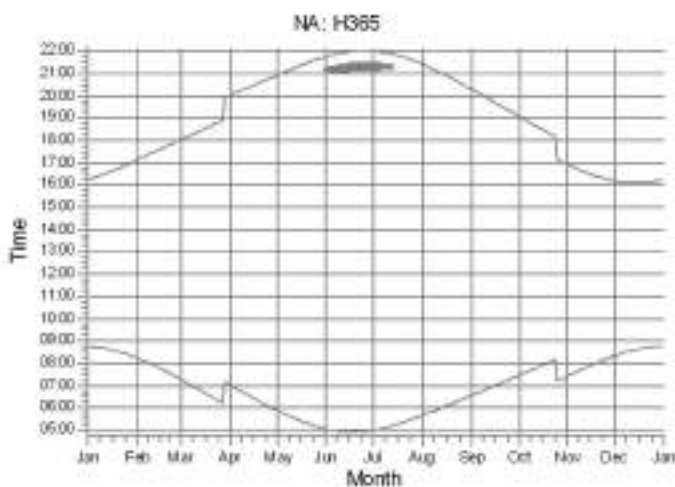
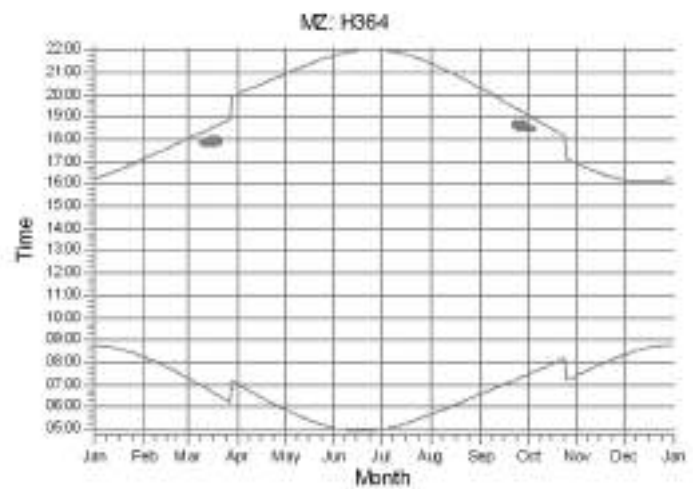
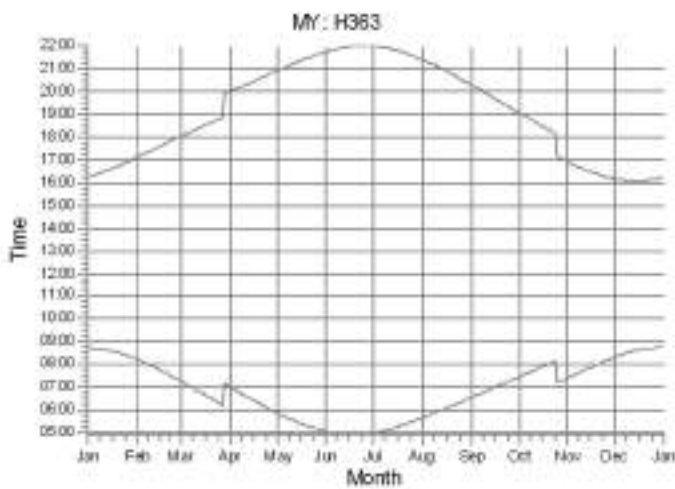
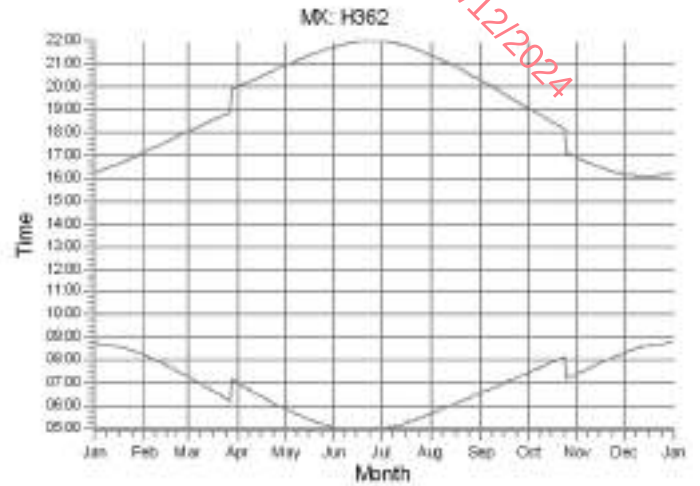
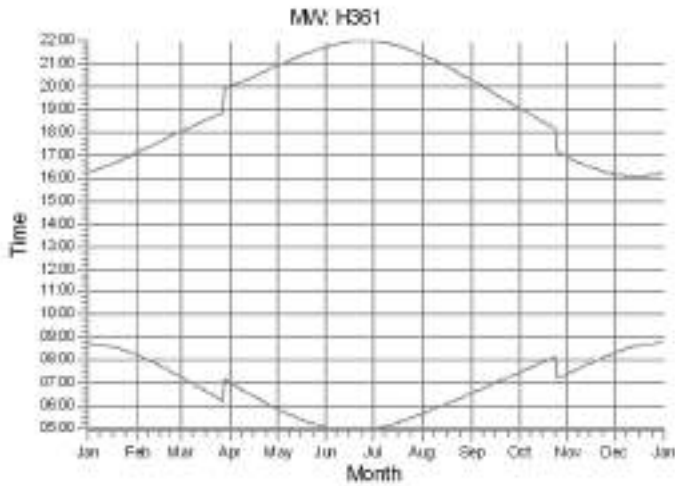


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

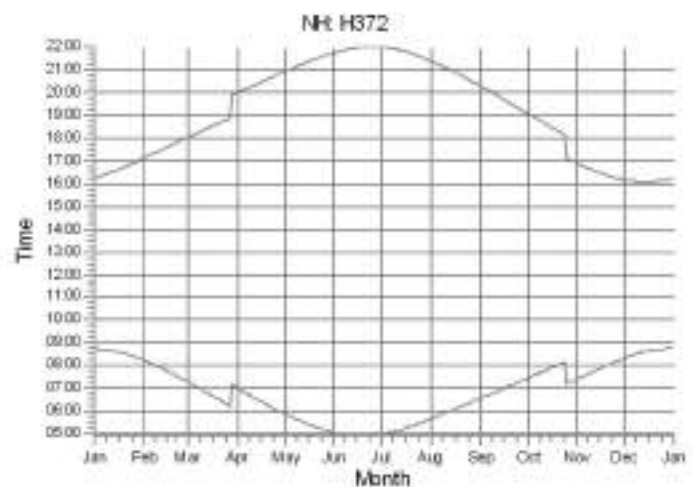
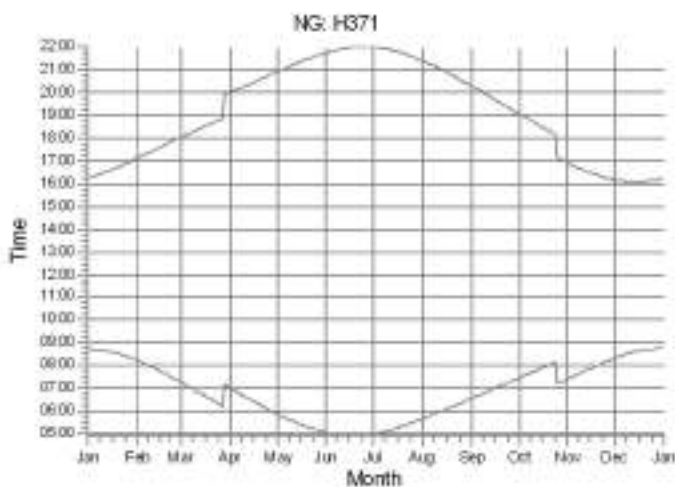
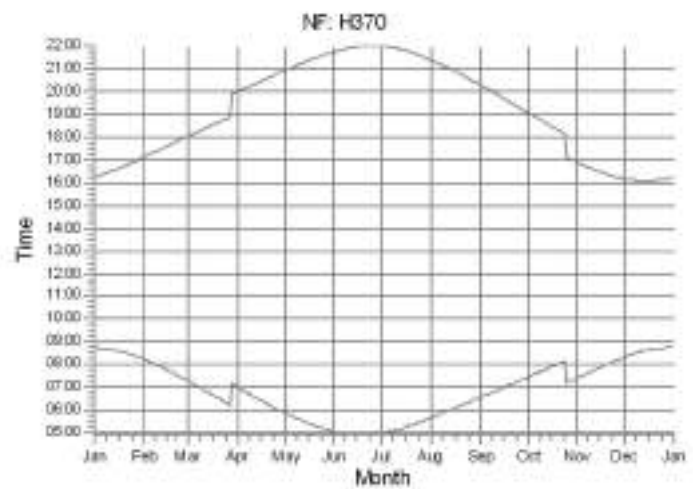
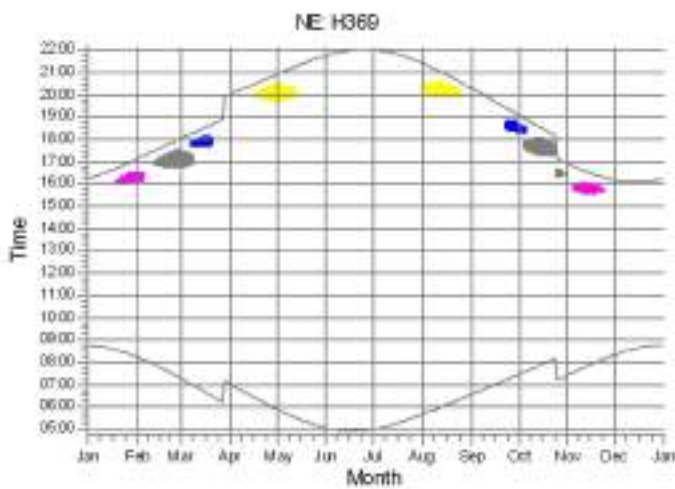
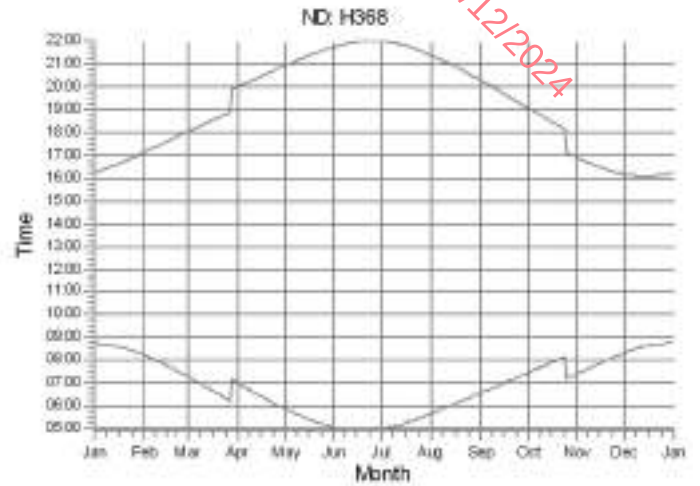
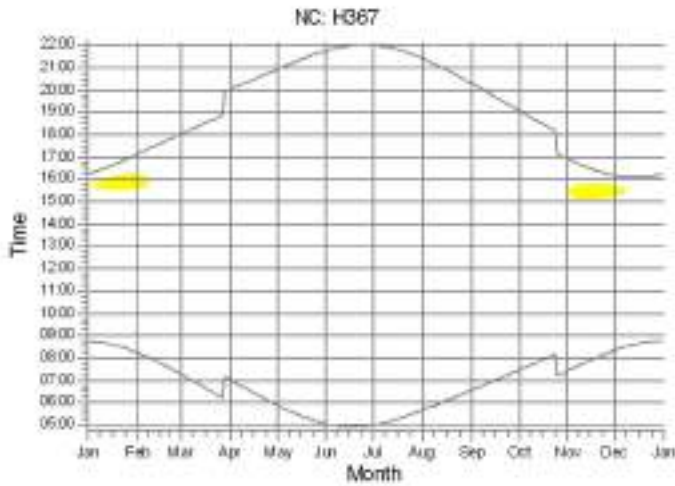


WTGs

4: T04

SHADOW - Calendar, graphical

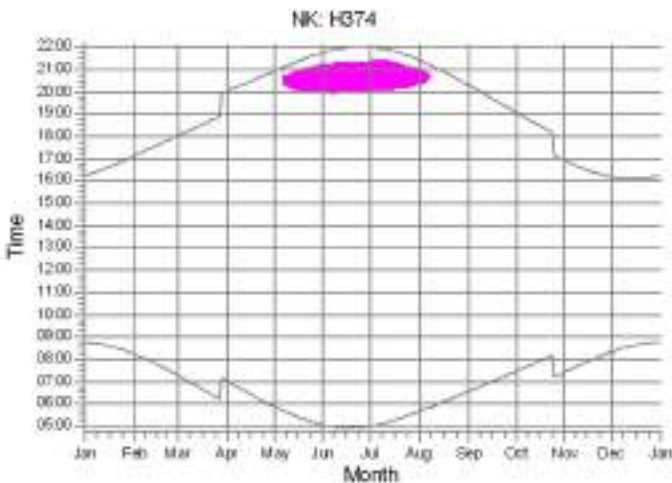
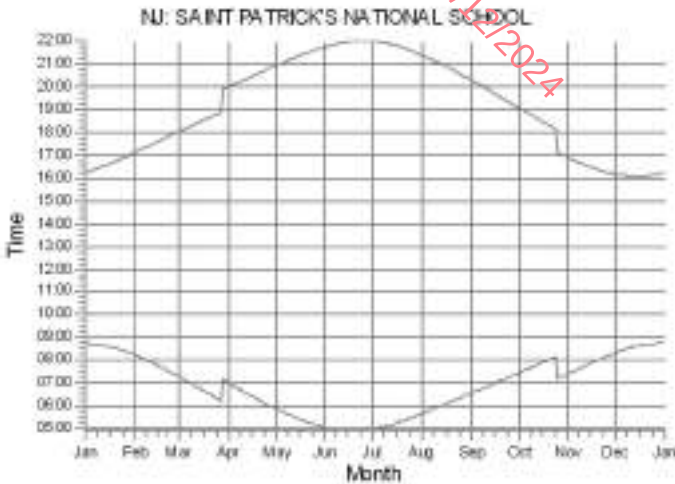
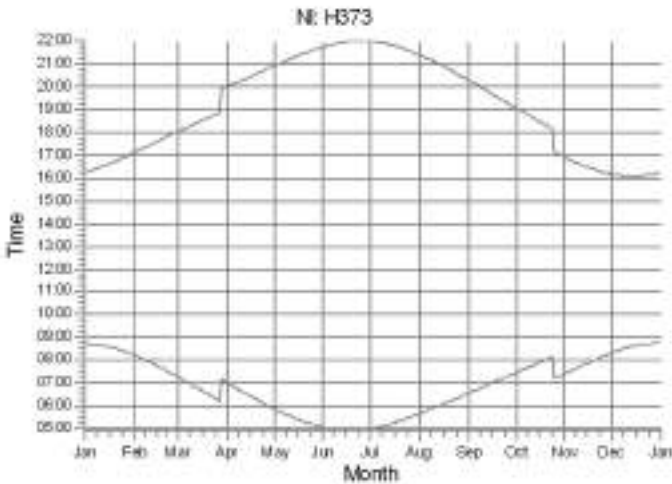
Calculation: Kellystown N163 Worst Case



WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical
Calculation: Kellystown N163 Worst Case



WTGs

5: T05

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 1 - T01
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 10:29-12:54/145 14:05-15:37/92 16:15 13:10-13:45/35	08:14 08:42-09:08/26 16:23-16:34/11 17:06 15:37-16:14/37	07:16 08:31-09:08/37 08:11-08:17/6 18:02 07:41-08:02/21	07:01 07:25-07:38/13 20:00	05:52 06:18-06:45/27 20:55 07:01-07:39/38	05:03 05:34-05:49/15 21:45 05:50-05:57/7
2	08:44 10:30-12:55/145 14:06-15:38/92 16:16 13:11-13:45/34	08:12 08:40-09:09/29 16:22-16:37/15 17:08 15:42-16:13/31	07:14 08:33-09:06/33 18:04 07:39-08:03/24	06:59 07:23-07:41/18 20:02	05:50 06:16-06:44/28 20:57 07:02-07:37/35	05:02 05:33-05:49/16 21:47
3	08:44 10:30-12:54/144 14:06-15:39/93 16:17 13:12-13:44/32	08:10 08:38-09:10/32 16:21-16:39/18 17:10 15:43-16:13/30	07:12 08:35-09:03/28 18:06 07:36-08:03/27	06:56 07:20-07:41/21 20:04	05:48 06:14-06:42/28 20:59 07:03-07:35/32	05:01 05:32-05:49/17 21:48
4	08:43 10:31-12:54/143 14:07-15:41/94 16:18 13:13-13:44/31	08:09 08:36-09:12/36 16:20-16:41/21 17:12 15:44-16:12/28	07:09 08:39-09:00/21 18:08 07:34-08:03/29	06:54 07:18-07:43/25 20:06	05:46 06:12-06:40/28 21:01 07:05-07:33/28	05:00 05:31-05:48/17 21:49
5	08:43 10:31-12:53/142 14:07-15:42/95 16:20 13:14-13:44/30	08:07 08:34-09:13/39 16:20-16:43/23 17:14 15:46-16:10/24	07:07 07:31-08:02/31 18:10 08:49-08:51/2	06:52 07:15-07:44/29 20:08	05:44 06:10-06:34/24 21:03 07:06-07:31/25	04:59 05:31-05:49/18 21:50
6	08:43 10:32-12:53/141 14:08-15:44/96 16:21 13:16-13:44/28	08:05 08:32-09:14/42 16:20-16:45/25 17:16 15:48-16:08/20	07:05 07:29-08:02/33 18:11	06:49 07:13-07:45/32 20:09	05:42 06:09-06:34/25 21:04 07:09-07:30/21	04:59 05:30-05:48/18 21:51
7	08:42 10:33-12:52/139 14:09-15:45/96 16:22 13:17-13:43/26	08:03 08:30-09:15/45 16:19-16:47/28 17:18 15:51-16:05/14	07:02 07:27-08:02/35 18:13	06:47 07:11-07:47/36 20:11	05:40 06:07-06:34/27 21:06 07:12-07:26/14	04:58 05:30-05:49/19 21:52
8	08:42 10:33-12:50/137 14:10-15:46/96 16:24 13:19-13:42/23	08:01 08:28-09:15/47 17:20 16:19-16:50/31	07:00 07:24-08:01/37 18:15	06:44 07:08-07:47/39 20:13	05:38 06:05-06:33/28 21:08	04:57 05:29-05:48/19 21:53
9	08:41 10:35-12:49/134 14:11-15:49/98 16:25 13:21-13:42/21	07:59 08:26-09:16/50 17:22 16:19-16:52/33	06:57 07:22-08:00/38 18:17	06:42 07:06-07:48/42 20:15	05:36 06:03-06:31/28 21:10	04:57 05:29-05:49/20 21:54
10	08:40 10:36-12:46/130 14:12-15:50/98 16:27 13:24-13:40/16	07:57 08:24-09:17/53 17:24 16:20-16:54/34	06:55 07:19-07:59/40 18:19	06:40 07:03-07:48/45 20:17	05:34 06:02-06:31/29 21:12	04:56 05:28-05:48/20 21:55
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12	08:39 10:37-12:18/101 12:19-12:32/13 16:30 14:14-15:54/100	07:53 08:20-09:18/58 17:28 16:21-16:59/38	06:50 07:14-07:55/41 18:23	06:35 06:59-07:49/50 20:21	05:31 05:58-06:27/29 21:15	04:55 05:28-05:49/21 21:56
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14	08:37 10:40-12:00/80 14:17-14:42/25 16:33 14:43-15:57/74	07:49 08:15-09:18/63 17:32 16:21-17:02/41	06:45 07:09-07:47/38 18:27	06:30 06:54-07:49/55 20:24	05:27 05:55-06:22/27 21:18	04:55 05:27-05:48/21 21:58
15	08:36 11:27-11:58/31 10:41-11:25/44 16:35 14:44-15:59/75 14:18-14:41/23	07:47 08:13-09:18/65 17:34 16:22-17:05/43	06:43 07:07-07:38/31 18:29	06:28 06:52-07:49/57 20:26	05:26 05:54-06:22/28 21:20	04:55 05:27-05:48/21 21:58
16	08:35 11:31-11:39/8 11:45-11:54/9 14:20-14:40/20 16:36 14:45-16:01/76 10:43-11:24/41	07:45 08:11-09:19/68 17:36 16:24-17:07/43	06:40 07:05-07:36/31 18:30	06:25 06:50-07:50/60 20:28	05:24 05:52-06:21/29 21:22	04:54 05:27-05:48/21 21:59
17	08:34 14:45-16:02/77 14:22-14:38/16 16:38 10:43-11:22/39	07:43 08:09-09:19/70 17:38 16:26-17:09/43	06:38 07:06-07:34/28 18:32	06:23 06:47-07:49/62 20:30	05:22 05:51-06:20/29 21:23	04:54 05:27-05:48/21 21:59
18	08:33 14:46-16:05/79 14:25-14:36/11 16:40 10:45-11:20/35	07:41 08:07-09:19/72 17:40 16:28-17:11/43	06:36 07:07-07:31/24 18:34	06:21 06:45-07:49/64 20:32	05:21 05:49-06:18/29 21:25	04:54 05:27-05:48/21 22:00
19	08:32 14:47-16:07/80 16:41 10:48-11:17/29	07:39 08:04-09:18/74 17:42 16:33-17:13/40	06:33 07:09-07:20/11 18:36	06:18 06:43-07:49/66 20:33	05:19 05:48-06:16/28 21:27	04:54 05:27-05:48/21 22:00
20	08:31 14:47-16:08/81 16:43 10:50-11:09/19	07:37 08:02-09:18/76 17:44 16:36-17:13/37	06:31 18:38	06:16 06:41-07:48/67 20:35	05:18 05:46-06:08/22 21:28	04:54 05:27-05:48/21 22:00
21	08:30 14:49-16:11/82 16:45 10:53-11:07/14	07:34 08:00-09:18/78 17:46 16:48-17:13/25	06:28 18:40	06:14 06:39-07:48/69 20:37	05:16 05:45-06:07/22 21:30	04:55 05:28-05:49/21 22:01
22	08:29 14:49-16:12/83 16:47	07:32 07:58-09:16/78 17:48 16:47-17:12/25	06:26 18:42	06:12 06:36-07:47/71 20:39	05:15 05:44-06:06/22 21:31	04:55 05:28-05:49/21 22:01
23	08:27 14:51-16:13/82 16:49	07:30 07:58-09:16/78 16:48-17:11/23 17:50 07:55-07:57/2	06:23 18:43	06:09 06:34-07:46/72 20:41	05:13 05:43-06:03/20 21:33	04:55 05:28-05:49/21 22:01
24	08:26 14:52-16:13/81 16:51	07:28 07:59-09:15/76 16:49-17:11/22 17:52 07:53-07:58/5	06:21 18:45	06:07 06:32-07:46/74 20:43	05:12 05:41-06:01/20 21:34	04:55 05:28-05:49/21 22:01
25	08:25 14:54-16:14/80 16:52	07:25 07:50-09:14/84 17:54 16:50-17:09/19	06:18 18:47	06:05 06:30-07:45/75 20:44	05:11 05:40-06:01/21 21:36	04:56 05:29-05:50/21 22:01
26	08:23 15:22-16:14/52 16:54 14:55-15:19/24	07:23 07:48-09:13/85 17:56 16:51-17:08/17	06:16 18:49	06:03 06:28-07:44/76 20:46	05:09 05:39-06:01/22 21:37	04:56 05:29-05:50/21 22:01
27	08:22 15:24-16:14/50 16:56 14:58-15:19/21	07:21 08:28-09:12/44 07:46-08:01/15 17:58 08:02-08:25/23 16:54-17:06/12	06:14 18:51	06:01 06:26-06:53/27 20:48	05:08 05:38-06:00/22 21:39	04:56 05:30-05:51/21 22:01
28	08:20 08:49-08:56/7 15:00-15:16/16 16:58 15:26-16:15/49	07:19 08:29-09:10/41 08:03-08:21/18 18:00 07:43-08:01/18	06:11 18:53	05:58 06:24-06:51/27 20:50	05:07 05:37-06:00/23 21:40	04:57 05:30-05:51/21 22:01
29	08:19 08:47-09:00/13 15:03-15:13/10 17:00 15:28-16:14/46	 	07:09 19:55	05:56 06:22-06:49/27 20:52	05:06 05:36-05:59/23 21:42	04:58 05:31-05:52/21 22:01
30	08:17 08:45-09:03/18 16:25-16:29/4 17:02 15:32-16:14/42	 	07:06 19:56	05:54 06:20-06:47/27 20:54	05:05 05:35-05:58/23 21:43	04:58 05:31-05:52/21 22:00
31	08:15 08:44-09:06/22 16:23-16:31/8 17:04 15:34-16:14/40	 	07:04 07:27-07:35/8 19:58	 	05:04 05:34-05:57/23 21:44	
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	5084	2675	734	1596	984	605

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+ 353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 1 - T01
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 05:32-05:52/20 22:00	05:39 06:09-06:38/29 21:25	06:33 07:00-07:48/48 20:18	07:26 07:53-08:34/41 19:05	07:24 07:54-08:46/52 16:54 15:49-16:23/34	08:19 10:19-12:16/117 12:17-12:23/6 16:10 13:11-13:19/8 13:55-15:34/99
2	05:00 05:33-05:53/20 22:00	05:40 06:11-06:40/29 21:23	06:35 07:02-07:47/45 20:16	07:28 07:54-08:35/41 19:02	07:26 07:56-08:46/50 16:52 15:49-16:21/32	08:21 10:19-12:29/130 13:55-15:33/98 16:09 13:07-13:23/16
3	05:00 05:34-05:54/20 21:59	05:42 06:12-06:41/29 21:21	06:36 07:04-07:46/42 20:14	07:30 07:56-08:36/40 19:00	07:28 07:58-08:45/47 16:50 15:49-16:19/30	08:22 10:18-12:32/134 13:54-15:32/98 16:08 13:05-13:25/20
4	05:01 05:34-05:54/20 21:59	05:44 06:14-06:42/28 21:19	06:38 07:05-07:44/39 20:11	07:32 07:58-08:37/39 18:57	07:30 08:00-08:44/44 15:49-16:17/28 16:48 15:20-15:36/16	08:24 10:18-12:35/137 13:55-15:32/97 16:08 13:04-13:27/23
5	05:02 05:35-05:54/19 21:58	05:45 06:16-06:43/27 21:17 07:26-07:32/6	06:40 07:07-07:43/36 20:09	07:33 08:00-08:38/38 18:55	07:32 08:02-08:43/41 15:49-16:14/25 16:46 15:17-15:38/21	08:25 10:18-12:37/139 13:54-15:30/96 16:07 13:02-13:28/26
6	05:03 05:36-05:55/19 21:58	05:47 06:17-06:43/26 21:16 07:20-07:37/17	06:42 07:09-07:42/33 20:06	07:35 08:02-08:38/36 18:53	07:34 08:04-08:42/38 15:50-16:12/22 16:45 15:15-15:40/25	08:27 10:18-12:39/141 13:55-15:30/95 16:07 13:02-13:30/28
7	05:04 05:37-05:55/18 21:57	05:49 06:19-06:44/25 21:14 07:18-07:40/22	06:44 07:10-07:39/29 20:04	07:37 08:04-08:38/34 18:50	07:36 08:06-08:41/35 15:50-16:10/20 16:43 15:14-15:41/27	08:28 10:18-12:40/142 13:54-15:29/95 16:06 13:01-13:31/30
8	05:05 05:38-05:56/18 21:56	05:51 06:20-06:47/27 21:12 07:15-07:41/26	06:45 07:12-07:37/25 20:01	07:39 08:06-08:38/32 18:48	07:38 08:09-08:41/32 15:51-16:08/17 16:41 15:13-15:42/29	08:29 10:19-12:42/143 13:55-15:29/94 16:06 13:02-13:33/31
9	05:06 05:39-05:56/17 21:56	05:52 06:22-06:50/28 21:10 07:09-07:47/38	06:47 07:14-07:36/22 19:59	07:41 09:16-09:31/15 18:45 08:07-08:37/30	07:40 08:11-08:40/29 15:53-16:07/14 16:39 15:13-15:44/31	08:30 10:19-12:43/144 13:55-15:28/93 16:05 13:01-13:33/32
10	05:07 05:40-05:56/16 21:55	05:54 06:24-06:52/28 21:08 07:12-07:45/33	06:49 07:16-07:34/18 19:57	07:43 09:11-09:35/24 18:43 08:09-08:37/28	07:42 08:13-08:38/25 15:54-16:05/11 16:37 15:08-15:45/37	08:32 10:19-12:44/145 13:55-15:28/93 16:05 13:01-13:34/33
11	05:08 05:41-05:57/16 21:54	05:56 06:25-06:53/28 21:06 07:10-07:46/36	06:51 07:17-07:31/14 19:54	07:44 09:08-09:38/30 18:41 08:11-08:36/25	07:44 08:15-08:37/22 15:55-16:03/8 16:36 15:05-15:45/40	08:33 10:19-12:44/145 13:55-15:27/92 16:05 13:00-13:35/35
12	05:09 05:42-06:05/23 21:53	05:58 06:27-06:54/27 21:04 07:09-07:47/38	06:52 07:19-07:28/9 19:52	07:46 09:06-09:40/34 18:38 08:13-08:36/23	07:46 08:17-08:34/17 15:57-16:01/4 16:34 15:03-15:46/43	08:34 10:20-12:45/145 13:55-15:27/92 16:05 13:01-13:35/35
13	05:11 05:43-06:06/23 21:52	05:59 06:29-06:56/27 21:01 07:09-07:49/40	06:54 19:49	07:48 09:04-09:42/38 08:42-08:52/10 18:36 08:15-08:35/20	07:48 08:19-08:32/13 14:35-14:45/10 16:32 15:00-15:46/46	08:35 10:20-12:47/147 13:56-15:27/91 16:05 13:01-13:37/36
14	05:12 05:44-06:07/23 21:51	06:01 06:30-06:57/27 20:59 07:07-07:49/42	06:56 19:47	07:50 09:02-09:43/41 08:17-08:34/17 18:34 08:35-08:55/20 17:28-17:36/8	07:49 08:21-08:27/6 14:32-14:48/16 16:31 14:57-15:47/50	08:36 10:20-12:48/148 13:56-15:27/91 16:05 13:01-13:38/37
15	05:13 05:45-06:09/24 21:50	06:03 06:32-06:59/27 20:57 07:06-07:50/44	06:58 19:44	07:52 08:19-09:44/85 18:31 17:25-17:39/14	07:51 14:56-15:47/51 16:29 14:30-14:51/21	08:37 10:21-12:49/148 13:57-15:27/90 16:05 13:01-13:39/38
16	05:14 05:47-06:10/23 21:49	06:05 06:34-07:00/26 20:55 07:05-07:50/45	06:59 19:42	07:54 08:21-09:45/84 18:29 17:23-17:40/17	07:53 14:55-15:47/52 16:28 14:28-14:52/24	08:38 10:20-12:48/148 13:56-15:26/90 16:05 13:01-13:38/37
17	05:16 05:48-06:10/22 21:48	06:06 06:35-07:51/76 20:53	07:01 19:39	07:56 08:31-09:46/75 17:21-17:42/21 18:27 08:23-08:30/7	07:55 14:27-15:47/80 16:26	08:39 10:21-12:49/148 13:57-15:27/90 16:05 13:01-13:39/38
18	05:17 05:49-06:11/22 21:46	06:08 06:37-07:52/75 20:51	07:03 19:37	07:57 08:30-09:47/77 17:20-17:42/22 18:24 08:25-08:29/4	07:57 14:26-15:47/81 16:25	08:39 10:21-12:50/149 13:57-15:27/90 16:05 13:02-13:40/38
19	05:19 05:51-06:12/21 21:45	06:10 06:39-07:51/72 20:48	07:05 19:34	07:59 08:29-09:47/78 18:22 17:19-17:43/24	07:59 14:25-15:47/82 16:23	08:40 10:22-12:51/149 13:58-15:28/90 16:05 13:02-13:41/39
20	05:20 05:52-06:12/20 21:44	06:12 06:40-07:52/72 20:46	07:06 19:32	08:01 08:29-09:48/79 18:20 17:19-17:43/24	08:01 14:24-15:47/83 16:22	08:41 10:22-12:51/149 13:58-15:27/89 16:06 13:02-13:41/39
21	05:21 05:53-06:14/21 21:42	06:13 06:42-07:52/70 20:44	07:08 19:29	08:03 08:31-09:48/77 17:09-17:14/5 18:18 17:18-17:43/25	08:02 14:24-15:46/82 16:21 10:28-10:42/14	08:41 10:23-12:52/149 13:59-15:28/89 16:06 13:03-13:42/39
22	05:23 05:55-06:17/22 21:41	06:15 06:44-07:52/68 20:42	07:10 19:27	08:05 08:33-09:48/75 18:15 17:05-17:43/38	08:04 14:23-15:44/81 16:19 10:26-10:45/19	08:42 10:23-12:52/149 13:59-15:28/89 16:07 13:03-13:42/39
23	05:24 05:56-06:18/22 21:40	06:17 06:45-07:52/67 20:39	07:12 19:24	08:07 08:35-09:48/73 18:13 17:03-17:43/40	08:06 14:23-15:43/80 16:18 10:24-10:53/29	08:42 10:24-12:53/149 14:00-15:29/89 16:07 13:04-13:43/39
24	05:26 05:57-06:19/22 21:38	06:19 06:47-07:52/65 20:37	07:14 07:53-08:03/10 19:22	08:09 08:37-09:48/71 18:11 16:57-17:41/44	08:08 14:23-15:42/79 14:02-14:13/11 16:17 10:23-10:57/34	08:43 10:24-12:53/149 14:00-15:29/89 16:08 13:04-13:43/39
25	05:27 05:59-06:28/29 21:37	06:21 06:49-07:51/62 20:35	07:15 08:06-08:13/7 19:19	07:11 07:39-08:48/69 17:09 15:55-16:38/43	08:09 14:23-15:41/78 14:00-14:16/16 16:16 10:22-11:00/38	08:43 10:24-12:53/149 14:00-15:30/90 16:08 13:04-13:43/39
26	05:29 06:00-06:29/29 21:35	06:22 06:50-07:51/61 20:33	07:17 07:48-08:15/27 19:17	07:13 07:41-08:48/67 17:07 15:53-16:36/43	08:11 11:09-11:17/8 11:23-11:32/9 13:59-14:18/19 16:15 14:23-15:39/76 10:21-11:02/41	08:43 10:26-12:54/148 14:02-15:31/89 16:09 13:06-13:44/38
27	05:31 06:02-06:31/29 21:33	06:24 06:52-07:51/59 20:30	07:19 07:47-08:17/30 19:15	07:15 07:43-08:48/65 17:04 15:52-16:34/42	08:13 11:06-11:37/31 10:20-11:04/44 16:14 14:23-15:38/75 13:58-14:20/22	08:44 10:26-12:54/148 14:02-15:32/90 16:10 13:06-13:44/38
28	05:32 06:03-06:31/28 21:32	06:26 06:54-07:51/57 20:28	07:21 07:47-08:18/31 19:12	07:17 07:45-08:47/62 17:02 15:51-16:31/40	08:14 10:20-11:40/80 13:57-14:22/25 16:13 14:24-15:37/73	08:44 10:26-12:54/148 14:03-15:33/90 16:11 13:07-13:45/38
29	05:34 06:05-06:33/28 21:30	06:28 06:55-07:50/55 20:25	07:23 07:49-08:26/37 19:10	07:19 07:47-08:47/60 17:00 15:50-16:29/39	08:16 10:19-11:41/82 11:43-11:55/12 16:12 14:23-15:36/73 13:55-14:22/27	08:44 10:27-12:55/148 14:03-15:34/91 16:12 13:08-13:45/37
30	05:35 06:06-06:33/27 21:28	06:29 06:57-07:50/53 20:23	07:24 07:51-08:30/39 19:07	07:20 07:50-08:48/58 16:58 15:49-16:27/38	08:18 10:19-11:59/100 12:00-12:13/13 16:11 13:55-15:35/100	08:44 10:28-12:55/147 14:04-15:35/91 16:12 13:09-13:45/36
31	05:37 06:08-06:37/29 21:27	06:31 06:59-07:49/50 20:21	07:25 07:52-08:47/55 16:56 15:50-16:24/34	07:22 07:52-08:47/55 16:56 15:50-16:24/34	16:11 13:55-15:35/100 16:11 13:55-15:35/100	08:44 10:27-12:54/147 14:04-15:35/91 16:13 13:09-13:44/35
Potential sun hours	512	460	382	328	259	233
Sum of minutes with flicker	699	1778	555	2438	3032	8372

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 2 - T02
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 14:59-15:37/38 09:18-10:43/85 16:15 10:49-12:06/77 12:22-14:37/135	08:14 15:16-16:34/78 09:33-10:08/35 17:06 08:42-09:21/39 13:54-14:39/45	07:16 16:33-17:34/61 18:02 16:36-17:36/60	07:01 18:31-19:33/62 20:00 18:31-19:35/64	05:52 19:18-20:26/68 20:55 19:18-20:27/69	05:03 20:29-21:10/41 21:45 20:06-20:17/11
2	08:44 15:00-15:39/39 09:17-10:44/86 16:16 10:50-12:06/76 12:23-14:38/135	08:10 15:20-16:39/79 09:38-10:03/25 17:10 08:38-09:15/37 13:57-14:36/39	07:12 16:46-17:38/52 18:06 16:48-17:41/53	06:59 18:32-19:37/65 20:02 18:32-19:37/65	05:48 19:20-20:29/69 20:59 19:20-20:32/70	05:01 20:32-21:13/41 21:48 20:33-21:14/41
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Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	8719	3459	1704	1916	1943	1252

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 2 - T02
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 20:43-21:23/40	05:39 19:58-20:53/55	06:33 18:40-19:50/70	07:26 07:52-08:08/16	07:24 07:54-08:41/47	08:19 14:45-15:49/08 54:10-54:27/93
2	22:00	21:25	20:18	19:05 17:35-18:23/48	16:54 15:07-16:23/76	16:10 14:45-11:23/38 12:13-14:24/131
3	05:00 20:43-21:24/41	05:40 19:58-20:52/54	06:35 18:37-19:48/71	07:28 07:54-08:08/14	07:26 07:56-08:42/46	12:21 14:45-15:37/47 12:13-14:24/131
4	22:00	21:23	20:16	19:02 17:34-18:23/49	16:52 15:06-16:21/75	16:09 11:33-14:29/08 56:10-56:28/92
5	05:00 20:42-21:23/41	05:42 19:57-20:50/53	06:36 18:35-19:46/71	07:30 07:56-08:07/11	07:28 15:01-16:19/78	16:22 14:46-15:32/46 10:42-11:25/43 12:12-14:24/132
6	21:59	21:21	20:13	19:00 17:32-18:24/52	16:50 15:08-16:23/75	16:08 11:30-11:45/15 08:57-10:28/91
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12	05:23 20:03-21:07/64	06:15 19:17-20:12/55	07:10 18:21-18:58/37	08:05 16:43-17:48/41	08:04 14:42-15:44/62 09:55-10:15/19	08:42 14:54-15:28/34 09:17-10:39/82
13	21:41	20:42	19:27	18:15	16:44-17:45/61	16:06 10:42-12:03/81 12:16-14:32/136
14	05:24 20:03-21:07/64	06:17 19:16-20:10/54	07:12 18:22-18:56/34	08:07 16:45-17:55/61	08:06 14:42-15:43/61 09:53-10:17/24	08:43 14:55-15:34 09:18-10:40/82
15	21:39	20:39	19:24	18:13	16:42-17:43/61	16:07 10:43-12:05/82 12:17-14:33/136
16	05:26 20:02-21:05/63	06:19 19:10-20:09/59	07:14 18:23-18:54/31	08:09 16:37-19:48-14:16-21:36/211	08:08 14:42-15:42/60 11:01-11:06/5 12:17-14:20/123	08:43 14:55-15:29/34 09:18-10:40/82
17	21:38	20:37	19:22	18:11	16:41-17:41/60	16:08 10:43-12:05/82 12:17-14:34/137
18	05:27 20:02-21:04/62	06:20 19:05-20:06/61	07:15 18:23-18:51/28	07:11 17:39-18:02-18:04-15:17-15:36/19	08:09 14:42-15:41/60 12:14-16:14/21/25	08:43 14:55-15:35 09:19-10:41/82
19	21:36	20:35	19:19	17:09 15:59-18:14/15	17:09 15:59-18:14/15	16:08 10:44-12:05/81 12:18-14:34/136
20	05:29 20:01-21:02/61	06:22 19:02-20:06/62	07:17 17:53-18:04-17:11 17:54-18:17/23	17:13 17:01-18:26/40	08:11 14:43-15:39/56 10:55-11:12/20	08:43 14:56-15:30/34 09:19-10:41/82
21	21:35	20:32	19:17	17:07 15:14-16:38/82	16:15 14:45-10:22/97 12:14-14:21/216	16:09 10:45-12:06/81 12:19-14:34/136
22	05:30 20:01-21:00/59	06:24 19:00-20:02/62	07:19 17:51-08:06/15 17:48-18:20/32	17:15 17:43-18:32/49	18:13 14:45-13:38/51 10:53-11:17/24	08:44 14:57-15:32/35 09:19-10:42/83
23	21:33/10	20:30	19:14	17:13 17:46-18:42/20	17:13 17:46-18:42/20	16:05 10:45-12:06/81 12:19-14:35/138
24	05:32 20:00-20:59/59	06:26 18:57-19:59/62	07:21 17:50-08:07/17 17:43-18:21/38	17:17 17:45-18:35/50	18:14 14:44-15:37/53 10:53-11:19/26	08:44 14:57-15:33/36 09:19-10:42/83
25	21:32	20:28	19:12	17:12 17:40-16:34/17	17:12 17:40-16:34/17	16:11 10:46-12:06/80 12:20-14:36/138
26	05:34 19:59-20:57/58	06:28 18:55-19:57/62	07:22 17:49-08:08/19 17:40-18:22/42	17:18 17:47-08:37/50	18:16 14:44-15:36/52 10:51-11:20/23	08:44 14:59-15:34/36 09:19-10:43/84
27	21:30	20:25	19:10	17:10 17:40-16:29/18	17:10 17:40-16:29/18	16:11 10:47-12:07/82 12:21-14:36/138
28	05:35 19:50-20:56/57	06:29 18:54-19:56/61	07:24 17:51-08:08/17 17:37-18:22/45	17:20 17:50-08:38/48	18:18 14:44-15:35/51 10:49-11:22/23	08:44 14:59-15:35/36 09:19-10:43/84
29	21:28	20:23 18:51-18:32	19:07 18:33-18:38/5	16:58 15:08-16:27/79	16:11 08:52-10:26/94 12:13-14:23/134	16:12 10:48-12:07/79 12:17-14:37/136
30	05:37 19:59-20:55/56	06:31 18:43-19:52/69		07:22 17:52-08:41/49		08:44 14:58-15:35/37 09:18-10:43/85
31	21:27	20:21		16:56 15:08-16:25/77		16:13 10:47-12:06/79 12:21-14:37/136
Sum of minutes with flicker	512	460	382	328	259	233
Potential sum of minutes with flicker	1690	1931	1739	2713	6606	10330

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 11:15/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 3 - T03
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44	09:20-09:59/39		08:14	08:42-08:55/13		07:16	17:04-17:34/30		07:01	19:08-19:33/25		05:52	20:02-20:26/24		05:03	20:33-21:08/35	
	16:15	15:03-15:37/34		17:06	16:04-16:34/30		18:02	07:41-07:50/9		20:00			20:55			21:45	05:33-05:51/18	
2	08:44	09:21-09:59/38		08:12	08:40-08:55/15		07:14	17:04-17:36/32		06:59	19:10-19:35/25		05:50	20:02-20:27/25		05:02	20:34-21:09/35	
	16:16	15:05-15:39/34		17:08	16:10-16:37/27		18:04	07:39-07:51/12		20:02			20:57			21:47	05:33-05:50/17	
3	08:44	09:21-09:58/37		08:10	08:38-08:55/17		07:12	17:06-17:38/32		06:56	19:12-19:37/25		05:48	20:02-20:29/27		05:01	20:35-21:09/34	
	16:17	15:05-15:39/34		17:10	16:12-16:39/27		18:06	07:36-07:50/14		20:04			20:59			21:48	05:32-05:49/17	
4	08:43	09:22-09:58/36		08:08	08:36-08:55/19		07:09	17:07-17:41/34		06:54	19:14-19:39/25		05:46	20:03-20:30/27		05:00	05:31-05:49/18	
	16:18	15:06-15:41/35		17:12	16:14-16:41/27		18:08	07:34-07:50/16		20:06			21:01			21:49	20:36-21:08/32	
5	08:43	09:23-09:55/32		08:07	08:34-08:55/21		07:07	17:08-17:42/34		06:52	19:15-19:40/25		05:44	20:03-20:32/29		04:59	05:31-05:49/18	
	16:20	15:06-15:42/36		17:14	16:15-16:43/28		18:09	07:31-07:49/18		20:08			21:03			21:50	20:38-21:09/31	
6	08:43	09:24-09:54/30		08:05	08:32-08:55/23		07:05	17:10-17:45/35		06:49	19:17-19:42/25		05:42	20:04-20:33/29		04:59	05:30-05:49/19	
	16:21	15:08-15:44/36		17:16	16:16-16:45/29		18:11	07:29-07:49/20		20:09			21:04			21:51	20:39-21:08/29	
7	08:42	09:24-09:51/27		08:03	08:31-08:54/23		07:02	17:14-17:46/32		06:47	19:18-19:43/25		05:40	20:06-20:36/30		04:58	05:30-05:49/19	
	16:22	15:08-15:45/37		17:18	16:18-16:47/29		18:13	07:26-07:48/22		20:11			21:06			21:52	20:41-21:08/27	
8	08:42	15:09-15:46/37		08:01	08:31-08:53/22		07:00	17:24-17:48/24		06:44	19:20-19:46/26		05:38	20:08-20:37/29		04:57	05:29-05:48/19	
	16:24	09:25-09:48/23		17:20	16:20-16:50/30		18:15	07:24-07:47/23		20:13			21:08			21:53	20:43-21:08/25	
9	08:41	15:11-15:49/38		07:59	08:32-08:52/20		06:57	17:24-17:50/26		06:42	19:22-19:48/26		05:36	20:10-20:39/29		04:57	05:29-05:48/19	
	16:25	09:27-09:48/21		17:22	16:22-16:52/30		18:17	07:22-07:47/25		20:15			21:10			21:54	20:44-21:08/24	
10	08:40	15:13-15:50/37		07:57	08:34-08:51/17		06:55	17:25-17:52/27		06:39	19:23-19:49/26		05:34	20:11-20:40/29		04:56	05:28-05:48/20	
	16:27	09:28-09:47/19		17:24	16:24-16:54/30		18:19	07:19-07:44/25		20:17			21:12			21:55	20:44-21:08/24	
11	08:40	15:14-15:52/38		07:55	08:36-08:49/13		06:53	17:26-17:55/29		06:37	19:25-19:51/26		05:33	20:13-20:42/29		04:56	05:28-05:48/20	
	16:28	09:29-09:46/17		17:26	16:28-16:56/28		18:21	07:18-07:42/24		20:19			21:13			21:55	20:45-21:08/23	
12	08:39	15:16-15:54/38		07:53	08:40-08:44/4		06:50	17:25-17:56/31		06:35	19:26-19:53/27		05:31	20:14-20:43/29		04:55	05:28-05:48/20	
	16:30	09:30-09:44/14		17:28	16:32-16:59/27		18:23	07:18-07:37/19		20:20			21:15			21:56	20:46-21:08/22	
13	08:38	15:17-15:55/38		07:51	16:34-17:00/26		06:48	17:27-17:58/31		06:32	19:27-19:54/27		05:29	20:14-20:44/30		04:55	05:27-05:47/20	
	16:31	09:32-09:43/11		17:30			18:25	07:20-07:33/13		20:22			21:17			21:57	20:45-21:08/23	
14	08:37	15:20-15:57/37		07:49	16:37-17:02/25		06:45	17:27-18:00/33		06:30	19:29-19:56/27		05:27	20:15-20:47/32		04:55	05:27-05:47/20	
	16:33	09:34-09:41/7		17:32			18:27	07:23-07:29/6		20:24			21:18			21:58	20:46-21:08/22	
15	08:36	15:23-15:59/36		07:47	16:37-17:05/28		06:43	17:29-18:02/33		06:28	19:32-19:39/7		05:26	20:15-20:48/33		04:55	05:27-05:47/20	
	16:35			17:34			18:29			20:26	19:42-19:58/16		21:20	05:54-05:55/1		21:58	20:46-21:08/22	
16	08:35	15:24-16:00/36		07:45	16:38-17:07/29		06:40	17:31-18:04/33		06:25	19:42-20:00/18		05:24	20:16-20:50/34		04:54	05:27-05:47/20	
	16:36			17:36			18:30			20:28			21:22	05:52-05:55/3		21:59	20:47-21:08/21	
17	08:34	15:26-16:02/36		07:43	16:39-17:09/30		06:38	17:35-18:06/31		06:23	19:41-20:01/20		05:22	20:16-20:51/35		04:54	05:27-05:47/20	
	16:38			17:38			18:32			20:30			21:23	05:51-05:56/5		21:59	20:47-21:08/21	
18	08:33	15:27-16:05/38		07:41	16:39-17:11/32		06:36	17:40-18:07/27		06:21	19:41-20:03/22		05:21	20:17-20:53/36		04:54	05:27-05:47/20	
	16:40			17:40			18:34			20:32			21:25	05:49-05:55/6		22:00	20:47-21:08/21	
19	08:32	15:45-16:07/22		07:39	16:40-17:13/33		06:33	17:43-18:10/27		06:18	19:41-20:05/24		05:19	20:18-20:54/36		04:54	05:27-05:47/20	
	16:41	15:29-15:44/15		17:42			18:36			20:33			21:27	05:48-05:56/8		22:00	20:48-21:08/20	
20	08:31	15:45-16:08/23		07:37	16:42-17:16/34		06:31	17:47-18:11/24		06:16	19:42-20:04/22		05:18	20:18-20:55/37		04:54	05:27-05:47/20	
	16:43	15:30-15:43/13		17:44			18:38			20:35			21:28	05:46-05:55/9		22:00	20:48-21:08/20	
21	08:30	15:46-16:11/25		07:34	16:44-17:18/34		06:28	17:48-18:13/25		06:14	19:42-20:03/21		05:16	20:20-20:57/37		04:55	05:27-05:48/21	
	16:45	15:33-15:42/9		17:46			18:40			20:37			21:30	05:45-05:55/10		22:01	20:48-21:08/20	
22	08:29	15:46-16:12/26		07:32	16:46-17:19/33		06:26	17:48-18:15/27		06:12	20:06-20:10/4		05:15	20:21-20:59/38		04:55	05:28-05:48/20	
	16:47			17:48			18:42			20:39	19:43-20:02/19		21:31	05:44-05:55/11		22:01	20:49-21:09/20	
23	08:27	15:47-16:15/28		07:30	16:55-17:22/27		06:23	17:50-18:17/27		06:09	20:05-20:12/7		05:13	20:22-20:59/37		04:55	05:28-05:48/20	
	16:49			17:50			18:43			20:41	19:44-20:00/16		21:33	05:43-05:55/12		22:01	20:49-21:09/20	
24	08:26	15:48-16:17/29		07:28	16:56-17:24/28		06:21	17:51-18:18/27		06:07	20:04-20:14/10		05:12	20:24-21:01/37		04:55	05:28-05:48/20	
	16:51			17:52			18:45			20:43	19:46-19:58/12		21:34	05:41-05:54/13		22:01	20:49-21:09/20	
25	08:25	15:50-16:19/29		07:25	16:56-17:26/30		06:18	17:54-18:21/27		06:05	20:03-20:15/12		05:11	20:26-21:02/36		04:56	05:29-05:49/20	
	16:52			17:54			18:47			20:44	19:49-19:55/6		21:36	05:40-05:54/14		22:01	20:49-21:10/21	
26	08:23	15:51-16:21/30		07:23	16:57-17:28/31		06:16	17:57-18:22/25		06:03	20:03-20:17/14		05:09	20:29-21:04/35		04:56	05:29-05:49/20	
	16:54			17:56			18:49			20:46			21:37	05:39-05:54/15		22:01	20:49-21:10/21	
27	08:22	08:51-08:52/1		07:21	16:59-17:31/32		06:13	18:00-18:24/24		06:01	20:02-20:19/17		05:08	20:29-21:05/36		04:56	05:30-05:50/20	
	16:56	15:52-16:23/31		17:58	07:46-07:49/3		18:51			20:48			21:39	05:38-05:53/15		22:01	20:49-21:10/21	
28	08:20	08:49-08:52/3		07:19	17:01-17:32/31		06:11	18:03-18:26/23		05:58	20:02-20:21/19		05:07	20:30-21:06/36		04:57	05:30-05:50/20	
	16:58	15:56-16:26/30		18:00	07:43-07:49/6		18:53			20:50			21:40	05:37-05:53/16		22:01	20:49-21:11/22	
29	08:19	08:47-08:53/6					07:09	19:03-19:28/25		05:56	20:02-20:22/20		05:06	20:31-21:07/36		04:58	05:31-05:51/20	
	17:00	15:58-16:28/30					19:55			20:52			21:41	05:36-05:52/16		22:01	20:50-21:12/22	
30	08:17	08:45-08:53/8					07:06	19:04-19:30/26		05:54	20:02-20:24/22		05:05	20:31-21:08/37		04:58	05:31-05:51/20	
	17:02	16:00-16:29/29					19:56			20:54			21:43	05:35-05:51/16		22:00	20:4	

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 3 - T03
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 05:32-05:52/20 22:00 20:49-21:12/23	05:39 20:24-20:53/29 21:25 20:18	06:33 19:24-19:50/26 20:18	07:26 18:05-18:36/31 19:05 07:58-08:13/15	07:24 08:03-08:21/18 16:54 15:53-16:23/30	08:19 14:56-15:34/38 16:10 09:11-09:28/17
2	05:00 05:33-05:53/20 22:00 20:49-21:13/24	05:40 20:23-20:52/29 21:23 20:16	06:35 19:22-19:48/26 20:16	07:28 18:04-18:33/29 19:02 07:56-08:19/23	07:26 08:02-08:22/20 16:52 15:51-16:21/30	08:21 14:55-15:32/37 16:09 09:11-09:30/19
3	05:00 05:33-05:52/19 21:59 20:49-21:13/24	05:42 20:21-20:50/29 21:21 20:13	06:36 19:19-19:45/26 20:13	07:30 18:03-18:31/28 19:00 07:56-08:21/25	07:28 08:01-08:23/22 16:50 15:49-16:19/30	08:22 14:55-15:32/37 16:08 09:10-09:31/21
4	05:01 05:34-05:53/19 21:59 20:49-21:13/24	05:44 20:19-20:48/29 21:19 20:11	06:38 19:17-19:43/26 20:11	07:32 18:02-18:29/27 18:57 07:58-08:23/25	07:30 08:00-08:24/24 16:48 15:47-16:17/30	08:24 14:55-15:32/37 16:08 09:10-09:33/23
5	05:02 05:35-05:54/19 21:58 20:49-21:14/25	05:45 20:16-20:46/30 21:17 20:09	06:40 19:15-19:41/26 20:09	07:33 18:01-18:26/25 18:55 08:00-08:24/24	07:32 08:02-08:24/22 16:46 15:46-16:15/29	08:25 09:09-09:36/27 16:07 14:54-15:30/36
6	05:03 05:36-05:55/19 21:58 20:46-21:14/28	05:47 20:15-20:45/30 21:16 20:06	06:42 19:13-19:39/26 20:06	07:35 17:54-18:24/30 18:52 08:02-08:25/23	07:34 08:04-08:25/21 16:44 15:45-16:12/27	08:26 09:10-09:40/30 16:07 14:54-15:30/36
7	05:04 05:37-05:55/18 21:57 20:45-21:15/30	05:49 20:14-20:43/29 21:14 20:04	06:44 19:10-19:35/25 20:04	07:37 17:47-18:21/34 18:50 08:04-08:25/21	07:36 08:06-08:25/19 16:43 15:44-16:10/26	08:28 09:10-09:41/31 16:06 14:53-15:29/36
8	05:05 05:38-05:56/18 21:56 20:44-21:15/31	05:51 20:12-20:41/29 21:12 20:01	06:45 19:09-19:33/24 20:01	07:39 17:44-18:18/34 18:48 08:05-08:24/19	07:38 08:09-08:26/17 16:41 15:41-16:08/27	08:29 09:10-09:46/36 16:06 14:53-15:28/35
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23	05:24 20:30-21:07/37 21:39 05:56-06:06/10	06:17 19:46-20:08/22 20:39	07:12 18:32-18:56/24 19:24	08:07 17:10-17:43/33 18:13	08:06 15:21-15:43/22 16:18 15:05-15:20/15	08:42 09:18-10:03/45 14:26-14:40/14 16:07 14:59-15:29/30
24	05:26 20:28-21:05/37 21:38 05:57-06:05/8	06:19 19:45-20:09/24 20:37	07:14 18:28-18:54/26 19:22	08:09 17:09-17:41/32 18:11	08:08 15:04-15:42/38 16:17	08:43 09:18-10:03/45 14:26-14:40/14 16:08 14:59-15:29/30
25	05:27 20:28-21:04/36 21:36 05:59-06:06/7	06:20 19:44-20:06/22 20:35	07:15 18:23-18:51/28 19:19	07:11 16:08-16:38/30 17:09	08:09 15:04-15:41/37 16:16	08:43 09:18-10:03/45 14:27-14:40/13 16:08 14:59-15:30/31
26	05:29 20:27-21:02/35 21:35 06:00-06:06/6	06:22 19:44-20:04/20 20:32	07:17 18:20-18:48/28 19:17	07:13 16:07-16:36/29 17:07	08:11 15:03-15:39/36 16:15	08:43 09:19-10:03/44 14:27-14:40/13 16:09 14:59-15:30/31
27	05:31 20:27-21:01/34 21:33 06:02-06:06/4	06:24 19:44-20:02/18 20:30	07:19 18:13-18:46/33 19:14	07:15 16:07-16:34/27 17:04	08:13 15:02-15:38/36 16:14	08:44 09:19-10:03/44 14:29-14:41/12 16:10 15:01-15:32/31
28	05:32 20:26-20:59/33 21:32 06:03-06:05/2	06:26 19:32-19:40/8 20:28 19:43-19:59/16	07:21 18:11-18:44/33 19:12	07:17 16:06-16:31/25 17:02	08:14 15:00-15:37/37 16:13 09:15-09:21/6	08:44 09:19-10:01/42 14:30-14:41/11 16:11 15:01-15:33/32
29	05:34 20:26-20:58/32 21:30 06:05-06:06/1	06:28 19:29-19:57/28 20:25	07:22 18:09-18:41/32 19:10	07:18 16:02-16:29/27 17:00	08:16 14:57-15:36/39 16:12 09:12-09:23/11	08:44 09:19-10:00/41 14:31-14:41/10 16:12 15:02-15:34/32
30	05:35 20:25-20:56/31 21:28	06:29 19:28-19:55/27 20:23	07:24 18:06-18:38/32 19:07	07:20 08:08-08:14/6 16:58 15:59-16:27/28	08:18 14:57-15:35/38 16:11 09:11-09:25/14	08:44 09:19-10:00/41 14:33-14:41/8 16:12 15:03-15:35/32
31	05:37 20:25-20:55/30 21:27	06:31 19:25-19:52/27 20:21	07:25 18:05-18:12/11 16:56 15:57-16:25/28	07:22 08:05-08:19/14 16:56 15:57-16:25/28	08:19 14:57-15:35/38 16:11 09:11-09:25/14	08:44 09:19-09:59/40 14:34-14:39/5 16:13 15:02-15:35/33
Potential sun hours	512	460	382	328	259	233
Sum of minutes with flicker	1420	749	809	1202	1196	2417

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 4 - T04
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		
1	08:44 16:15	14:39-15:37/58	08:14 17:06	15:25-16:35/70	07:16 18:02	16:35-17:34/59	07:01 20:00	18:44-19:33/49	05:52 20:55	20:15-20:26/11 06:18-06:31/13	19:29-20:05/36	05:03 21:45	20:08-21:10/62 05:33-05:46/13
2	08:44 16:16	14:41-15:39/58	08:12 17:08	15:26-16:37/71	07:14 18:04	16:36-17:36/60	06:59 20:02	18:44-19:35/51	05:50 20:57	20:13-20:27/14 06:16-06:30/14	19:30-20:04/34	05:02 21:46	20:10-21:12/62 05:33-05:46/13
3	08:44 16:17	14:41-15:39/58	08:10 17:10	15:27-16:39/72	07:12 18:06	16:40-17:38/58	06:56 20:04	18:46-19:37/51	05:48 20:59	20:11-20:29/18 06:14-06:29/15	19:31-20:03/32	05:01 21:48	20:10-21:13/63 05:32-05:45/13
4	08:43 16:18	14:42-15:41/59	08:08 17:12	15:28-16:41/73	07:09 18:08	16:45-17:41/56	06:54 20:06	18:48-19:39/51	05:46 21:01	20:10-20:30/20 06:12-06:28/16	19:32-20:02/30	05:00 21:49	20:10-21:14/64 05:31-05:44/13
5	08:43 16:20	14:42-15:42/60	08:07 17:14	15:29-16:43/74	07:07 18:09	16:47-17:42/55	06:51 20:07	18:50-19:40/50	05:44 21:03	20:09-20:32/23 06:10-06:27/17	19:33-20:00/27	04:59 21:50	20:11-21:15/64 05:31-05:44/13
6	08:43 16:21	14:44-15:44/60	08:05 17:16	15:31-16:45/74	07:04 18:11	16:51-17:45/54	06:49 20:09	18:51-19:41/50	05:42 21:04	20:07-20:33/26 06:09-06:27/18	19:34-19:58/24	04:59 21:51	20:11-21:16/65 05:30-05:44/14
7	08:42 16:22	14:44-15:45/61	08:03 17:18	15:32-16:47/75	07:02 18:13	16:53-17:46/53	06:47 20:11	18:52-19:40/48	05:40 21:06	20:07-20:36/29 06:07-06:25/18	19:37-19:57/20	04:58 21:52	20:12-21:16/64 05:30-05:44/14
8	08:42 16:24	14:44-15:46/62	08:01 17:20	15:34-16:50/76	07:00 18:15	16:54-17:48/54	06:44 20:13	18:54-19:40/46	05:38 21:08	20:06-20:37/31 06:05-06:23/18	19:39-19:55/16	04:57 21:53	20:13-21:18/65 05:29-05:42/13
9	08:41 16:25	14:46-15:49/63	07:59 17:22	15:37-16:52/75	06:57 18:17	16:54-17:50/56	06:42 20:15	18:56-19:40/44	05:36 21:10	20:06-20:39/33 06:03-06:19/16	19:42-19:51/9	04:57 21:54	20:13-21:19/66 05:29-05:42/13
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11	08:40 16:28	14:47-15:52/65	07:55 17:26	15:53-16:56/63	06:53 18:21	16:57-17:55/58	06:37 20:19	18:58-19:38/40	05:33 21:13	20:05-20:42/37 06:00-06:10/10		04:56 21:55	20:14-21:20/66 05:28-05:41/13
12	08:39 16:30	14:48-15:54/66	07:53 17:28	15:55-16:58/63	06:50 18:23	16:58-17:56/58	06:35 20:20	19:00-19:53/53	05:31 21:15	20:04-20:43/39 05:58-06:09/11		04:55 21:56	20:15-21:21/66 05:28-05:41/13
13	08:38 16:31	14:49-15:55/66	07:51 17:30	15:55-17:00/65	06:48 18:25	17:00-17:58/58	06:32 20:22	19:01-19:54/53	05:29 21:17	20:04-20:44/40 05:57-06:09/12		04:55 21:57	20:15-21:21/66 05:27-05:40/13
14	08:37 16:33	14:50-15:57/67	07:49 17:32	15:56-17:02/66	06:45 18:27	17:02-18:00/58	06:30 20:24	19:02-19:56/54	05:27 21:18	20:04-20:47/43 05:55-06:07/12		04:55 21:58	20:16-21:22/66 05:27-05:40/13
15	08:36 16:34	14:51-15:59/68	07:47 17:34	15:56-17:05/69	06:43 18:28	17:06-18:02/56	06:28 20:26	19:03-19:58/55	05:26 21:20	20:03-20:48/45 05:56-06:06/10		04:55 21:58	20:16-21:22/66 05:27-05:41/14
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31	08:15 17:04	15:24-16:32/68			07:04 19:58	18:42-19:31/49			05:04 21:44	20:08-21:09/61 05:34-05:46/12			
Potential sun hours	250		273		367		420		494			510	
Sum of minutes with flicker	1996		1993		1651		1498		1841			2366	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 4 - T04
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 20:19-21:24/65 22:00 05:32-05:45/13	05:39 20:15-20:53/38 21:25 06:09-06:20/11	06:33 18:57-19:37/40 20:18 19:38-19:50/12	07:26 17:38-18:36/58 19:05 16:54 16:10	07:24 15:09-16:23/74 16:52 16:09	08:19 14:29-15:34/65 16:10
2	05:00 20:19-21:24/65 22:00 05:33-05:46/13	05:40 20:16-20:52/36 21:23 06:11-06:21/10	06:35 18:55-19:38/43 20:16 19:40-19:48/8	07:28 17:36-18:33/57 19:02 16:52	07:26 15:06-16:21/75 16:52 16:09	08:21 14:28-15:33/65 16:09
3	05:00 20:18-21:23/65 21:59 05:33-05:46/13	05:42 20:15-20:50/35 21:21 06:12-06:21/9	06:36 18:53-19:37/44 20:13 19:42-19:45/3	07:30 17:34-18:31/57 19:00 16:50	07:28 15:04-16:19/75 16:50 16:08	08:22 14:29-15:32/63 16:08
4	05:01 20:18-21:23/65 21:59 05:34-05:47/13	05:44 20:16-20:48/32 19:51-20:03/12 21:19 06:14-06:31/7	06:38 18:51-19:37/46 20:11 18:57	07:31 17:33-18:29/56 18:57 16:48	07:30 15:02-16:17/75 16:48 16:08	08:24 14:29-15:32/63 16:08
5	05:02 20:18-21:23/65 21:58 05:35-05:48/13	05:45 20:16-20:46/30 19:47-20:05/18 21:17 06:16-06:34/18	06:40 18:49-19:37/48 20:09 18:55	07:33 17:31-18:26/55 18:55 16:46	07:32 15:00-16:15/75 16:46 16:07	08:25 14:29-15:30/61 16:07
6	05:03 20:18-21:22/64 21:58 05:36-05:50/14	05:47 20:17-20:45/28 19:45-20:07/22 21:15 06:17-06:35/18	06:42 18:47-19:37/50 20:06 18:52	07:35 17:30-18:24/54 18:52 16:44	07:34 14:59-16:12/73 16:44 16:07	08:26 14:30-15:30/60 16:07
7	05:04 20:18-21:22/64 21:57 05:37-05:50/13	05:49 20:18-20:43/25 19:44-20:09/25 21:14 06:19-06:37/18	06:43 18:45-19:35/50 20:04 18:50	07:37 17:29-18:21/52 18:50 16:43	07:36 14:58-16:10/72 16:43 16:06	08:28 14:29-15:29/60 16:06
8	05:05 20:18-21:21/63 21:56 05:38-05:51/13	05:51 20:18-20:41/23 19:42-20:10/28 21:12 06:20-06:37/17	06:45 18:42-19:33/51 20:01 18:48	07:39 17:24-18:18/54 18:48 16:41	07:38 14:57-16:08/71 16:41 16:06	08:29 14:29-15:28/59 16:06
9	05:06 20:17-21:21/64 21:55 05:39-05:52/13	05:52 20:20-20:39/19 19:41-20:11/30 21:10 06:22-06:38/16	06:47 18:40-19:31/51 19:59 18:45	07:41 17:21-18:16/55 18:45 16:39	07:40 14:56-16:06/70 16:39 16:05	08:30 14:30-15:28/58 16:05
10	05:07 20:17-21:20/63 21:55 05:40-05:53/13	05:54 20:20-20:37/17 19:39-20:12/33 21:08 06:24-06:39/15	06:49 18:38-19:28/50 19:56 18:43	07:42 17:16-18:14/58 18:43 16:37	07:42 14:56-16:05/69 16:37 16:05	08:31 14:30-15:28/58 16:05
11	05:08 20:17-21:19/62 21:54 05:41-05:53/12	05:56 20:22-20:35/13 19:38-20:13/35 21:05 06:25-06:39/14	06:51 18:36-19:26/50 19:54 18:40	07:44 17:12-18:11/59 18:40 16:36	07:44 14:55-16:03/68 16:36 16:05	08:33 14:29-15:27/58 16:05
12	05:09 20:17-21:18/61 21:53 05:42-05:54/12	05:58 20:24-20:34/10 19:38-20:14/36 21:03 06:27-06:40/13	06:52 18:34-19:24/50 19:52 18:38	07:46 17:09-18:09/60 18:38 16:34	07:45 14:55-16:01/66 16:34 16:05	08:34 14:29-15:27/58 16:05
13	05:11 20:16-21:17/61 21:52 05:43-05:54/11	05:59 20:25-20:31/6 19:36-20:14/38 21:01 06:28-06:41/13	06:54 18:32-19:22/50 19:49 18:36	07:48 17:07-18:07/60 18:36 16:32	07:47 14:54-15:59/65 16:32 16:05	08:35 14:29-15:27/58 16:05
14	05:12 20:16-21:16/60 21:51 05:44-05:55/11	06:01 06:30-06:41/11 20:59 19:36-20:14/38	06:56 18:30-19:18/48 19:47 18:33	07:50 17:00-18:04/64 18:33 16:31	07:49 14:54-15:58/64 16:31 16:05	08:36 14:29-15:26/57 16:05
15	05:13 20:15-21:15/60 21:50 05:45-05:55/10	06:03 06:32-06:41/9 20:57 19:35-20:15/40	06:58 18:28-19:16/48 19:44 18:31	07:52 16:56-18:02/66 18:31 16:29	07:51 14:54-15:56/62 16:29 16:05	08:37 14:30-15:26/56 16:05
16	05:14 20:16-21:15/59 21:49 05:47-05:56/9	06:05 06:33-06:41/8 20:55 19:34-20:15/41	06:59 18:24-19:14/50 19:42 18:29	07:53 16:47-17:59/72 18:29 16:27	07:53 14:54-15:54/60 16:27 16:05	08:38 14:30-15:26/56 16:05
17	05:16 20:15-21:14/59 21:47 05:48-05:56/8	06:06 06:35-06:41/6 20:53 19:34-20:15/41	07:01 18:19-19:11/52 19:39 18:26	07:55 16:42-17:57/75 18:26 16:26	07:55 14:54-15:52/58 16:26 16:05	08:38 14:30-15:27/57 16:05
18	05:17 20:15-21:12/57 21:46 05:49-05:56/7	06:08 06:37-06:41/4 20:51 19:34-20:15/41	07:03 18:16-19:08/52 19:37 18:24	07:57 16:39-17:55/76 18:24 16:25	07:57 14:54-15:51/57 16:25 16:05	08:39 14:31-15:27/56 16:05
19	05:18 20:15-21:11/56 21:45 05:50-05:56/6	06:10 19:33-20:15/42 20:48 06:38-06:40/2	07:05 18:14-19:06/52 19:34 18:22	07:59 16:37-17:52/75 18:22 16:23	07:59 14:39-14:49/10 16:23 14:54-15:49/55	08:40 14:32-15:28/56 16:05
20	05:20 20:15-21:10/55 21:44 05:52-05:57/5	06:12 19:33-20:15/42 20:46 19:32	07:06 18:13-19:04/51 19:32 18:20	08:01 16:35-17:50/75 18:20 16:22	08:00 14:36-14:52/16 16:22 14:53-15:47/54	08:41 14:31-15:27/56 16:06
21	05:21 20:15-21:09/54 21:42 05:53-05:57/4	06:13 19:33-20:15/42 20:44 19:29	07:08 18:10-19:01/51 19:29 18:17	08:03 16:33-17:48/75 18:17 16:20	08:02 14:34-15:46/72 16:20 16:06	08:41 14:32-15:28/56 16:06
22	05:23 20:14-21:07/53 21:41 05:55-05:58/3	06:15 19:32-20:12/40 20:42 19:16-19:26/10	07:10 18:09-18:58/49 19:27 18:15	08:05 16:31-17:45/74 18:15 16:19	08:04 14:33-15:44/71 16:19 16:07	08:42 14:32-15:28/56 16:07
23	05:24 20:15-21:07/52 21:39 05:56-05:57/1	06:17 19:16-19:26/10 20:39 19:32-20:10/38	07:12 18:08-18:56/48 19:24 18:13	08:07 16:30-17:43/73 18:13 16:18	08:06 14:32-15:43/71 16:18 16:07	08:42 14:33-15:29/56 16:07
24	05:26 20:14-21:05/51 21:38 20:13-20:09/36	06:19 19:13-19:30/17 20:37 19:33-20:09/36	07:14 18:06-18:54/48 19:22 18:11	08:09 16:29-17:41/72 18:11 16:17	08:08 14:31-15:42/71 16:17 16:08	08:43 14:33-15:30/57 16:08
25	05:27 20:15-21:04/49 21:36 20:12-20:06/57	06:20 19:09-20:06/57 20:35 19:19	07:15 18:01-18:51/50 19:19 17:09	07:11 15:28-16:38/70 17:09 16:16	08:09 14:30-15:41/71 16:16 16:08	08:43 14:34-15:30/56 16:08
26	05:29 20:14-21:02/48 21:35 20:12-20:04/57	06:22 19:07-20:04/57 20:32 19:17	07:17 17:57-18:48/51 19:17 17:07	07:13 15:27-16:36/69 17:07 16:15	08:11 14:30-15:39/69 16:15 16:09	08:43 14:34-15:30/56 16:09
27	05:31 20:15-21:01/46 21:33 20:13-20:02/56	06:24 19:06-20:02/56 20:30 19:04-19:59/55	07:19 17:53-18:46/53 19:14 17:04	07:15 15:26-16:34/68 17:04 16:14	08:13 14:30-15:38/68 16:14 16:10	08:44 14:36-15:32/56 16:10
28	05:32 20:14-20:59/45 21:32 06:08-06:14/6	06:26 19:04-19:59/55 20:28 19:02-19:57/55	07:21 17:49-18:44/55 19:12 17:02	07:16 15:25-16:31/66 17:02 16:13	08:14 14:30-15:37/67 16:13 16:11	08:44 14:36-15:33/57 16:11
29	05:34 20:15-20:58/43 21:30 06:06-06:17/11	06:28 19:02-19:57/55 20:25 19:02-19:55/53	07:22 17:44-18:41/57 19:10 17:00	07:18 15:24-16:29/65 17:00 16:12	08:16 14:29-15:36/67 16:12 16:11	08:44 14:37-15:34/57 16:11
30	05:35 20:15-20:56/41 21:28 06:06-06:18/12	06:29 19:02-19:55/53 20:23 18:59-19:52/53	07:24 17:40-18:38/58 19:07 16:58	07:20 15:23-16:27/64 16:58 16:11	08:18 14:29-15:35/66 16:11 16:12	08:44 14:37-15:34/57 16:12
31	05:37 20:15-20:55/40 21:27 06:08-06:20/12	06:31 18:59-19:52/53 20:21 16:56	16:56 15:15-15:19/4 16:56 15:15-15:19/4	16:56 15:15-15:19/4 16:56 15:15-15:19/4	16:56 15:15-15:19/4 16:56 15:15-15:19/4	16:56 15:15-15:19/4 16:56 15:15-15:19/4
Potential sun hours	512	460	382	328	259	233
Sum of minutes with flicker	2026	1672	1519	2002	2057	1801

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 5 - T05
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44 15:06-15:37/31	08:14 16:03-16:35/32	07:16 16:59-17:34/35	07:01 18:38-19:33/55		05:52 19:48-20:26/38	05:03 20:01-21:10/69				
2	08:44 15:07-15:39/32	08:12 16:05-16:37/32	07:14 17:00-17:36/36	06:59 18:44-19:35/51	07:53-08:04/11	05:50 19:48-20:27/39	05:02 20:01-21:12/71				
3	08:44 15:07-15:39/32	08:10 16:08-16:39/31	07:12 17:03-17:38/35	06:56 18:44-19:36/52		05:48 19:49-20:29/40	05:01 20:01-21:13/72				
4	08:43 15:08-15:41/33	08:08 16:10-16:41/31	07:09 17:11-17:41/30	06:54 18:45-19:36/51		05:46 19:50-20:30/40	05:00 20:01-21:14/73				
5	08:43 15:08-15:42/34	08:07 16:11-16:43/32	07:07 17:10-17:42/32	06:52 18:45-19:35/50		05:44 19:50-20:32/42	04:59 20:01-21:15/74				
6	08:43 15:10-15:44/34	08:05 16:12-16:45/33	07:05 17:11-17:45/34	06:49 18:47-19:35/48		05:42 19:51-20:33/42	04:59 20:01-21:16/75				
7	08:42 15:10-15:45/35	08:03 16:13-16:47/34	07:02 17:11-17:46/35	06:47 18:47-19:34/47		05:40 19:52-20:36/44	04:58 20:00-21:16/76				
8	08:42 15:11-15:46/35	08:01 16:16-16:50/34	07:00 17:12-17:48/36	06:44 18:49-19:33/44		05:38 19:53-20:37/44	04:57 20:01-21:17/76				
9	08:41 15:12-15:49/37	07:59 16:19-16:52/33	06:57 17:12-17:50/38	06:42 18:51-19:32/41		05:36 19:54-20:38/44	04:57 20:02-21:19/77				
10	08:40 15:13-15:50/37	07:57 16:22-16:54/32	06:55 17:14-17:52/38	06:39 07:03-07:32/29		05:34 19:55-20:40/45	04:56 20:01-21:19/78				
11	08:40 15:14-15:52/38	07:55 16:25-16:56/31	06:53 17:17-17:55/38	06:37 07:03-07:32/29		05:33 19:58-20:42/44	04:56 20:01-21:20/79				
12	08:39 15:15-15:54/39	07:53 16:27-16:58/31	06:50 17:21-17:56/35	06:35 19:52-19:53/1	19:07-19:28/21	05:31 20:01-20:43/42	04:55 20:02-21:21/79				
13	08:38 15:17-15:55/38	07:51 16:29-17:00/31	06:48 17:20-17:58/38	06:32 19:49-19:54/5	19:09-19:25/16	05:29 20:02-20:45/43	04:55 20:01-21:21/80				
14	08:37 15:18-15:57/39	07:49 16:32-17:02/30	06:45 17:19-18:00/41	06:30 19:47-19:56/9	19:12-19:21/9	05:27 20:03-20:47/44	04:55 20:02-21:21/79				
15	08:36 15:21-15:59/38	07:47 16:34-17:05/31	06:43 17:20-18:02/42	06:28 19:46-19:58/12	07:07-07:25/18	05:26 20:04-20:48/44	04:55 20:02-21:22/80				
16	08:35 15:27-16:00/33	07:45 16:35-17:07/32	06:40 17:19-18:04/45	06:25 19:45-20:00/15	07:10-07:23/13	05:24 20:05-20:50/45	04:54 20:02-21:23/81				
17	08:34 15:28-16:03/35	07:43 16:37-17:09/32	06:38 17:19-18:06/47	06:23 19:44-20:01/17		05:22 20:06-20:51/45	04:54 20:02-21:23/81				
18	08:33 15:30-16:05/35	07:41 16:38-17:11/33	06:36 17:19-18:07/48	06:21 19:43-20:03/20		05:21 20:06-20:52/46	04:54 20:03-21:24/81				
19	08:32 15:31-16:07/36	07:39 16:44-17:13/29	06:33 17:20-18:10/50	06:18 19:43-20:05/22		05:19 20:06-20:54/48	04:54 20:03-21:24/81				
20	08:31 15:31-16:08/37	07:36 16:45-17:16/31	06:31 17:20-18:11/51	06:16 19:43-20:07/24		05:18 20:05-20:55/50	04:54 20:03-21:24/81				
21	08:30 15:33-16:11/38	07:34 16:46-17:18/32	06:28 17:21-18:13/52	06:14 19:42-20:08/26		05:16 20:04-20:57/53	04:55 20:03-21:24/81				
22	08:29 15:34-16:12/38	07:32 16:47-17:19/32	06:26 17:21-18:15/54	06:12 19:42-20:10/28		05:15 20:04-20:59/55	04:55 20:04-21:25/81				
23	08:27 15:36-16:15/39	07:30 16:49-17:22/33	06:23 17:23-18:17/54	06:09 19:43-20:12/29		05:13 20:03-20:59/56	04:55 20:04-21:25/81				
24	08:26 15:38-16:17/39	07:28 16:52-17:24/32	06:21 17:24-18:18/54	06:07 19:43-20:13/30		05:12 20:03-21:01/58	04:55 20:04-21:25/81				
25	08:24 15:41-16:19/38	07:25 16:53-17:26/33	06:18 17:27-18:21/54	06:05 19:44-20:15/31		05:11 20:02-21:02/60	04:56 20:04-21:25/81				
26	08:23 15:45-16:21/36	07:23 16:55-17:28/33	06:16 17:30-18:23/53	06:03 19:45-20:17/32		05:09 20:02-21:03/61	04:56 20:04-21:25/81				
27	08:22 15:47-16:23/36	07:21 16:56-17:31/35	06:13 17:30-18:24/54	06:01 19:46-20:19/33		05:08 20:02-21:05/63	04:56 20:05-21:25/80				
28	08:20 15:53-16:26/33	07:19 16:57-17:32/35	06:11 17:31-18:26/55	05:58 19:48-20:21/33		05:07 20:02-21:06/64	04:57 20:05-21:25/80				
29	08:19 15:55-16:28/33		06:09 18:32-19:28/56	05:56 19:48-20:22/34		05:06 20:01-21:07/66	04:58 20:05-21:25/80				
30	08:17 15:56-16:30/34		06:07 18:34-19:30/56	05:54 19:48-20:24/36		05:05 20:01-21:08/67	04:58 20:05-21:24/79				
31	08:15 15:58-16:32/34		06:04 18:35-19:31/56	05:52 19:48-20:26/37		05:04 20:01-21:09/68	04:58 20:05-21:24/79				
Potential sun hours	250	273	367	420		494	510				
Sum of minutes with flicker	1106	900	2069	1800		2171	3381				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 11:15/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 5 - T05
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

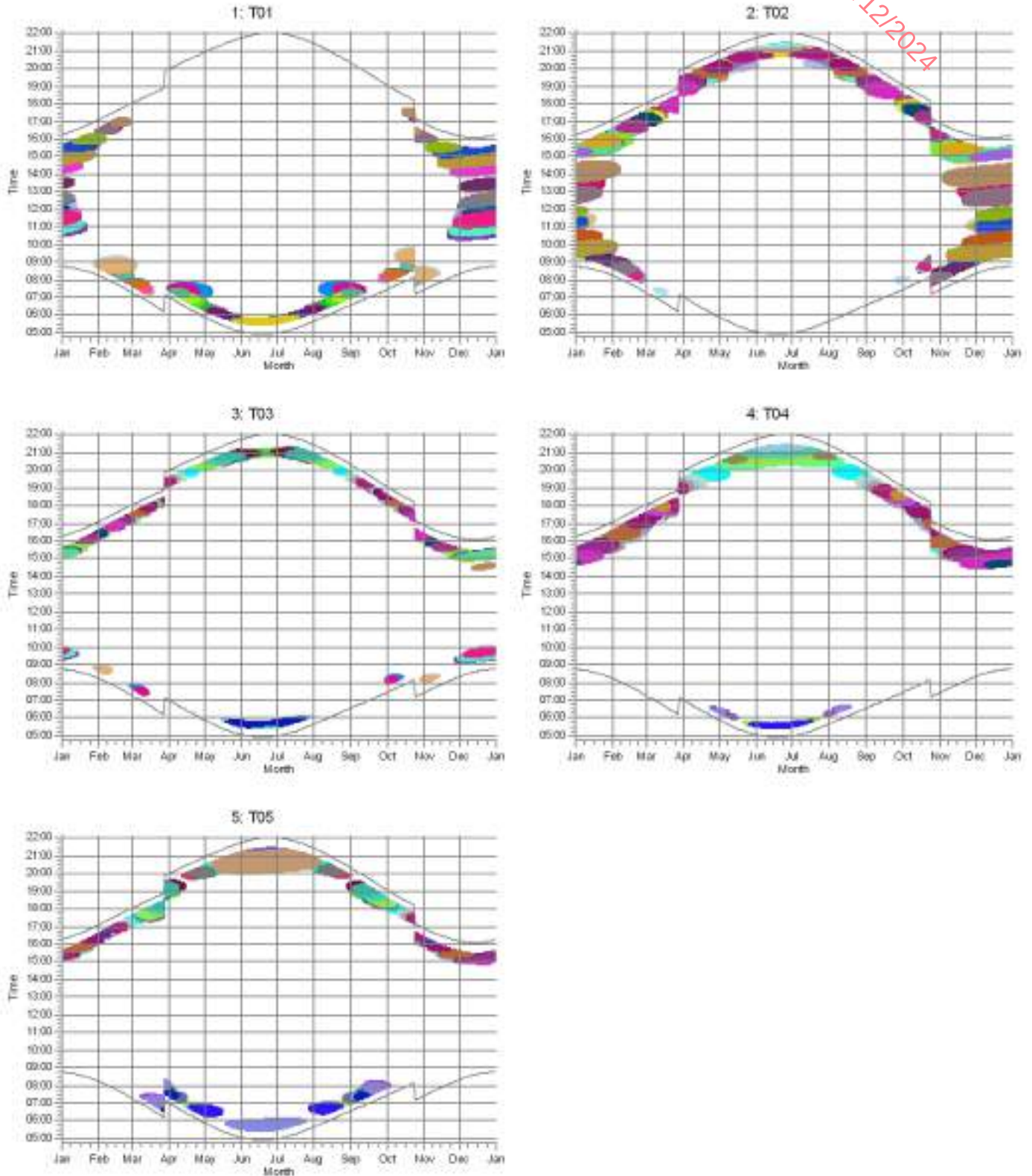
July		August		September		October		November		December	
1	04:59 20:06-21:24/78	05:39 20:10-20:53/43		06:33 07:02-07:31/29		07:26 17:59-18:36/37		07:24 15:51-16:23/32		08:19 14:56-15:34/38	
	22:00 05:32-06:07/35	21:25 06:29-06:53/24		20:18 19:05-19:28/23		19:05 07:52-08:06/14		16:54		16:10	
2	05:00 20:06-21:24/78	05:40 20:07-20:52/45		06:35 07:02-07:31/29		07:28 17:56-18:33/37		07:26 15:49-16:21/32		08:21 14:55-15:33/38	
	22:00 05:33-06:07/34	21:23 06:29-06:55/26		20:16 18:52-19:29/37		19:02 07:54-08:05/11		16:52		16:09	
3	05:00 20:06-21:23/77	05:42 20:05-20:50/45		06:36 18:49-19:30/41		07:30 17:53-18:31/38		07:28 15:45-16:19/34		08:22 14:55-15:32/37	
	21:59 05:33-06:07/34	21:21 06:27-06:55/28		20:13 07:04-07:32/28		19:00 07:56-08:03/7		16:50		16:08	
4	05:01 20:06-21:23/77	05:44 20:04-20:48/44		06:38 18:46-19:30/44		07:32 17:51-18:29/38		07:30 15:43-16:17/34		08:24 14:56-15:32/36	
	21:59 05:34-06:07/33	21:19 06:26-06:56/30		20:11 07:05-07:31/26		18:57 07:58-08:01/3		16:48		16:08	
5	05:02 20:07-21:23/76	05:45 20:02-20:46/44		06:40 18:44-19:31/47		07:33 17:49-18:26/37		07:32 15:41-16:15/34		08:25 14:55-15:30/35	
	21:58 05:35-06:07/32	21:17 06:26-06:57/31		20:09 07:07-07:36/29		18:55		16:46		16:07	
6	05:03 20:07-21:22/75	05:47 20:02-20:45/43		06:42 18:43-19:31/48		07:35 17:48-18:24/36		07:34 15:40-16:12/32		08:26 14:56-15:30/34	
	21:58 05:36-06:07/31	21:15 06:25-06:58/33		20:06 07:09-07:40/31		18:52		16:45		16:07	
7	05:04 20:08-21:22/74	05:49 20:01-20:43/42		06:43 18:41-19:30/49		07:37 17:46-18:21/35		07:36 15:39-16:10/31		08:28 14:56-15:29/33	
	21:57 05:37-06:08/31	21:14 06:24-06:59/35		20:04 07:10-07:41/31		18:50		16:43		16:06	
8	05:05 20:08-21:21/73	05:51 19:59-20:41/42		06:45 18:40-19:30/50		07:39 17:46-18:18/32		07:38 15:37-16:08/31		08:29 14:55-15:28/33	
	21:56 05:38-06:08/30	21:12 06:23-07:00/37		20:01 07:12-07:42/30		18:48		16:41		16:06	
9	05:06 20:08-21:21/73	05:52 19:59-20:39/40		06:47 18:39-19:30/51		07:41 17:45-18:16/31		07:40 15:34-16:06/32		08:30 14:56-15:29/33	
	21:55 05:39-06:08/29	21:10 06:23-07:02/39		19:59 07:14-07:44/30		18:45		16:39		16:05	
10	05:07 20:09-21:20/71	05:54 19:57-20:37/40		06:49 18:37-19:28/51	07:47-07:56/9	07:42 17:45-18:14/29		07:42 15:34-16:05/31		08:31 14:56-15:28/32	
	21:55 05:40-06:08/28	21:08 06:24-07:03/39		19:56 07:16-07:44/28		18:43		16:37		16:05	
11	05:08 20:09-21:19/70	05:56 19:57-20:35/38		06:51 18:31-19:26/55		07:44 17:35-18:11/36		07:44 15:30-16:03/33		08:33 14:56-15:27/31	
	21:54 05:41-06:07/26	21:05 06:25-07:03/38		19:54 07:17-07:59/42		18:41		16:36		16:05	
12	05:09 20:09-21:18/69	05:58 19:56-20:34/38		06:52 18:28-19:24/56		07:46 17:33-18:09/36		07:45 15:28-16:01/33		08:34 14:56-15:27/31	
	21:53 05:42-06:07/25	21:03 06:27-07:04/37		19:52 07:19-08:02/43		18:38		16:34		16:05	
13	05:11 20:09-21:17/68	05:59 19:55-20:31/36		06:54 18:25-19:22/57		07:48 17:31-18:07/36		07:47 15:27-15:59/32		08:35 14:57-15:27/30	
	21:52 05:43-06:07/24	21:01 06:29-07:05/36		19:49 07:22-08:05/44		18:36		16:32		16:05	
14	05:13 20:10-21:16/66	06:01 19:55-20:29/34		06:56 18:21-19:18/56		07:50 17:30-18:04/34		07:49 15:25-15:58/33		08:36 14:57-15:26/29	
	21:51 05:44-06:07/23	20:59 06:30-07:05/35		19:47 07:22-08:07/45		18:33		16:31		16:05	
15	05:13 20:10-21:15/65	06:03 19:55-20:28/33		06:58 18:21-19:16/55		07:52 17:28-18:02/34		07:51 15:20-15:56/36		08:37 14:57-15:26/29	
	21:50 05:45-06:06/21	20:57 06:32-07:06/34		19:44 07:24-08:08/44		18:31		16:29		16:05	
16	05:14 20:11-21:15/64	06:05 19:53-20:25/32		06:59 18:20-19:14/54		07:54 17:26-18:00/34		07:53 15:18-15:54/36		08:38 14:50-14:55/5	
	21:49 05:47-06:07/20	20:55 06:33-07:05/32		19:42 07:26-08:10/44		18:29		16:28		16:05 14:58-15:27/29	
17	05:16 20:11-21:14/63	06:06 19:51-20:23/32		07:01 18:18-19:11/53		07:56 17:24-17:57/33		07:55 15:14-15:52/38		08:38 14:50-14:56/6	
	21:47 05:48-06:06/18	20:53 06:35-07:06/31		19:39 07:28-08:11/43		18:27		16:26		16:05 14:59-15:27/28	
18	05:17 20:12-21:12/60	06:08 19:50-20:22/32		07:03 18:15-19:08/53		07:57 17:22-17:55/33		07:57 15:12-15:51/39		08:39 14:50-14:57/7	
	21:46 05:49-06:05/16	20:51 06:37-07:06/29		19:37 07:29-08:11/42		18:24		16:25		16:05 14:59-15:27/28	
19	05:19 20:12-21:11/59	06:10 19:49-20:19/30		07:05 18:12-19:06/54		07:59 17:20-17:52/32		07:59 15:10-15:49/39		08:40 14:51-14:58/7	
	21:45 05:50-06:05/15	20:48 06:38-07:05/27		19:34 07:31-08:12/41		18:22		16:23		16:05 15:00-15:28/28	
20	05:20 20:13-21:10/57	06:12 19:48-20:17/29		07:06 18:10-19:04/54		08:01 17:18-17:50/32		08:00 15:09-15:47/38		08:41 14:50-14:58/8	
	21:44 05:52-06:05/13	20:46 06:40-07:05/25		19:32 07:33-08:12/39		18:20		16:22		16:06 15:00-15:27/27	
21	05:21 20:13-21:09/56	06:13 19:48-20:15/27		07:08 18:07-19:01/54		08:03 17:16-17:48/32		08:02 15:08-15:46/38		08:41 14:51-14:59/8	
	21:42 05:53-06:04/11	20:44 06:42-07:05/23		19:29 07:35-08:13/38		18:17		16:21		16:06 15:01-15:28/27	
22	05:23 20:14-21:07/53	06:15 19:47-20:12/25		07:10 18:06-18:59/53		08:05 17:15-17:45/30		08:04 15:07-15:44/37		08:42 14:51-14:59/8	
	21:41 05:55-06:04/9	20:42 06:43-07:04/21		19:27 07:36-08:12/36		18:15		16:19		16:07 15:01-15:28/27	
23	05:24 20:15-21:07/52	06:17 19:47-20:10/23		07:12 18:05-18:56/51		08:07 17:12-17:43/31		08:06 15:07-15:43/36		08:42 14:52-15:00/8	
	21:39 05:56-06:03/7	20:39 06:45-07:04/19		19:24 07:38-08:12/34		18:13		16:18		16:07 15:02-15:29/27	
24	05:26 20:15-21:05/50	06:19 19:47-20:09/22		07:14 18:04-18:54/50		08:09 17:08-17:41/33		08:08 15:07-15:42/35		08:43 14:53-15:00/7	
	21:38 05:57-06:01/4	20:37 06:47-07:03/16		19:22 07:40-08:12/32		18:11		16:17		16:08 15:02-15:30/28	
25	05:27 20:17-21:04/47	06:21 19:46-20:06/20		07:15 18:02-18:51/49		07:11 16:06-16:38/32		08:09 15:06-15:41/35		08:43 14:53-15:00/7	
	21:36 05:59-06:01/2	20:35 06:48-07:02/14		19:19 07:42-08:12/30		17:09		16:16		16:08 15:02-15:30/28	
26	05:29 20:17-21:02/45	06:22 19:46-20:04/18	07:16-07:20/4	07:17 18:01-18:48/47		07:13 16:04-16:36/32		08:11 15:06-15:40/34		08:43 14:54-15:00/6	
	21:35	20:32 06:50-07:01/11		19:17 07:43-08:10/27		17:07		16:15		16:09 15:02-15:31/29	
27	05:31 20:17-21:01/44	06:24 19:47-20:02/15	07:11-07:25/14	07:19 18:01-18:46/45		07:15 16:03-16:34/31		08:13 15:00-15:38/38		08:44 14:56-15:01/5	
	21:33	20:30 06:52-07:00/8		19:14 07:45-08:10/25		17:04		16:14		16:10 15:04-15:32/28	
28	05:32 20:15-20:59/44	06:26 19:47-19:59/12	07:09-07:27/18	07:21 18:00-18:44/44		07:16 16:01-16:31/30		08:14 14:58-15:38/40		08:44 14:57-15:00/3	
	21:32 06:39-06:43/4	20:28 06:54-06:59/5		19:12 07:47-08:10/23		17:02		16:13		16:11 15:04-15:33/29	
29	05:34 20:15-20:58/43	06:28 19:48-19:57/9	19:13-19:22/9	07:22 18:00-18:41/41		07:18 15:58-16:29/31		08:16 14:57-15:36/39		08:44 15:05-15:34/29	
	21:30 06:36-06:48/12	20:25 07:06-07:28/22	06:55-06:56/1	19:10 07:49-08:09/20		17:00		16:12		16:12	
30	05:35 20:14-20:56/42	06:29 19:50-19:55/5	19:09-19:26/17	07:24 17:59-18:38/39		07:20 15:56-16:27/31		08:18 14:56-15:35/39		08:44 15:04-15:34/30	
	21:28 06:33-06:50/17	20:23 07:05-07:30/25		19:07 07:51-08:08/17		16:58		16:11		16:12	
31	05:37 20:13-20:55/42	06:31 19:51-19:52/1	19:06-19:27/21			07:22 15:53-16:25/32				08:44 15:05-15:35/30	
	21:27 06:31-06:52/21	20:21 07:04-07:31/27				16:56				16:13	
Potential sun hours	512	460		382		328		259		233	
Sum of minutes with flicker	2516	1860		2470		1070		1051		1036	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

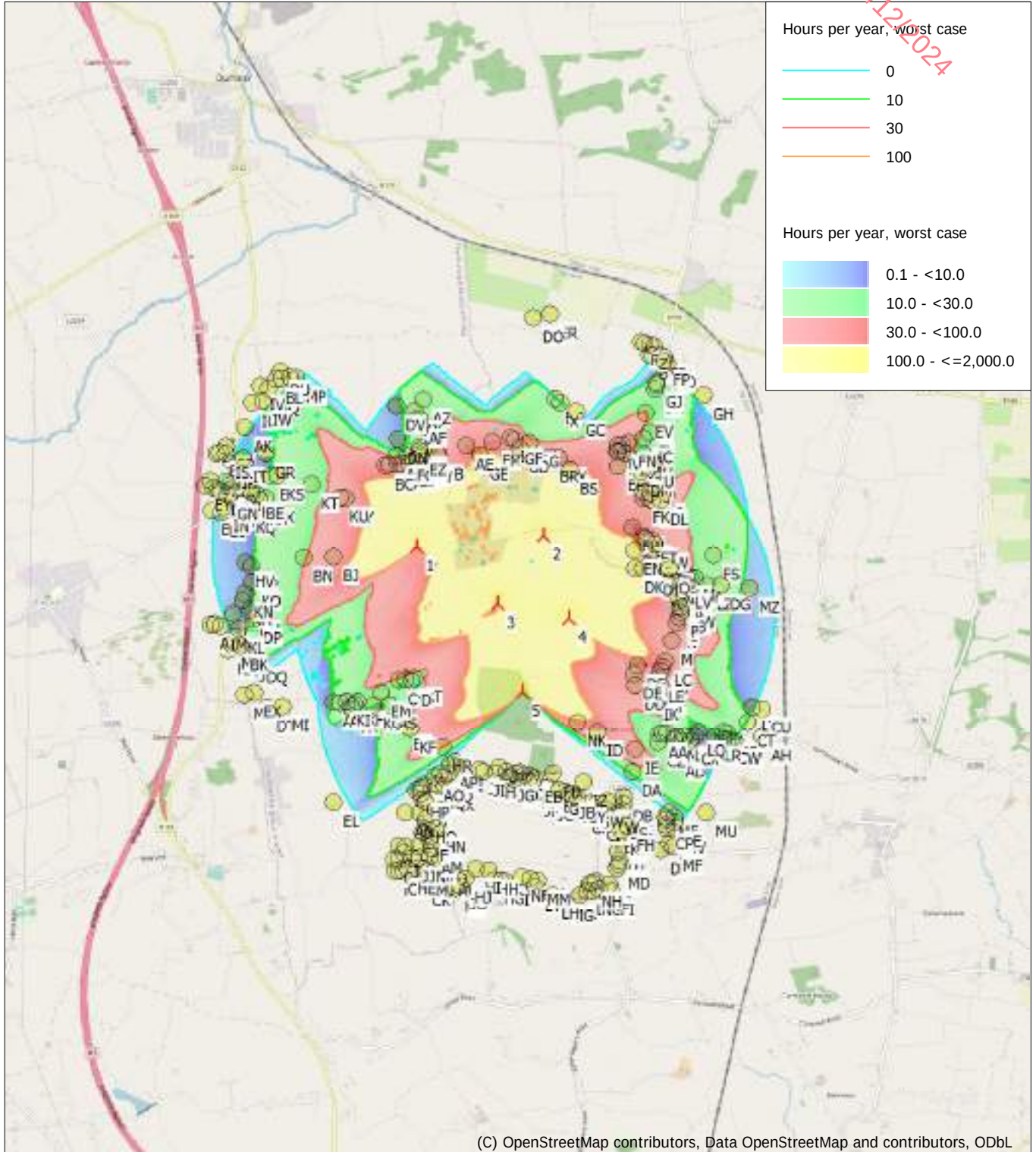
SHADOW - Calendar per WTG, graphical

Calculation: Kellystown N163 Worst Case



SHADOW - Map

Calculation: Kellystown N163 Worst Case

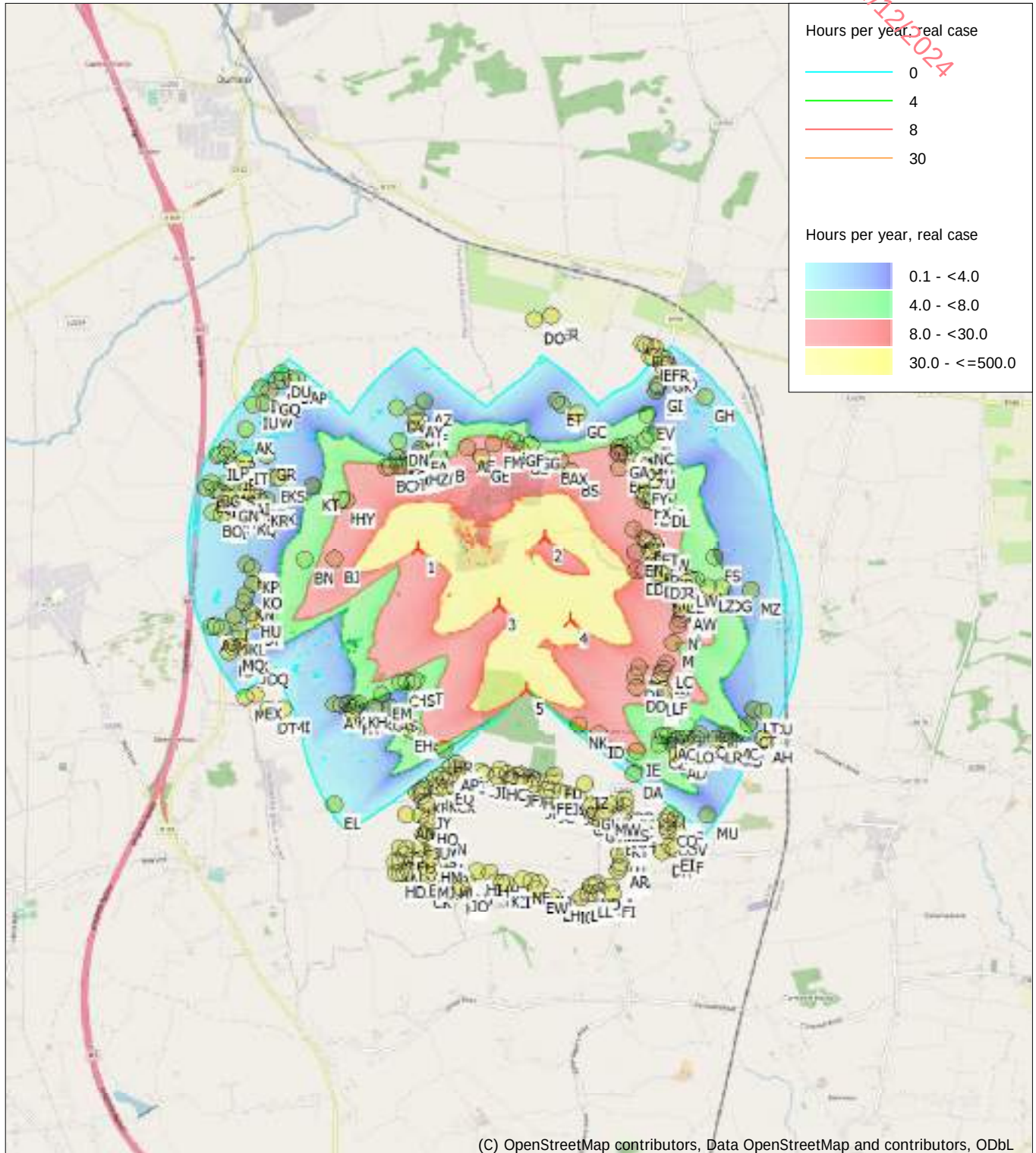


0 500 1000 1500 2000 m

Map: EMD OpenStreetMap , Print scale 1:50,000, Map center Irish ITM-IRENET95 (IE), geocentric, GRS80 East: 708,030 North: 783,620
New WTG Shadow receptor
Flicker map level: Height Contours: CONTOURLINE_6918 Kellystown_3.wpo (3)
Time step: 2 minutes, Day step: 3 days, Map resolution: 10 m, Visibility resolution: 5 m, Eye height: 1.5 m

SHADOW - Map

Calculation: Kellystown SG155 Real Case



0 500 1000 1500 2000 m

Map: EMD OpenStreetMap , Print scale 1:50,000, Map center Irish ITM-IRENET95 (IE), geocentric, GRS80 East: 708,030 North: 783,620
New WTG Shadow receptor
Flicker map level: Height Contours: CONTOURLINE_6918 Kellystown_3.wpo (3)
Time step: 2 minutes, Day step: 3 days, Map resolution: 10 m, Visibility resolution: 5 m, Eye height: 1.5 m

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time
N NNE NE ENE E ESE SE SSE S SSW SW WSW
160 97 158 383 373 261 461 767 532 825 1,031 1,215

W WNW NW NNW Sum
766 673 581 477 8,760

Monthly aggregation of real case reduction
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_6918 Kellystown_3.w
Receptor grid resolution: 1.0 m

All coordinates are in
Irish ITM-IRENET95 (IE), geocentric, GRS80

WTGs

	Easting	Northing	Z	Row data/Description	WTG type		Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data	
					Valid	Manufact.					Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	707,338	784,036	115.1	T01	Yes	Siemens Gamesa	SG 6.6-155-6,600	6,600	155.0	102.5	2,007	9.3
2	708,442	784,164	104.8	T02	Yes	Siemens Gamesa	SG 6.6-155-6,600	6,600	155.0	102.5	2,007	9.3
3	708,057	783,557	98.1	T03	Yes	Siemens Gamesa	SG 6.6-155-6,600	6,600	155.0	102.5	2,007	9.3
4	708,686	783,447	90.3	T04	Yes	Siemens Gamesa	SG 6.6-155-6,600	6,600	155.0	102.5	2,007	9.3
5	708,318	782,833	109.5	T05	Yes	Siemens Gamesa	SG 6.6-155-6,600	6,600	155.0	102.5	2,007	9.3

Shadow receptor-Input

No.	Name	Easting	Northing	Z	Width	Height	Elevation	Slope of	Direction mode	Eye height
							a.g.l.	window		(ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	H1	709,505	784,550	91.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
B	H2	709,367	784,550	93.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
C	H3	707,206	782,871	130.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
D	H4	707,318	782,870	131.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
E	H5	707,444	781,961	140.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
F	H6	707,513	781,507	158.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
G	H7	707,383	781,906	145.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
H	H8	705,584	783,319	107.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
I	H9	705,744	783,414	104.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
J	H10	705,902	783,048	123.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
K	H11	708,134	781,146	127.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
L	H12	706,829	782,648	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
M	H13	709,591	783,271	84.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
N	H14	709,625	783,428	81.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
O	H15	709,647	783,479	84.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
P	H16	709,657	783,517	86.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Q	H17	709,551	783,895	97.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
R	H18	709,459	783,967	94.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
S	H19	709,386	784,693	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
T	H20	709,354	784,771	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
U	H21	709,398	784,820	73.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
V	H22	709,114	784,973	73.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...



SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
W H23		709,077	784,968	73.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
X H24		708,564	785,327	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Y H25		709,371	785,841	63.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Z H26		709,336	785,853	64.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AA H27		709,496	782,453	88.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AB H28		709,526	782,458	88.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AC H29		709,557	782,461	87.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AD H30		709,649	782,293	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AE H31		707,754	784,932	85.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AF H32		707,338	785,150	88.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AG H33		707,139	784,828	105.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AH H34		710,397	782,450	63.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AI H35		705,824	784,510	80.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AJ H36		705,550	783,314	106.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AK H37		705,812	785,050	78.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AL H38		707,240	781,305	179.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AM H39		707,528	781,402	160.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AN H40		707,291	781,712	158.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AO H41		707,540	782,027	136.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AP H42		707,674	782,146	133.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AQ H43		708,690	781,931	116.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AR H44		709,175	781,337	87.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AS H45		707,126	782,653	129.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AT H46		707,344	782,894	131.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AU H47		706,698	782,663	128.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AV H48		706,639	782,666	128.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AW H49		709,674	783,593	86.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AX H50		708,565	784,842	79.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AY H51		707,289	785,222	92.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AZ H52		707,364	785,326	87.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BA H53		706,194	785,494	90.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BB H54		706,039	784,628	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BC H55		707,042	784,741	105.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BD H56		707,077	784,751	104.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BE H57		705,927	784,462	79.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BF H58		705,705	784,510	85.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BG H59		705,521	784,573	88.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BH H60		705,656	784,393	92.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BI H61		705,616	784,300	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BJ H62		706,612	783,934	103.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BK H63		705,816	783,140	110.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BL H64		706,071	785,473	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BM H65		706,123	785,479	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BN H66		706,349	783,922	93.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BO H67		705,540	784,312	102.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BP H68		705,596	784,822	78.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BQ H69		708,136	785,009	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BR H70		708,483	784,848	80.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BS H71		708,669	784,739	80.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BT H72		709,294	784,805	78.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BU H73		709,311	784,893	73.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BV H74		709,363	785,756	61.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BW H75		709,335	785,767	61.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BX H76		709,291	785,868	64.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BY H77		707,293	785,144	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BZ H78		707,340	784,844	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CA H79		707,301	784,792	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CB H80		707,252	784,779	97.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CC H81		709,390	784,492	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CD H82		709,503	783,935	96.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CE H83		709,610	783,743	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CF H84		709,573	783,753	94.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CG H85		709,535	783,765	95.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CH H86		709,484	783,778	96.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

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SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
CI H87		708,177	781,136	125.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CJ H88		707,792	781,047	132.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CK H89		707,456	781,117	152.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CL H90		707,203	781,303	180.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CM H91		707,245	781,206	170.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CN H92		707,415	781,706	152.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CO H93		709,577	781,624	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CP H94		709,574	781,659	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CQ H95		709,571	781,704	81.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CR H96		709,565	781,730	82.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CS H97		709,652	781,734	79.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CT H98		710,271	782,572	67.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CU H99		710,392	782,695	67.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CV H100		710,154	782,410	71.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CW H101		710,096	782,415	72.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CX H102		709,782	782,400	81.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CY H103		709,653	782,327	85.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CZ H104		709,486	782,375	89.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DA H105		709,265	782,119	91.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DB H106		709,201	781,889	100.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DC H107		709,196	781,773	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DD H108		709,275	782,875	91.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DE H109		709,266	782,972	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DF H110		709,289	783,047	90.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DG H111		710,003	783,760	89.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DH H112		709,324	783,893	105.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DI H113		709,411	783,875	103.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DJ H114		709,463	783,861	102.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DK H115		709,255	783,893	105.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DL H116		709,467	784,495	94.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DM H117		709,282	784,741	84.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DN H118		707,145	784,976	107.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DO H119		708,308	786,067	65.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DP H120		705,922	783,376	107.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DQ H121		705,963	783,037	123.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DR H122		709,536	781,439	81.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DS H123		706,804	782,632	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DT H124		706,066	782,611	127.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DU H125		706,111	785,544	88.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DV H126		707,126	785,263	97.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DW H127		709,426	784,111	91.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DX H128		709,392	785,462	69.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DY H129		708,305	782,018	122.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DZ H130		708,330	782,064	124.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EA H131		708,379	782,060	124.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EB H132		708,418	782,035	123.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EC H133		708,356	782,014	122.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ED H134		708,578	782,087	121.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EE H135		709,648	781,687	77.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EF H136		709,004	781,720	103.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EG H137		709,126	781,613	94.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EH H138		707,259	782,476	128.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EI H139		709,611	781,494	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EJ H140		707,668	782,062	132.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EK H141		707,304	781,411	179.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EL H142		706,657	781,789	159.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EM H143		707,054	782,762	127.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EN H144		709,238	784,049	99.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EO H145		709,146	784,894	74.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EP H146		709,081	784,786	78.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EQ H147		707,624	782,023	133.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ER H148		708,458	786,104	60.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ES H149		709,179	781,738	99.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ET H150		708,515	785,357	78.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
EU H151		709,357	784,502	92.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EV H152		709,311	785,254	65.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EW H153		708,444	781,087	111.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EX H154		705,947	782,729	126.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EY H155		705,470	784,531	91.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EZ H156		707,342	784,881	98.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FA H157		707,342	784,908	100.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FB H158		707,196	784,755	100.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FC H159		709,256	785,879	64.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FD H160		708,205	782,041	121.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FE H161		708,510	781,960	119.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FF H162		707,719	782,168	133.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FG H163		707,234	784,825	101.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FH H164		709,237	781,637	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FI H165		709,111	781,063	90.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FJ H166		709,367	784,069	93.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FK H167		709,307	784,515	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FL H168		709,352	785,081	70.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FM H169		707,979	784,969	85.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FN H170		709,169	784,987	73.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FO H171		709,496	785,693	59.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FP H172		709,460	785,707	60.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FQ H173		709,467	785,745	60.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FR H174		709,433	785,761	62.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FS H175		709,934	784,019	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FT H176		709,387	784,150	92.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FU H177		709,340	784,163	94.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FV H178		709,318	784,178	94.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FW H179		709,215	784,252	97.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FX H180		709,312	784,556	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FY H181		709,279	784,682	86.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FZ H182		709,116	784,922	74.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GA H183		709,082	784,914	74.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GB H184		709,070	784,913	74.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GC H185		708,707	785,255	80.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GD H186		708,216	784,924	80.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GE H187		707,874	784,854	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GF H188		708,178	784,996	82.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GG H189		708,305	784,969	81.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GH H190		709,818	785,414	62.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GI H191		709,402	785,500	69.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GJ H192		709,405	785,517	69.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GK H193		709,453	785,665	59.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GL H194		709,456	785,693	59.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GM H195		705,544	784,509	90.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GN H196		705,680	784,453	88.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GO H197		705,657	784,572	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GP H198		705,651	784,873	80.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GQ H199		706,010	785,393	90.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GR H200		705,999	784,823	97.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GS H201		708,974	781,721	104.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GT H202		708,947	781,729	104.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GU H203		708,977	781,847	107.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GV H204		708,935	781,765	106.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GW H205		708,905	781,831	109.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GX H206		708,838	781,781	109.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GY H207		708,796	781,872	111.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GZ H208		708,636	781,939	116.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HA H209		708,397	782,002	121.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HB H210		708,267	782,013	120.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HC H211		708,078	782,066	123.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HD H212		707,212	781,200	170.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HE H213		707,323	781,217	168.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HF H214		707,484	781,251	162.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
HG	H215	708,081	781,151	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HH	H216	708,031	781,228	128.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HI	H217	707,920	781,237	134.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HJ	H218	707,831	781,155	137.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HK	H219	707,748	781,065	135.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HL	H220	707,681	781,206	148.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HM	H221	707,513	781,338	162.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HN	H222	707,561	781,590	149.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HO	H223	707,469	781,664	152.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HP	H224	707,425	781,885	142.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HQ	H225	707,542	781,969	136.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HR	H226	707,609	782,297	132.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HS	H227	707,268	782,879	130.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HT	H228	706,805	782,611	128.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HU	H229	705,896	783,448	103.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HV	H230	705,841	783,863	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HW	H231	705,887	784,475	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HX	H232	706,014	784,437	79.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HY	H233	706,701	784,453	96.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HZ	H234	707,338	784,807	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IA	H235	707,506	784,843	97.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IB	H236	707,514	784,845	97.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IC	H237	708,102	782,128	123.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ID	H238	708,956	782,454	108.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IE	H239	709,290	782,312	91.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IF	H240	709,136	781,735	101.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IG	H241	709,182	781,682	97.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IH	H242	709,642	783,733	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
II	H243	709,515	783,040	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IJ	H244	709,454	782,822	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IK	H245	709,444	782,792	92.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IL	H246	705,567	784,809	77.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IM	H247	705,638	783,305	105.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IN	H248	705,640	784,350	95.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IO	H249	705,650	784,374	93.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IP	H250	705,583	784,500	89.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IQ	H251	705,613	784,489	89.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IR	H252	705,712	784,727	77.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IS	H253	705,654	784,815	78.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IT	H254	705,800	784,781	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IU	H255	705,868	785,262	73.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IV	H256	705,937	785,412	86.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IW	H257	705,962	785,280	81.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IX	H258	709,053	781,852	105.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IY	H259	709,046	781,725	102.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IZ	H260	708,843	782,018	113.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JA	H261	708,760	781,877	112.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JB	H262	708,726	781,912	114.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JC	H263	708,535	781,883	115.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JD	H264	708,421	781,927	118.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JE	H265	708,252	782,077	123.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JF	H266	708,233	782,021	120.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JG	H267	708,187	782,044	121.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JH	H268	708,163	782,093	122.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JI	H269	707,974	782,092	127.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JJ	H270	707,933	782,103	128.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JK	H271	707,283	781,361	179.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JL	H272	707,284	781,205	168.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JM	H273	707,360	781,320	173.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JN	H274	707,423	781,321	169.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JO	H275	707,786	781,092	135.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JP	H276	707,640	781,305	151.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JQ	H277	707,609	781,309	153.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JR	H278	707,530	781,439	159.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
JS H279		707,518	781,467	159.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JT H280		707,417	781,420	170.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JU H281		707,445	781,545	160.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JV H282		707,503	781,557	155.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JW H283		707,479	781,570	157.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JX H284		707,471	781,630	157.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JY H285		707,466	781,810	141.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JZ H286		707,440	781,835	140.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KA H287		707,401	781,915	144.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KB H288		707,430	781,935	142.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KC H289		707,570	781,956	135.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KD H290		707,588	782,057	134.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KE H291		707,733	782,121	133.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KF H292		707,320	782,445	128.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KG H293		706,989	782,647	130.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KH H294		706,850	782,679	126.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KI H295		706,756	782,676	128.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KJ H296		705,706	783,101	120.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KK H297		705,767	783,216	110.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KL H298		705,798	783,285	108.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KM H299		705,822	783,531	100.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KN H300		705,842	783,600	106.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KO H301		705,902	783,694	102.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KP H302		705,896	783,830	98.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KQ H303		705,844	784,342	88.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KR H304		705,959	784,420	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KS H305		706,102	784,637	91.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KT H306		706,407	784,566	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KU H307		706,661	784,461	96.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KV H308		707,151	784,761	103.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KW H309		707,353	784,818	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KX H310		709,200	781,828	99.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KY H311		709,179	781,595	93.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KZ H312		709,659	783,758	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LA H313		709,633	783,663	85.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LB H314		709,653	783,554	87.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LC H315		709,531	783,091	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LD H316		709,503	783,005	87.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LE H317		709,478	782,944	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LF H318		709,508	782,861	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LG H319		709,450	782,849	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LH H320		708,598	781,027	105.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LI H321		709,088	781,130	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LJ H322		709,157	781,278	85.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LK H323		708,833	781,031	96.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LL H324		708,900	781,062	94.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LM H325		709,704	783,834	98.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LN H326		709,694	782,393	84.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LO H327		709,723	782,432	83.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LP H328		709,807	782,438	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LQ H329		709,837	782,477	78.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LR H330		709,987	782,433	75.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LS H331		710,055	782,422	73.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LT H332		710,299	782,705	69.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LU H333		709,157	781,422	89.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LV H334		709,700	783,772	96.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LW H335		709,700	783,800	98.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LX H336		709,734	783,831	97.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LY H337		709,777	783,823	96.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LZ H338		709,888	783,758	91.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MA H339		709,626	782,417	86.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MB H340		709,655	782,420	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MC H341		710,093	782,469	72.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MD H342		709,164	781,301	86.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
ME H343		709,597	781,764	80.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MF H344		709,643	781,469	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MG H345		708,679	781,011	102.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MH H346		708,399	781,162	113.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MI H347		706,194	782,621	124.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MJ H348		707,491	781,202	157.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MK H349		709,000	781,085	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ML H350		709,665	783,563	87.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MM H351		708,461	781,151	111.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MN H352		708,290	782,083	124.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MO H353		705,858	782,712	125.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MP H354		706,252	785,486	90.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MQ H355		705,733	783,152	113.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MR H356		709,492	783,870	102.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MS H357		710,128	782,412	71.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MT H358		709,404	783,965	96.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MU H359		709,923	781,772	70.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MV H360		709,659	781,632	75.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MW H361		709,031	781,787	106.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MX H362		707,629	781,952	131.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MY H363		709,130	781,697	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MZ H364		710,258	783,747	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NA H365		710,059	782,479	72.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NB H366		707,240	781,420	179.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NC H367		709,301	785,032	71.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ND H368		708,915	781,135	92.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NE H369		709,539	783,850	102.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NF H370		708,323	781,177	117.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NG H371		708,949	781,069	93.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NH H372		708,942	781,142	92.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NI H373		708,972	781,153	91.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NJ SAINT PATRICK'S NATIONAL SCHOOL		708,565	781,951	118.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NK H374		708,783	782,534	110.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5

Calculation Results

Shadow receptor

No.	Name	Shadow, worst case			Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]	
A H1		42:15	122	0:32	6:53	
B H2		38:59	115	0:36	6:33	
C H3		24:47	109	0:30	5:14	
D H4		20:27	71	0:35	4:21	
E H5		0:00	0	0:00	0:00	
F H6		0:00	0	0:00	0:00	
G H7		0:00	0	0:00	0:00	
H H8		4:49	27	0:17	1:09	
I H9		6:48	32	0:21	1:38	
J H10		14:33	63	0:19	3:07	
K H11		0:00	0	0:00	0:00	
L H12		16:39	80	0:20	3:37	
M H13		40:15	109	0:40	8:45	
N H14		59:23	149	0:48	12:22	
O H15		62:55	155	0:49	13:02	
P H16		63:02	162	0:49	13:02	
Q H17		53:20	161	0:38	10:23	
R H18		66:28	184	0:40	12:40	
S H19		26:43	85	0:34	4:37	
T H20		29:03	87	0:34	4:54	
U H21		26:57	85	0:32	4:33	
V H22		46:32	92	0:37	7:14	
W H23		52:12	114	0:38	8:10	

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]	Shadow hours per year [h/year]
	X H24	12:05	52	0:22	1:58	
	Y H25	0:00	0	0:00	0:00	
	Z H26	0:00	0	0:00	0:00	
	AA H27	19:02	67	0:30	4:21	
	AB H28	19:03	74	0:30	4:19	
	AC H29	19:20	79	0:29	4:19	
	AD H30	15:03	49	0:27	3:26	
	AE H31	75:33	88	1:09	10:48	
	AF H32	14:27	52	0:26	2:13	
	AG H33	26:07	67	0:44	3:37	
	AH H34	12:12	64	0:19	2:32	
	AI H35	7:54	29	0:23	1:25	
	AJ H36	4:31	25	0:17	1:05	
	AK H37	7:06	30	0:21	1:05	
	AL H38	0:00	0	0:00	0:00	
	AM H39	0:00	0	0:00	0:00	
	AN H40	0:00	0	0:00	0:00	
	AO H41	0:00	0	0:00	0:00	
	AP H42	0:00	0	0:00	0:00	
	AQ H43	0:00	0	0:00	0:00	
	AR H44	0:00	0	0:00	0:00	
	AS H45	13:29	58	0:27	3:07	
	AT H46	21:45	73	0:35	4:34	
	AU H47	13:19	73	0:17	2:57	
	AV H48	10:16	59	0:16	2:20	
	AW H49	53:49	144	0:47	11:05	
	AX H50	64:46	107	0:55	9:34	
	AY H51	13:01	52	0:24	1:58	
	AZ H52	20:20	64	0:25	2:48	
	BA H53	8:55	36	0:19	1:07	
	BB H54	10:22	34	0:26	1:44	
	BC H55	64:51	90	1:13	8:53	
	BD H56	59:03	88	1:11	8:04	
	BE H57	9:26	32	0:24	1:42	
	BF H58	6:18	26	0:21	1:08	
	BG H59	4:30	23	0:19	0:48	
	BH H60	5:37	25	0:21	1:02	
	BI H61	4:57	23	0:20	0:57	
	BJ H62	52:08	102	0:50	11:51	
	BK H63	9:08	43	0:20	2:07	
	BL H64	14:14	50	0:21	1:52	
	BM H65	12:48	44	0:21	1:39	
	BN H66	27:35	72	0:36	6:10	
	BO H67	4:14	22	0:19	0:48	
	BP H68	5:12	24	0:19	0:52	
	BQ H69	54:07	80	0:58	7:49	
	BR H70	59:55	104	0:54	8:49	
	BS H71	100:25	129	1:10	15:29	
	BT H72	33:23	96	0:35	5:36	
	BU H73	33:16	98	0:33	5:31	
	BV H74	0:00	0	0:00	0:00	
	BW H75	0:00	0	0:00	0:00	
	BX H76	0:00	0	0:00	0:00	
	BY H77	12:42	46	0:26	1:57	
	BZ H78	36:11	92	0:37	5:10	
	CA H79	43:36	98	0:40	6:17	
	CB H80	44:20	101	0:51	6:18	
	CC H81	46:41	124	0:36	7:46	
	CD H82	59:40	173	0:39	11:28	
	CE H83	52:15	146	0:37	10:34	
	CF H84	56:19	152	0:39	11:21	
	CG H85	61:09	163	0:40	12:17	
	CH H86	68:38	176	0:42	13:44	

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]	Shadow hours per year [h/year]
CI	H87	0:00	0	0:00	0:00	0:00
CJ	H88	0:00	0	0:00	0:00	0:00
CK	H89	0:00	0	0:00	0:00	0:00
CL	H90	0:00	0	0:00	0:00	0:00
CM	H91	0:00	0	0:00	0:00	0:00
CN	H92	0:00	0	0:00	0:00	0:00
CO	H93	0:00	0	0:00	0:00	0:00
CP	H94	0:00	0	0:00	0:00	0:00
CQ	H95	0:00	0	0:00	0:00	0:00
CR	H96	0:00	0	0:00	0:00	0:00
CS	H97	0:00	0	0:00	0:00	0:00
CT	H98	17:28	80	0:21	3:48	3:48
CU	H99	7:14	34	0:19	1:38	1:38
CV	H100	12:24	68	0:19	2:35	2:35
CW	H101	10:08	60	0:20	2:09	2:09
CX	H102	10:29	37	0:25	2:24	2:24
CY	H103	14:26	47	0:27	3:19	3:19
CZ	H104	20:42	58	0:30	4:44	4:44
DA	H105	3:38	28	0:11	0:42	0:42
DB	H106	0:00	0	0:00	0:00	0:00
DC	H107	0:00	0	0:00	0:00	0:00
DD	H108	49:39	125	0:38	10:33	10:33
DE	H109	43:04	123	0:38	9:06	9:06
DF	H110	68:31	152	0:43	14:04	14:04
DG	H111	23:40	98	0:26	4:46	4:46
DH	H112	96:31	245	0:48	18:37	18:37
DI	H113	73:24	192	0:44	14:17	14:17
DJ	H114	64:40	180	0:41	12:40	12:40
DK	H115	123:41	274	0:52	23:40	23:40
DL	H116	46:33	125	0:34	7:40	7:40
DM	H117	33:15	95	0:36	5:37	5:37
DN	H118	7:42	32	0:23	1:11	1:11
DO	H119	0:00	0	0:00	0:00	0:00
DP	H120	10:03	40	0:24	2:24	2:24
DQ	H121	12:43	55	0:19	2:42	2:42
DR	H122	0:00	0	0:00	0:00	0:00
DS	H123	16:15	80	0:19	3:32	3:32
DT	H124	0:00	0	0:00	0:00	0:00
DU	H125	0:00	0	0:00	0:00	0:00
DV	H126	8:20	38	0:22	1:17	1:17
DW	H127	74:29	187	0:38	13:41	13:41
DX	H128	18:51	54	0:25	2:42	2:42
DY	H129	0:00	0	0:00	0:00	0:00
DZ	H130	0:00	0	0:00	0:00	0:00
EA	H131	0:00	0	0:00	0:00	0:00
EB	H132	0:00	0	0:00	0:00	0:00
EC	H133	0:00	0	0:00	0:00	0:00
ED	H134	0:00	0	0:00	0:00	0:00
EE	H135	0:00	0	0:00	0:00	0:00
EF	H136	0:00	0	0:00	0:00	0:00
EG	H137	0:00	0	0:00	0:00	0:00
EH	H138	22:09	91	0:31	5:10	5:10
EI	H139	0:00	0	0:00	0:00	0:00
EJ	H140	0:00	0	0:00	0:00	0:00
EK	H141	0:00	0	0:00	0:00	0:00
EL	H142	1:23	20	0:06	0:19	0:19
EM	H143	19:34	99	0:25	4:16	4:16
EN	H144	114:08	225	0:47	21:11	21:11
EO	H145	53:57	130	0:37	8:40	8:40
EP	H146	63:16	142	0:42	10:19	10:19
EQ	H147	0:00	0	0:00	0:00	0:00
ER	H148	0:00	0	0:00	0:00	0:00
ES	H149	0:00	0	0:00	0:00	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]	
ET	H150	15:56	68	0:22	2:29	
EU	H151	45:08	123	0:37	7:34	
EV	H152	29:18	72	0:28	4:26	
EW	H153	0:00	0	0:00	0:00	
EX	H154	0:00	0	0:00	0:00	
EY	H155	4:08	22	0:18	0:45	
EZ	H156	26:17	87	0:29	3:45	
FA	H157	21:24	83	0:28	3:05	
FB	H158	52:48	103	1:03	7:20	
FC	H159	0:00	0	0:00	0:00	
FD	H160	0:00	0	0:00	0:00	
FE	H161	0:00	0	0:00	0:00	
FF	H162	0:00	0	0:00	0:00	
FG	H163	29:28	95	0:31	4:15	
FH	H164	0:00	0	0:00	0:00	
FI	H165	0:00	0	0:00	0:00	
FJ	H166	86:13	196	0:41	15:53	
FK	H167	44:16	121	0:39	7:33	
FL	H168	33:04	94	0:29	5:16	
FM	H169	74:21	72	1:16	10:24	
FN	H170	44:23	94	0:35	6:57	
FO	H171	10:10	38	0:20	1:24	
FP	H172	7:23	32	0:18	1:00	
FQ	H173	5:16	26	0:15	0:42	
FR	H174	1:57	16	0:09	0:15	
FS	H175	25:45	109	0:26	4:59	
FT	H176	79:09	182	0:38	14:18	
FU	H177	84:50	187	0:40	15:17	
FV	H178	85:38	183	0:41	15:22	
FW	H179	82:29	161	0:46	14:34	
FX	H180	38:31	111	0:38	6:36	
FY	H181	33:30	92	0:37	5:43	
FZ	H182	54:36	123	0:37	8:40	
GA	H183	56:34	122	0:39	8:57	
GB	H184	57:01	122	0:39	9:00	
GC	H185	8:11	36	0:21	1:22	
GD	H186	56:39	96	0:46	8:19	
GE	H187	102:58	90	1:23	14:52	
GF	H188	50:52	84	0:49	7:27	
GG	H189	37:45	96	0:35	5:35	
GH	H190	8:33	38	0:20	1:26	
GI	H191	16:41	50	0:24	2:21	
GJ	H192	15:39	48	0:24	2:12	
GK	H193	10:07	38	0:20	1:23	
GL	H194	8:13	34	0:18	1:07	
GM	H195	4:39	23	0:19	0:50	
GN	H196	6:04	26	0:21	1:06	
GO	H197	5:43	25	0:20	1:01	
GP	H198	5:32	26	0:19	0:55	
GQ	H199	12:52	62	0:21	1:49	
GR	H200	8:41	33	0:24	1:23	
GS	H201	0:00	0	0:00	0:00	
GT	H202	0:00	0	0:00	0:00	
GU	H203	0:00	0	0:00	0:00	
GV	H204	0:00	0	0:00	0:00	
GW	H205	0:00	0	0:00	0:00	
GX	H206	0:00	0	0:00	0:00	
GY	H207	0:00	0	0:00	0:00	
GZ	H208	0:00	0	0:00	0:00	
HA	H209	0:00	0	0:00	0:00	
HB	H210	0:00	0	0:00	0:00	
HC	H211	0:00	0	0:00	0:00	
HD	H212	0:00	0	0:00	0:00	

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
HE	H213	0:00	0	0:00	0:00
HF	H214	0:00	0	0:00	0:00
HG	H215	0:00	0	0:00	0:00
HH	H216	0:00	0	0:00	0:00
HI	H217	0:00	0	0:00	0:00
HJ	H218	0:00	0	0:00	0:00
HK	H219	0:00	0	0:00	0:00
HL	H220	0:00	0	0:00	0:00
HM	H221	0:00	0	0:00	0:00
HN	H222	0:00	0	0:00	0:00
HO	H223	0:00	0	0:00	0:00
HP	H224	0:00	0	0:00	0:00
HQ	H225	0:00	0	0:00	0:00
HR	H226	21:46	61	0:31	4:40
HS	H227	22:01	99	0:33	4:39
HT	H228	14:03	76	0:19	3:03
HU	H229	9:31	37	0:24	2:18
HV	H230	7:55	30	0:23	1:48
HW	H231	8:47	31	0:24	1:35
HX	H232	11:00	34	0:26	1:59
HY	H233	47:41	95	0:48	7:44
HZ	H234	34:24	83	0:37	4:58
IA	H235	47:43	92	0:55	6:43
IB	H236	47:54	94	0:54	6:45
IC	H237	0:00	0	0:00	0:00
ID	H238	48:36	75	0:52	9:57
IE	H239	40:15	81	0:35	8:26
IF	H240	0:00	0	0:00	0:00
IG	H241	0:00	0	0:00	0:00
IH	H242	49:11	141	0:36	9:58
II	H243	75:46	151	0:42	16:07
IJ	H244	29:53	105	0:32	6:35
IK	H245	33:16	113	0:32	7:17
IL	H246	5:03	24	0:19	0:50
IM	H247	5:31	28	0:18	1:20
IN	H248	5:20	24	0:20	1:00
IO	H249	5:32	25	0:21	1:01
IP	H250	4:59	24	0:19	0:54
IQ	H251	5:19	25	0:20	0:58
IR	H252	6:26	26	0:21	1:04
IS	H253	5:44	26	0:20	0:57
IT	H254	6:48	28	0:21	1:08
IU	H255	8:08	36	0:20	1:15
IV	H256	9:58	52	0:20	1:27
IW	H257	9:41	42	0:21	1:29
IX	H258	0:00	0	0:00	0:00
IY	H259	0:00	0	0:00	0:00
IZ	H260	0:00	0	0:00	0:00
JA	H261	0:00	0	0:00	0:00
JB	H262	0:00	0	0:00	0:00
JC	H263	0:00	0	0:00	0:00
JD	H264	0:00	0	0:00	0:00
JE	H265	0:00	0	0:00	0:00
JF	H266	0:00	0	0:00	0:00
JG	H267	0:00	0	0:00	0:00
JH	H268	0:00	0	0:00	0:00
JI	H269	0:00	0	0:00	0:00
JJ	H270	0:00	0	0:00	0:00
JK	H271	0:00	0	0:00	0:00
JL	H272	0:00	0	0:00	0:00
JM	H273	0:00	0	0:00	0:00
JN	H274	0:00	0	0:00	0:00
JO	H275	0:00	0	0:00	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]
JP	H276	0:00	0	0:00	0:00
JQ	H277	0:00	0	0:00	0:00
JR	H278	0:00	0	0:00	0:00
JS	H279	0:00	0	0:00	0:00
JT	H280	0:00	0	0:00	0:00
JU	H281	0:00	0	0:00	0:00
JV	H282	0:00	0	0:00	0:00
JW	H283	0:00	0	0:00	0:00
JX	H284	0:00	0	0:00	0:00
JY	H285	0:00	0	0:00	0:00
JZ	H286	0:00	0	0:00	0:00
KA	H287	0:00	0	0:00	0:00
KB	H288	0:00	0	0:00	0:00
KC	H289	0:00	0	0:00	0:00
KD	H290	0:00	0	0:00	0:00
KE	H291	0:00	0	0:00	0:00
KF	H292	28:15	106	0:34	6:33
KG	H293	10:55	74	0:24	2:29
KH	H294	20:42	99	0:21	4:31
KI	H295	18:45	90	0:19	4:05
KJ	H296	5:45	33	0:17	1:20
KK	H297	7:15	35	0:20	1:42
KL	H298	7:40	35	0:20	1:49
KM	H299	8:07	33	0:23	1:55
KN	H300	7:51	32	0:23	1:50
KO	H301	9:03	32	0:25	2:07
KP	H302	8:58	33	0:24	2:03
KQ	H303	7:59	29	0:24	1:29
KR	H304	10:01	33	0:25	1:49
KS	H305	11:23	37	0:27	1:53
KT	H306	21:38	56	0:35	3:30
KU	H307	43:03	92	0:46	7:02
KV	H308	48:45	85	1:06	6:40
KW	H309	32:48	81	0:36	4:44
KX	H310	0:00	0	0:00	0:00
KY	H311	0:00	0	0:00	0:00
KZ	H312	45:14	138	0:35	9:07
LA	H313	55:58	149	0:44	11:26
LB	H314	62:04	168	0:51	12:49
LC	H315	74:45	159	0:42	16:09
LD	H316	71:42	148	0:42	15:04
LE	H317	56:13	141	0:39	11:39
LF	H318	37:47	132	0:30	7:58
LG	H319	32:04	120	0:32	6:58
LH	H320	0:00	0	0:00	0:00
LI	H321	0:00	0	0:00	0:00
LJ	H322	0:00	0	0:00	0:00
LK	H323	0:00	0	0:00	0:00
LL	H324	0:00	0	0:00	0:00
LM	H325	38:19	130	0:33	7:35
LN	H326	12:29	41	0:26	2:52
LO	H327	11:33	38	0:26	2:38
LP	H328	10:02	36	0:24	2:16
LQ	H329	9:23	35	0:24	2:06
LR	H330	7:33	38	0:21	1:41
LS	H331	8:56	55	0:21	1:56
LT	H332	13:07	60	0:21	2:57
LU	H333	0:00	0	0:00	0:00
LV	H334	40:39	133	0:34	8:10
LW	H335	39:14	130	0:33	7:50
LX	H336	36:20	128	0:32	7:12
LY	H337	33:49	121	0:31	6:43
LZ	H338	28:54	109	0:28	5:50

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]	
MA	H339	17:39	77	0:27	3:56	
MB	H340	18:21	80	0:27	4:02	
MC	H341	14:43	72	0:20	3:03	
MD	H342	0:00	0	0:00	0:00	
ME	H343	0:00	0	0:00	0:00	
MF	H344	0:00	0	0:00	0:00	
MG	H345	0:00	0	0:00	0:00	
MH	H346	0:00	0	0:00	0:00	
MI	H347	0:00	0	0:00	0:00	
MJ	H348	0:00	0	0:00	0:00	
MK	H349	0:00	0	0:00	0:00	
ML	H350	57:33	155	0:49	11:54	
MM	H351	0:00	0	0:00	0:00	
MN	H352	0:00	0	0:00	0:00	
MO	H353	0:00	0	0:00	0:00	
MP	H354	6:39	30	0:17	0:49	
MQ	H355	6:41	35	0:18	1:34	
MR	H356	59:52	170	0:40	11:43	
MS	H357	11:18	63	0:20	2:22	
MT	H358	76:01	197	0:42	14:25	
MU	H359	12:25	51	0:21	2:26	
MV	H360	0:00	0	0:00	0:00	
MW	H361	0:00	0	0:00	0:00	
MX	H362	0:00	0	0:00	0:00	
MY	H363	0:00	0	0:00	0:00	
MZ	H364	10:45	52	0:21	2:15	
NA	H365	14:02	70	0:21	2:56	
NB	H366	0:00	0	0:00	0:00	
NC	H367	36:29	97	0:31	5:49	
ND	H368	0:00	0	0:00	0:00	
NE	H369	53:42	159	0:39	10:35	
NF	H370	0:00	0	0:00	0:00	
NG	H371	0:00	0	0:00	0:00	
NH	H372	0:00	0	0:00	0:00	
NI	H373	0:00	0	0:00	0:00	
NJ	SAINT PATRICK'S NATIONAL SCHOOL	0:00	0	0:00	0:00	
NK	H374	47:02	65	0:57	9:27	

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	T01	531:37	89:04
2	T02	732:08	124:04
3	T03	248:22	45:45
4	T04	394:19	74:06
5	T05	327:21	66:02

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

The calculation of the total expected values for a given receptor assumes a weighted average directional reduction for all WTGs contributing to shadow flicker within the same day. In the case where shadow flicker from different WTGs is not concurrent within the day, the total expected time at a given receptor may deviate marginally from the individual flicker time caused by each turbine separately.

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: A - H1

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:03 (4)	08:14	16:31 (3)	07:16	17:09 (2)	07:01	05:52	05:03		
	16:15	27	15:30 (4)	17:06	3	16:34 (3)	18:02	25	17:34 (2)	20:00	21:45
2	08:44	15:04 (4)	08:12	16:30 (3)	07:14	17:08 (2)	06:59		05:50	05:02	
	16:16	27	15:31 (4)	17:08	7	16:37 (3)	18:04	28	17:36 (2)	20:02	21:46
3	08:44	15:04 (4)	08:10	16:30 (3)	07:12	17:08 (2)	06:56		05:48	05:01	
	16:17	26	15:30 (4)	17:10	9	16:39 (3)	18:06	30	17:38 (2)	20:04	21:48
4	08:43	15:05 (4)	08:08	16:29 (3)	07:09	17:08 (2)	06:54		05:46	05:00	
	16:18	26	15:31 (4)	17:12	12	16:41 (3)	18:07	32	17:40 (2)	20:06	21:49
5	08:43	15:05 (4)	08:07	16:29 (3)	07:07	17:07 (2)	06:51		05:44	04:59	
	16:19	26	15:31 (4)	17:14	14	16:43 (3)	18:09	32	17:39 (2)	20:07	21:50
6	08:43	15:06 (4)	08:05	16:30 (3)	07:04	17:07 (2)	06:49		05:42	04:58	
	16:21	26	15:32 (4)	17:16	15	16:45 (3)	18:11	32	17:39 (2)	20:09	21:51
7	08:42	15:06 (4)	08:03	16:30 (3)	07:02	17:07 (2)	06:47		05:40	04:58	
	16:22	25	15:31 (4)	17:18	17	16:47 (3)	18:13	31	17:38 (2)	20:11	21:52
8	08:42	15:07 (4)	08:01	16:30 (3)	07:00	17:07 (2)	06:44		05:38	04:57	
	16:24	24	15:31 (4)	17:20	20	16:50 (3)	18:15	31	17:38 (2)	20:13	21:53
9	08:41	15:09 (4)	07:59	16:31 (3)	06:57	17:07 (2)	06:42		05:36	04:57	
	16:25	23	15:32 (4)	17:22	19	16:50 (3)	18:17	29	17:36 (2)	20:15	21:54
10	08:40	15:09 (4)	07:57	16:32 (3)	06:55	17:08 (2)	06:39		05:34	04:56	
	16:26	23	15:32 (4)	17:24	17	16:49 (3)	18:19	28	17:36 (2)	20:17	21:55
11	08:40	15:10 (4)	07:55	16:33 (3)	06:52	17:10 (2)	06:37		05:33	04:56	
	16:28	21	15:31 (4)	17:26	15	16:48 (3)	18:21	25	17:35 (2)	20:19	21:55
12	08:39	15:11 (4)	07:53	16:35 (3)	06:50	17:10 (2)	06:35		05:31	04:55	
	16:30	20	15:31 (4)	17:28	12	16:47 (3)	18:23	23	17:33 (2)	20:20	21:56
13	08:38	15:12 (4)	07:51	16:37 (3)	06:48	17:12 (2)	06:32		05:29	04:55	
	16:31	19	15:31 (4)	17:30	6	16:43 (3)	18:25	19	17:31 (2)	20:22	21:57
14	08:37	15:14 (4)	07:49		06:45		17:14 (2)	06:30	05:27	04:55	
	16:33	16	15:30 (4)	17:32		18:27	14	17:28 (2)	20:24	21:58	
15	08:36	15:16 (4)	07:47		06:43			06:28	05:25	04:54	
	16:34	14	15:30 (4)	17:34		18:28		20:26	21:20	21:58	
16	08:35	15:17 (4)	07:45		06:40			06:25	05:24	04:54	
	16:36	10	15:27 (4)	17:36		18:30		20:28	21:22	21:59	
17	08:34	15:21 (4)	07:43		06:38			06:23	05:22	04:54	
	16:38	4	15:25 (4)	17:38		18:32		20:30	21:23	21:59	
18	08:33		07:41		06:35			06:21	05:21	04:54	
	16:40		17:40		18:34			20:31	21:25	22:00	
19	08:32		07:39		06:33			06:18	05:19	04:54	
	16:41		17:42		18:36			20:33	21:27	22:00	
20	08:31		07:36		06:31			06:16	05:18	04:54	
	16:43		17:44		18:38			20:35	21:28	22:00	
21	08:30		07:34		06:28			06:14	05:16	04:54	
	16:45		17:46		18:40			20:37	21:30	22:01	
22	08:29		07:32		06:26			06:12	05:15	04:55	
	16:47		17:48		18:42			20:39	21:31	22:01	
23	08:27		07:30		06:23			06:09	05:13	04:55	
	16:49		17:50	3	17:22 (2)	18:43		20:41	21:33	22:01	
24	08:26		07:28		17:16 (2)	06:21		06:07	05:12	04:55	
	16:50		17:52	8	17:24 (2)	18:45		20:43	21:34	22:01	
25	08:24		07:25		17:14 (2)	06:18		06:05	05:11	04:55	
	16:52		17:54	12	17:26 (2)	18:47		20:44	21:36	22:01	
26	08:23		07:23		17:12 (2)	06:16		06:03	05:09	04:56	
	16:54		17:56	16	17:28 (2)	18:49		20:46	21:37	22:01	
27	08:22		07:21		17:11 (2)	06:13		06:00	05:08	04:56	
	16:56		17:58	20	17:31 (2)	18:51		20:48	21:39	22:01	
28	08:20		07:18		17:10 (2)	06:11		05:58	05:07	04:57	
	16:58		18:00	22	17:32 (2)	18:53		20:50	21:40	22:01	
29	08:19				07:08			05:56	05:06	04:57	
	17:00				19:54			20:52	21:41	22:01	
30	08:17				07:06			05:54	05:05	04:58	
	17:02				19:56			20:54	21:43	22:00	
31	08:15	16:30 (3)			07:04				05:04		
	17:04	1	16:31 (3)		19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case	358		247		379						
Sun reduction	0.24		0.23		0.27						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.65		0.66		0.68						
Total reduction	0.16		0.15		0.18						
Total, real	57		38		70						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: A - H1

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:50 (2) 18:11 (2)	07:24 16:54	16:01 (3) 16:19 (3)	08:19 16:10	14:52 (4) 15:14 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:48 (2) 18:12 (2)	07:26 16:52	16:01 (3) 16:20 (3)	08:21 16:09	14:51 (4) 15:14 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:47 (2) 18:13 (2)	07:28 16:50	16:00 (3) 16:19 (3)	08:22 16:08	14:52 (4) 15:15 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:46 (2) 18:14 (2)	07:30 16:48	15:59 (3) 16:17 (3)	08:24 16:08	14:52 (4) 15:16 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:45 (2) 18:14 (2)	07:32 16:46	15:59 (3) 16:15 (3)	08:25 16:07	14:52 (4) 15:16 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:44 (2) 18:15 (2)	07:34 16:44	15:59 (3) 16:12 (3)	08:26 16:07	14:52 (4) 15:18 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:42 (2) 18:14 (2)	07:36 16:43	15:59 (3) 16:10 (3)	08:28 16:06	14:52 (4) 15:18 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:42 (2) 18:14 (2)	07:38 16:41	16:00 (3) 16:08 (3)	08:29 16:06	14:52 (4) 15:18 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:42 (2) 18:14 (2)	07:40 16:39	16:01 (3) 16:07 (3)	08:30 16:05	14:53 (4) 15:19 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:42 (2) 18:13 (2)	07:42 16:37	16:02 (3) 16:05 (3)	08:31 16:05	14:53 (4) 15:20 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:42 (2) 18:11 (2)	07:44 16:35	16:02 (3) 16:03 (3)	08:33 16:05	14:53 (4) 15:20 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:42 (2) 18:09 (2)	07:45 16:34	08:34 16:05	14:53 (4) 15:20 (4)	
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:42 (2) 18:07 (2)	07:47 16:32	08:35 16:04	14:53 (4) 15:21 (4)	
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:43 (2) 18:04 (2)	07:49 16:31	08:36 16:04	14:54 (4) 15:21 (4)	
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:44 (2) 18:02 (2)	07:51 16:29	08:37 16:04	14:54 (4) 15:22 (4)	
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:45 (2) 17:59 (2)	07:53 16:27	08:38 16:05	14:55 (4) 15:23 (4)	
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:46 (2) 17:57 (2)	07:55 16:26	08:38 16:05	14:55 (4) 15:23 (4)	
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:48 (2) 17:55 (2)	07:57 16:24	08:39 16:05	14:56 (4) 15:24 (4)	
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	07:59 16:23	08:40 16:05	14:57 (4) 15:25 (4)	
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:00 16:22	08:41 16:06	14:56 (4) 15:25 (4)	
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:02 16:20	08:41 16:06	14:57 (4) 15:26 (4)	
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:04 16:19	08:42 16:06	14:57 (4) 15:26 (4)	
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:06 16:18	08:42 16:07	14:58 (4) 15:27 (4)	
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:08 16:17	08:43 16:08	14:58 (4) 15:27 (4)	
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	14:59 (4) 15:03 (4)	08:43 16:08	14:59 (4) 15:27 (4)	
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	14:56 (4) 15:06 (4)	08:43 16:09	14:59 (4) 15:27 (4)	
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	14:55 (4) 15:09 (4)	08:44 16:10	15:00 (4) 15:28 (4)	
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	14:54 (4) 15:10 (4)	08:44 16:10	15:01 (4) 15:29 (4)	
29	05:34 21:30	06:27 20:25	07:22 19:09	17:57 (2) 18:07 (2)	07:18 17:00	16:06 (3) 16:14 (3)	08:16 16:11	14:53 (4) 15:11 (4)	
30	05:35 21:28	06:29 20:23	07:24 19:07	17:52 (2) 18:09 (2)	07:20 16:58	16:03 (3) 16:16 (3)	08:18 16:11	14:52 (4) 15:12 (4)	
31	05:37 21:27	06:31 20:21		07:22 16:56	16:02 (3) 16:17 (3)		08:44 16:13	15:02 (4) 15:29 (4)	
Potential sun hours	512	460	382	328	259		233		
Total, worst case			27	474	214		836		
Sun reduction			0.32	0.29	0.27		0.21		
Oper. time red.			1.00	1.00	1.00		1.00		
Wind dir. red.			0.68	0.68	0.65		0.65		
Total reduction			0.22	0.20	0.17		0.13		
Total, real			6	94	37		113		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: B - H2

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44		14:46 (4)	08:14		16:18 (3)	07:16		16:56 (2)	07:01		05:52			05:03		
	16:15	20	15:06 (4)	17:06	16	16:34 (3)	18:02	35	17:31 (2)	20:00		20:55			21:45		
2	08:44		14:48 (4)	08:12		16:18 (3)	07:14		16:55 (2)	06:59		05:50			05:02		
	16:16	18	15:06 (4)	17:08	19	16:37 (3)	18:04	36	17:31 (2)	20:02		20:57			21:46		
3	08:44		14:48 (4)	08:10		16:19 (3)	07:12		16:55 (2)	06:56		05:48			05:01		
	16:17	18	15:06 (4)	17:10	20	16:39 (3)	18:06	36	17:31 (2)	20:04		20:59			21:48		
4	08:43		14:50 (4)	08:08		16:19 (3)	07:09		16:55 (2)	06:54		05:46			05:00		
	16:18	16	15:06 (4)	17:12	22	16:41 (3)	18:07	36	17:31 (2)	20:06		21:01			21:49		
5	08:43		14:50 (4)	08:07		16:19 (3)	07:07		16:55 (2)	06:51		05:44			04:59		
	16:19	15	15:05 (4)	17:14	21	16:40 (3)	18:09	35	17:30 (2)	20:07		21:03			21:50		
6	08:43		14:53 (4)	08:05		16:20 (3)	07:04		16:56 (2)	06:49		05:42			04:58		
	16:21	12	15:05 (4)	17:16	20	16:40 (3)	18:11	34	17:30 (2)	20:09		21:04			21:51		
7	08:42		14:54 (4)	08:03		16:21 (3)	07:02		16:55 (2)	06:47		05:40			04:58		
	16:22	10	15:04 (4)	17:18	18	16:39 (3)	18:13	33	17:28 (2)	20:11		21:06			21:52		
8	08:42		14:57 (4)	08:01		16:23 (3)	07:00		16:57 (2)	06:44		05:38			04:57		
	16:24	4	15:01 (4)	17:20	15	16:38 (3)	18:15	31	17:28 (2)	20:13		21:08			21:53		
9	08:41			07:59		16:25 (3)	06:57		16:57 (2)	06:42		05:36			04:57		
	16:25			17:22	11	16:36 (3)	18:17	29	17:26 (2)	20:15		21:10			21:54		
10	08:40			07:57		16:29 (3)	06:55		16:58 (2)	06:39		05:34			04:56		
	16:26			17:24	4	16:33 (3)	18:19	27	17:25 (2)	20:17		21:11			21:55		
11	08:40			07:55			06:53		17:00 (2)	06:37		05:33			04:56		
	16:28			17:26			18:21	23	17:23 (2)	20:19		21:13			21:55		
12	08:39			07:53			06:50		17:02 (2)	06:35		05:31			04:55		
	16:30			17:28			18:23	19	17:21 (2)	20:20		21:15			21:56		
13	08:38			07:51			06:48		17:05 (2)	06:32		05:29			04:55		
	16:31			17:30			18:25	13	17:18 (2)	20:22		21:17			21:57		
14	08:37			07:49			06:45		06:30	05:27		04:55					
	16:33			17:32			18:27		20:24	21:18		21:58					
15	08:36			07:47			06:43		06:28	05:26		04:54					
	16:34			17:34			18:28		20:26	21:20		21:58					
16	08:35			07:45			06:40		06:25	05:24		04:54					
	16:36			17:36			18:30		20:28	21:22		21:59					
17	08:34			07:43			06:38		06:23	05:22		04:54					
	16:38			17:38			18:32		20:30	21:23		21:59					
18	08:33			07:41			06:35		06:21	05:21		04:54					
	16:40			17:40			18:34		20:31	21:25		22:00					
19	08:32			07:39		17:08 (2)	06:33		06:18	05:19		04:54					
	16:41			17:42	5	17:13 (2)	18:36		20:33	21:27		22:00					
20	08:31			07:36		17:05 (2)	06:31		06:16	05:18		04:54					
	16:43			17:44	11	17:16 (2)	18:38		20:35	21:28		22:00					
21	08:30			07:34		17:03 (2)	06:28		06:14	05:16		04:54					
	16:45			17:46	15	17:18 (2)	18:40		20:37	21:30		22:01					
22	08:29			07:32		17:01 (2)	06:26		06:12	05:15		04:55					
	16:47			17:48	18	17:19 (2)	18:42		20:39	21:31		22:01					
23	08:27			07:30		17:00 (2)	06:23		06:09	05:13		04:55					
	16:49			17:50	22	17:22 (2)	18:43		20:41	21:33		22:01					
24	08:26			07:28		16:59 (2)	06:21		06:07	05:12		04:55					
	16:50			17:52	25	17:24 (2)	18:45		20:43	21:34		22:01					
25	08:24			07:25		16:58 (2)	06:18		06:05	05:11		04:55					
	16:52			17:54	28	17:26 (2)	18:47		20:44	21:36		22:01					
26	08:23		16:19 (3)	07:23		16:57 (2)	06:16		06:03	05:09		04:56					
	16:54	2	16:21 (3)	17:56	31	17:28 (2)	18:49		20:46	21:37		22:01					
27	08:22		16:18 (3)	07:21		16:57 (2)	06:13		06:00	05:08		04:56					
	16:56	5	16:23 (3)	17:58	34	17:31 (2)	18:51		20:48	21:39		22:01					
28	08:20		16:18 (3)	07:18		16:56 (2)	06:11		05:58	05:07		04:57					
	16:58	8	16:26 (3)	18:00	35	17:31 (2)	18:53		20:50	21:40		22:01					
29	08:19		16:18 (3)				07:08		05:56	05:06		04:57					
	17:00	10	16:28 (3)				19:54		20:52	21:41		22:01					
30	08:17		16:18 (3)				07:06		05:54	05:05		04:58					
	17:02	11	16:29 (3)				19:56		20:54	21:43		22:00					
31	08:15		16:17 (3)				07:04			05:04							
	17:04	14	16:31 (3)				19:58			21:44							
Potential sun hours	250			273			367		420	494		510					
Total, worst case	163			390			387										
Sun reduction	0.24			0.23			0.27										
Oper. time red.	1.00			1.00			1.00										
Wind dir. red.	0.65			0.67			0.67										
Total reduction	0.16			0.16			0.18										
Total, real	26			61			71										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: B - H2

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:42 (2) 17:58 (2)	07:24 16:54	15:57 (3) 16:03 (3)	08:19 16:10	
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:39 (2) 18:01 (2)	07:26 16:52	15:54 (3) 16:06 (3)	08:21 16:09	
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:37 (2) 18:02 (2)	07:28 16:50	15:52 (3) 16:08 (3)	08:22 16:08	
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:35 (2) 18:03 (2)	07:30 16:48	15:51 (3) 16:09 (3)	08:24 16:08	14:42 (4) 14:46 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:34 (2) 18:04 (2)	07:32 16:46	15:50 (3) 16:10 (3)	08:25 16:07	14:39 (4) 14:49 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:33 (2) 18:05 (2)	07:34 16:44	15:49 (3) 16:10 (3)	08:26 16:07	14:39 (4) 14:51 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:31 (2) 18:04 (2)	07:36 16:43	15:49 (3) 16:10 (3)	08:28 16:06	14:38 (4) 14:52 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:30 (2) 18:05 (2)	07:38 16:41	15:48 (3) 16:08 (3)	08:29 16:06	14:37 (4) 14:53 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:30 (2) 18:05 (2)	07:40 16:39	15:49 (3) 16:07 (3)	08:30 16:05	14:37 (4) 14:55 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:29 (2) 18:05 (2)	07:42 16:37	15:49 (3) 16:05 (3)	08:31 16:05	14:37 (4) 14:55 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:29 (2) 18:05 (2)	07:44 16:35	15:49 (3) 16:03 (3)	08:33 16:05	14:36 (4) 14:56 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:29 (2) 18:05 (2)	07:45 16:34	15:49 (3) 16:01 (3)	08:34 16:05	14:36 (4) 14:57 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:29 (2) 18:04 (2)	07:47 16:32	15:50 (3) 15:59 (3)	08:35 16:05	14:36 (4) 14:57 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:29 (2) 18:04 (2)	07:49 16:31	15:50 (3) 15:57 (3)	08:36 16:04	14:36 (4) 14:58 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:29 (2) 18:02 (2)	07:51 16:29	15:51 (3) 15:56 (3)	08:37 16:04	14:37 (4) 14:59 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:29 (2) 17:59 (2)	07:53 16:27	15:52 (3) 15:54 (3)	08:38 16:05	14:37 (4) 15:00 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:30 (2) 17:57 (2)	07:55 16:26	15:54 (3) 16:05	08:38 16:05	14:38 (4) 15:00 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:31 (2) 17:55 (2)	07:57 16:24	16:05 16:05	08:39 16:05	14:38 (4) 15:01 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:32 (2) 17:52 (2)	07:59 16:23	16:05 16:05	08:40 16:05	14:39 (4) 15:02 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:33 (2) 17:50 (2)	08:00 16:22	16:05 16:06	08:41 16:06	14:39 (4) 15:02 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:34 (2) 17:48 (2)	08:02 16:20	16:05 16:06	08:41 16:06	14:39 (4) 15:03 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:36 (2) 17:45 (2)	08:04 16:19	16:05 16:06	08:42 16:06	14:39 (4) 15:03 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:40 (2) 17:43 (2)	08:06 16:18	16:05 16:07	08:42 16:07	14:40 (4) 15:04 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:48 (2) 17:36 (2)	08:08 16:17	16:05 16:08	08:43 16:08	14:41 (4) 15:04 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	17:48 (2) 17:36 (2)	08:09 16:16	16:05 16:08	08:43 16:08	14:41 (4) 15:04 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	17:48 (2) 17:36 (2)	08:11 16:14	16:05 16:09	08:43 16:09	14:41 (4) 15:04 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	17:48 (2) 17:36 (2)	08:13 16:13	16:05 16:10	08:44 16:10	14:43 (4) 15:05 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	17:48 (2) 17:36 (2)	08:14 16:12	16:05 16:10	08:44 16:10	14:43 (4) 15:06 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	17:48 (2) 17:36 (2)	08:16 16:12	16:05 16:11	08:44 16:11	14:44 (4) 15:06 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:46 (2) 17:55 (2)	17:48 (2) 17:36 (2)	08:18 16:11	16:05 16:12	08:44 16:12	14:44 (4) 15:05 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	17:48 (2) 17:36 (2)		16:05 16:12	08:44 16:13	14:45 (4) 15:06 (4)
Potential sun hours	512	460	382	328	259	233			
Total, worst case			9	611	217	562			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.67	0.67	0.66	0.65			
Total reduction			0.22	0.20	0.17	0.13			
Total, real			2	121	38	75			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: C - H3

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June			
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:39 (5) 21 08:00 (5)	05:52 20:55	06:18 (4) 13 06:31 (4)	05:03 21:45	05:33 (3) 5 05:38 (3)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:42 (5) 15 07:57 (5)	05:50 20:57	06:16 (4) 14 06:30 (4)	05:02 21:47	05:33 (3) 6 05:39 (3)
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:45 (5) 8 07:53 (5)	05:48 20:59	06:14 (4) 15 06:29 (4)	05:01 21:48	05:32 (3) 7 05:39 (3)
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:53 (5) 10 07:53 (5)	05:46 21:01	06:16 (4) 10 06:26 (4)	05:00 21:49	05:31 (3) 8 05:39 (3)
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:53 (5) 4 07:53 (5)	05:44 21:03	06:19 (4) 4 06:23 (4)	04:59 21:50	05:31 (3) 10 05:41 (3)
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:53 (5) 10 07:53 (5)	05:42 21:04	06:19 (4) 4 06:23 (4)	04:59 21:51	05:30 (3) 10 05:40 (3)
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:53 (5) 10 07:53 (5)	05:40 21:06	06:19 (4) 4 06:23 (4)	04:58 21:52	05:30 (3) 11 05:41 (3)
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:53 (5) 10 07:53 (5)	05:38 21:08	06:19 (4) 4 06:23 (4)	04:57 21:53	05:29 (3) 12 05:41 (3)
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:53 (5) 10 07:53 (5)	05:36 21:10	06:19 (4) 4 06:23 (4)	04:57 21:54	05:29 (3) 13 05:42 (3)
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:53 (5) 10 07:53 (5)	05:35 21:12	06:19 (4) 4 06:23 (4)	04:56 21:55	05:28 (3) 14 05:42 (3)
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:53 (5) 10 07:53 (5)	05:33 21:13	06:19 (4) 4 06:23 (4)	04:56 21:56	05:28 (3) 14 05:42 (3)
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	07:53 (5) 10 07:53 (5)	05:31 21:15	06:19 (4) 4 06:23 (4)	04:56 21:57	05:28 (3) 15 05:43 (3)
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	07:53 (5) 10 07:53 (5)	05:29 21:17	06:19 (4) 4 06:23 (4)	04:55 21:58	05:27 (3) 15 05:42 (3)
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	07:53 (5) 10 07:53 (5)	05:27 21:18	06:19 (4) 4 06:23 (4)	04:55 21:59	05:27 (3) 16 05:43 (3)
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	07:53 (5) 10 07:53 (5)	05:26 21:20	06:19 (4) 4 06:23 (4)	04:55 22:00	05:27 (3) 16 05:43 (3)
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	07:53 (5) 10 07:53 (5)	05:24 21:22	06:19 (4) 4 06:23 (4)	04:55 22:01	05:27 (3) 16 05:43 (3)
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	07:53 (5) 10 07:53 (5)	05:22 21:23	06:19 (4) 4 06:23 (4)	04:54 22:02	05:27 (3) 17 05:44 (3)
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	07:53 (5) 10 07:53 (5)	05:21 21:25	06:19 (4) 4 06:23 (4)	04:54 22:03	05:27 (3) 17 05:44 (3)
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	07:53 (5) 10 07:53 (5)	05:19 21:27	06:19 (4) 4 06:23 (4)	04:54 22:04	05:27 (3) 17 05:44 (3)
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	07:53 (5) 10 07:53 (5)	05:18 21:28	06:19 (4) 4 06:23 (4)	04:54 22:05	05:27 (3) 17 05:44 (3)
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	07:53 (5) 10 07:53 (5)	05:16 21:30	06:19 (4) 4 06:23 (4)	04:55 22:06	05:27 (3) 17 05:44 (3)
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	07:53 (5) 10 07:53 (5)	05:15 21:31	06:19 (4) 4 06:23 (4)	04:55 22:07	05:28 (3) 17 05:45 (3)
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	07:53 (5) 10 07:53 (5)	05:13 21:33	06:19 (4) 4 06:23 (4)	04:55 22:08	05:28 (3) 17 05:45 (3)
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	07:53 (5) 10 07:53 (5)	05:12 21:34	06:19 (4) 4 06:23 (4)	04:55 22:09	05:28 (3) 17 05:45 (3)
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	07:53 (5) 10 07:53 (5)	05:11 21:36	06:19 (4) 4 06:23 (4)	04:56 22:10	05:29 (3) 17 05:46 (3)
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	07:53 (5) 10 07:53 (5)	05:09 21:37	06:19 (4) 4 06:23 (4)	04:56 22:11	05:29 (3) 17 05:46 (3)
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	07:53 (5) 10 07:53 (5)	05:08 21:39	06:19 (4) 4 06:23 (4)	04:57 22:12	05:30 (3) 16 05:46 (3)
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	07:53 (5) 10 07:53 (5)	05:07 21:40	06:19 (4) 4 06:23 (4)	04:57 22:13	05:30 (3) 16 05:46 (3)
29	08:19 17:00	07:19 18:00	06:11 18:53	05:59 20:50	07:53 (5) 10 07:53 (5)	05:07 21:40	06:19 (4) 4 06:23 (4)	04:57 22:13	05:30 (3) 16 05:46 (3)
30	08:17 17:02	07:17 17:58	06:09 18:51	05:57 20:48	07:53 (5) 10 07:53 (5)	05:05 21:38	06:19 (4) 4 06:23 (4)	04:58 22:14	05:31 (3) 15 05:46 (3)
31	08:15 17:04	07:15 17:56	06:07 18:49	05:55 20:46	07:53 (5) 10 07:53 (5)	05:04 21:37	06:19 (4) 4 06:23 (4)	04:58 22:15	05:31 (3) 15 05:46 (3)
Potential sun hours	250	273	367	420	494	510			
Total, worst case			310	97	63	421			
Sun reduction			0.27	0.35	0.38	0.32			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.67	0.67	0.67	0.66			
Total reduction			0.18	0.24	0.26	0.21			
Total, real			56	23	16	89			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: C - H3

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1 04:59	05:32 (3) 05:39		06:33	07:26	07:24	08:19
22:00	15 05:47 (3) 21:25		20:18	19:05	16:54	16:10
2 05:00	05:33 (3) 05:40		06:35	07:28	07:26	08:21
22:00	14 05:47 (3) 21:23		20:16	19:02	16:52	16:09
3 05:00	05:33 (3) 05:42		06:36	07:30	07:28	08:22
21:59	13 05:46 (3) 21:21		20:14	19:00	16:50	16:09
4 05:01	05:34 (3) 05:44		06:38	07:32	07:30	08:24
21:59	13 05:47 (3) 21:19		20:11	18:57	16:48	16:08
5 05:02	05:35 (3) 05:46		06:40	07:33	07:32	08:25
21:58	12 05:47 (3) 21:17		20:09	18:55	16:46	16:07
6 05:03	05:36 (3) 05:47		06:42	07:35	07:34	08:26
21:58	11 05:47 (3) 21:16		20:06	18:53	16:45	16:07
7 05:04	05:37 (3) 05:49		06:44	07:37	07:36	08:28
21:57	10 05:47 (3) 21:14		20:04	18:50	16:43	16:06
8 05:05	05:38 (3) 05:51	06:27 (4) 06:45		07:39	07:38	08:29
21:56	9 05:47 (3) 21:12	7 06:34 (4) 20:01		18:48	16:41	16:06
9 05:06	05:39 (3) 05:52	06:25 (4) 06:47	07:40 (5) 07:41	07:40	08:30	
21:55	8 05:47 (3) 21:10	12 06:37 (4) 19:59	6 07:46 (5) 18:45	16:39	16:06	
10 05:07	05:40 (3) 05:54	06:24 (4) 06:49	07:35 (5) 07:43	07:42	08:32	
21:55	7 05:47 (3) 21:08	15 06:39 (4) 19:57	15 07:50 (5) 18:43	16:37	16:05	
11 05:08	05:41 (3) 05:56	06:25 (4) 06:51	07:32 (5) 07:44	07:44	08:33	
21:54	5 05:46 (3) 21:06	14 06:39 (4) 19:54	20 07:52 (5) 18:41	16:36	16:05	
12 05:09	05:42 (3) 05:58	06:27 (4) 06:52	07:30 (5) 07:46	07:46	08:34	
21:53	4 05:46 (3) 21:03	13 06:40 (4) 19:52	23 07:53 (5) 18:38	16:34	16:05	
13 05:11	05:43 (3) 05:59	06:29 (4) 06:54	07:29 (5) 07:48	07:47	08:35	
21:52	3 05:46 (3) 21:01	12 06:41 (4) 19:49	26 07:55 (5) 18:36	16:32	16:05	
14 05:12	05:44 (3) 06:01	06:30 (4) 06:56	07:27 (5) 07:50	07:49	08:36	
21:51	1 05:45 (3) 20:59	11 06:41 (4) 19:47	28 07:55 (5) 18:34	16:31	16:05	
15 05:13		06:32 (4) 06:58	07:26 (5) 07:52	07:51	08:37	
21:50		9 06:41 (4) 19:44	29 07:55 (5) 18:31	16:29	16:05	
16 05:14		06:33 (4) 06:59	07:26 (5) 07:54	07:53	08:38	
21:49		8 06:41 (4) 19:42	30 07:56 (5) 18:29	16:28	16:05	
17 05:16		06:35 (4) 07:01	07:28 (5) 07:56	07:55	08:39	
21:47		6 06:41 (4) 19:39	28 07:56 (5) 18:27	16:26	16:05	
18 05:17		06:37 (4) 07:03	07:29 (5) 07:57	07:57	08:39	
21:46		4 06:41 (4) 19:37	26 07:55 (5) 18:24	16:25	16:05	
19 05:19		06:38 (4) 07:05	07:31 (5) 07:59	07:59	08:40	
21:45		2 06:40 (4) 19:34	24 07:55 (5) 18:22	16:23	16:05	
20 05:20			07:06	07:33 (5) 08:01	08:01	08:41
21:44			19:32	22 07:55 (5) 18:20	16:22	16:06
21 05:21			07:08	07:35 (5) 08:03	08:02	08:41
21:42			19:29	20 07:55 (5) 18:18	16:21	16:06
22 05:23			07:10	07:36 (5) 08:05	08:04	08:42
21:41			19:27	17 07:53 (5) 18:15	16:19	16:07
23 05:24			07:12	07:38 (5) 08:07	08:06	08:42
21:39			19:24	15 07:53 (5) 18:13	16:18	16:07
24 05:26			07:14	07:40 (5) 08:09	08:08	08:43
21:38			19:22	12 07:52 (5) 18:11	16:17	16:08
25 05:27			07:15	07:42 (5) 07:11	08:09	08:43
21:36			19:19	9 07:51 (5) 17:09	16:16	16:08
26 05:29			07:17	07:43 (5) 07:13	08:11	08:43
21:35			19:17	6 07:49 (5) 17:07	16:15	16:09
27 05:31			07:19	07:45 (5) 07:15	08:13	08:44
21:33			19:15	2 07:47 (5) 17:05	16:14	16:10
28 05:32			07:21		07:17	08:14
21:32			19:12		17:02	16:13
29 05:34			07:23		07:18	08:16
21:30			19:10		17:00	16:12
30 05:35			07:24		07:20	08:18
21:28			19:07		16:58	16:11
31 05:37					07:22	08:14
21:27					16:56	16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	125	113	358			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.68	0.67			
Total reduction	0.21	0.23	0.22			
Total, real	27	26	77			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: D - H4

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March			April			May			June	July	August			September			October	November	December
1	08:44	08:14	07:16			07:01		07:37 (5)	05:52			06:18 (4)	05:03	04:59	05:39		06:33		07:26	07:24	08:19	
	16:15	17:06	18:02			20:00	28	08:05 (5)	20:55	11		06:29 (4)	21:45	22:00	21:25		20:18		19:05	16:54	16:10	
2	08:44	08:12	07:14			06:59		07:39 (5)	05:50			06:16 (4)	05:02	05:00	05:40		06:35		07:28	07:26	08:21	
	16:16	17:08	18:04			20:02	24	08:03 (5)	20:57	12		06:28 (4)	21:47	22:00	21:23		20:16		19:02	16:52	16:09	
3	08:44	08:10	07:12			06:56		07:40 (5)	05:48			06:14 (4)	05:01	05:00	05:42		06:36		07:30	07:28	08:22	
	16:17	17:10	18:06			20:04	20	08:00 (5)	20:59	14		06:28 (4)	21:48	21:59	21:21		20:14		19:00	16:50	16:09	
4	08:43	08:09	07:09			06:54		07:43 (5)	05:46			06:12 (4)	05:00	05:01	05:44		06:38		07:32	07:30	08:24	
	16:18	17:12	18:08			20:06	15	07:58 (5)	21:01	15		06:27 (4)	21:49	21:59	21:19	10	06:31 (4)	06:38	07:31	16:48	16:08	
5	08:43	08:07	07:07			06:52		07:47 (5)	05:44			06:10 (4)	04:59	05:02	05:46		06:19 (4)	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10			20:08	5	07:52 (5)	21:03	16		06:26 (4)	21:50	21:58	21:17	14	06:33 (4)	06:40	07:36	16:46	16:07	
6	08:43	08:05	07:05			06:49			05:42			06:09 (4)	04:59	05:03	05:47		06:17 (4)	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11			20:09			21:04	17		06:26 (4)	21:51	21:58	21:16	17	06:34 (4)	06:40	07:32	16:45	16:07	
7	08:42	08:03	07:02			06:47			05:40			06:08 (4)	04:58	05:04	05:49		06:19 (4)	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13			20:11			21:06	16		06:24 (4)	21:52	21:57	21:14	16	06:35 (4)	06:40	07:46	16:43	16:06	
8	08:42	08:01	07:00			06:44			05:38			06:10 (4)	04:57	05:05	05:51		06:20 (4)	06:45	07:37 (5)	07:39	08:29	
	16:24	17:20	18:15			20:13			21:08	12		06:22 (4)	21:53	21:56	21:12	16	06:36 (4)	06:41	07:52 (5)	16:48	16:06	
9	08:41	07:59	06:57			06:42			05:36			06:12 (4)	04:57	05:06	05:52		06:22 (4)	06:47	07:34 (5)	07:41	08:30	
	16:25	17:22	18:17			20:15			21:10	7		06:19 (4)	21:54	21:55	21:10	15	06:37 (4)	19:59	20	07:54 (5)	16:45	16:06
10	08:40	07:57	06:55			06:40			05:35				04:56	05:07	05:54		06:24 (4)	06:49	07:32 (5)	07:43	08:32	
	16:27	17:24	18:19			20:17			21:12				21:55	21:55	21:08	13	06:37 (4)	19:57	24	07:56 (5)	16:43	16:05
11	08:40	07:55	06:53			06:37			05:33				04:56	05:08	05:56		06:25 (4)	06:51	07:30 (5)	07:44	08:33	
	16:28	17:26	18:21			20:19			21:13				21:55	21:54	21:06	12	06:37 (4)	19:54	27	07:57 (5)	16:41	16:05
12	08:39	07:53	06:50			06:35			05:31				04:56	05:09	05:58		06:27 (4)	06:52	07:29 (5)	07:46	08:34	
	16:30	17:28	18:23			20:20			21:15				21:56	21:53	21:03	11	06:38 (4)	19:52	29	07:58 (5)	16:38	16:05
13	08:38	07:51	06:48			06:32			05:29				04:55	05:11	05:59		06:28 (4)	06:54	07:27 (5)	07:48	08:35	
	16:31	17:30	18:25			20:22			21:17				21:57	21:52	21:01	9	06:37 (4)	19:49	32	07:59 (5)	16:32	16:05
14	08:37	07:49	06:45			06:30			05:27				04:55	05:12	06:01		06:30 (4)	06:56	07:26 (5)	07:50	08:36	
	16:33	17:32	18:27			20:24			21:18				21:58	21:51	20:59		07:37 (4)	19:47	33	07:59 (5)	16:34	16:05
15	08:36	07:47	06:43			06:28			05:26				04:55	05:13	06:03		06:32 (4)	06:58	34	07:25 (5)	07:52	08:37
	16:35	17:34	18:29			20:26			21:20				21:58	21:50	20:57	5	06:37 (4)	19:44	34	07:59 (5)	16:31	16:29
16	08:35	07:45	06:40			06:25			05:24				04:55	05:14	06:05		06:33 (4)	06:59	35	07:26 (5)	07:54	08:38
	16:36	17:36	18:30	4	07:04 (5)	20:28			21:22				21:59	21:49	20:55	3	06:36 (4)	19:42	33	07:59 (5)	16:29	16:05
17	08:34	07:43	06:38		07:02 (5)	06:23			05:22				04:54	05:16	06:06		06:35 (4)	07:01		07:28 (5)	07:56	08:39
	16:38	17:38	18:32	7	07:09 (5)	20:30			21:23				21:59	21:47	20:53	1	06:36 (4)	19:39	32	08:00 (5)	16:27	16:05
18	08:33	07:41	06:36		06:59 (5)	06:21			05:21				04:54	05:17	06:08			07:03	07:29 (5)	07:57	08:39	
	16:40	17:40	18:34	11	07:10 (5)	20:32			21:25				22:00	21:46	20:51			19:37	30	07:59 (5)	16:24	16:05
19	08:32	07:39	06:33		06:57 (5)	06:18			05:19				04:54	05:19	06:10			07:05	07:31 (5)	07:59	08:40	
	16:41	17:42	18:36	14	07:11 (5)	20:33			21:27				22:00	21:45	20:48			19:34	28	07:59 (5)	16:22	16:23
20	08:31	07:37	06:31		06:54 (5)	06:16			05:18				04:54	05:20	06:12			07:06		07:30	08:01	08:41
	16:43	17:44	18:38	17	07:12 (5)	20:35			21:28				22:00	21:44	20:46			19:26	25	07:58 (5)	16:20	16:22
21	08:30	07:34	06:28		06:52 (5)	06:14			05:16				04:55	05:21	06:13			07:08	07:35 (5)	08:03	08:02	08:41
	16:45	17:46	18:40	20	07:12 (5)	20:37			21:30				22:01	21:42	20:44			19:29	23	07:58 (5)	16:18	16:21
22	08:29	07:32	06:26		06:50 (5)	06:12			05:15				04:55	05:23	06:15			07:10		07:36 (5)	08:05	08:04
	16:47	17:48	18:42	22	07:12 (5)	20:39			21:31				22:01	21:41	20:42			19:27	20	07:56 (5)	16:15	16:19
23	08:27	07:30	06:23		06:47 (5)	06:09			05:13				04:55	05:24	06:17			07:12		07:38 (5)	08:07	08:06
	16:49	17:50	18:43	25	07:12 (5)	20:41			21:33				22:01	21:39	20:39			19:24	18	07:56 (5)	16:13	16:18
24	08:26	07:28	06:21		06:45 (5)	06:07			05:12				04:55	05:26	06:19			07:14		07:40 (5)	08:09	08:08
	16:51	17:52	18:45	27	07:12 (5)	20:43			21:34				22:01	21:38	20:37			19:22	15	07:55 (5)	16:11	16:17
25	08:25	07:25	06:18		06:42 (5)	06:05			05:11				04:56	05:27	06:21			07:15		07:42 (5)	07:11	08:09
	16:53	17:54	18:47	29	07:11 (5)	20:44			21:36				22:01	21:36	20:35			19:19	12	07:54 (5)	16:09	16:16
26	08:23	07:23	06:16		06:40 (5)	06:03		06:28 (4)	05:09				04:56	05:29	06:22			07:17		07:43 (5)	07:13	08:11
	16:54	17:56	18:49	31	07:11 (5)	20:46	1	06:29 (4)	21:37				22:01	21:35	20:32			19:17	9	07:52 (5)	16:07	16:15
27	08:22	07:21	06:14		06:37 (5)	06:01		06:26 (4)	05:08				04:57	05:31	06:24			07:19		07:45 (5)	07:15	08:13
	16:56	17:58	18:51	33	07:10 (5)	20:48	4	06:30 (4)	21:39				22:01	21:33	20:30			19:15	5	07:50 (5)	16:04	16:10
28	08:20	07:19	06:11		06:35 (5)	05:59		06:24 (4)	05:07				04:57	05:32	06:26			07:21		07:47 (5)	07:17	08:14
	16:58	18:00	18:53	35	07:10 (5)	20:50	6	06:30 (4)	21:40				22:01	21:32	20:28			19:12	1	07:48 (5)	16:02	16:11
29	08:19		07:09		07:35 (5)	05:56		06:22 (4)	05:06				04:58	05:34	06:28			07:23		07:18	08:16	08:44
	17:00		19:55	33	08:08 (5)	20:52	8	06:30 (4)	21:41				22:01	21:30	20:25			19:10		17:00	16:12	16:12
30	08:17		07:06		07:36 (5)	05:54		06:20 (4)	05:05				04:58	05:35	06:29			07:24		07:20	08:18	08:44
	17:02		19:56	32	08:08 (5)	20:54	9	06:29 (4)	21:43				22:00	21:28	20:23			19:07		16:58	16:11	16:13
31	08:15		07:04		07:36 (5)				05:04					05:37	06:31					07:22		08:44
	17:04		19:58	30	08:06 (5)				21:44					21:27	20:21					16:56		16:14
Potential sun hours	250	273	367			420			494			510	512	460		382		468		328	259	233
Total, worst case			370			120			120					149		468		0.34				
Sun reduction			0.27			0.35			0.38					0.34		0.32		1.00				
Oper. time red.			1.00			1.00			1.00					1.00		1.00		0.67				
Wind dir. red.			0.67			0.67			0.67					0.67		0.67		0.67				
Total reduction			0.18			0.24			0.26					0.23		0.22		0.22				
Total, real			67			28			31					34		101						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: E - H5

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24	16:13	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: F - H6

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:15	08:15	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: G - H7

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: H - H8

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	06:31 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:41	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	06:31 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:57	05:48	06:14 (1)	05:01	05:01	05:42	06:37	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	06:30 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09
4	08:43	08:09	07:09	06:54	05:46	06:12 (1)	05:00	05:01	05:44	06:29 (1)	06:38	07:32	08:24
	16:18	17:12	18:08	20:06	21:01	06:29 (1)	21:49	21:59	21:19	3 06:32 (1)	20:11	18:57	16:08
5	08:43	08:07	07:07	06:52	05:44	06:12 (1)	05:00	05:02	05:46	06:26 (1)	06:40	07:33	08:25
	16:20	17:14	18:10	20:08	21:03	06:28 (1)	21:50	21:58	21:18	9 06:35 (1)	20:09	18:55	16:07
6	08:43	08:05	07:05	06:49	05:42	06:14 (1)	04:59	05:03	05:47	06:24 (1)	06:42	07:35	08:27
	16:21	17:16	18:12	20:10	21:05	06:28 (1)	21:51	21:58	21:16	12 06:36 (1)	20:06	18:53	16:07
7	08:42	08:03	07:02	06:47	05:40	06:15 (1)	04:58	05:04	05:49	06:23 (1)	06:44	07:37	08:28
	16:22	17:18	18:13	20:11	21:06	06:26 (1)	21:52	21:57	21:14	15 06:38 (1)	20:04	18:50	16:06
8	08:42	08:01	07:00	06:44	05:38	06:16 (1)	04:57	05:05	05:51	06:21 (1)	06:45	07:39	08:29
	16:24	17:20	18:15	20:13	21:08	06:24 (1)	21:53	21:56	21:12	17 06:38 (1)	20:02	18:48	16:06
9	08:41	07:59	06:58	06:42	05:36		04:57	05:06	05:52	06:22 (1)	06:47	07:41	08:30
	16:25	17:22	18:17	20:15	21:10		21:54	21:56	21:10	17 06:39 (1)	19:59	18:45	16:06
10	08:41	07:57	06:55	06:40	05:35		04:56	05:07	05:54	06:24 (1)	06:49	07:43	08:32
	16:27	17:24	18:19	20:17	21:12		21:55	21:55	21:08	16 06:40 (1)	19:57	18:43	16:05
11	08:40	07:55	06:53	06:37	05:33		04:56	05:08	05:56	06:25 (1)	06:51	07:44	08:33
	16:28	17:26	18:21	20:19	21:13		21:56	21:54	21:06	14 06:39 (1)	19:54	18:41	16:05
12	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	06:27 (1)	06:52	07:46	08:34
	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	12 06:39 (1)	19:52	18:38	16:05
13	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	06:29 (1)	06:54	07:48	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:02	11 06:40 (1)	19:49	18:36	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:30 (1)	06:56	07:50	08:36
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	9 06:39 (1)	19:47	18:34	16:05
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:32 (1)	06:58	07:52	08:37
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	6 06:38 (1)	19:44	18:31	16:05
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	06:34 (1)	07:00	07:54	08:38
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	4 06:38 (1)	19:42	18:29	16:05
17	08:35	07:43	06:38	06:23	05:22		04:55	05:16	06:07	06:35 (1)	07:01	07:56	08:39
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	1 06:36 (1)	19:39	18:27	16:05
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08		07:03	07:58	08:39
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51		19:37	18:24	16:05
19	08:32	07:39	06:33	06:19	05:19		04:54	05:19	06:10		07:05	07:59	08:40
	16:42	17:42	18:36	20:34	21:27		22:00	21:45	20:49		19:34	18:22	16:05
20	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12		07:07	08:01	08:41
	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46		19:32	18:20	16:06
21	08:30	07:34	06:28	06:14	05:16		04:55	05:22	06:14		07:08	08:03	08:42
	16:45	17:46	18:40	20:37	21:30		22:01	21:42	20:44		19:29	18:18	16:06
22	08:29	07:32	06:26	06:12	05:15		04:55	05:23	06:15		07:10	08:05	08:44
	16:47	17:48	18:42	20:39	21:32		22:01	21:41	20:42		19:27	18:15	16:07
23	08:27	07:30	06:23	06:10	05:13		04:55	05:24	06:17		07:12	08:07	08:42
	16:49	17:50	18:44	20:41	21:33		22:01	21:40	20:40		19:24	18:13	16:07
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26	06:19		07:14	08:09	08:43
	16:51	17:52	18:45	20:43	21:35		22:01	21:38	20:37		19:22	18:11	16:08
25	08:25	07:26	06:19	06:05	05:11		04:56	05:28	06:21		07:15	07:11	08:09
	16:53	17:54	18:47	20:45	21:36		22:01	21:37	20:35		19:20	17:09	16:16
26	08:23	07:23	06:16	06:03	05:10	06:28 (1)	04:56	05:29	06:22		07:17	07:13	08:11
	16:55	17:56	18:49	20:46	2 06:30 (1)	21:37	22:01	21:35	20:33		19:17	17:07	16:15
27	08:22	07:21	06:14	06:01	05:08	06:26 (1)	04:57	05:31	06:24		07:19	07:15	08:13
	16:56	17:58	18:51	20:48	4 06:30 (1)	21:39	22:01	21:33	20:30		19:15	17:05	16:14
28	08:20	07:19	06:11	05:59	05:07	06:24 (1)	04:57	05:32	06:26		07:21	07:17	08:15
	16:58	18:00	18:53	20:50	7 06:31 (1)	21:40	22:01	21:32	20:28		19:12	17:02	16:13
29	08:19		07:09	05:56	05:06	06:22 (1)	04:58	05:34	06:28		07:23	07:19	08:16
	17:00		19:55	20:52	9 06:31 (1)	21:42	22:01	21:30	20:26		19:10	17:00	16:12
30	08:17		07:06	05:54	05:05	06:20 (1)	04:58	05:36	06:30		07:24	07:21	08:18
	17:02		19:57	20:54	11 06:31 (1)	21:43	22:01	21:28	20:23		19:07	16:58	16:11
31	08:15		07:04		05:04			05:37	06:31			07:22	
	17:04		19:58		21:44			21:27	20:21			16:56	
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233
Total, worst case						110				146			
Sun reduction				0.35		0.38				0.34			
Oper. time red.				1.00		1.00				1.00			
Wind dir. red.				0.68		0.68				0.68			
Total reduction				0.24		0.26				0.23			
Total, real				8		28				34			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: I - H9

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:56	06:36 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:41	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	06:36 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	06:57	05:48	06:15 (1)	05:01	05:01	05:42	06:37	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	06:35 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09		
4	08:43	08:09	07:09	06:54	05:46	06:15 (1)	05:00	05:01	05:44	6	06:32 (1)	06:38	07:32	07:30	08:24
	16:18	17:12	18:08	20:06	21:01	06:34 (1)	21:49	21:59	21:19	6	06:38 (1)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	06:16 (1)	04:59	05:02	05:46	6	06:29 (1)	06:40	07:33	07:32	08:25
	16:20	17:14	18:10	20:08	21:03	06:33 (1)	21:50	21:58	21:18	11	06:40 (1)	20:09	18:55	16:47	16:07
6	08:43	08:05	07:05	06:49	05:42	06:17 (1)	04:59	05:03	05:47	11	06:27 (1)	06:42	07:35	07:34	08:27
	16:21	17:16	18:12	20:10	21:05	06:33 (1)	21:51	21:58	21:16	14	06:41 (1)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	06:18 (1)	04:58	05:04	05:49	14	06:26 (1)	06:44	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	06:31 (1)	21:52	21:57	21:14	17	06:43 (1)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	06:20 (1)	04:57	05:05	05:51	17	06:25 (1)	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	06:29 (1)	21:53	21:56	21:12	18	06:43 (1)	20:02	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36	06:24 (1)	04:57	05:06	05:52	18	06:24 (1)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	06:25 (1)	21:54	21:56	21:10	20	06:44 (1)	19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35		04:56	05:07	05:54	20	06:24 (1)	06:49	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12		21:55	21:55	21:08	21	06:45 (1)	19:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33		04:56	05:08	05:56	21	06:25 (1)	06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13		21:56	21:54	21:06	19	06:44 (1)	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	19	06:27 (1)	06:52	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	18	06:45 (1)	19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	18	06:29 (1)	06:54	07:48	07:48	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	16	06:45 (1)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	16	06:30 (1)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	14	06:44 (1)	19:47	18:34	16:31	16:05
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	14	06:32 (1)	06:58	07:52	07:51	08:37
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	12	06:44 (1)	19:44	18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	12	06:34 (1)	07:00	07:54	07:53	08:38
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	10	06:44 (1)	19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22		04:54	05:16	06:06	10	06:35 (1)	07:01	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	7	06:42 (1)	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08	7	06:37 (1)	07:03	07:58	07:57	08:39
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51	4	06:41 (1)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19		04:54	05:19	06:10	4	06:39 (1)	07:05	07:59	07:59	08:40
	16:42	17:42	18:36	20:34	21:27		22:00	21:45	20:49	1	06:40 (1)	19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12	1		07:07	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46			19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16		04:55	05:22	06:14			07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30		22:01	21:42	20:44			19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15		04:55	05:23	06:15			07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	21:32		22:01	21:41	20:42			19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13		04:55	05:24	06:17			07:12	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	21:33		22:01	21:40	20:39			19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	06:32 (1)	05:12	04:55	05:26	06:19		07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	2	06:34 (1)	21:35	22:01	21:38	20:37		19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11	06:30 (1)	05:11	04:56	05:28	06:21		07:15	07:11	08:09	08:43
	16:53	17:54	18:47	20:45	5	06:35 (1)	21:36	22:01	21:37	20:35		19:20	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:10	06:28 (1)	05:10	04:56	05:29	06:22		07:17	07:13	08:11	08:44
	16:55	17:56	18:49	20:46	8	06:36 (1)	21:37	22:01	21:35	20:33		19:17	17:07	16:15	16:09
27	08:22	07:21	06:14	06:01	05:08	06:26 (1)	05:08	04:57	05:31	06:24		07:19	07:15	08:13	08:44
	16:56	17:58	18:51	20:48	10	06:36 (1)	21:39	22:01	21:33	20:30		19:15	17:05	16:14	16:10
28	08:20	07:19	06:11	05:59	05:07	06:24 (1)	05:07	04:57	05:32	06:26		07:21	07:17	08:15	08:44
	16:58	18:00	18:53	20:50	12	06:36 (1)	21:40	22:01	21:32	20:28		19:12	17:02	16:13	16:11
29	08:19		07:09	05:56	06:22 (1)	05:06		04:58	05:34	06:28		07:23	07:19	08:16	08:44
	17:00		19:55	20:52	14	06:36 (1)	21:42	22:01	21:30	20:26		19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	06:20 (1)	05:05		04:58	05:36	06:29		07:24	07:21	08:18	08:44
	17:02		19:57	20:54	16	06:36 (1)	21:43	22:01	21:28	20:23		19:07	16:58	16:11	16:13
31	08:15		07:04		05:04				05:37	06:31			07:22		08:44
	17:04		19:58		21:44				21:27	20:21			16:56		16:14
Potential sun hours	250	273	367	420	494		510	512	460		382	328		259	233
Total, worst case						133				208					
Sun reduction				0.35		0.38				0.34					
Oper. time red.				1.00		1.00				1.00					
Wind dir. red.				0.68		0.68				0.68					
Total reduction				0.24		0.26				0.23					
Total, real				16		34				48					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: J - H10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December						
1	08:44	08:14	07:16	07:01	05:52	05:03	05:34 (1)	04:59	05:35 (1)	05:39	06:33	07:26	07:24	08:19				
2	16:15	17:06	18:02	20:00	20:56	21:45	05:49 (1)	22:00	17	05:52 (1)	21:25	20:18	19:05	16:54	16:10			
	08:44	08:12	07:14	06:59	05:50	05:02	05:33 (1)	05:00		05:35 (1)	05:41	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	21:47	05:49 (1)	22:00	18	05:53 (1)	21:23	20:16	19:02	16:52	16:09			
3	08:44	08:10	07:12	06:57	05:48	05:01	05:32 (1)	05:01		05:36 (1)	05:42	06:37	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	21:48	05:49 (1)	21:59	18	05:54 (1)	21:21	20:14	19:00	16:50	16:09			
	08:43	08:09	07:09	06:54	05:46	05:00	05:31 (1)	05:01		05:35 (1)	05:44	06:38	07:32	07:30	08:24			
4	16:18	17:12	18:08	20:06	21:01	21:49	05:48 (1)	21:59	19	05:54 (1)	21:19	20:11	18:57	16:48	16:08			
	08:43	08:07	07:07	06:52	05:44	04:59	05:31 (1)	05:02		05:35 (1)	05:46	06:40	07:33	07:32	08:25			
	16:20	17:14	18:10	20:08	21:03	21:50	05:49 (1)	21:58	19	05:54 (1)	21:18	20:09	18:55	16:47	16:07			
6	08:43	08:05	07:05	06:49	05:42	04:59	05:30 (1)	05:03		05:36 (1)	05:47	06:42	07:35	07:34	08:27			
	16:21	17:16	18:12	20:09	21:05	21:51	05:48 (1)	21:58	18	05:55 (1)	21:16	20:06	18:53	16:45	16:07			
	08:42	08:03	07:02	06:47	05:40	04:58	05:30 (1)	05:04		05:37 (1)	05:49	06:44	07:37	07:36	08:28			
8	16:22	17:18	18:13	20:11	21:06	21:52	05:49 (1)	21:57	18	05:55 (1)	21:14	20:04	18:50	16:43	16:06			
	08:42	08:01	07:00	06:44	05:38	04:57	05:29 (1)	05:05		05:38 (1)	05:51	06:45	07:39	07:38	08:29			
	16:24	17:20	18:15	20:13	21:08	21:53	05:48 (1)	21:56	18	05:56 (1)	21:12	20:01	18:48	16:41	16:06			
9	08:41	07:59	06:58	06:42	05:36	04:57	05:30 (1)	05:06		05:39 (1)	05:52	06:47	07:41	07:40	08:30			
	16:25	17:22	18:17	20:15	21:10	21:54	05:49 (1)	21:56	17	05:56 (1)	21:10	19:59	18:45	16:39	16:06			
	08:41	07:57	06:55	06:40	05:35	04:56	05:30 (1)	05:07		05:40 (1)	05:54	06:49	07:43	07:42	08:32			
10	16:27	17:24	18:19	20:17	21:12	21:55	05:48 (1)	21:55	16	05:56 (1)	21:08	19:57	18:43	16:37	16:05			
	08:40	07:55	06:53	06:37	05:33	04:56	05:31 (1)	05:08		05:41 (1)	05:56	06:51	07:44	07:44	08:33			
	16:28	17:26	18:21	20:19	21:13	21:56	05:48 (1)	21:54	16	05:57 (1)	21:06	19:54	18:41	16:36	16:05			
12	08:39	07:53	06:50	06:35	05:31	04:56	05:32 (1)	05:10		05:42 (1)	05:58	06:52	07:46	07:46	08:34			
	16:30	17:28	18:23	20:21	21:15	21:56	05:49 (1)	21:53	15	05:57 (1)	21:04	19:52	18:38	16:34	16:05			
	08:38	07:51	06:48	06:33	05:29	04:55	05:31 (1)	05:11		05:43 (1)	05:59	06:54	07:48	07:48	08:35			
13	16:31	17:30	18:25	20:22	21:17	21:57	05:48 (1)	21:52	14	05:57 (1)	21:01	19:49	18:36	16:32	16:05			
	08:37	07:49	06:45	06:30	05:27	04:55	05:32 (1)	05:12		05:44 (1)	06:01	06:56	07:50	07:49	08:36			
	16:33	17:32	18:27	20:24	21:19	21:58	05:48 (1)	21:51	13	05:57 (1)	20:59	19:47	18:34	16:31	16:06			
15	08:36	07:47	06:43	06:28	05:26	04:55	05:32 (1)	05:13		05:46 (1)	06:03	06:58	07:52	07:51	08:37			
	16:35	17:34	18:29	20:26	21:20	21:58	05:48 (1)	21:50	12	05:58 (1)	20:57	19:44	18:31	16:29	16:05			
	08:36	07:45	06:41	06:25	05:24	04:55	05:33 (1)	05:15		05:47 (1)	06:05	07:00	07:54	07:53	08:38			
16	16:36	17:36	18:31	20:28	21:22	21:59	05:48 (1)	21:49	11	05:58 (1)	20:55	19:42	18:29	16:28	16:05			
	08:35	07:43	06:38	06:23	05:22	04:54	05:33 (1)	05:16		05:48 (1)	06:06	07:01	07:56	07:55	08:39			
	16:38	17:38	18:32	20:30	21:24	21:59	05:48 (1)	21:48	10	05:58 (1)	20:53	19:39	18:27	16:26	16:05			
18	08:33	07:41	06:36	06:21	05:21	04:54	05:33 (1)	05:17		05:49 (1)	06:08	07:03	07:58	07:57	08:39			
	16:40	17:40	18:34	20:32	21:25	22:00	05:48 (1)	21:46	8	05:57 (1)	20:51	19:37	18:24	16:25	16:05			
	08:32	07:39	06:33	06:19	05:19	04:54	05:34 (1)	05:19		05:51 (1)	06:10	07:05	07:59	07:59	08:40			
19	16:42	17:42	18:36	20:33	21:27	22:00	05:48 (1)	21:45	7	05:58 (1)	20:48	19:34	18:22	16:23	16:05			
	08:31	07:37	06:31	06:16	05:18	04:55	05:34 (1)	05:20		05:52 (1)	06:12	07:07	08:01	08:01	08:41			
	16:43	17:44	18:38	20:35	21:28	22:00	05:48 (1)	21:44	5	05:57 (1)	20:46	19:32	18:20	16:22	16:06			
21	08:30	07:34	06:28	06:14	05:16	04:55	05:35 (1)	05:22		05:53 (1)	06:14	07:08	08:03	08:02	08:41			
	16:45	17:46	18:40	20:37	21:30	1	05:46 (1)	22:01	14	05:49 (1)	21:42	4	05:57 (1)	20:44	19:29	18:18	16:21	16:06
	08:29	07:32	06:26	06:12	05:15	05:44 (1)	04:55	05:35 (1)	05:23	05:55 (1)	06:15	07:10	08:05	08:04	08:42			
22	16:47	17:48	18:42	20:39	21:31	3	05:47 (1)	22:01	14	05:49 (1)	21:41	2	05:57 (1)	20:42	19:27	18:15	16:19	16:07
	08:27	07:30	06:23	06:10	05:13	05:43 (1)	04:55	05:35 (1)	05:24		06:17	07:12	08:07	08:06	08:42			
	16:49	17:50	18:44	20:41	21:33	5	05:48 (1)	22:01	14	05:49 (1)	21:40	20:39	19:24	18:13	16:18	16:07		
24	08:26	07:28	06:21	06:07	05:12	05:41 (1)	04:55	05:34 (1)	05:26		06:19	07:14	08:09	08:08	08:43			
	16:51	17:52	18:45	20:43	21:35	6	05:47 (1)	22:01	15	05:49 (1)	21:38	20:37	19:22	18:11	16:17	16:08		
	08:25	07:26	06:19	06:05	05:11	05:40 (1)	04:56	05:35 (1)	05:28		06:21	07:15	08:11	08:09	08:43			
25	16:53	17:54	18:47	20:45	21:36	8	05:48 (1)	22:01	15	05:50 (1)	21:37	20:35	19:20	17:09	16:16	16:08		
	08:23	07:23	06:16	06:03	05:10	05:39 (1)	04:56	05:35 (1)	05:29		06:22	07:17	08:13	08:11	08:44			
	16:55	17:56	18:49	20:46	21:37	9	05:48 (1)	22:01	15	05:50 (1)	21:35	20:33	19:17	17:07	16:15	16:09		
27	08:22	07:21	06:14	06:01	05:08	05:38 (1)	04:57	05:35 (1)	05:31		06:24	07:19	08:15	08:13	08:44			
	16:56	17:58	18:51	20:48	21:39	10	05:48 (1)	22:01	16	05:51 (1)	21:33	20:30	19:15	17:05	16:14	16:10		
	08:20	07:19	06:11	05:59	05:07	05:37 (1)	04:57	05:35 (1)	05:32		06:26	07:21	08:17	08:15	08:44			
28	16:58	18:00	18:53	20:50	21:40	11	05:48 (1)	22:01	16	05:51 (1)	21:32	20:28	19:12	17:02	16:13	16:11		
	08:19		07:09	05:56	05:06	05:36 (1)	04:58	05:35 (1)	05:34		06:28	07:23	08:19	08:16	08:44			
	17:00		07:55	20:52	21:42	12	05:48 (1)	22:01	17	05:52 (1)	21:30	20:26	19:10	17:00	16:12	16:12		
30	08:17		07:06	05:54	05:05	05:35 (1)	04:58	05:35 (1)	05:36		06:29	07:24	08:21	08:18	08:44			
	17:02		19:57	20:54	21:43	13	05:48 (1)	22:00	17	05:52 (1)	21:28	20:23	19:07	16:58	16:11	16:13		
	08:15		07:04		05:04	05:34 (1)				05:37		06:31		07:22		08:44		
31	17:04		19:58		21:44	14	05:48 (1)			21:27		20:21		16:56		16:14		
	Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233					
	Total, worst case					92	485	296										
Sun reduction					0.38	0.32												
Oper. time red.					1.00	1.00												
Wind dir. red.					0.66	0.66												
Total reduction					0.25	0.21	0.21											
Total, real					23	102	63											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: K - H11

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: L - H12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16	07:01	07:25 (5)	05:52	05:03	05:34 (3)									
	16:15	17:06	18:02	20:00	4	07:29 (5)	20:55	21:45	9	05:43 (3)							
2	08:44	08:12	07:14	06:59	07:23 (5)	05:50	05:02	05:33 (3)									
	16:16	17:08	18:04	20:02	7	07:30 (5)	20:57	21:47	10	05:43 (3)							
3	08:44	08:10	07:12	06:56	07:20 (5)	05:48	05:01	05:32 (3)									
	16:17	17:10	18:06	20:04	9	07:29 (5)	20:59	21:48	11	05:43 (3)							
4	08:43	08:09	07:09	06:54	07:18 (5)	05:46	05:00	05:31 (3)									
	16:18	17:12	18:08	20:06	12	07:30 (5)	21:01	21:49	12	05:43 (3)							
5	08:43	08:07	07:07	06:52	07:15 (5)	05:44	04:59	05:31 (3)									
	16:20	17:14	18:10	20:08	14	07:29 (5)	21:03	21:50	12	05:43 (3)							
6	08:43	08:05	07:05	06:49	07:13 (5)	05:42	04:59	05:30 (3)									
	16:21	17:16	18:11	20:09	16	07:29 (5)	21:04	21:51	13	05:43 (3)							
7	08:42	08:03	07:02	06:47	07:11 (5)	05:40	04:58	05:30 (3)									
	16:22	17:18	18:13	20:11	17	07:28 (5)	21:06	21:52	14	05:44 (3)							
8	08:42	08:01	07:00	06:44	07:08 (5)	05:38	04:57	05:29 (3)									
	16:24	17:20	18:15	20:13	19	07:27 (5)	21:08	21:53	14	05:43 (3)							
9	08:41	07:59	06:57	06:42	07:06 (5)	05:36	04:57	05:29 (3)									
	16:25	17:22	18:17	20:15	20	07:26 (5)	21:10	21:54	15	05:44 (3)							
10	08:40	07:57	06:55	06:40	07:06 (5)	05:35	04:56	05:28 (3)									
	16:27	17:24	18:19	20:17	18	07:24 (5)	21:12	21:55	15	05:43 (3)							
11	08:40	07:55	06:53	06:37	07:08 (5)	05:33	04:56	05:28 (3)									
	16:28	17:26	18:21	20:19	14	07:22 (5)	21:13	21:55	16	05:44 (3)							
12	08:39	07:53	06:50	06:35	07:10 (5)	05:31	04:56	05:28 (3)									
	16:30	17:28	18:23	20:21	10	07:20 (5)	21:15	21:56	16	05:44 (3)							
13	08:38	07:51	06:48	06:32		05:29	04:55	05:27 (3)									
	16:31	17:30	18:25	20:22		21:17	21:57	05:44 (3)									
14	08:37	07:49	06:45	06:30		05:27	04:55	05:27 (3)									
	16:33	17:32	18:27	20:24		21:18	21:58	05:44 (3)									
15	08:36	07:47	06:43	06:28		05:26	04:55	05:27 (3)									
	16:35	17:34	18:29	20:26		21:20	21:58	05:44 (3)									
16	08:35	07:45	06:41	06:25		05:24	04:55	05:27 (3)									
	16:36	17:36	18:30	20:28		21:22	21:59	05:44 (3)									
17	08:34	07:43	06:38	06:23		05:22	04:54	05:27 (3)									
	16:38	17:38	18:32	20:30		21:23	21:59	05:44 (3)									
18	08:33	07:41	06:36	06:21		05:21	04:54	05:27 (3)									
	16:40	17:40	18:34	20:32		21:25	22:00	05:45 (3)									
19	08:32	07:39	06:33	06:19		05:19	04:54	05:27 (3)									
	16:42	17:42	18:36	20:33		21:27	22:00	05:45 (3)									
20	08:31	07:37	06:31	06:16		05:18	04:55	05:27 (3)									
	16:43	17:44	18:38	20:35		21:28	22:00	05:45 (3)									
21	08:30	07:34	06:28	06:14		05:16	04:55	05:28 (3)									
	16:45	17:46	18:40	20:37		21:30	22:01	05:46 (3)									
22	08:29	07:32	06:26	06:12		05:15	04:55	05:28 (3)									
	16:47	17:48	18:42	20:39		21:31	22:01	05:46 (3)									
23	08:27	07:30	06:23	06:09		05:13	04:55	05:28 (3)									
	16:49	17:50	18:44	20:41		21:33	22:01	05:46 (3)									
24	08:26	07:28	06:21	06:07		05:12	04:55	05:28 (3)									
	16:51	17:52	18:45	20:43		21:34	22:01	05:46 (3)									
25	08:25	07:25	06:18	06:05		05:11	04:56	05:29 (3)									
	16:53	17:54	18:47	20:44		21:36	22:01	05:47 (3)									
26	08:23	07:23	06:16	06:03		05:10	04:56	05:29 (3)									
	16:54	17:56	18:49	20:46		21:37	22:01	05:46 (3)									
27	08:22	07:21	06:14	06:01		05:08	04:57	05:30 (3)									
	16:56	17:58	18:51	20:48		21:39	22:01	05:47 (3)									
28	08:20	07:19	06:11	05:59		05:07	04:57	05:30 (3)									
	16:58	18:00	18:53	20:50		21:40	22:01	05:47 (3)									
29	08:19		07:09	05:56		05:06	04:58	05:31 (3)									
	17:00		19:55	20:52		21:41	22:01	05:48 (3)									
30	08:17		07:06	05:54		05:05	04:58	05:31 (3)									
	17:02		19:56	20:54		21:43	22:00	05:47 (3)									
31	08:15		07:04	07:27 (5)		05:04	05:34 (3)										
	17:04		19:58	1	07:28 (5)	21:44	8	05:42 (3)									
Potential sun hours	250	273	367	420		494	510										
Total, worst case			1	160		30	470										
Sun reduction			0.27	0.35		0.38	0.32										
Oper. time red.			1.00	1.00		1.00	1.00										
Wind dir. red.			0.67	0.67		0.66	0.66										
Total reduction			0.18	0.24		0.25	0.21										
Total, real			0	38		8	99										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: L - H12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 16	05:32 (3) 05:48 (3) 21:25	05:39 20:18 14	07:07 (5) 07:21 (5) 19:05	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 16	05:33 (3) 05:49 (3) 21:23	05:40 20:16 18	07:05 (5) 07:23 (5) 19:02	07:28 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 15	05:33 (3) 05:48 (3) 21:21	05:42 20:14 20	07:04 (5) 07:24 (5) 19:00	07:30 16:50 16:09	08:22 16:09 16:09
4	05:01 21:59 15	05:34 (3) 05:49 (3) 21:19	05:44 20:11 19	07:05 (5) 07:24 (5) 18:57	07:32 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 14	05:35 (3) 05:49 (3) 21:17	05:46 20:09 17	07:07 (5) 07:24 (5) 18:55	07:33 16:46 16:07	08:25 16:07 16:07
6	05:03 21:58 13	05:36 (3) 05:49 (3) 21:16	05:47 20:06 16	07:09 (5) 07:25 (5) 18:53	07:35 16:45 16:07	08:26 16:07 16:07
7	05:04 21:57 13	05:37 (3) 05:50 (3) 21:14	05:49 20:04 14	07:10 (5) 07:24 (5) 18:50	07:36 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 12	05:38 (3) 05:50 (3) 21:12	05:51 20:01 12	07:12 (5) 07:24 (5) 18:48	07:38 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 11	05:39 (3) 05:50 (3) 21:10	05:52 19:59 9	07:14 (5) 07:23 (5) 18:45	07:41 16:39 16:06	08:30 16:06 16:06
10	05:07 21:55 10	05:40 (3) 05:50 (3) 21:08	05:54 19:57 7	07:16 (5) 07:23 (5) 18:43	07:43 16:37 16:05	08:32 16:05 16:05
11	05:08 21:54 9	05:41 (3) 05:50 (3) 21:06	05:56 19:54 4	07:17 (5) 07:21 (5) 18:41	07:44 16:36 16:05	08:33 16:05 16:05
12	05:10 21:53 8	05:42 (3) 05:50 (3) 21:03	05:58 19:52 1	07:19 (5) 07:20 (5) 18:38	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 7	05:43 (3) 05:50 (3) 21:01	06:00 19:49 1	07:20 (5) 18:36 16:32	07:47 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 6	05:44 (3) 05:50 (3) 20:59	06:01 19:47 1	07:21 (5) 18:34 16:31	07:49 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 5	05:45 (3) 05:50 (3) 20:57	06:03 19:44 1	07:22 (5) 18:31 16:29	07:51 16:29 16:05	08:37 16:05 16:05
16	05:15 21:49 4	05:47 (3) 05:51 (3) 20:55	06:05 19:42 1	07:23 (5) 18:29 16:28	07:53 16:28 16:05	08:38 16:05 16:05
17	05:16 21:47 2	05:48 (3) 05:50 (3) 20:53	06:06 19:39 1	07:24 (5) 18:27 16:26	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 1	05:49 (3) 05:50 (3) 20:51	06:08 19:37 1	07:25 (5) 18:24 16:25	07:57 16:25 16:05	08:39 16:05 16:05
19	05:19 21:45 1	06:10 20:48 1	07:05 19:34 1	07:59 18:22 16:23	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44 1	06:12 20:46 1	07:07 19:32 1	08:01 18:20 16:22	08:01 16:22 16:06	08:41 16:06 16:06
21	05:21 21:42 1	06:14 20:44 1	07:08 19:29 1	08:03 18:18 16:21	08:02 16:21 16:06	08:41 16:06 16:06
22	05:23 21:41 1	06:15 20:42 1	07:10 19:27 1	08:05 18:15 16:19	08:04 16:19 16:07	08:42 16:07 16:07
23	05:24 21:39 1	06:17 20:39 1	07:12 19:24 1	08:07 18:13 16:18	08:06 16:18 16:07	08:42 16:07 16:07
24	05:26 21:38 1	06:19 20:37 1	07:14 19:22 1	08:09 18:11 16:17	08:08 16:17 16:08	08:43 16:08 16:08
25	05:28 21:36 1	06:21 20:35 1	07:15 19:19 1	07:11 17:09 16:16	08:09 16:16 16:08	08:43 16:08 16:08
26	05:29 21:35 1	06:22 20:33 1	07:17 19:17 1	07:13 17:07 16:15	08:11 16:15 16:09	08:43 16:09 16:09
27	05:31 21:33 1	06:24 20:30 1	07:19 19:15 1	07:15 17:05 16:14	08:13 16:14 16:10	08:44 16:10 16:10
28	05:32 21:32 1	06:26 20:28 1	07:21 19:12 1	07:17 17:02 16:13	08:14 16:13 16:11	08:44 16:11 16:11
29	05:34 21:30 1	06:28 20:25 1	07:23 19:10 1	07:19 17:00 16:12	08:16 16:12 16:12	08:44 16:12 16:12
30	05:35 21:28 1	06:29 20:23 1	07:24 19:07 1	07:20 16:58 16:11	08:18 16:11 16:13	08:44 16:13 16:13
31	05:37 21:27 1	06:31 20:21 10	07:10 (5) 07:20 (5)	07:22 16:56 16:14	08:44 16:14 16:14	08:44 16:14 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	177	10	151			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.67	0.67			
Total reduction	0.21	0.23	0.22			
Total, real	38	2	33			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: M - H13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	17:16 (5) 20:00	07:01 20:55	19:29 (4) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	17:15 (5) 20:02	06:59 20:57	19:30 (4) 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	17:15 (5) 20:04	06:56 20:59	19:31 (4) 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	17:14 (5) 20:06	06:54 21:01	19:32 (4) 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	17:13 (5) 20:07	06:51 21:03	19:33 (4) 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	17:14 (5) 20:09	06:49 21:04	19:34 (4) 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	17:13 (5) 20:11	06:47 21:06	19:36 (4) 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	17:14 (5) 20:13	06:44 21:08	19:38 (4) 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	17:14 (5) 20:15	06:42 21:10	19:42 (4) 21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	17:15 (5) 20:17	06:39 21:11	19:50 (4) 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	17:16 (5) 20:19	06:37 21:13	19:41 (4) 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	17:17 (5) 20:20	06:35 21:15	19:51 (3) 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	17:18 (5) 20:22	06:32 21:17	19:53 (3) 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	17:19 (5) 20:24	06:30 21:18	19:54 (3) 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	17:20 (5) 20:26	06:28 21:20	19:55 (3) 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	17:21 (5) 20:28	06:25 21:22	19:56 (3) 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	17:22 (5) 20:30	06:23 21:23	19:57 (3) 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	17:23 (5) 20:31	06:21 21:25	19:58 (3) 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	17:24 (5) 20:33	06:18 21:27	19:59 (3) 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	17:25 (5) 20:35	06:16 21:28	19:59 (3) 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	17:26 (5) 20:37	06:14 21:30	19:59 (3) 22:00
22	08:28 16:47	07:32 17:48	06:26 18:41	17:27 (5) 20:39	06:12 21:31	19:59 (3) 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	17:28 (5) 20:41	06:09 21:33	19:59 (3) 22:01
24	08:26 16:50	07:28 17:52	06:21 18:45	17:29 (5) 20:42	06:07 21:34	19:59 (3) 22:01
25	08:24 16:52	07:25 17:54	17:24 (5) 18:47	17:30 (5) 20:44	06:05 21:36	19:59 (3) 22:01
26	08:23 16:54	07:23 17:56	17:21 (5) 18:49	17:31 (5) 20:46	06:03 21:37	19:59 (3) 22:01
27	08:22 16:56	07:21 17:58	17:19 (5) 18:51	17:32 (5) 20:48	06:01 21:39	19:59 (3) 22:01
28	08:20 16:58	07:18 18:00	17:17 (5) 18:53	17:33 (5) 20:50	05:58 21:40	19:59 (3) 22:01
29	08:18 17:00		07:08 19:54	17:34 (5) 20:52	05:56 21:41	19:59 (3) 22:01
30	08:17 17:02		07:06 19:56	17:35 (5) 20:54	05:54 21:43	19:59 (3) 22:01
31	08:15 17:04		07:04 19:58	17:36 (5) 20:56	05:52 21:44	19:59 (3) 22:01
Potential sun hours	250	273	367	420	494	510
Total, worst case		36	287	639	220	34
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.68	0.68	0.65	0.65	0.61
Total reduction		0.16	0.18	0.23	0.25	0.19
Total, real		6	53	147	55	7

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: M - H13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December		
1	04:59 22:00	05:39 21:25	06:33 20:18	19:40 (4) 19:50 (3)	07:26 19:05	17:57 (5) 18:12 (5)	07:24 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	19:44 (4) 19:48 (4)	07:28 19:02	17:55 (5) 18:13 (5)	07:26 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13		07:30 19:00	17:53 (5) 18:15 (5)	07:28 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	19:51 (4) 20:02 (4)	06:38 20:11	07:31 18:57	17:52 (5) 18:15 (5)	07:30 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	19:47 (4) 20:04 (4)	06:40 20:09	07:33 18:55	17:51 (5) 18:16 (5)	07:32 16:46	08:25 16:07
6	05:03 21:57	05:47 21:15	19:45 (4) 20:06 (4)	06:42 20:06	07:35 18:52	17:50 (5) 18:16 (5)	07:34 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	19:44 (4) 20:08 (4)	06:43 20:04	07:37 18:50	17:49 (5) 18:15 (5)	07:36 16:43	08:28 16:06
8	05:05 21:56	05:51 21:11	19:42 (4) 20:09 (4)	06:45 20:01	07:39 18:48	17:49 (5) 18:15 (5)	07:38 16:41	08:29 16:06
9	05:06 21:55	05:52 21:09	19:41 (4) 20:10 (4)	06:47 19:59	07:41 18:45	17:48 (5) 18:15 (5)	07:40 16:39	08:30 16:05
10	05:07 21:55	05:54 21:07	19:39 (4) 20:10 (4)	06:49 19:56	07:42 18:43	17:49 (5) 18:14 (5)	07:42 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	19:38 (4) 20:11 (4)	06:50 19:54	07:44 18:40	17:49 (5) 18:11 (5)	07:44 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	19:38 (4) 20:12 (4)	06:52 19:51	07:46 18:38	17:49 (5) 18:09 (5)	07:45 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	19:36 (4) 20:12 (4)	06:54 19:49	07:48 18:36	17:50 (5) 18:07 (5)	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	19:36 (4) 20:13 (4)	06:56 19:47	07:50 18:33	17:51 (5) 18:04 (5)	07:49 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	19:36 (4) 20:14 (4)	06:58 19:44	07:52 18:31	17:52 (5) 18:02 (5)	07:51 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	19:34 (4) 20:13 (4)	06:59 19:42	07:54 18:29	17:54 (5) 18:00 (5)	07:53 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	19:34 (4) 20:13 (4)	07:01 19:39	07:55 18:26		07:55 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	19:34 (4) 20:14 (4)	07:03 19:37	07:57 18:24		07:57 16:25	08:39 16:05
19	05:18 21:45	06:10 20:48	19:33 (4) 20:13 (4)	07:05 19:34	07:59 18:22		07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	19:33 (4) 20:13 (4)	07:06 19:32	08:01 18:20		08:00 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	19:33 (4) 20:13 (4)	07:08 19:29	08:03 18:17		08:02 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	19:33 (4) 20:12 (4)	07:10 19:27	08:05 18:15		08:04 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	19:33 (4) 20:10 (4)	07:12 19:24	08:07 18:13		08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	19:33 (4) 20:09 (4)	07:13 19:22	08:09 18:11		08:08 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	19:33 (4) 20:06 (3)	07:15 19:19	07:11 17:09		08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	19:34 (4) 20:04 (3)	07:17 19:17	07:13 17:06		08:11 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	19:35 (4) 20:02 (3)	07:19 19:14	07:14 17:04		08:13 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	19:35 (4) 19:59 (3)	07:21 19:12	07:16 17:02		08:14 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	19:36 (4) 19:57 (3)	07:22 19:09	07:18 17:00		08:16 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	19:37 (4) 19:55 (3)	07:24 19:07	18:00 (5) 18:09 (5)		08:18 16:11	08:44 16:12
31	05:37 21:26	06:31 20:21	19:38 (4) 19:52 (3)		07:22 16:56			08:44 16:13
Potential sun hours	512	460	382		328		259	233
Total, worst case		855		23		321		
Sun reduction		0.34		0.32		0.29		
Oper. time red.		1.00		1.00		1.00		
Wind dir. red.		0.65		0.66		0.68		
Total reduction		0.22		0.21		0.20		
Total, real		190		5		64		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: N - H14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June			
1	08:44 16:15	08:14 17:06	07:16 18:02	16:59 (5) 22 17:21 (5)	07:01 20:00	19:05 (4) 28 19:33 (4)	05:52 20:55	05:03 21:45	20:49 (2) 21:10 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	17:00 (5) 19 17:19 (5)	06:59 20:02	19:03 (4) 32 19:35 (3)	05:50 20:57	05:02 21:46	20:49 (2) 21:12 (2)
3	08:43 16:17	08:10 17:10	07:11 18:06	17:01 (5) 17 17:18 (5)	06:56 20:04	19:03 (4) 34 19:37 (3)	05:48 20:59	05:01 21:48	20:49 (2) 21:13 (2)
4	08:43 16:18	08:08 17:12	07:09 18:07	17:04 (5) 12 17:16 (5)	06:54 20:06	19:02 (4) 37 19:39 (3)	05:46 21:01	05:00 21:49	20:49 (2) 21:14 (2)
5	08:43 16:19	08:07 17:14	07:07 18:09	17:07 (5) 4 17:11 (5)	06:51 20:07	19:01 (4) 39 19:40 (3)	05:44 21:03	04:59 21:50	20:48 (2) 21:14 (2)
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	19:01 (4) 41 19:42 (3)	05:42 21:04	04:59 21:51	20:49 (2) 21:16 (2)	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	19:00 (4) 43 19:43 (3)	05:40 21:06	04:58 21:52	20:49 (2) 21:16 (2)	
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	19:00 (4) 46 19:46 (3)	05:38 21:08	04:57 21:53	20:49 (2) 21:17 (2)	
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	19:00 (4) 48 19:48 (3)	05:36 21:10	04:57 21:54	20:49 (2) 21:17 (2)	
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	19:00 (4) 46 19:46 (3)	05:34 21:11	04:56 21:55	20:50 (2) 21:18 (2)	
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	19:00 (4) 46 19:46 (3)	05:33 21:13	04:56 21:55	20:50 (2) 21:18 (2)	
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	19:01 (4) 44 19:45 (3)	05:31 21:15	04:55 21:56	20:49 (2) 21:18 (2)	
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:01 (4) 42 19:43 (3)	05:29 21:17	04:55 21:57	20:50 (2) 21:18 (2)	
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:02 (4) 39 19:41 (3)	05:27 21:18	04:55 21:57	20:50 (2) 21:18 (2)	
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:03 (4) 35 19:38 (3)	05:26 21:20	04:55 21:58	20:51 (2) 21:19 (2)	
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:04 (4) 28 19:32 (4)	05:24 21:22	04:54 21:59	20:51 (2) 21:19 (2)	
17	08:34 16:38	07:43 17:38	17:06 (5) 3 17:09 (5)	06:38 18:32	19:05 (4) 24 19:29 (4)	05:22 21:23	04:54 21:59	20:51 (2) 21:19 (2)	
18	08:33 16:40	07:41 17:40	17:03 (5) 8 17:11 (5)	06:35 18:34	19:06 (4) 21 19:27 (4)	05:21 21:25	04:54 22:00	20:51 (2) 21:19 (2)	
19	08:32 16:41	07:39 17:42	17:02 (5) 11 17:13 (5)	06:33 18:36	19:09 (4) 16 19:25 (4)	05:19 21:27	04:54 22:00	20:52 (2) 21:20 (2)	
20	08:31 16:43	07:36 17:44	17:01 (5) 15 17:16 (5)	06:31 18:38	19:13 (4) 8 19:21 (4)	05:18 21:28	04:54 22:00	20:52 (2) 21:20 (2)	
21	08:30 16:45	07:34 17:46	17:00 (5) 18 17:18 (5)	06:28 18:40	05:16 21:30	20:56 (2) 1 20:57 (2)	04:54 22:01	20:52 (2) 21:20 (2)	
22	08:28 16:47	07:32 17:48	16:59 (5) 20 17:19 (5)	06:26 18:41	05:15 21:31	20:55 (2) 4 20:59 (2)	04:55 22:01	20:53 (2) 21:21 (2)	
23	08:27 16:49	07:30 17:50	16:59 (5) 23 17:22 (5)	06:23 18:43	05:13 21:33	20:53 (2) 6 20:59 (2)	04:55 22:01	20:53 (2) 21:21 (2)	
24	08:26 16:50	07:28 17:52	16:59 (5) 25 17:24 (5)	06:21 18:45	05:12 21:34	20:52 (2) 9 21:01 (2)	04:55 22:01	20:52 (2) 21:20 (2)	
25	08:24 16:52	07:25 17:54	16:58 (5) 25 17:23 (5)	06:18 18:47	05:11 21:36	20:51 (2) 11 21:02 (2)	04:56 22:01	20:53 (2) 21:21 (2)	
26	08:23 16:54	07:23 17:56	16:58 (5) 25 17:23 (5)	06:16 18:49	05:09 21:37	20:51 (2) 13 21:04 (2)	04:56 22:01	20:53 (2) 21:21 (2)	
27	08:22 16:56	07:21 17:58	16:59 (5) 24 17:23 (5)	06:13 18:51	05:08 21:39	20:50 (2) 15 21:05 (2)	04:56 22:01	20:53 (2) 21:21 (2)	
28	08:20 16:58	07:18 18:00	16:58 (5) 24 17:22 (5)	06:11 18:53	05:07 21:40	20:50 (2) 16 21:06 (2)	04:57 22:01	20:53 (2) 21:22 (2)	
29	08:18 17:00		07:08 19:54	19:09 (4) 19 19:28 (4)	05:56 20:52	05:06 21:41	04:57 21:07 (2)	20:54 (2) 21:22 (2)	
30	08:17 17:02		07:06 19:56	19:08 (4) 22 19:30 (4)	05:54 20:53	05:05 21:43	20:49 (2) 19 21:08 (2)	20:54 (2) 21:22 (2)	
31	08:15 17:04		07:04 19:58	19:06 (4) 25 19:31 (4)	05:54 21:44	05:04 21:44	20:49 (2) 20 21:09 (2)		
Potential sun hours	250	273	367	420	494	510	819		
Total, worst case		221	166	697	131	819			
Sun reduction		0.23	0.27	0.35	0.38	0.32			
Oper. time red.		1.00	1.00	1.00	1.00	1.00			
Wind dir. red.		0.67	0.67	0.67	0.62	0.62			
Total reduction		0.16	0.18	0.24	0.23	0.20			
Total, real		35	30	165	31	161			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: N - H14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59	20:54 (2)	05:39	06:33	18:59 (4)	07:26		07:24	08:19		
	22:00	28	21:22 (2)	21:25	20:18	46	19:45 (3)	19:05	16:54	16:10	
2	05:00	20:55 (2)	05:40	06:35	18:59 (4)	07:28		07:26	08:21		
	22:00	28	21:23 (2)	21:23	20:16	46	19:45 (3)	19:02	16:52	16:09	
3	05:00	20:54 (2)	05:42	06:36	18:57 (4)	07:30		07:28	08:22		
	21:59	28	21:22 (2)	21:21	20:13	48	19:45 (3)	19:00	16:50	16:08	
4	05:01	20:55 (2)	05:44	06:38	18:57 (4)	07:31		07:30	08:24		
	21:59	28	21:23 (2)	21:19	20:11	46	19:43 (3)	18:57	16:48	16:08	
5	05:02	20:55 (2)	05:45	06:40	18:57 (4)	07:33		07:32	08:25		
	21:58	28	21:23 (2)	21:17	20:09	44	19:41 (3)	18:55	16:46	16:07	
6	05:03	20:55 (2)	05:47	06:42	18:57 (4)	07:35		07:34	08:26		
	21:57	27	21:22 (2)	21:15	20:06	42	19:39 (3)	18:52	16:44	16:07	
7	05:04	20:56 (2)	05:49	06:43	18:56 (4)	07:37		07:36	08:28		
	21:57	26	21:22 (2)	21:13	20:04	39	19:35 (3)	18:50	16:43	16:06	
8	05:05	20:56 (2)	05:51	06:45	18:57 (4)	07:39		07:38	08:29		
	21:56	25	21:21 (2)	21:11	20:01	36	19:33 (3)	18:48	16:41	16:06	
9	05:06	20:56 (2)	05:52	06:47	18:57 (4)	07:41		17:40 (5)	07:40	08:30	
	21:55	25	21:21 (2)	21:09	19:59	34	19:31 (3)	18:45	9	17:49 (5)	16:39
10	05:07	20:57 (2)	05:54	06:49	18:56 (4)	07:42		17:37 (5)	07:42	08:31	
	21:55	23	21:20 (2)	21:07	19:56	32	19:28 (3)	18:43	14	17:51 (5)	16:37
11	05:08	20:57 (2)	05:56	06:50	18:57 (4)	07:44		17:35 (5)	07:44	08:33	
	21:54	22	21:19 (2)	21:05	19:54	29	19:26 (3)	18:40	18	17:53 (5)	16:35
12	05:09	20:57 (2)	05:57	06:52	18:58 (4)	07:46		17:33 (5)	07:45	08:34	
	21:53	21	21:18 (2)	21:03	19:51	26	19:24 (4)	18:38	21	17:54 (5)	16:34
13	05:10	20:58 (2)	05:59	06:54	18:59 (4)	07:48		17:32 (5)	07:47	08:35	
	21:52	19	21:17 (2)	21:01	19:49	23	19:22 (4)	18:36	23	17:55 (5)	16:32
14	05:12	20:58 (2)	06:01	06:56	18:59 (4)	07:50		17:31 (5)	07:49	08:36	
	21:51	18	21:16 (2)	20:59	19:47	19	19:18 (4)	18:33	24	17:55 (5)	16:31
15	05:13	20:58 (2)	06:03	06:58	19:01 (4)	07:52		17:31 (5)	07:51	08:37	
	21:50	17	21:15 (2)	20:57	19:44	15	19:16 (4)	18:31	24	17:55 (5)	16:29
16	05:14	20:59 (2)	06:04	06:59	19:03 (4)	07:54		17:30 (5)	07:53	08:38	
	21:49	15	21:14 (2)	20:55	19:42	11	19:14 (4)	18:29	25	17:55 (5)	16:27
17	05:16	21:00 (2)	06:06	07:01	19:06 (4)	07:55		17:30 (5)	07:55	08:38	
	21:47	14	21:14 (2)	20:53	19:39	5	19:11 (4)	18:26	25	17:55 (5)	16:26
18	05:17	21:00 (2)	06:08	07:03	19:07			17:30 (5)	07:57	08:39	
	21:46	12	21:12 (2)	20:50	19:37			18:24	25	17:55 (5)	16:24
19	05:18	21:01 (2)	06:10	07:05	19:09			17:30 (5)	07:59	08:40	
	21:45	10	21:11 (2)	20:48	19:34			18:22	22	17:52 (5)	16:23
20	05:20	21:03 (2)	06:12	07:06	19:11			18:01		17:30 (5)	08:00
	21:44	7	21:10 (2)	20:46	19:32			18:20	20	17:50 (5)	16:22
21	05:21	21:04 (2)	06:13	07:08	19:13			18:03		17:31 (5)	08:02
	21:42	5	21:09 (2)	20:44	19:29			18:17	17	17:48 (5)	16:20
22	05:23	21:05 (2)	06:15	07:10	19:31			18:05		17:32 (5)	08:04
	21:41	2	21:07 (2)	20:42	19:27			18:15	13	17:45 (5)	16:19
23	05:24		06:17	19:16 (4)	07:12			18:07		17:33 (5)	08:06
	21:39		20:39	9	19:25 (4)	19:24		18:13	10	17:43 (5)	16:18
24	05:26		06:19	19:12 (4)	07:13			18:09		17:34 (5)	08:08
	21:38		20:37	17	19:29 (4)	19:22		18:11	7	17:41 (5)	16:17
25	05:27		06:20	19:09 (4)	07:15			17:11		16:37 (5)	08:09
	21:36		20:35	21	19:30 (4)	19:19		17:09	1	16:38 (5)	16:16
26	05:29		06:22	19:07 (4)	07:17			17:13		16:39 (5)	08:11
	21:35		20:32	25	19:32 (4)	19:17		17:06		16:14	16:09
27	05:30		06:24	19:06 (4)	07:19			17:14		16:15	08:13
	21:33		20:30	28	19:34 (4)	19:14		17:04		16:13	16:10
28	05:32		06:26	19:03 (4)	07:21			17:16		16:14	08:44
	21:32		20:28	36	19:39 (3)	19:12		17:02		16:12	16:11
29	05:34		06:27	19:02 (4)	07:22			17:18		16:16	08:44
	21:30		20:25	40	19:42 (3)	19:09		17:00		16:12	16:11
30	05:35		06:29	19:02 (4)	07:24			17:20		16:18	08:44
	21:28		20:23	42	19:44 (3)	19:07		16:58		16:11	16:12
31	05:37		06:31	19:00 (4)				17:22			08:44
	21:26		20:21	44	19:44 (3)			16:56			16:13
Potential sun hours	512		460		382			328		259	233
Total, worst case		428		262		541			298		
Sun reduction		0.32		0.34		0.32		0.29			
Oper. time red.		1.00		1.00		1.00		1.00			
Wind dir. red.		0.62		0.67		0.67		0.67			
Total reduction		0.20		0.23		0.22		0.20			
Total, real		85		60		116		59			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: O - H15

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June			
1	08:44 16:15	08:14 17:06	07:16 18:02	16:59 (5) 17:13 (5)	07:01 20:00	18:54 (4) 19:33 (3)	05:52 20:55	05:03 21:45	20:40 (2) 21:08 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	17:02 (5) 17:09 (5)	06:59 20:02	18:53 (4) 19:35 (3)	05:50 20:57	05:02 21:46	20:41 (2) 21:09 (2)
3	08:43 16:17	08:10 17:10	07:11 18:06		06:56 20:04	18:53 (4) 19:37 (3)	05:48 20:59	05:01 21:48	20:41 (2) 21:08 (2)
4	08:43 16:18	08:08 17:12	07:09 18:07		06:54 20:06	18:54 (4) 19:39 (3)	05:46 21:01	05:00 21:49	20:41 (2) 21:08 (2)
5	08:43 16:19	08:07 17:14	07:07 18:09		06:51 20:07	18:53 (4) 19:40 (3)	05:44 21:03	04:59 21:50	20:40 (2) 21:08 (2)
6	08:42 16:21	08:05 17:16	07:04 18:11		06:49 20:09	18:54 (4) 19:42 (3)	05:42 21:04	04:59 21:51	20:41 (2) 21:09 (2)
7	08:42 16:22	08:03 17:18	07:02 18:13		06:47 20:11	18:53 (4) 19:41 (3)	05:40 21:06	04:58 21:52	20:41 (2) 21:08 (2)
8	08:42 16:24	08:01 17:20	07:00 18:15		06:44 20:13	18:54 (4) 19:40 (3)	05:38 21:08	04:57 21:53	20:42 (2) 21:09 (2)
9	08:41 16:25	07:59 17:22	06:57 18:17		06:42 20:15	18:56 (4) 19:39 (3)	05:36 21:10	04:57 21:54	20:42 (2) 21:08 (2)
10	08:40 16:26	07:57 17:24	06:55 18:19		06:39 20:17	18:56 (4) 19:37 (3)	05:34 21:11	04:56 21:55	20:42 (2) 21:09 (2)
11	08:40 16:28	07:55 17:26	06:52 18:21		06:37 20:19	18:58 (4) 19:35 (3)	05:33 21:13	04:56 21:55	20:43 (2) 21:09 (2)
12	08:39 16:30	07:53 17:28	06:50 18:23		06:35 20:20	19:00 (4) 19:20 (4)	05:31 21:15	04:55 21:56	20:43 (2) 21:09 (2)
13	08:38 16:31	07:51 17:30	06:48 18:25		06:32 20:22	19:01 (4) 19:17 (4)	05:29 21:17	04:55 21:57	20:43 (2) 21:09 (2)
14	08:37 16:33	07:49 17:32	06:45 18:27		06:30 20:24	19:06 (4) 19:12 (4)	05:27 21:18	04:55 21:57	20:44 (2) 21:09 (2)
15	08:36 16:34	07:47 17:34	17:00 (5) 17:05 (5)		06:28 20:26		05:26 21:20	04:55 21:58	20:44 (2) 21:09 (2)
16	08:35 16:36	07:45 17:36	16:59 (5) 17:07 (5)		06:25 20:28		05:24 21:22	20:46 (2) 21:59	04:54 21:10 (2)
17	08:34 16:38	07:43 17:38	16:58 (5) 17:09 (5)		06:23 20:30		05:22 21:23	20:44 (2) 20:51 (2)	04:54 21:59
18	08:33 16:40	07:41 17:40	16:56 (5) 17:11 (5)		06:21 20:31		05:21 21:25	20:43 (2) 20:53 (2)	04:54 22:00
19	08:32 16:41	07:39 17:42	16:55 (5) 17:13 (5)		06:18 20:33		05:19 21:27	20:43 (2) 20:54 (2)	04:54 22:00
20	08:31 16:43	07:36 17:44	16:55 (5) 17:16 (5)		06:16 20:35		05:18 21:28	20:42 (2) 20:55 (2)	04:54 22:00
21	08:30 16:45	07:34 17:46	16:55 (5) 17:18 (5)		06:14 20:37		05:16 21:30	20:41 (2) 20:57 (2)	04:54 22:01
22	08:28 16:47	07:32 17:48	16:54 (5) 17:19 (5)	18:07 (4)	06:12 20:39		05:15 21:31	20:41 (2) 20:59 (2)	04:55 22:01
23	08:27 16:49	07:30 17:50	16:54 (5) 17:19 (5)	18:15 (4)	06:09 20:41		05:13 21:33	20:40 (2) 20:59 (2)	04:55 22:01
24	08:26 16:50	07:28 17:52	16:55 (5) 17:19 (5)	18:02 (4)	06:07 20:42		05:12 21:34	20:40 (2) 21:01 (2)	04:55 22:01
25	08:24 16:52	07:25 17:54	16:55 (5) 17:18 (5)	18:01 (4)	06:05 20:44		05:11 21:36	20:40 (2) 21:02 (2)	04:55 22:01
26	08:23 16:54	07:23 17:56	16:55 (5) 17:17 (5)	17:58 (4)	06:03 20:46		05:09 21:37	20:40 (2) 21:04 (2)	04:56 22:01
27	08:22 16:56	07:21 17:58	16:57 (5) 17:17 (5)	17:58 (4)	06:01 20:48		05:08 21:39	20:40 (2) 21:05 (2)	04:56 22:01
28	08:20 16:58	07:18 18:00	16:57 (5) 17:14 (5)	17:57 (4)	05:58 20:50		05:07 21:40	20:40 (2) 21:06 (2)	04:57 22:01
29	08:18 17:00		07:08 19:54	18:56 (4)	05:56 20:52		05:06 21:41	20:40 (2) 21:07 (2)	04:57 22:01
30	08:17 17:02		07:06 19:56	18:55 (4)	05:54 20:53		05:05 21:43	20:40 (2) 21:08 (2)	04:58 22:00
31	08:15 17:04		07:04 19:58	18:54 (4)			05:04 21:44	20:40 (2) 21:08 (2)	
Potential sun hours	250	273	367		420		494		510
Total, worst case		257		260	519		299		779
Sun reduction		0.23		0.27	0.35		0.38		0.32
Oper. time red.		1.00		1.00	1.00		1.00		1.00
Wind dir. red.		0.67		0.67	0.67		0.62		0.62
Total reduction		0.16		0.18	0.24		0.24		0.20
Total, real		40		48	123		71		155

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: O - H15

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 26	20:47 (2) 21:13 (2) 21:25	06:33 20:18 35	18:56 (4) 19:34 (3) 19:05	07:24 16:54 16:10	08:19 16:10 16:21
2	04:59 22:00 26	20:48 (2) 21:14 (2) 21:23	06:35 20:16 41	18:55 (4) 19:36 (3) 19:02	07:26 16:52 16:09	08:21 16:09 16:22
3	05:00 21:59 26	20:47 (2) 21:13 (2) 21:21	06:36 20:13 44	18:53 (4) 19:37 (3) 19:00	07:30 16:50 16:08	08:22 16:08 16:24
4	05:01 21:59 27	20:47 (2) 21:14 (2) 21:19	06:38 20:11 46	18:51 (4) 19:37 (3) 18:57	07:30 16:48 16:08	08:24 16:08 16:25
5	05:02 21:58 26	20:48 (2) 21:14 (2) 21:17	06:40 20:09 47	18:51 (4) 19:38 (3) 18:55	07:32 16:46 16:07	08:25 16:07 16:26
6	05:03 21:57 27	20:48 (2) 21:15 (2) 21:15	06:42 20:06 49	18:50 (4) 19:39 (3) 18:52	07:34 16:44 16:07	08:26 16:07 16:28
7	05:04 21:57 27	20:48 (2) 21:15 (2) 21:13	06:43 20:04 47	18:48 (4) 19:35 (3) 18:50	07:36 16:43 16:06	08:28 16:06 16:29
8	05:05 21:56 28	20:48 (2) 21:16 (2) 21:11	06:45 20:01 45	18:48 (4) 19:33 (3) 18:48	07:38 16:41 16:06	08:29 16:06 16:30
9	05:06 21:55 28	20:48 (2) 21:16 (2) 21:09	06:47 19:59 43	18:48 (4) 19:31 (3) 18:45	07:40 16:39 16:05	08:30 16:05 16:31
10	05:07 21:55 28	20:48 (2) 21:16 (2) 21:07	06:49 19:56 42	18:46 (4) 19:28 (3) 18:43	07:42 16:37 16:05	08:31 16:05 16:33
11	05:08 21:54 28	20:48 (2) 21:16 (2) 21:05	06:50 19:54 40	18:46 (4) 19:26 (3) 18:40	07:44 16:35 16:05	08:33 16:05 16:34
12	05:09 21:53 28	20:48 (2) 21:16 (2) 21:03	06:52 19:51 38	18:46 (4) 19:24 (3) 18:38	17:34 (5) 17:45 (5) 16:34	08:34 16:05 16:35
13	05:10 21:52 28	20:48 (2) 21:16 (2) 21:01	06:54 19:49 36	18:46 (4) 19:22 (3) 18:36	17:32 (5) 17:47 (5) 16:32	08:35 16:05 16:36
14	05:12 21:51 28	20:48 (2) 21:16 (2) 20:59	06:56 19:47 32	18:46 (4) 19:18 (4) 18:33	17:30 (5) 17:48 (5) 16:31	08:36 16:05 16:37
15	05:13 21:50 27	20:48 (2) 21:15 (2) 20:57	06:58 19:44 30	18:46 (4) 19:16 (4) 18:31	17:28 (5) 17:49 (5) 16:29	08:37 16:05 16:38
16	05:14 21:49 26	20:48 (2) 21:14 (2) 20:55	06:59 19:42 27	18:47 (4) 19:14 (4) 18:29	17:27 (5) 17:50 (5) 16:27	08:38 16:05 16:38
17	05:16 21:47 25	20:49 (2) 21:14 (2) 20:53	07:01 19:39 24	18:47 (4) 19:11 (4) 18:26	17:27 (5) 17:50 (5) 16:26	08:38 16:05 16:39
18	05:17 21:46 23	20:49 (2) 21:12 (2) 20:50	07:03 19:37 20	18:48 (4) 19:08 (4) 18:24	17:26 (5) 17:50 (5) 16:24	08:39 16:05 16:40
19	05:18 21:45 22	20:49 (2) 21:11 (2) 20:48	07:05 19:34 17	18:49 (4) 19:06 (4) 18:22	17:26 (5) 17:50 (5) 16:23	08:40 16:05 16:41
20	05:20 21:44 20	20:50 (2) 21:10 (2) 20:46	07:06 19:32 13	18:51 (4) 19:04 (4) 18:20	17:25 (5) 17:50 (5) 16:22	08:41 16:06 16:41
21	05:21 21:42 18	20:51 (2) 21:09 (2) 20:44	07:08 19:29 9	18:52 (4) 19:01 (4) 18:17	17:25 (5) 17:48 (5) 16:20	08:41 16:06 16:42
22	05:23 21:41 16	20:51 (2) 21:07 (2) 20:42	07:10 19:27 3	18:55 (4) 18:58 (4) 18:15	17:26 (5) 17:45 (5) 16:19	08:42 16:06 16:42
23	05:24 21:39 15	20:52 (2) 21:07 (2) 20:39	07:12 19:24 17	18:07 18:13 17	17:26 (5) 17:43 (5) 16:18	08:42 16:07 16:43
24	05:26 21:38 13	20:52 (2) 21:05 (2) 20:37	07:13 19:22 14	18:09 18:11 14	17:27 (5) 17:41 (5) 16:17	08:43 16:08 16:43
25	05:27 21:36 10	20:54 (2) 21:04 (2) 20:35	07:15 19:19 11	17:11 17:09 11	16:27 (5) 16:38 (5) 16:16	08:43 16:08 16:43
26	05:29 21:35 8	20:54 (2) 21:02 (2) 20:32	07:17 19:17 7	17:13 17:06 7	16:29 (5) 16:36 (5) 16:14	08:43 16:09 16:44
27	05:30 21:33 5	20:55 (2) 21:00 (2) 20:30	07:19 19:14 4	17:14 17:04 4	16:30 (5) 16:34 (5) 16:13	08:44 16:10 16:44
28	05:32 21:32 2	20:57 (2) 20:59 (2) 20:28	07:21 19:12 19:07 (4)	17:16 17:02 17:18	16:14 16:12 16:16	08:44 16:11 16:44
29	05:34 21:30 6	06:27 20:25 19:13 (4)	07:22 19:09 19:02 (4)	17:18 17:00 17:20	16:16 16:12 16:18	08:44 16:11 16:44
30	05:35 21:28 16	06:29 20:23 19:18 (4)	07:24 19:07 18:58 (4)	17:20 16:58 17:22	16:18 16:11 16:19	08:44 16:12 16:44
31	05:37 21:26 21	06:31 20:21 19:19 (4)	07:22 16:56 16:13	17:22 16:56 16:13	16:19 16:13 16:13	08:44 16:13 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case	611	43	728	279		
Sun reduction	0.32	0.34	0.32	0.29		
Oper. time red.	1.00	1.00	1.00	1.00		
Wind dir. red.	0.62	0.68	0.67	0.67		
Total reduction	0.20	0.23	0.22	0.20		
Total, real	123	10	157	55		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: P - H16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:48 (4) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:48 (4) 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:49 (4) 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:50 (4) 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	18:50 (4) 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	18:51 (4) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	18:52 (4) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	18:54 (4) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	18:57 (4) 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	19:03 (4) 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	16:56 (5) 17:00 (5)	06:48 18:25	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	16:55 (5) 17:02 (5)	06:45 18:27	05:27 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	16:54 (5) 17:05 (5)	06:43 18:28	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	16:53 (5) 17:07 (5)	06:40 18:30	05:24 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	16:53 (5) 17:09 (5)	06:38 18:32	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	16:51 (5) 17:11 (5)	06:35 18:34	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	16:51 (5) 17:13 (5)	06:33 18:36	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	16:51 (5) 17:16 (5)	06:31 18:38	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	16:52 (5) 17:16 (5)	06:28 18:40	05:16 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	16:51 (5) 17:15 (5)	06:26 18:41	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	16:52 (5) 17:15 (5)	06:23 18:43	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	16:53 (5) 17:14 (5)	06:21 18:45	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	16:53 (5) 17:12 (5)	06:18 18:47	05:11 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	16:55 (5) 17:11 (5)	06:16 18:49	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	16:57 (5) 17:09 (5)	06:13 18:51	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	17:00 (5) 17:05 (5)	06:11 18:53	05:07 21:40	04:57 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	05:48 20:53	05:04 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case		263		377		641
Sun reduction		0.23		0.27		0.32
Oper. time red.		1.00		1.00		1.00
Wind dir. red.		0.67		0.68		0.63
Total reduction		0.16		0.18		0.20
Total, real		41		69		129

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: P - H16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July			August			September			October			November		December	
1	04:59	20:44 (2)	05:39	20:52 (2)	06:33		07:26		07:24	08:19						
	22:00	22	21:06 (2)	21:25	1	20:53 (2)	20:18		19:05	16:54	16:10					
2	04:59	20:44 (2)	05:40		06:35		19:01 (4)	07:28		07:26	08:21					
	22:00	22	21:06 (2)	21:23		20:16	2	19:03 (4)	19:02	16:52	16:09					
3	05:00	20:44 (2)	05:42		06:36		18:54 (4)	07:30		07:28	08:22					
	21:59	22	21:06 (2)	21:21		20:13	21	19:27 (3)	19:00	16:50	16:08					
4	05:01	20:44 (2)	05:44		06:38		18:51 (4)	07:31		07:30	08:24					
	21:59	23	21:07 (2)	21:19		20:11	33	19:30 (3)	18:57	16:48	16:08					
5	05:02	20:44 (2)	05:45		06:40		18:49 (4)	07:33		07:32	08:25					
	21:58	23	21:07 (2)	21:17		20:09	41	19:32 (3)	18:55	16:46	16:07					
6	05:03	20:44 (2)	05:47		06:42		18:47 (4)	07:35		07:34	08:26					
	21:58	24	21:08 (2)	21:15		20:06	46	19:33 (3)	18:52	16:44	16:07					
7	05:04	20:44 (2)	05:49		06:43		18:45 (4)	07:37		07:36	08:28					
	21:57	24	21:08 (2)	21:13		20:04	48	19:33 (3)	18:50	16:43	16:06					
8	05:05	20:44 (2)	05:51		06:45		18:44 (4)	07:39		07:38	08:29					
	21:56	25	21:09 (2)	21:11		20:01	49	19:33 (3)	18:48	16:41	16:06					
9	05:06	20:44 (2)	05:52		06:47		18:43 (4)	07:41		07:40	08:30					
	21:55	25	21:09 (2)	21:09		19:59	48	19:31 (3)	18:45	16:39	16:05					
10	05:07	20:44 (2)	05:54		06:49		18:41 (4)	07:42		07:42	08:31					
	21:55	26	21:10 (2)	21:07		19:56	47	19:28 (3)	18:43	16:37	16:05					
11	05:08	20:44 (2)	05:56		06:50		18:41 (4)	07:44		07:44	08:33					
	21:54	26	21:10 (2)	21:05		19:54	45	19:26 (3)	18:40	16:35	16:05					
12	05:09	20:43 (2)	05:57		06:52		18:40 (4)	07:46		07:45	08:34					
	21:53	27	21:10 (2)	21:03		19:51	44	19:24 (3)	18:38	16:34	16:05					
13	05:10	20:43 (2)	05:59		06:54		18:40 (4)	07:48		07:47	08:35					
	21:52	27	21:10 (2)	21:01		19:49	42	19:22 (3)	18:36	16:32	16:05					
14	05:12	20:43 (2)	06:01		06:56		18:39 (4)	07:50								
	21:51	27	21:10 (2)	20:59		19:47	39	19:18 (3)	18:33	9	17:31 (5)	07:49	08:36			
15	05:13	20:43 (2)	06:03		06:58		18:38 (4)	07:52		17:28 (5)	07:51	08:37				
	21:50	28	21:11 (2)	20:57		19:44	38	19:16 (3)	18:31	14	17:42 (5)	16:29	16:05			
16	05:14	20:43 (2)	06:04		06:59		18:39 (4)	07:54		17:26 (5)	07:53	08:38				
	21:49	28	21:11 (2)	20:55		19:42	35	19:14 (3)	18:29	18	17:44 (5)	16:27	16:05			
17	05:16	20:43 (2)	06:06		07:01		18:38 (4)	07:55		17:25 (5)	07:55	08:38				
	21:47	28	21:11 (2)	20:53		19:39	33	19:11 (4)	18:26	20	17:45 (5)	16:26	16:05			
18	05:17	20:43 (2)	06:08		07:03		18:38 (4)	07:57		17:24 (5)	07:57	08:39				
	21:46	28	21:11 (2)	20:50		19:37	30	19:08 (4)	18:24	22	17:46 (5)	16:24	16:05			
19	05:18	20:43 (2)	06:10		07:05		18:39 (4)	07:59		17:23 (5)	07:59	08:40				
	21:45	28	21:11 (2)	20:48		19:34	27	19:06 (4)	18:22	23	17:46 (5)	16:23	16:05			
20	05:20	20:44 (2)	06:12		07:06		18:39 (4)	08:01		17:22 (5)	08:00	08:41				
	21:44	26	21:10 (2)	20:46		19:32	25	19:04 (4)	18:20	24	17:46 (5)	16:22	16:06			
21	05:21	20:44 (2)	06:13		07:08		18:39 (4)	08:03		17:22 (5)	08:02	08:41				
	21:42	25	21:09 (2)	20:44		19:29	22	19:01 (4)	18:17	24	17:46 (5)	16:20	16:06			
22	05:23	20:44 (2)	06:15		07:10		18:40 (4)	08:05		17:22 (5)	08:04	08:42				
	21:41	23	21:07 (2)	20:42		19:27	18	18:58 (4)	18:15	23	17:45 (5)	16:19	16:06			
23	05:24	20:45 (2)	06:17		07:12		18:42 (4)	08:07		17:22 (5)	08:06	08:42				
	21:39	22	21:07 (2)	20:39		19:24	14	18:56 (4)	18:13	21	17:43 (5)	16:18	16:07			
24	05:26	20:44 (2)	06:19		07:13		18:43 (4)	08:09		17:22 (5)	08:08	08:43				
	21:38	21	21:05 (2)	20:37		19:22	11	18:54 (4)	18:11	19	17:41 (5)	16:17	16:08			
25	05:27	20:45 (2)	06:20		07:15		18:45 (4)	07:11		16:22 (5)	08:09	08:43				
	21:36	19	21:04 (2)	20:35		19:19	6	18:51 (4)	17:09	16	16:38 (5)	16:16	16:08			
26	05:29	20:46 (2)	06:22		07:17			07:13		16:23 (5)	08:11	08:43				
	21:35	16	21:02 (2)	20:32		19:17		17:06	13	16:36 (5)	16:14	16:09				
27	05:30	20:46 (2)	06:24		07:19			07:14		16:24 (5)	08:13	08:44				
	21:33	14	21:00 (2)	20:30		19:14		17:04	10	16:34 (5)	16:13	16:10				
28	05:32	20:47 (2)	06:26		07:21			07:16		16:25 (5)	08:14	08:44				
	21:32	12	20:59 (2)	20:28		19:12		17:02	6	16:31 (5)	16:12	16:11				
29	05:34	20:47 (2)	06:27		07:22			07:18		16:26 (5)	08:16	08:44				
	21:30	10	20:57 (2)	20:25		19:09		17:00	3	16:29 (5)	16:12	16:11				
30	05:35	20:49 (2)	06:29		07:24			07:20			08:18	08:44				
	21:28	7	20:56 (2)	20:23		19:07		16:58		16:11	16:12	16:12				
31	05:37	20:51 (2)	06:31					07:22			08:44	08:44				
	21:26	4	20:55 (2)	20:21				16:56			16:13	16:13				
Potential sun hours	512		460		382		328		259		233					
Total, worst case	682		1		764		265									
Sun reduction	0.32		0.34		0.32		0.29									
Oper. time red.	1.00		1.00		1.00		1.00									
Wind dir. red.	0.63		0.63		0.67		0.67									
Total reduction	0.20		0.21		0.22		0.20									
Total, real	139		0		165		52									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: Q - H17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	08:14	16:06 (5)	07:16	16:45 (4)	07:01	05:52	19:44 (2)	05:03		
	16:15	17:06	20	16:26 (5)	18:02	29	17:14 (4)	20:00	20:55	28	20:12 (2)
2	08:44	08:12	16:07 (5)	07:14	16:46 (4)	06:59	05:50	19:44 (2)	05:02		
	16:16	17:08	18	16:25 (5)	18:04	26	17:12 (4)	20:02	20:57	27	20:11 (2)
3	08:44	08:10	16:08 (5)	07:12	16:48 (4)	06:56	05:48	19:45 (2)	05:01		
	16:17	17:10	16	16:24 (5)	18:06	23	17:11 (4)	20:04	20:59	25	20:10 (2)
4	08:43	08:08	16:10 (5)	07:09	16:50 (4)	06:54	05:46	19:46 (2)	05:00		
	16:18	17:12	13	16:23 (5)	18:07	19	17:09 (4)	20:06	21:01	23	20:09 (2)
5	08:43	08:07	16:13 (5)	07:07	16:53 (4)	06:51	05:44	19:47 (2)	04:59		
	16:19	17:14	7	16:20 (5)	18:09	12	17:05 (4)	20:07	21:03	20	20:07 (2)
6	08:42	08:05	16:14 (5)	07:04	17:43 (3)	06:49	05:42	19:49 (2)	04:59		
	16:21	17:16		18:11	2	17:45 (3)	20:09	21:04	16	20:05 (2)	21:51
7	08:42	08:03	16:15 (5)	07:02	17:41 (3)	06:47	05:40	19:52 (2)	04:58		
	16:22	17:18		18:13	5	17:46 (3)	20:11	21:06	12	20:04 (2)	21:52
8	08:42	08:01	16:16 (5)	07:00	17:40 (3)	06:44	05:38	19:56 (2)	04:57		
	16:24	17:20		18:15	8	17:48 (3)	20:13	21:08	3	19:59 (2)	21:53
9	08:41	07:59	16:17 (5)	06:57	17:39 (3)	06:42	05:36		04:57		
	16:25	17:22		18:17	11	17:50 (3)	20:15	21:10			21:54
10	08:40	07:57	16:18 (5)	06:55	17:38 (3)	06:39	05:34		04:56		
	16:26	17:24	3	16:54 (4)	18:19	14	17:52 (3)	20:17	21:11		21:55
11	08:40	07:55	16:19 (5)	06:52	17:38 (3)	06:37	05:33		04:56		
	16:28	17:26	7	16:56 (4)	18:21	17	17:55 (3)	20:19	21:13		21:55
12	08:39	07:53	16:20 (5)	06:50	17:38 (3)	06:35	05:31		04:55		
	16:30	17:28	11	16:58 (4)	18:23	18	17:56 (3)	20:20	21:15		21:56
13	08:38	07:51	16:21 (5)	06:48	17:38 (3)	06:32	05:29		04:55		
	16:31	17:30	14	17:00 (4)	18:25	20	17:58 (3)	20:22	21:17		21:57
14	08:37	07:49	16:22 (5)	06:45	17:38 (3)	06:30	05:27		04:55		
	16:33	17:32	17	17:02 (4)	18:27	22	18:00 (3)	20:24	21:18		21:58
15	08:36	07:47	16:23 (5)	06:43	17:39 (3)	06:28	19:53 (2)	05:26			04:54
	16:34	17:34	20	17:05 (4)	18:28	20	17:59 (3)	20:26	5	19:58 (2)	21:20
16	08:35	07:45	16:24 (5)	06:40	17:39 (3)	06:25	19:51 (2)	05:24			04:54
	16:36	17:36	23	17:07 (4)	18:30	18	17:57 (3)	20:28	9	20:00 (2)	21:22
17	08:34	07:43	16:25 (5)	06:38	17:41 (3)	06:23	19:49 (2)	05:22			04:54
	16:38	17:38	25	17:09 (4)	18:32	15	17:56 (3)	20:30	12	20:01 (2)	21:23
18	08:33	16:04 (5)	07:41	16:42 (4)	06:35	17:43 (3)	06:21	19:47 (2)	05:21		04:54
	16:40	16:05 (5)	17:40	17:11 (4)	18:34	9	17:52 (3)	20:31	16	20:03 (2)	21:25
19	08:32	16:04 (5)	07:39	16:42 (4)	06:33	06:18	19:46 (2)	05:19			04:54
	16:41	16:07 (5)	17:42	17:13 (4)	18:36	20:33	20:05 (2)	21:27	19	20:05 (2)	21:27
20	08:31	16:03 (5)	07:36	16:42 (4)	06:31	06:16	19:46 (2)	05:18			04:54
	16:43	16:08 (5)	17:44	17:16 (4)	18:38	20:35	20:07 (2)	21:28	21	20:07 (2)	21:28
21	08:30	16:03 (5)	07:34	16:42 (4)	06:28	06:14	19:44 (2)	05:16			04:54
	16:45	16:11 (5)	17:46	17:18 (4)	18:40	20:37	20:08 (2)	21:30	24	20:08 (2)	21:30
22	08:29	16:02 (5)	07:32	16:41 (4)	06:26	06:12	19:43 (2)	05:15			04:55
	16:47	16:12 (5)	17:48	17:19 (4)	18:41	20:39	20:10 (2)	21:31	27	20:10 (2)	21:31
23	08:27	16:03 (5)	07:30	16:42 (4)	06:23	06:09	19:43 (2)	05:13			04:55
	16:49	16:15 (5)	17:50	17:19 (4)	18:43	20:41	20:12 (2)	21:33	29	20:12 (2)	21:33
24	08:26	16:02 (5)	07:28	16:42 (4)	06:21	06:07	19:43 (2)	05:12			04:55
	16:50	16:17 (5)	17:52	17:19 (4)	18:45	20:42	20:14 (2)	21:34	31	20:14 (2)	21:34
25	08:24	16:03 (5)	07:25	16:42 (4)	06:18	06:05	19:43 (2)	05:11			04:55
	16:52	16:19 (5)	17:54	17:18 (4)	18:47	20:44	20:15 (2)	21:36	32	20:15 (2)	21:36
26	08:23	16:03 (5)	07:23	16:43 (4)	06:16	06:03	19:43 (2)	05:09			04:56
	16:54	16:21 (5)	17:56	17:17 (4)	18:49	20:46	20:15 (2)	21:37	32	20:15 (2)	21:37
27	08:22	16:03 (5)	07:21	16:44 (4)	06:13	06:01	19:43 (2)	05:08			04:56
	16:56	16:23 (5)	17:58	17:17 (4)	18:51	20:48	20:15 (2)	21:39	32	20:15 (2)	21:39
28	08:20	16:04 (5)	07:18	16:44 (4)	06:11	05:58	19:43 (2)	05:07			04:57
	16:58	16:26 (5)	18:00	17:15 (4)	18:53	20:50	20:14 (2)	21:40	31	20:14 (2)	21:40
29	08:18	16:04 (5)		07:08	18:53	05:56	19:43 (2)	05:06			04:57
	17:00	16:27 (5)		19:54		20:52	20:14 (2)	21:41	31	20:14 (2)	21:41
30	08:17	16:04 (5)		07:06		05:54	19:43 (2)	05:05			04:58
	17:02	16:26 (5)		19:56		20:53	20:13 (2)	21:43	30	20:13 (2)	21:43
31	08:15	16:05 (5)		07:04			05:04				
	17:04	16:26 (5)		19:58			21:44				
Potential sun hours	250		273		367		420		494		510
Total, worst case		196		570		288		381		154	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.67		0.67		0.65		0.65	
Total reduction		0.16		0.16		0.18		0.23		0.25	
Total, real		32		88		53		87		38	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: Q - H17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:17 (3) 16:54	16:21 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:16 (3) 16:52	16:23 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:16 (3) 16:50	16:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:16 (3) 16:48	16:24 16:08
5	05:02 21:58	05:45 21:17	20:03 (2) 20:11 (2)	06:40 20:09	07:33 18:55	16:25 16:07
6	05:03 21:58	05:47 21:15	20:00 (2) 20:14 (2)	06:42 20:06	07:35 18:52	16:46 15:42 (5)
7	05:04 21:57	05:49 21:13	19:59 (2) 20:16 (2)	06:43 20:04	07:37 18:50	15:40 (5) 15:53 (5)
8	05:05 21:56	05:50 21:12	19:56 (2) 20:17 (2)	06:45 20:01	07:39 18:48	15:38 (5) 15:54 (5)
9	05:06 21:55	05:52 21:10	19:55 (2) 20:19 (2)	06:47 19:59	07:41 18:45	15:37 (5) 15:55 (5)
10	05:07 21:55	05:54 21:07	19:53 (2) 20:19 (2)	06:49 19:56	07:42 18:43	15:37 (5) 15:57 (5)
11	05:08 21:54	05:56 21:05	19:53 (2) 20:20 (2)	06:50 19:54	07:44 18:40	15:36 (5) 15:58 (5)
12	05:09 21:53	05:57 21:03	19:52 (2) 20:21 (2)	06:52 19:51	07:46 18:38	15:36 (5) 15:58 (5)
13	05:10 21:52	05:59 21:01	19:51 (2) 20:21 (2)	06:54 19:49	07:48 18:36	15:36 (5) 15:58 (5)
14	05:12 21:51	06:01 20:59	19:50 (2) 20:21 (2)	06:56 19:47	07:50 18:33	15:36 (5) 15:58 (5)
15	05:13 21:50	06:03 20:57	19:50 (2) 20:22 (2)	06:58 19:44	07:52 18:31	15:36 (5) 15:56 (5)
16	05:14 21:49	06:04 20:55	19:49 (2) 20:21 (2)	06:59 19:42	07:54 18:29	15:36 (5) 15:54 (5)
17	05:16 21:47	06:06 20:53	19:49 (2) 20:21 (2)	07:01 19:39	07:55 18:26	15:36 (5) 15:52 (5)
18	05:17 21:46	06:08 20:51	19:49 (2) 20:22 (2)	07:03 19:37	07:57 18:24	15:36 (5) 15:51 (5)
19	05:18 21:45	06:10 20:48	19:48 (2) 20:19 (2)	07:05 19:34	07:59 18:22	15:37 (5) 15:49 (5)
20	05:20 21:44	06:12 20:46	19:49 (2) 20:17 (2)	07:06 19:32	08:01 18:20	15:37 (5) 15:47 (5)
21	05:21 21:42	06:13 20:44	19:49 (2) 20:15 (2)	07:08 19:29	08:03 18:17	15:38 (5) 15:46 (5)
22	05:23 21:41	06:15 20:42	19:49 (2) 20:12 (2)	07:10 19:27	08:05 18:15	15:39 (5) 15:44 (5)
23	05:24 21:39	06:17 20:39	19:49 (2) 20:10 (2)	07:12 19:24	08:07 18:13	15:40 (5) 15:43 (5)
24	05:26 21:38	06:19 20:37	19:50 (2) 20:09 (2)	07:13 19:22	08:09 18:11	15:41 (5) 15:42 (5)
25	05:27 21:36	06:20 20:35	19:50 (2) 20:06 (2)	07:15 19:19	08:09 18:11	15:42 (5) 16:08
26	05:29 21:35	06:22 20:32	19:52 (2) 20:04 (2)	07:17 19:17	08:13 18:37 (3)	16:16 16:09
27	05:30 21:33	06:24 20:30	19:53 (2) 20:02 (2)	07:19 19:14	08:15 18:38 (3)	16:14 (4) 16:13
28	05:32 21:32	06:26 20:28	19:54 (2) 19:59 (2)	07:21 19:12	08:16 18:40 (3)	16:15 (4) 16:12
29	05:34 21:30	06:27 20:25	07:22 19:09	18:19 (3) 18:40 (3)	07:18 17:00	16:16 (4) 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	18:17 (3) 18:38 (3)	07:20 16:58	16:17 (4) 16:11
31	05:37 21:26	06:31 20:21	07:25 16:56	18:39 (3) 16:56	07:21 16:25 (4)	16:18 (4) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		546	99	693	273	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.18	
Total, real		121	21	136	48	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: R - H18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:23 (4)	07:16		17:31 (3)	07:01			05:52		19:35 (2)	05:03			
	16:15			17:06	12 16:35 (4)	18:02	3	17:34 (3)	20:00			20:55	26	20:01 (2)	21:45			
2	08:44			08:12	16:22 (4)	07:14		17:29 (3)	06:59			05:50		19:36 (2)	05:02			
	16:16			17:08	15 16:37 (4)	18:04	7	17:36 (3)	20:02			20:57	23	19:59 (2)	21:46			
3	08:44			08:10	16:21 (4)	07:12		17:28 (3)	06:56			05:48		19:37 (2)	05:01			
	16:17			17:10	18 16:39 (4)	18:06	10	17:38 (3)	20:04			20:59	21	19:58 (2)	21:48			
4	08:43			08:08	16:20 (4)	07:09		17:28 (3)	06:54			05:46		19:39 (2)	05:00			
	16:18			17:12	21 16:41 (4)	18:07	13	17:41 (3)	20:06			21:01	17	19:56 (2)	21:49			
5	08:43			08:07	16:20 (4)	07:07		17:26 (3)	06:51			05:44		19:41 (2)	04:59			
	16:19			17:14	23 16:43 (4)	18:09	16	17:42 (3)	20:07			21:03	12	19:53 (2)	21:50			
6	08:43			08:05	16:19 (4)	07:04		17:26 (3)	06:49			05:42			04:59			
	16:21			17:16	26 16:45 (4)	18:11	19	17:45 (3)	20:09			21:04			21:51			
7	08:42		15:44 (5)	08:03	16:19 (4)	07:02		17:26 (3)	06:47			05:40			04:58			
	16:22	1	15:45 (5)	17:18	28 16:47 (4)	18:13	20	17:46 (3)	20:11			21:06			21:52			
8	08:42		15:44 (5)	08:01	16:18 (4)	07:00		17:26 (3)	06:44			05:38			04:57			
	16:24	2	15:46 (5)	17:20	32 16:50 (4)	18:15	22	17:48 (3)	20:13			21:08			21:53			
9	08:41		15:44 (5)	07:59	16:18 (4)	06:57		17:26 (3)	06:42			05:36			04:57			
	16:25	5	15:49 (5)	17:22	34 16:52 (4)	18:17	23	17:49 (3)	20:15			21:10			21:54			
10	08:40		15:44 (5)	07:57	16:18 (4)	06:55		17:27 (3)	06:39			19:48 (2)			04:56			
	16:26	6	15:50 (5)	17:24	36 16:54 (4)	18:19	22	17:49 (3)	20:17	1	19:49 (2)	21:11			21:55			
11	08:40		15:44 (5)	07:55	16:18 (4)	06:52		17:28 (3)	06:37			19:44 (2)			04:56			
	16:28	8	15:52 (5)	17:26	38 16:56 (4)	18:21	20	17:48 (3)	20:19	7	19:51 (2)	21:13			21:55			
12	08:39		15:44 (5)	07:53	16:17 (4)	06:50		17:28 (3)	06:35			19:41 (2)			04:55			
	16:30	10	15:54 (5)	17:28	40 16:57 (4)	18:23	18	17:46 (3)	20:20	12	19:53 (2)	21:15			21:56			
13	08:38		15:44 (5)	07:51	16:17 (4)	06:48		17:30 (3)	06:32			19:39 (2)			04:55			
	16:31	11	15:55 (5)	17:30	40 16:57 (4)	18:25	14	17:44 (3)	20:22	15	19:54 (2)	21:17			21:57			
14	08:37		15:44 (5)	07:49	16:17 (4)	06:45		17:33 (3)	06:30			19:37 (2)			04:55			
	16:33	13	15:57 (5)	17:32	40 16:57 (4)	18:27	8	17:41 (3)	20:24	19	19:56 (2)	21:18			21:58			
15	08:36		15:44 (5)	07:47	16:18 (4)	06:43			06:28			19:36 (2)			04:54			
	16:34	15	15:59 (5)	17:34	39 16:57 (4)	18:28			20:26	22	19:58 (2)	21:20			21:58			
16	08:35		15:44 (5)	07:45	16:18 (4)	06:40			06:25			19:35 (2)			04:54			
	16:36	16	16:00 (5)	17:36	39 16:57 (4)	18:30			20:28	25	20:00 (2)	21:22			21:59			
17	08:34		15:44 (5)	07:43	16:19 (4)	06:38			06:23			19:33 (2)			04:54			
	16:38	19	16:03 (5)	17:38	37 16:56 (4)	18:32			20:30	28	20:01 (2)	21:23			21:59			
18	08:33		15:45 (5)	07:41	16:19 (4)	06:35			06:21			19:33 (2)			04:54			
	16:40	20	16:05 (5)	17:40	36 16:55 (4)	18:34			20:31	30	20:03 (2)	21:25			22:00			
19	08:32		15:45 (5)	07:39	16:20 (4)	06:33			06:18			19:32 (2)			04:54			
	16:41	22	16:07 (5)	17:42	34 16:54 (4)	18:36			20:33	33	20:05 (2)	21:27			22:00			
20	08:31		15:45 (5)	07:36	16:21 (4)	06:31			06:16			19:32 (2)			04:54			
	16:43	23	16:08 (5)	17:44	33 16:54 (4)	18:38			20:35	35	20:07 (2)	21:28			22:00			
21	08:30		15:46 (5)	07:34	16:22 (4)	06:28			06:14			19:31 (2)			04:54			
	16:45	23	16:09 (5)	17:46	31 16:53 (4)	18:40			20:37	35	20:06 (2)	21:30			22:01			
22	08:29		15:46 (5)	07:32	16:23 (4)	06:26			06:12			19:31 (2)			04:55			
	16:47	23	16:09 (5)	17:48	28 16:51 (4)	18:42			20:39	35	20:06 (2)	21:31			22:01			
23	08:27		15:47 (5)	07:30	16:24 (4)	06:23			06:09			19:31 (2)			04:55			
	16:49	22	16:09 (5)	17:50	26 16:50 (4)	18:43			20:41	35	20:06 (2)	21:33			22:01			
24	08:26		15:47 (5)	07:28	16:27 (4)	06:21			06:07			19:31 (2)			04:55			
	16:50	22	16:09 (5)	17:52	21 16:48 (4)	18:45			20:43	35	20:06 (2)	21:34			22:01			
25	08:24		15:49 (5)	07:25	16:29 (4)	06:18			06:05			19:31 (2)			04:55			
	16:52	20	16:09 (5)	17:54	15 16:44 (4)	18:47			20:44	35	20:06 (2)	21:36			22:01			
26	08:23		15:49 (5)	07:23	16:36 (4)	06:16			06:03			19:31 (2)			04:56			
	16:54	19	16:08 (5)	17:56	2 16:38 (4)	18:49			20:46	34	20:05 (2)	21:37			22:01			
27	08:22		15:50 (5)	07:21		06:13			06:01			19:32 (2)			04:56			
	16:56	17	16:07 (5)	17:58		18:51			20:48	33	20:05 (2)	21:39			22:01			
28	08:20		15:52 (5)	07:18		06:11			05:58			19:32 (2)			04:57			
	16:58	15	16:07 (5)	18:00		18:53			20:50	32	20:04 (2)	21:40			22:01			
29	08:18		15:54 (5)			07:08			05:56			19:33 (2)			04:57			
	17:00	12	16:06 (5)			19:54			20:52	30	20:03 (2)	21:41			22:01			
30	08:17		15:56 (5)			07:06			05:54			19:34 (2)			04:58			
	17:02	12	16:30 (4)			19:56			20:54	28	20:02 (2)	21:43			22:00			
31	08:15		16:24 (4)			07:04						05:04						
	17:04	7	16:31 (4)			19:58						21:44						
Potential sun hours	250			273		367		420		494					510			
Total, worst case		363		744		215		559		99								
Sun reduction		0.24		0.23		0.27		0.35		0.38								
Oper. time red.		1.00		1.00		1.00		1.00		1.00								
Wind dir. red.		0.66		0.66		0.68		0.65		0.65								
Total reduction		0.16		0.15		0.18		0.23		0.25								
Total, real		58		113		39		129		25								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: R - H18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December				
1	04:59 22:00	05:39 21:25	06:33 20:18	19:43 (2) 19:50 (2)	07:26 19:05	18:08 (3) 18:24 (3)	07:24 16:54	15:47 (4) 16:23 (4)	08:19 16:10	15:26 (5) 15:34 (5)
2	04:59 22:00	05:40 21:23	06:35 20:16	19:47 (2) 19:48 (2)	07:28 19:02	18:06 (3) 18:26 (3)	07:26 16:52	15:48 (4) 16:21 (4)	08:21 16:09	15:26 (5) 15:33 (5)
3	05:00 21:59	05:42 21:21	06:36 20:13		07:30 19:00	18:05 (3) 18:26 (3)	07:28 16:50	15:48 (4) 16:19 (4)	08:22 16:08	15:27 (5) 15:32 (5)
4	05:01 21:59	05:44 21:19	06:38 20:11		07:31 18:57	18:04 (3) 18:27 (3)	07:30 16:48	15:48 (4) 16:17 (4)	08:24 16:08	15:29 (5) 15:32 (5)
5	05:02 21:58	05:45 21:17	06:40 20:09		07:33 18:55	18:03 (3) 18:26 (3)	07:32 16:46	15:49 (4) 16:15 (4)	08:25 16:07	15:29 (5) 15:30 (5)
6	05:03 21:58	05:47 21:15	06:42 20:06		07:35 18:52	18:03 (3) 18:24 (3)	07:34 16:44	15:49 (4) 16:12 (4)	08:26 16:07	
7	05:04 21:57	05:49 21:13	19:54 (2) 20:00 (2)	06:43 20:04	07:37 18:50	18:02 (3) 18:21 (3)	07:36 16:43	15:50 (4) 16:10 (4)	08:28 16:06	
8	05:05 21:56	05:50 21:12	19:50 (2) 20:03 (2)	06:45 20:01	07:39 18:48	18:01 (3) 18:18 (3)	07:38 16:41	15:51 (4) 16:08 (4)	08:29 16:06	
9	05:06 21:55	05:52 21:10	19:47 (2) 20:06 (2)	06:47 19:59	07:41 18:45	18:02 (3) 18:16 (3)	07:40 16:39	15:52 (4) 16:06 (4)	08:30 16:05	
10	05:07 21:55	05:54 21:07	19:45 (2) 20:07 (2)	06:49 19:56	07:42 18:43	18:02 (3) 18:14 (3)	07:42 16:37	15:54 (4) 16:05 (4)	08:31 16:05	
11	05:08 21:54	05:56 21:05	19:44 (2) 20:08 (2)	06:50 19:54	07:44 18:40	18:03 (3) 18:11 (3)	07:44 16:35	15:56 (4) 16:03 (4)	08:33 16:05	
12	05:09 21:53	05:57 21:03	19:43 (2) 20:10 (2)	06:52 19:51	07:46 18:38	18:03 (3) 18:09 (3)	07:45 16:34	15:28 (5) 16:01 (4)	08:34 16:05	
13	05:10 21:52	05:59 21:01	19:41 (2) 20:10 (2)	06:54 19:49	07:48 18:36	18:05 (3) 18:07 (3)	07:47 16:32	15:26 (5) 15:38 (5)	08:35 16:05	
14	05:12 21:51	06:01 20:59	19:40 (2) 20:11 (2)	06:56 19:47	07:50 18:33		07:49 16:31	15:24 (5) 15:39 (5)	08:36 16:04	
15	05:13 21:50	06:03 20:57	19:40 (2) 20:12 (2)	06:58 19:44	07:52 18:31		07:51 16:29	15:23 (5) 15:40 (5)	08:37 16:05	
16	05:14 21:49	06:04 20:55	19:38 (2) 20:11 (2)	06:59 19:42	07:54 18:29	17:04 (4) 17:14 (4)	07:53 16:27	15:22 (5) 15:41 (5)	08:38 16:05	
17	05:16 21:47	06:06 20:53	19:38 (2) 20:12 (2)	07:01 19:39	07:55 18:26	17:00 (4) 17:17 (4)	07:55 16:26	15:22 (5) 15:42 (5)	08:38 16:05	
18	05:17 21:46	06:08 20:51	19:38 (2) 20:12 (2)	07:03 19:37	07:57 18:24	16:57 (4) 17:20 (4)	07:57 16:24	15:21 (5) 15:43 (5)	08:39 16:05	
19	05:18 21:45	06:10 20:48	19:37 (2) 20:12 (2)	07:05 19:34	07:59 18:22	16:55 (4) 17:21 (4)	07:59 16:23	15:21 (5) 15:43 (5)	08:40 16:05	
20	05:20 21:44	06:12 20:46	19:36 (2) 20:12 (2)	07:06 19:32	08:01 18:20	16:53 (4) 17:23 (4)	08:00 16:22	15:21 (5) 15:44 (5)	08:41 16:06	
21	05:21 21:42	06:13 20:44	19:37 (2) 20:12 (2)	07:08 19:29	08:03 18:17	16:52 (4) 17:24 (4)	08:02 16:20	15:21 (5) 15:44 (5)	08:41 16:06	
22	05:23 21:41	06:15 20:42	19:36 (2) 20:11 (2)	07:10 19:27	08:05 18:15	16:51 (4) 17:24 (4)	08:04 16:19	15:21 (5) 15:44 (5)	08:42 16:06	
23	05:24 21:39	06:17 20:39	19:36 (2) 20:10 (2)	07:12 19:24	08:07 18:13	16:50 (4) 17:25 (4)	08:06 16:18	15:21 (5) 15:43 (5)	08:42 16:07	
24	05:26 21:38	06:19 20:37	19:36 (2) 20:09 (2)	07:13 19:22	08:09 18:11	16:49 (4) 17:25 (4)	08:08 16:17	15:22 (5) 15:42 (5)	08:43 16:08	
25	05:27 21:36	06:20 20:35	19:36 (2) 20:06 (2)	07:15 19:19	07:11 17:09	15:48 (4) 16:26 (4)	08:09 16:16	15:22 (5) 15:41 (5)	08:43 16:08	
26	05:29 21:35	06:22 20:32	19:36 (2) 20:04 (2)	07:17 19:17	07:13 17:06	15:48 (4) 16:26 (4)	08:11 16:14	15:23 (5) 15:40 (5)	08:43 16:09	
27	05:30 21:33	06:24 20:30	19:37 (2) 20:02 (2)	07:19 19:14	07:15 17:04	15:47 (4) 16:26 (4)	08:13 16:13	15:23 (5) 15:38 (5)	08:44 16:10	
28	05:32 21:32	06:26 20:28	19:37 (2) 19:59 (2)	07:21 19:12	07:16 17:02	15:47 (4) 16:26 (4)	08:14 16:12	15:24 (5) 15:37 (5)	08:44 16:11	
29	05:34 21:30	06:27 20:25	19:38 (2) 19:57 (2)	07:22 19:09	18:16 (3) 18:19 (3)	15:47 (4) 17:00	08:16 16:12	15:24 (5) 15:36 (5)	08:44 16:11	
30	05:35 21:28	06:29 20:23	19:40 (2) 19:55 (2)	07:24 19:07	18:10 (3) 18:22 (3)	15:46 (4) 16:26 (4)	08:18 16:11	15:25 (5) 15:35 (5)	08:44 16:12	
31	05:37 21:27	06:31 20:21	19:40 (2) 19:52 (2)		07:22 16:56	15:46 (4) 16:25 (4)			08:44 16:13	
Potential sun hours	512	460	382	328	259	233				
Total, worst case		663	23	716	582	24				
Sun reduction		0.34	0.32	0.29	0.27	0.21				
Oper. time red.		1.00	1.00	1.00	1.00	1.00				
Wind dir. red.		0.65	0.67	0.66	0.66	0.66				
Total reduction		0.22	0.21	0.19	0.17	0.14				
Total, real		147	5	139	102	3				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: S - H19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44	08:14	16:09 (3)	07:16	16:41 (2)	07:01
	16:15	17:06	16:26 (3)	18:02	21	17:02 (2)
2	08:44	08:12	16:10 (3)	07:14	16:42 (2)	06:59
	16:16	17:08	16:25 (3)	18:04	18	17:00 (2)
3	08:44	08:10	16:12 (3)	07:12	16:45 (2)	06:56
	16:17	17:10	16:23 (3)	18:06	12	16:57 (2)
4	08:43	08:08	16:14 (3)	07:09		06:54
	16:18	17:12	7	16:21 (3)		20:06
5	08:43	08:07		07:07		21:01
	16:19	17:14		18:09		21:49
6	08:43	08:05		07:04		20:51
	16:21	17:16		18:11		21:03
7	08:42	08:03		07:02		21:50
	16:22	17:18		18:13		21:06
8	08:42	08:01		07:00		21:52
	16:24	17:20		18:15		21:08
9	08:41	07:59	16:48 (2)	06:57		21:53
	16:25	17:22	4	16:52 (2)		21:08
10	08:40	07:57	16:45 (2)	06:55		21:54
	16:26	17:24	9	16:54 (2)		21:10
11	08:40	07:55	16:43 (2)	06:53		21:55
	16:28	17:26	13	16:56 (2)		21:11
12	08:39	07:53	16:41 (2)	06:50		21:56
	16:30	17:28	18	16:59 (2)		21:15
13	08:38	07:51	16:39 (2)	06:48		21:57
	16:31	17:30	21	17:00 (2)		21:11
14	08:37	07:49	16:38 (2)	06:45		21:58
	16:33	17:32	24	17:02 (2)		21:18
15	08:36	07:47	16:38 (2)	06:43		21:59
	16:34	17:34	27	17:05 (2)		21:22
16	08:35	07:45	16:37 (2)	06:40		21:54
	16:36	17:36	30	17:07 (2)		21:22
17	08:34	07:43	16:37 (2)	06:38		21:59
	16:38	17:38	32	17:09 (2)		21:23
18	08:33	07:41	16:36 (2)	06:35		21:59
	16:40	17:40	32	17:08 (2)		21:23
19	08:32	16:06 (3)	07:39	16:35 (2)		21:54
	16:41	16:07 (3)	34	17:09 (2)		21:27
20	08:31	16:05 (3)	07:36	16:36 (2)		22:00
	16:43	16:08 (3)	33	17:09 (2)		21:28
21	08:30	16:05 (3)	07:34	16:36 (2)		22:00
	16:45	16:11 (3)	33	17:09 (2)		21:30
22	08:29	16:04 (3)	07:32	16:35 (2)		22:01
	16:47	16:12 (3)	34	17:09 (2)		21:31
23	08:27	16:05 (3)	07:30	16:36 (2)		22:01
	16:49	16:15 (3)	32	17:08 (2)		21:33
24	08:26	16:04 (3)	07:28	16:36 (2)		22:01
	16:50	16:17 (3)	32	17:08 (2)		21:34
25	08:24	16:05 (3)	07:25	16:36 (2)		22:01
	16:52	16:19 (3)	31	17:07 (2)		21:36
26	08:23	16:05 (3)	07:23	16:37 (2)		22:01
	16:54	16:21 (3)	29	17:06 (2)		21:37
27	08:22	16:05 (3)	07:21	16:38 (2)		22:01
	16:56	16:23 (3)	28	17:06 (2)		21:39
28	08:20	16:06 (3)	07:18	16:39 (2)		22:01
	16:58	16:26 (3)	25	17:04 (2)		21:40
29	08:19	16:06 (3)		07:08		21:56
	17:00	16:27 (3)		19:54		21:41
30	08:17	16:06 (3)		07:06		21:54
	17:02	16:26 (3)		19:56		21:43
31	08:15	16:07 (3)		07:04		21:54
	17:04	16:26 (3)		19:58		21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case	169	571	51			
Sun reduction	0.24	0.23	0.27			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.66	0.66			
Total reduction	0.16	0.15	0.18			
Total, real	27	88	9			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: S - H19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	16:15 (2) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	16:18 (2) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	15:44 (3) 15:51 (3)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	15:41 (3) 15:53 (3)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	15:41 (3) 15:56 (3)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 17:23 (2) 17:28 (2)	15:40 (3) 15:57 (3)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 17:18 (2) 17:32 (2)	15:39 (3) 15:58 (3)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 17:15 (2) 17:35 (2)	15:38 (3) 15:58 (3)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 17:13 (2) 17:36 (2)	15:38 (3) 15:59 (3)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 17:11 (2) 17:37 (2)	15:38 (3) 15:57 (3)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 17:10 (2) 17:38 (2)	15:38 (3) 15:56 (3)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 17:09 (2) 17:39 (2)	15:38 (3) 15:54 (3)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 17:08 (2) 17:39 (2)	15:38 (3) 15:52 (3)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 17:07 (2) 17:40 (2)	15:38 (3) 15:50 (3)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 17:07 (2) 17:40 (2)	15:39 (3) 15:49 (3)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 17:06 (2) 17:40 (2)	14:40 (4) 15:39 (3)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 17:06 (2) 17:40 (2)	15:40 (3) 15:46 (3)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 17:06 (2) 17:40 (2)	15:41 (3) 15:44 (3)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 17:06 (2) 17:39 (2)	15:42 (3) 15:43 (3)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 17:06 (2) 17:39 (2)	16:07 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:06 (2) 16:38 (2)	16:08 16:16
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:07 (2) 16:36 (2)	16:08 16:14
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:07 (2) 16:34 (2)	16:09 16:13
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:08 (2) 16:31 (2)	16:10 16:12
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:09 (2) 16:29 (2)	16:11 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:10 (2) 16:27 (2)	16:11 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56	16:12 (2) 16:25 (2)	16:12 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case				572	229	11
Sun reduction				0.29	0.27	0.21
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.66	0.66	0.65
Total reduction				0.19	0.18	0.13
Total, real				111	40	1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: T - H20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December						
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:51 (2)	08:19					
2	16:15	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	31	16:22 (2)	16:10				
3	08:44	08:12	16:35 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	15:52 (2)	08:21				
4	16:16	17:08	2	16:37 (2)	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02	16:52	29	16:21 (2)	16:09		
5	08:44	08:10	16:30 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	15:52 (2)	08:22				
6	16:17	17:10	9	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	27	16:19 (2)	16:08		
7	08:43	08:08	16:27 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	15:53 (2)	08:24				
8	16:18	17:12	14	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	24	16:17 (2)	16:08		
9	08:43	08:07	16:26 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	15:54 (2)	08:25				
10	16:19	17:14	17	16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	20	16:14 (2)	16:07		
11	08:43	08:05	16:24 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	15:56 (2)	08:26				
12	16:21	17:16	21	16:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16	16:12 (2)	16:07		
13	08:42	08:03	16:23 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	15:57 (2)	08:28				
14	16:22	17:18	24	16:47 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	13	16:10 (2)	16:06		
15	08:42	08:01	16:23 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	16:00 (2)	08:29				
16	16:24	17:20	27	16:50 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	8	16:08 (2)	16:06		
17	08:41	07:59	16:22 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			08:30			
18	16:25	17:22	30	16:52 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39		16:05			
19	08:40	07:57	16:21 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42			08:31			
20	16:26	17:24	31	16:52 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37		16:05			
21	08:40	07:55	16:21 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44		15:34 (3)	08:33			
22	16:28	17:26	32	16:53 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	8	15:42 (3)	16:05		
23	08:39	07:53	16:21 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:45		15:32 (3)	08:34			
24	16:30	17:28	33	16:54 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	13	15:45 (3)	16:05		
25	08:38	15:54 (3)	07:51	16:20 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47		15:31 (3)	08:35		
26	16:31	15:55 (3)	17:30	16:53 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	15	15:46 (3)	16:04		
27	08:37	15:54 (3)	07:49	16:20 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49		15:30 (3)	08:36		
28	16:33	15:57 (3)	17:32	16:53 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	17	15:47 (3)	16:04		
29	08:36	15:54 (3)	07:47	16:20 (2)	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51		15:29 (3)	08:37		
30	16:34	15:59 (3)	17:34	16:54 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	19	15:48 (3)	16:04		
31	08:35	15:53 (3)	07:45	16:20 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	17:04 (2)	07:53	15:29 (3)	08:38		
32	16:36	16:00 (3)	17:36	16:54 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	9	17:13 (2)	16:27	19	15:48 (3)	16:05
33	08:34	15:53 (3)	07:43	16:21 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	17:00 (2)	07:55	15:29 (3)	08:38		
34	16:38	16:02 (3)	17:38	16:54 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	17	17:17 (2)	16:26	20	15:49 (3)	16:05
35	08:33	15:53 (3)	07:41	16:20 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	16:57 (2)	07:57	15:28 (3)	08:39		
36	16:40	16:05 (3)	17:40	16:52 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	21	17:18 (2)	16:24	21	15:49 (3)	16:05
37	08:32	15:54 (3)	07:39	16:21 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	16:56 (2)	07:59	15:28 (3)	08:40		
38	16:41	16:07 (3)	17:42	16:52 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	24	17:20 (2)	16:23	21	15:49 (3)	16:05
39	08:31	15:53 (3)	07:36	16:22 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	16:54 (2)	08:00	15:29 (3)	08:41		
40	16:43	16:08 (3)	17:44	16:52 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	27	17:21 (2)	16:22	18	15:47 (3)	16:06
41	08:30	15:54 (3)	07:34	16:23 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	16:53 (2)	08:02	15:29 (3)	08:41		
42	16:45	16:11 (3)	17:46	16:51 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	29	17:22 (2)	16:20	17	15:46 (3)	16:06
43	08:29	15:54 (3)	07:32	16:23 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	16:52 (2)	08:04	15:29 (3)	08:42		
44	16:47	16:12 (3)	17:48	16:49 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	30	17:22 (2)	16:19	15	15:44 (3)	16:06
45	08:27	15:54 (3)	07:30	16:25 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	16:51 (2)	08:06	15:30 (3)	08:42		
46	16:49	16:15 (3)	17:50	16:48 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	32	17:23 (2)	16:18	13	15:43 (3)	16:07
47	08:26	15:54 (3)	07:28	16:27 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	16:51 (2)	08:08	15:30 (3)	08:43		
48	16:50	16:15 (3)	17:52	16:47 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	32	17:23 (2)	16:17	12	15:42 (3)	16:08
49	08:25	15:56 (3)	07:25	16:29 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	15:50 (2)	08:09	15:31 (3)	08:43		
50	16:52	16:16 (3)	17:54	16:43 (2)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	33	16:23 (2)	16:16	10	15:41 (3)	16:08
51	08:23	15:56 (3)	07:23	16:34 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	15:50 (2)	08:11	15:32 (3)	08:43		
52	16:54	16:15 (3)	17:56	16:39 (2)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	33	16:23 (2)	16:14	7	15:39 (3)	16:09
53	08:22	15:56 (3)	07:21	16:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	15:49 (2)	08:13	15:33 (3)	08:44			
54	16:56	16:15 (3)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	34	16:23 (2)	16:13	5	15:38 (3)	16:10	
55	08:20	15:58 (3)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	15:49 (2)	08:14	15:34 (3)	08:44			
56	16:58	16:15 (3)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	34	16:23 (2)	16:12	3	15:37 (3)	16:10	
57	08:19	15:59 (3)		17:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	15:49 (2)	08:16	15:34 (3)	08:44			
58	17:00	16:14 (3)		19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	34	16:23 (2)	16:11	2	15:36 (3)	16:11	
59	08:17	16:01 (3)		17:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	15:50 (2)	08:18		08:44			
60	17:02	16:13 (3)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	32	16:22 (2)	16:11		16:12		
61	08:15	16:03 (3)		17:04	05:04	05:04	05:37	06:31		07:22	15:50 (2)				08:44			
62	17:04	16:10 (3)		19:58	21:44	21:44	21:27	20:21		16:56	32	16:22 (2)			16:13			
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	423	233					
Total, worst case	251	616									453							
Sun reduction	0.24	0.23									0.29		423					
Oper. time red.	1.00	1.00									1.00		1.00					
Wind dir. red.	0.66	0.65									0.65		0.66					
Total reduction	0.16	0.15									0.19		0.17					
Total, real	40	94									87		74					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: U - H21

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	08:14	16:32 (2) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:49 (2) 08:19	
16:15	17:06	2 16:34 (2) 18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	30 16:19 (2) 16:10	
2 08:44	08:12	16:27 (2) 07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	15:49 (2) 08:21	
16:16	17:08	10 16:37 (2) 18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02	16:52	30 16:19 (2) 16:09	
3 08:44	08:10	16:25 (2) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	15:50 (2) 08:22	
16:17	17:10	14 16:39 (2) 18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	28 16:18 (2) 16:08	
4 08:43	08:08	16:23 (2) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	15:50 (2) 08:24	
16:18	17:12	18 16:41 (2) 18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	27 16:17 (2) 16:08	
5 08:43	08:07	16:22 (2) 07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	15:51 (2) 08:25	
16:19	17:14	21 16:43 (2) 18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	23 16:14 (2) 16:07	
6 08:43	08:05	16:21 (2) 07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	15:52 (2) 08:26	
16:21	17:16	24 16:45 (2) 18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	20 16:12 (2) 16:07	
7 08:42	08:03	16:20 (2) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	15:53 (2) 08:28	
16:22	17:18	27 16:47 (2) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	17 16:10 (2) 16:06	
8 08:42	08:01	16:20 (2) 07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	15:55 (2) 08:29	
16:24	17:20	28 16:48 (2) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	13 16:08 (2) 16:06	
9 08:41	07:59	16:19 (2) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	15:58 (2) 08:30	
16:25	17:22	30 16:49 (2) 18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	9 16:07 (2) 16:05	
10 08:40	07:57	16:19 (2) 06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	15:59 (2) 08:31	
16:26	17:24	31 16:50 (2) 18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	16:05	
11 08:40	07:55	16:19 (2) 06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	15:36 (3) 08:33	
16:28	17:26	31 16:50 (2) 18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	3 15:39 (3) 16:05	
12 08:39	07:53	16:19 (2) 06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:45	15:33 (3) 08:34	
16:30	17:28	31 16:50 (2) 18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	10 15:43 (3) 16:05	
13 08:38	15:53 (3) 07:51	16:18 (2) 06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	15:31 (3) 08:35	
16:31	2 15:55 (3) 17:30	32 16:50 (2) 18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	13 15:44 (3) 16:04	
14 08:37	15:53 (3) 07:49	16:18 (2) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	15:30 (3) 08:36	
16:33	4 15:57 (3) 17:32	32 16:50 (2) 18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	15 15:45 (3) 16:04	
15 08:36	15:53 (3) 07:47	16:18 (2) 06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	15:29 (3) 08:37	
16:34	6 15:59 (3) 17:34	32 16:50 (2) 18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	17 15:46 (3) 16:04	
16 08:35	15:52 (3) 07:45	16:19 (2) 06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	15:29 (3) 08:38	
16:36	8 16:00 (3) 17:36	31 16:50 (2) 18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	18 15:47 (3) 16:05	
17 08:34	15:53 (3) 07:43	16:20 (2) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	15:28 (3) 08:38	
16:38	9 16:02 (3) 17:38	29 16:49 (2) 18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	20 15:48 (3) 16:05	
18 08:33	15:53 (3) 07:41	16:19 (2) 06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	17:01 (2) 07:57	15:28 (3) 08:39	
16:40	12 16:05 (3) 17:40	29 16:48 (2) 18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	9 17:10 (2) 16:24	20 15:48 (3) 16:05	
19 08:32	15:53 (3) 07:39	16:20 (2) 06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	16:57 (2) 07:59	15:28 (3) 08:40	
16:41	14 16:07 (3) 17:42	27 16:47 (2) 18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16 17:13 (2) 16:23	21 15:49 (3) 16:05	
20 08:31	15:53 (3) 07:36	16:22 (2) 06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	16:55 (2) 08:00	15:28 (3) 08:41	
16:43	15 16:08 (3) 17:44	25 16:47 (2) 18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	20 17:15 (2) 16:22	19 15:47 (3) 16:06	
21 08:30	15:53 (3) 07:34	16:23 (2) 06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	16:53 (2) 08:02	15:29 (3) 08:41	
16:45	18 16:11 (3) 17:46	23 16:46 (2) 18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	23 17:16 (2) 16:20	17 15:46 (3) 16:06	
22 08:29	15:53 (3) 07:32	16:24 (2) 06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	16:52 (2) 08:04	15:29 (3) 08:42	
16:47	19 16:12 (3) 17:48	19 16:43 (2) 18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	25 17:17 (2) 16:19	15 15:44 (3) 16:06	
23 08:27	15:54 (3) 07:30	16:27 (2) 06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	16:51 (2) 08:06	15:29 (3) 08:42	
16:49	21 16:15 (3) 17:50	14 16:41 (2) 18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	27 17:18 (2) 16:18	14 15:43 (3) 16:07	
24 08:26	15:54 (3) 07:28	16:32 (2) 06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	16:50 (2) 08:08	15:30 (3) 08:43	
16:50	20 16:14 (3) 17:52	5 16:37 (2) 18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	29 17:19 (2) 16:17	12 15:42 (3) 16:08	
25 08:25	15:55 (3) 07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	15:49 (2) 08:09	15:31 (3) 08:43	
16:52	20 16:15 (3) 17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	30 16:19 (2) 16:16	10 15:41 (3) 16:08	
26 08:23	15:56 (3) 07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	15:48 (2) 08:11	15:31 (3) 08:43	
16:54	18 16:14 (3) 17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	31 16:19 (2) 16:14	8 15:39 (3) 16:09	
27 08:22	15:56 (3) 07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	15:48 (2) 08:13	15:32 (3) 08:44	
16:56	17 16:13 (3) 17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	31 16:19 (2) 16:13	6 15:38 (3) 16:10	
28 08:20	15:58 (3) 07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	15:48 (2) 08:14	15:33 (3) 08:44	
16:58	16 16:14 (3) 18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	31 16:19 (2) 16:12	4 15:37 (3) 16:10	
29 08:19	15:59 (3)	07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	15:47 (2) 08:16	15:34 (3) 08:44	
17:00	13 16:12 (3)	19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	32 16:19 (2) 16:11	2 15:36 (3) 16:11	
30 08:17	16:01 (3)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	15:47 (2) 08:18	15:30 (3) 08:44	
17:02	10 16:11 (3)	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	32 16:19 (2) 16:11	16:12	
31 08:15	16:05 (3)	07:04		05:04		05:37	06:31		07:22	15:47 (2)	08:44	
17:04	1 16:06 (3)	19:58		21:44		21:27	20:21		16:56	32 16:19 (2)	16:13	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	243	565								368	441	
Sun reduction	0.24	0.23								0.29	0.27	
Oper. time red.	1.00	1.00								1.00	1.00	
Wind dir. red.	0.66	0.66								0.66	0.66	
Total reduction	0.16	0.15								0.19	0.17	
Total, real	39	86								71	77	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: V - H22

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:07 (3)	08:14	15:21 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:54 (2)									
	16:15	29	15:36 (2)	17:06	26	15:47 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	32	15:26 (2)						
2	08:44	15:08 (3)	08:12	15:22 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	14:54 (2)									
	16:16	29	15:37 (2)	17:08	24	15:46 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	32	15:26 (2)						
3	08:44	15:08 (3)	08:10	15:24 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	14:55 (2)									
	16:17	29	15:37 (2)	17:10	21	15:45 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	31	15:26 (2)						
4	08:43	15:09 (3)	08:08	15:26 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	14:56 (2)									
	16:18	30	15:39 (2)	17:12	17	15:43 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	31	15:27 (2)						
5	08:43	15:09 (3)	08:07	15:30 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	14:56 (2)									
	16:19	30	15:39 (2)	17:14	10	15:40 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	30	15:26 (2)						
6	08:43	15:11 (2)	08:05	15:40 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	11	14:59 (2)	08:26	14:57 (2)						
	16:21	29	15:40 (2)	17:16	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	15:10 (2)	16:07	30	15:27 (2)							
7	08:42	15:11 (2)	08:03	15:41 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	17	15:13 (2)	16:06	30	15:26 (2)					
	16:22	30	15:41 (2)	17:18	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	14:54 (2)	08:29	14:56 (3)								
8	08:42	15:11 (2)	08:01	15:41 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	21	15:15 (2)	16:06	30	15:26 (2)					
	16:24	30	15:41 (2)	17:20	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	14:53 (2)	08:30	14:57 (3)								
9	08:41	15:12 (2)	07:59	15:43 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	24	15:17 (2)	16:05	30	15:27 (2)					
	16:25	31	15:43 (2)	17:22	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	14:52 (2)	08:32	14:57 (3)								
10	08:40	15:11 (2)	07:57	15:44 (2)	17:24	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	26	15:18 (2)	16:05	29	15:26 (2)					
	16:26	33	15:44 (2)	17:24	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44	14:51 (2)	08:33	14:57 (3)								
11	08:40	15:11 (2)	07:55	15:44 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	28	15:19 (2)	16:05	29	15:26 (2)					
	16:28	33	15:44 (2)	17:26	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	14:50 (2)	08:34	14:57 (3)								
12	08:39	15:11 (2)	07:53	15:45 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	30	15:20 (2)	16:05	29	15:26 (2)					
	16:30	34	15:45 (2)	17:28	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	14:49 (2)	08:35	14:57 (3)								
13	08:38	15:12 (2)	07:51	15:46 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	32	15:21 (2)	16:04	29	15:26 (2)					
	16:31	34	15:46 (2)	17:30	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	14:49 (2)	08:36	14:59 (3)								
14	08:37	15:12 (2)	07:49	15:46 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	32	15:21 (2)	16:04	28	15:27 (2)					
	16:33	34	15:46 (2)	17:32	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	14:48 (2)	08:37	14:58 (3)								
15	08:36	15:12 (2)	07:47	15:47 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	34	15:22 (2)	16:04	28	15:26 (2)					
	16:34	35	15:47 (2)	17:34	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	14:48 (2)	08:38	14:59 (3)								
16	08:35	15:11 (2)	07:45	15:47 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	35	15:23 (2)	16:05	27	15:26 (2)					
	16:36	36	15:47 (2)	17:36	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	14:48 (2)	08:39	14:59 (3)								
17	08:34	15:12 (2)	07:43	15:47 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	35	15:23 (2)	16:05	28	15:27 (2)					
	16:38	35	15:47 (2)	17:38	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	14:48 (2)	08:39	15:00 (3)								
18	08:33	15:12 (2)	07:41	15:48 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	35	15:23 (2)	16:05	27	15:27 (2)					
	16:40	36	15:48 (2)	17:40	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	14:48 (2)	08:40	15:00 (3)								
19	08:32	15:13 (2)	07:39	15:49 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	36	15:24 (2)	16:05	28	15:28 (2)					
	16:41	36	15:49 (2)	17:42	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	14:48 (2)	08:41	15:00 (3)								
20	08:31	15:12 (2)	07:36	15:49 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	36	15:24 (2)	16:06	27	15:27 (2)					
	16:43	37	15:49 (2)	17:44	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	14:48 (2)	08:41	15:01 (3)								
21	08:30	15:13 (2)	07:34	15:50 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	36	15:24 (2)	16:06	27	15:28 (2)					
	16:45	36	15:49 (2)	17:46	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	14:48 (2)	08:42	15:01 (3)								
22	08:29	15:13 (2)	07:32	15:51 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	37	15:25 (2)	16:06	27	15:28 (2)					
	16:47	36	15:49 (2)	17:48	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	14:49 (2)	08:42	15:02 (3)								
23	08:27	15:14 (2)	07:30	15:50 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	36	15:25 (2)	16:07	27	15:29 (2)					
	16:49	36	15:50 (2)	17:50	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	14:49 (2)	08:43	15:02 (3)								
24	08:26	15:14 (2)	07:28	15:49 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	36	15:25 (2)	16:08	27	15:29 (2)					
	16:50	35	15:49 (2)	17:52	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	06:09	14:50 (2)	08:43	15:03 (3)								
25	08:25	15:15 (2)	07:25	15:50 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	35	15:25 (2)	16:08	27	15:30 (2)					
	16:52	35	15:50 (2)	17:54	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	14:50 (2)	08:43	15:03 (3)								
26	08:23	15:15 (2)	07:23	15:50 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	36	15:26 (2)	16:09	27	15:30 (2)					
	16:54	35	15:50 (2)	17:56	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	14:51 (2)	08:44	15:04 (3)								
27	08:22	15:15 (2)	07:21	15:49 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	35	15:26 (2)	16:10	28	15:32 (2)					
	16:56	34	15:49 (2)	17:58	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	14:52 (2)	08:44	15:05 (3)								
28	08:20	15:17 (2)	07:19	15:50 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	34	15:26 (2)	16:10	28	15:33 (2)					
	16:58	33	15:50 (2)	18:00	07:09	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	14:52 (2)	08:44	15:05 (3)								
29	08:19	15:17 (2)	07:16	15:51 (2)	18:02	18:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:12	34	15:26 (2)	16:11	29	15:34 (2)					
	17:00	32	15:49 (2)	18:02	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	14:53 (2)	08:44	15:06 (3)								
30	08:17	15:18 (2)	07:14	15:52 (2)	18:04	18:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	33	15:26 (2)	16:12	29	15:35 (2)					
	17:02	30	15:48 (2)	18:05	07:04	05:52	05:04	04:57	05:32	06:26	07:21	07:17	08:15	14:53 (2)	08:44	15:06 (3)								
31	08:15	15:19 (2)	07:12	15:53 (2)	18:06	18:58	20:56	21:45	22:00	21:27:														

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: W - H23
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:03 (2)	08:14	15:16 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24							08:19			14:46 (2)	
	16:15	29	15:32 (2)	17:06	25	15:41 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05					16:54		16:10	36	15:22 (2)	
2	08:44	15:03 (2)	08:12	15:18 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26							08:21			14:46 (2)	
	16:16	30	15:33 (2)	17:08	21	15:39 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02					16:52		16:09	35	15:21 (2)	
3	08:44	15:03 (2)	08:10	15:20 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28							08:22			14:47 (2)	
	16:17	31	15:34 (2)	17:10	17	15:37 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00					16:50		16:08	35	15:22 (2)	
4	08:43	15:03 (2)	08:08	15:24 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30							08:24			14:48 (2)	
	16:18	32	15:35 (2)	17:12	10	15:34 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57					16:48		16:08	34	15:22 (2)	
5	08:43	15:03 (2)	08:07	15:25 (2)	07:07	06:51	05:44	05:00	05:02	05:45	06:40	07:33	07:32							08:25			14:49 (2)	
	16:19	32	15:35 (2)	17:14		18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55						16:46		16:07	33	15:22 (2)	
6	08:43	15:04 (2)	08:05	15:26 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34							08:26			14:50 (2)	
	16:21	32	15:36 (2)	17:16		18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52						16:44		16:07	32	15:22 (2)	
7	08:42	15:03 (2)	08:03	15:27 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36						14:53 (2)		16:08	28	14:50 (2)	
	16:22	34	15:37 (2)	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50						16:43	11	15:04 (2)	16:06	32	15:22 (2)
8	08:42	15:03 (2)	08:01	15:28 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38						16:43		16:02	28	14:50 (2)	
	16:24	34	15:37 (2)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48						16:41	17	15:07 (2)	16:06	32	15:22 (2)
9	08:41	15:04 (2)	07:59	15:29 (2)	06:42	06:57	05:36	04:57	05:06	05:52	06:47	07:41	07:40						16:41		16:02	28	14:52 (2)	
	16:25	35	15:39 (2)	17:22		18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45						16:39	21	15:10 (2)	16:05	31	15:23 (2)
10	08:40	15:04 (2)	07:57	15:30 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42						07:42		14:47 (2)	16:05	31	15:23 (2)
	16:26	35	15:39 (2)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43						16:37	24	15:11 (2)	16:05	31	15:23 (2)
11	08:40	15:04 (2)	07:55	15:31 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44						16:44		14:46 (2)	16:03	34	15:23 (2)
	16:28	36	15:40 (2)	17:26		18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40						16:35	27	15:13 (2)	16:05	30	15:23 (2)
12	08:39	15:04 (2)	07:53	15:32 (2)	07:53	6	16:55 (1)	18:23	20:15	21:06	21:03	19:51	18:38						16:37		14:45 (2)	16:05	30	15:23 (2)
	16:30	36	15:40 (2)	17:28	4	16:59 (1)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38					16:34	29	15:14 (2)	16:05	30	15:23 (2)
13	08:38	15:05 (2)	07:51	15:33 (2)	07:51	6	16:53 (1)	18:25	20:22	21:17	21:57	21:52	21:01	19:49					16:34		14:45 (2)	16:05	30	15:23 (2)
	16:31	36	15:41 (2)	17:30	7	17:00 (1)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36					16:32	31	15:15 (2)	16:05	29	15:23 (2)
14	08:37	15:05 (2)	07:49	15:35 (2)	07:49	6	16:52 (1)	18:27	20:24	21:18	21:58	21:51	20:59	19:47					16:31		14:43 (2)	16:04	29	15:24 (2)
	16:33	36	15:41 (2)	17:32	10	17:02 (1)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33					16:31	32	15:15 (2)	16:04	29	15:24 (2)
15	08:36	15:05 (2)	07:47	15:36 (2)	07:47	6	16:52 (1)	18:28	20:26	21:20	21:58	21:50	20:57	19:44					16:31		14:43 (2)	16:04	28	15:25 (2)
	16:34	37	15:42 (2)	17:34	13	17:05 (1)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31					16:29	33	15:16 (2)	16:04	28	15:25 (2)
16	08:35	15:05 (2)	07:45	15:37 (2)	07:45	6	16:52 (1)	18:30	20:28	21:22	21:59	21:49	20:55	19:42					16:29		14:42 (2)	16:03	28	15:25 (2)
	16:36	37	15:42 (2)	17:36	15	17:07 (1)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29					16:27	35	15:17 (2)	16:05	28	15:25 (2)
17	08:34	15:05 (2)	07:43	15:38 (2)	07:43	6	16:52 (1)	18:32	20:30	21:23	21:59	21:47	20:53	19:39					16:26		14:42 (2)	16:03	28	15:24 (2)
	16:38	37	15:42 (2)	17:38	17	17:09 (1)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26					16:26	35	15:17 (2)	16:05	28	15:24 (2)
18	08:33	15:06 (2)	07:41	15:39 (2)	07:41	6	16:51 (1)	18:36	20:31	21:25	22:00	21:46	20:51	19:37					16:24		14:42 (2)	16:03	29	15:26 (2)
	16:40	37	15:43 (2)	17:40	19	17:10 (1)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24					16:24	36	15:18 (2)	16:05	29	15:26 (2)
19	08:32	15:06 (2)	07:39	15:40 (2)	07:39	6	16:51 (1)	18:36	20:33	21:27	22:00	21:45	20:48	19:34					16:23		14:42 (2)	16:03	29	15:26 (2)
	16:41	38	15:44 (2)	17:42	17	17:09 (1)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22					16:23	8	17:28 (1)	16:05	29	15:26 (2)
20	08:31	15:06 (2)	07:36	15:41 (2)	07:36	6	16:51 (1)	18:38	20:35	21:28	22:00	21:44	20:46	19:32					16:22		14:42 (2)	16:03	29	15:26 (2)
	16:43	37	15:43 (2)	17:44	16	17:09 (1)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20					16:22	13	17:28 (1)	16:03	29	15:26 (2)
21	08:30	15:07 (2)	07:34	15:42 (2)	07:34	6	16:54 (1)	18:38	20:36	21:29	22:01	21:45	20:47	19:33					16:21		14:43 (2)	16:03	29	15:26 (2)
	16:45	37	15:44 (2)	17:46	14	17:08 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17					16:21	15	17:39 (1)	16:02	28	15:26 (2)
22	08:29	15:07 (2)	07:32	15:43 (2)	07:32	6	16:55 (1)	18:40	20:38	21:30	22:02	21:43	20:45	19:30					16:20		14:43 (2)	16:03	29	15:26 (2)
	16:47	36	15:43 (2)	17:48	11	17:06 (1)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15					16:20	17	17:40 (1)	16:03	28	15:26 (2)
23	08:27	15:08 (2)	07:30	15:44 (2)	07:30	6	16:56 (1)	18:43	20:40	21:33	22:01	21:39	20:39	19:24					16:19		14:43 (2)	16:03	28	15:27 (2)
	16:49	36	15:44 (2)	17:50	5	17:03 (1)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13					16:18	18	17:40 (1)	16:03	28	15:27 (2)
24	08:26	15:08 (2)	07:28	15:45 (2)	07:28	6	16:56 (1)	18:44	20:42	21:34	22:02	21:40	20:38	19:22					16:17		14:43 (2)	16:03	28	15:27 (2)
	16:50	36	15:44 (2)	17:52		18:45	20:43	21:34	22:01	21:37	20:37	19:22	18:11	17:00					16:16		14:43 (2)	16:03	28	15:27 (2)
25	08:25	15:09 (2)	07:25	15:46 (2)	07:25	6	16:57 (1)	18:45	20:44	21:35	22:02	21:41	20:39	19:20					16:15		14:43 (2)	16:03	28	15:27 (2)
	16:52	35	15:44 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:36	19:21	18:09	17:00					16:14		14:43 (2)	16:03	28	15:27 (2)
26	08:23	15:09 (2)	07:23	15:47 (2)	07:23	6	16:58 (1)	18:46	20:45	21:36	22:02	21:42	20:38	19:17					16:13		14:43 (2)	16:03	28	15:27 (2)
	16:54	35	15:44 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:00					16:12		14:43 (2)	16:03	28	15:27 (2)
27	08:22	15:10 (2)	07:21	15:48 (2)	07:21	6	16:59 (1)	18:47	20:46	21:37	22:02	21:43	20:39	19:16					16:11		14:43 (2)	16:03	28	15:27 (2)
	16:56	33	15:43 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:00					16:11	12	16:34 (1)	16:03	28	15:27 (2)
28	08:20	15:11 (2)	07:19	15:49 (2)	07:19	6	16:59 (1)	18:49	20:48	21:39	22:02	21:44	20:40	19:14					16:10		14:43 (2)	16:03	28	15:27 (2)
	16:58	32	15:43 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:00					16:09	9	16:31 (1)	16:02	28	15:27 (2)
29	08:19	15:12 (2)		15:50 (2)		18:55	20:51	21:41	22:01	21:33	20:29	19:13	17:03	16:01					16:08		14:44 (2)	16:03	28	15:27 (2)
	17:00	31	15:43 (2)																					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: X - H24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10	15:19 (1) 15:34 (1)		
2	08:44 16:16	15:37 (1) 15:38 (1)	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	15:20 (1) 15:33 (1)	
3	08:44 16:17	15:37 (1) 15:39 (1)	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08	15:20 (1) 15:32 (1)	
4	08:43 16:18	15:37 (1) 15:41 (1)	08:09 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08	15:22 (1) 15:32 (1)	
5	08:43 16:19	15:37 (1) 15:42 (1)	08:07 17:14	07:07 18:09	06:51 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07	15:22 (1) 15:30 (1)	
6	08:43 16:21	15:37 (1) 15:44 (1)	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07	15:23 (1) 15:30 (1)	
7	08:42 16:22	15:37 (1) 15:45 (1)	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06	15:24 (1) 15:29 (1)	
8	08:42 16:24	15:37 (1) 15:46 (1)	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06	15:25 (1) 15:29 (1)	
9	08:41 16:25	15:37 (1) 15:49 (1)	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05	15:26 (1) 15:28 (1)	
10	08:40 16:26	15:37 (1) 15:50 (1)	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05	15:26 (1) 15:28 (1)	
11	08:40 16:28	15:37 (1) 15:52 (1)	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	07:44 16:35	08:33 16:05		
12	08:39 16:30	15:37 (1) 15:53 (1)	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05		
13	08:38 16:31	15:38 (1) 15:58 (1)	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05		
14	08:37 16:33	15:38 (1) 15:57 (1)	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04		
15	08:36 16:34	15:38 (1) 15:59 (1)	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 15:21 (1) 15:29 (1)	08:37 16:04	
16	08:35 16:36	15:39 (1) 16:00 (1)	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 15:31 (1)	16:05	
17	08:34 16:38	15:38 (1) 16:00 (1)	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 15:32 (1)	16:05	
18	08:33 16:40	15:39 (1) 16:00 (1)	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 15:37 (1)	16:05	
19	08:32 16:41	15:40 (1) 16:01 (1)	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 15:34 (1)	16:05	
20	08:31 16:43	15:40 (1) 16:00 (1)	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 15:35 (1)	16:05	
21	08:30 16:45	15:41 (1) 16:01 (1)	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 15:36 (1)	16:06	
22	08:29 16:47	15:41 (1) 16:00 (1)	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 15:36 (1)	16:06	
23	08:27 16:49	15:42 (1) 16:00 (1)	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 15:37 (1)	16:07	
24	08:26 16:50	15:43 (1) 15:59 (1)	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 15:37 (1)	16:08	
25	08:25 16:52	15:45 (1) 15:59 (1)	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 15:38 (1)	16:08	
26	08:23 16:54	15:46 (1) 15:58 (1)	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:06	08:11 16:14	08:43 15:39 (1)	16:09	
27	08:22 16:56	15:48 (1) 15:56 (1)	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:13	08:44 15:38 (1)	16:10	
28	08:20 16:58		07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:12	08:44 15:37 (1)	16:11	
29	08:19 17:00			07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:12	08:44 15:35 (1)	16:11	
30	08:17 17:02			07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 15:35 (1)	16:12	
31	08:15 17:04			07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13		
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	286	78	
Total, worst case	361												286	0.21	
Sun reduction	0.24												0.27	0.21	
Oper. time red.	1.00												1.00	1.00	
Wind dir. red.	0.66												0.66	0.66	
Total reduction	0.16												0.18	0.14	
Total, real	58												50	11	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: Y - H25

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: Z - H26

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
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12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AA - H27

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	[January	[February	[March	[April	[May	[June	[July	[August	[September	[October	[November	[December		
1	08:44	08:14	07:16	07:01	05:52	19:57 (5)	05:03	04:59	05:39	20:09 (5)	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	29 20:26 (5)	21:45	22:00	21:25	24 20:33 (5)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	19:56 (5)	05:02	05:00	05:40	20:09 (5)	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	30 20:26 (5)	21:46	22:00	21:23	25 20:34 (5)	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48	19:56 (5)	05:01	05:00	05:42	20:07 (5)	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	30 20:26 (5)	21:48	21:59	21:21	27 20:34 (5)	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	19:56 (5)	05:00	05:01	05:44	20:07 (5)	06:38	07:31	07:30	08:24
	16:18	17:12	18:07	20:06	21:01	30 20:26 (5)	21:49	21:59	21:19	28 20:35 (5)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	19:56 (5)	04:59	05:02	05:45	20:06 (5)	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07	21:03	30 20:26 (5)	21:50	21:58	21:17	29 20:35 (5)	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	19:56 (5)	04:59	05:03	05:47	20:06 (5)	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	29 20:25 (5)	21:51	21:57	21:15	29 20:35 (5)	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	19:57 (5)	04:58	05:04	05:49	20:06 (5)	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	29 20:26 (5)	21:52	21:57	21:13	30 20:36 (5)	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	19:57 (5)	04:57	05:05	05:51	20:05 (5)	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	28 20:25 (5)	21:53	21:56	21:11	30 20:35 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	19:57 (5)	04:57	05:06	05:52	20:05 (5)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	27 20:24 (5)	21:54	21:55	21:09	30 20:35 (5)	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34	19:57 (5)	04:56	05:07	05:54	20:05 (5)	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11	26 20:23 (5)	21:55	21:54	21:07	30 20:35 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33	19:58 (5)	04:56	05:08	05:56	20:05 (5)	06:50	07:44	07:43	08:33
	16:28	17:26	18:21	20:18	21:13	25 20:23 (5)	21:55	21:54	21:05	30 20:35 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	19:59 (5)	04:55	05:09	05:58	20:05 (5)	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15	23 20:22 (5)	21:56	21:53	21:03	29 20:34 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29	20:00 (5)	04:55	05:11	05:59	20:05 (5)	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17	21 20:21 (5)	21:57	21:52	21:01	26 20:31 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27	20:01 (5)	04:55	05:12	06:01	20:06 (5)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:18	19 20:20 (5)	21:57	21:51	20:59	23 20:29 (5)	19:47	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26	20:02 (5)	04:55	05:13	06:03	20:06 (5)	06:58	07:52	07:51	08:37
	16:34	17:34	18:28	20:26	21:20	16 20:18 (5)	21:58	21:50	20:57	22 20:28 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24	20:05 (5)	04:54	05:14	06:05	20:06 (5)	06:59	07:54	07:53	08:38
	16:36	17:36	18:30	20:28	21:22	12 20:17 (5)	21:59	21:48	20:55	19 20:25 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	05:22	20:07 (5)	04:54	05:16	06:06	20:08 (5)	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30	21:23	7 20:14 (5)	21:59	21:47	20:53	15 20:23 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	05:21	04:54	21:21 (3)	05:17	06:08	20:09 (5)	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31	21:25	21:59	3 21:24 (3)	21:46	20:50	13 20:22 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	05:19	04:54	21:21 (3)	05:18	06:10	20:10 (5)	07:05	07:59	07:59	08:40
	16:41	17:42	18:36	20:33	21:27	22:00	3 21:24 (3)	21:45	20:48	9 20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	05:18	04:54	21:21 (3)	05:20	06:12	20:12 (5)	07:06	08:01	08:00	08:41
	16:43	17:44	18:38	20:35	21:28	22:00	3 21:24 (3)	21:44	20:46	5 20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	04:54	21:21 (3)	05:21	06:13	07:08	08:03	08:02	08:41	08:41
	16:45	17:46	18:40	20:37	21:30	22:00	3 21:24 (3)	21:42	20:44	19:29	18:17	16:20	16:06	16:06
22	08:28	07:32	06:26	06:12	05:15	04:55	21:22 (3)	05:23	06:15	07:10	08:05	08:04	08:42	08:42
	16:47	17:48	18:42	20:39	21:31	22:01	3 21:25 (3)	21:41	20:42	19:27	18:15	16:19	16:07	16:07
23	08:27	07:30	06:23	06:09	05:13	04:55	21:22 (3)	05:24	06:17	07:12	08:07	08:06	08:42	08:42
	16:49	17:50	18:43	20:41	6 20:12 (5)	21:33	3 21:25 (3)	21:39	20:39	19:24	18:13	16:18	16:07	16:07
24	08:26	07:28	06:21	06:07	05:12	04:55	21:22 (3)	05:26	06:19	07:13	08:09	08:07	08:43	08:43
	16:51	17:52	18:45	20:42	9 20:13 (5)	21:34	3 21:25 (3)	21:38	20:37	19:22	18:11	16:17	16:08	16:08
25	08:24	07:25	06:18	06:05	05:11	04:56	21:23 (3)	05:27	06:20	07:15	07:11	08:09	08:43	08:43
	16:52	17:54	18:47	20:44	13 20:15 (5)	21:36	2 21:25 (3)	21:36	20:35	19:19	17:09	16:16	16:08	16:08
26	08:23	07:23	06:16	06:03	05:09	04:56	21:23 (3)	05:29	06:22	07:17	07:13	08:11	08:43	08:43
	16:54	17:56	18:49	20:46	16 20:17 (5)	21:37	2 21:25 (3)	21:35	20:32	19:17	17:07	16:15	16:09	16:09
27	08:21	07:21	06:13	06:01	05:08	04:56	21:22 (3)	05:31	06:24	07:19	07:14	08:13	08:44	08:44
	16:56	17:58	18:51	20:48	19 20:19 (5)	21:39	2 21:24 (3)	21:33	9 20:26 (5)	07:14	17:04	16:14	16:10	16:10
28	08:20	07:18	06:11	05:58	19:59 (5)	05:07	21:23 (3)	05:32	06:26	07:21	07:16	08:14	08:44	08:44
	16:58	18:00	18:53	20:50	22 20:21 (5)	21:40	2 21:25 (3)	21:32	14 20:28 (5)	07:28	17:02	16:13	16:11	16:11
29	08:18	07:09	05:56	05:46	19:58 (5)	05:06	21:24 (3)	05:34	06:28	07:22	07:18	08:16	08:44	08:44
	17:00	19:54	20:52	24 20:22 (5)	21:41	22:00	1 21:25 (3)	21:30	17 20:30 (5)	07:25	17:09	17:00	16:12	16:11
30	08:17	07:06	05:54	05:45	19:57 (5)	05:05	04:58	05:35	06:29	07:24	07:20	08:17	08:44	08:44
	17:02	19:56	20:53	27 20:24 (5)	21:43	22:00	21:28	20 20:31 (5)	20:23	19:07	16:58	16:11	16:12	16:12
31	08:15	07:04	05:54	05:44	05:04	05:04	05:37	06:31	07:22	07:22	07:22	08:17	08:44	08:44
	17:04	19:58	20:54	21:44	21:44	21:44	21:26	22 20:32 (5)	20:21	16:56	16:56	16:13	16:13	16:13
Potential sun hours	250													
Total, worst case		273												
Sun reduction			367											
Oper. time red.				420										
Wind dir. red.					136									
Total reduction					0.35									
Total, real					0.38									
					1.00									
					0.65									
					0.65									
					0.23									
					0.25									
					0.19									
					0.21									
					8									
					17									
					104									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AB - H28
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:55 (5) 20:24 (5)	05:03 21:45	04:59 22:00	21:21 (3) 21:24 (3)	05:39 21:25	20:09 (5) 20:29 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:55 (5) 20:24 (5)	05:02 21:46	05:00 22:00	21:22 (3) 21:24 (3)	05:40 21:23	20:09 (5) 20:30 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:55 (5) 20:24 (5)	05:01 21:48	05:00 21:59	21:21 (3) 21:23 (3)	05:42 21:21	20:07 (5) 20:30 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:54 (5) 20:24 (5)	05:00 21:49	05:01 21:59	21:22 (3) 21:23 (3)	05:44 21:19	20:07 (5) 20:31 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:55 (5) 20:23 (5)	04:59 21:50	05:02 21:58	21:17 (3) 21:17	05:06 20:05 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07	
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:55 (5) 20:22 (5)	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:32 (5)	07:35 20:06	07:34 18:52	07:34 16:44	08:26 16:07	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:56 (5) 20:23 (5)	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:33 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06	
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	19:56 (5) 20:22 (5)	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:33 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06	
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	19:56 (5) 20:21 (5)	04:57 21:54	21:17 (3) 05:06 2 21:19 (3) 21:55	05:52 21:09	06:47 20:33 (5)	07:41 19:59	07:40 18:45	08:30 16:39		
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	19:57 (5) 20:20 (5)	04:56 21:55	21:17 (3) 05:07 2 21:19 (3) 21:54	05:54 21:07	06:49 20:32 (5)	07:42 19:56	08:31 18:43	07:42 16:37		
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	19:59 (5) 20:19 (5)	04:56 21:55	21:17 (3) 05:08 3 21:20 (3) 21:54	05:56 21:05	06:50 20:33 (5)	07:44 19:54	08:33 18:40	07:43 16:36		
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	19:59 (5) 20:18 (5)	04:55 21:56	21:17 (3) 05:09 4 21:21 (3) 21:53	05:58 21:03	06:52 20:33 (5)	07:46 19:51	08:34 18:38	07:45 16:34		
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:01 (5) 20:16 (5)	04:55 21:57	21:16 (3) 05:11 5 21:21 (3) 21:52	05:59 21:01	06:54 20:31 (5)	07:48 19:49	08:35 18:36	07:47 16:32		
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:03 (5) 20:15 (5)	04:55 21:57	21:17 (3) 05:12 5 21:22 (3) 21:51	06:01 20:59	06:56 20:29 (5)	07:50 19:47	08:36 18:33	07:49 16:31		
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:06 (5) 20:11 (5)	04:55 21:58	21:17 (3) 05:13 5 21:22 (3) 21:50	06:03 20:57	06:58 20:28 (5)	07:52 19:44	08:37 18:31	07:51 16:29		
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54	04:54	21:17 (3) 05:14 6 21:23 (3) 21:48	06:05 20:55	06:59 20:25 (5)	07:54 19:42	08:38 18:29	07:53 16:27		
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54	04:54	21:17 (3) 05:16 6 21:23 (3) 21:47	06:06 20:53	07:01 20:23 (5)	07:55 19:39	08:38 18:26	07:55 16:26		
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54	04:54	21:17 (3) 05:17 7 21:24 (3) 21:46	06:08 20:50	07:03 20:22 (5)	07:57 19:37	08:39 18:24	07:57 16:25		
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	19:58 (5) 20:17 (5)	05:09 21:37	21:18 (3) 05:18 6 21:24 (3) 21:45	06:10 20:48	07:05 20:19 (5)	07:59 19:34	08:40 18:22	07:59 16:23		
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54	04:54	21:18 (3) 05:20 6 21:24 (3) 21:43	06:12 20:46	07:06 20:17 (5)	08:01 19:32	08:00 18:20	08:00 16:22		
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54	04:54	21:18 (3) 05:21 6 21:24 (3) 21:42	06:13 20:44	07:08 20:10 (5)	08:03 19:29	08:02 18:17	08:02 16:20		
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	20:04 (5) 05:15 6 20:10 (5) 21:31	05:15	21:19 (3) 05:23 6 21:25 (3) 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07		
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 20:12 (5)	20:02 (5) 05:13 10 20:12 (5) 21:33	05:13	21:19 (3) 05:24 6 21:25 (3) 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07		
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 20:13 (5)	20:00 (5) 05:12 13 20:13 (5) 21:34	05:12	21:18 (3) 05:26 7 21:25 (3) 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08		
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 20:15 (5)	19:59 (5) 20:15 (5)	05:11 21:36	21:19 (3) 05:27 6 21:25 (3) 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08		
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 20:17 (5)	19:58 (5) 20:17 (5)	05:09 21:37	21:19 (3) 05:29 6 21:25 (3) 21:35	06:22 20:32	07:13 19:17	07:13 17:07	08:11 16:15	08:43 16:09		
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 20:48	19:57 (5) 20:19 (5)	05:08 21:39	21:19 (3) 05:30 5 21:24 (3) 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10		
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 20:50	19:56 (5) 20:21 (5)	05:07 21:40	21:20 (3) 05:32 5 21:25 (3) 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11		
29	08:18 17:00	07:09 19:54	05:56 20:52	05:06 20:52	05:06 20:22 (5)	19:56 (5) 20:22 (5)	05:06 21:41	21:21 (3) 05:34 4 21:25 (3) 21:30	06:28 8 20:24 (5) 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11		
30	08:17 17:02	07:06 19:56	05:54 20:53	05:05 20:53	05:05 20:24 (5)	19:55 (5) 20:24 (5)	05:05 21:43	21:20 (3) 05:35 4 21:24 (3) 21:28	06:29 13 20:26 (5) 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12		
31	08:15 17:04	07:04 19:58	05:52 20:55	05:04 21:44	05:04 21:44	05:04	05:04	21:26 17 20:28 (5) 20:21	06:31 20:21	07:22 16:56	07:18 16:56	08:15 16:13	08:44 16:13		
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233			
Total, worst case				166	344	112	46	475							
Sun reduction				0.35	0.38	0.32	0.32	0.34							
Oper. time red.				1.00	1.00	1.00	1.00	1.00							
Wind dir. red.				0.65	0.65	0.61	0.64	0.65							
Total reduction				0.23	0.25	0.19	0.21	0.22							
Total, real				38	85	22	10	105							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AC - H29
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	[January	[February	[March	[April	[May	[June	[July	[August	[September	[October	[November	[December
1 08:44	08:14	07:16	07:01	05:52	19:54 (5) 05:03	04:59	21:18 (3) 05:39	20:11 (5) 06:33	07:26	07:24	08:19	
16:15	17:06	18:02	20:00	20:55	28 20:22 (5) 21:45	22:00	6 21:24 (3) 21:25	20:24 (5) 20:18	19:05	16:54	16:10	
2 08:44	08:12	07:14	06:59	05:50	19:54 (5) 05:02	05:00	21:19 (3) 05:40	20:09 (5) 06:35	07:28	07:26	08:21	
16:16	17:08	18:04	20:02	20:57	28 20:22 (5) 21:46	22:00	5 21:24 (3) 21:23	20:26 (5) 20:16	19:02	16:52	16:09	
3 08:43	08:10	07:11	06:56	05:48	19:54 (5) 05:01	05:00	21:18 (3) 05:42	20:07 (5) 06:36	07:30	07:28	08:22	
16:17	17:10	18:06	20:04	20:59	28 20:22 (5) 21:48	21:59	5 21:23 (3) 21:21	20:27 (5) 20:13	19:00	16:50	16:08	
4 08:43	08:08	07:09	06:54	05:46	19:54 (5) 05:00	05:01	21:19 (3) 05:44	20:07 (5) 06:38	07:31	07:30	08:24	
16:18	17:12	18:07	20:06	21:01	27 20:21 (5) 21:49	21:59	4 21:23 (3) 21:19	20:28 (5) 20:11	18:57	16:48	16:08	
5 08:43	08:07	07:07	06:51	05:44	19:54 (5) 04:59	21:14 (3) 05:02	21:19 (3) 05:45	20:05 (5) 06:40	07:33	07:32	08:25	
16:20	17:14	18:09	20:07	21:03	27 20:21 (5) 21:50	1 21:15 (3) 21:58	4 21:23 (3) 21:17	20:29 (5) 20:09	18:55	16:46	16:07	
6 08:42	08:05	07:04	06:49	05:42	19:54 (5) 04:59	21:14 (3) 05:03	21:20 (3) 05:47	20:05 (5) 06:42	07:35	07:34	08:26	
16:21	17:16	18:11	20:09	21:04	26 20:20 (5) 21:51	2 21:16 (3) 21:57	2 21:22 (3) 21:15	20:30 (5) 20:06	18:52	16:44	16:07	
7 08:42	08:03	07:02	06:49	05:40	19:55 (5) 04:58	21:13 (3) 05:04	21:21 (3) 05:49	20:04 (5) 06:43	07:37	07:36	08:28	
16:22	17:18	18:13	20:11	21:06	25 20:20 (5) 21:52	3 21:16 (3) 21:57	1 21:22 (3) 21:13	20:30 (5) 20:04	18:50	16:43	16:06	
8 08:41	08:01	07:00	06:44	05:38	19:56 (5) 04:57	21:14 (3) 05:05	21:21 (3) 05:51	20:03 (5) 06:45	07:39	07:38	08:29	
16:24	17:20	18:15	20:13	21:08	23 20:19 (5) 21:53	3 21:17 (3) 21:56	21:11	20:30 (5) 20:01	18:48	16:41	16:06	
9 08:41	07:59	06:57	06:42	05:36	19:57 (5) 04:57	21:14 (3) 05:06	21:22 (3) 05:52	20:03 (5) 06:47	07:41	07:40	08:30	
16:25	17:22	18:17	20:15	21:10	21 20:18 (5) 21:54	5 21:19 (3) 21:55	21:09	20:31 (5) 19:59	18:45	16:39	16:05	
10 08:40	07:57	06:55	06:39	05:34	19:57 (5) 04:56	21:14 (3) 05:07	21:22 (3) 05:54	20:02 (5) 06:49	07:42	07:42	08:31	
16:27	17:24	18:19	20:17	21:11	19 20:16 (5) 21:55	5 21:19 (3) 21:54	21:07	20:30 (5) 19:56	18:43	16:37	16:05	
11 08:40	07:55	06:52	06:37	05:33	20:00 (5) 04:56	21:14 (3) 05:08	21:07	20:02 (5) 06:50	07:44	07:43	08:33	
16:28	17:26	18:21	20:18	21:13	15 20:15 (5) 21:55	6 21:20 (3) 21:54	21:05	20:31 (5) 19:54	18:40	16:36	16:05	
12 08:39	07:53	06:50	06:35	05:31	20:01 (5) 04:55	21:14 (3) 05:09	21:07	20:02 (5) 06:52	07:46	07:45	08:34	
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13 08:38	07:51	06:48	06:32	05:29	20:04 (5) 04:55	21:14 (3) 05:11	21:05	20:01 (5) 06:54	07:48	07:47	08:35	
16:31	17:30	18:25	20:22	21:17	6 20:10 (5) 21:57	7 21:21 (3) 21:52	21:01	20:30 (5) 19:49	18:36	16:32	16:05	
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16:33	17:32	18:27	20:24	21:18	21:57	8 21:22 (3) 21:51	20:59	20:29 (5) 19:47	18:33	16:31	16:05	
15 08:36	07:47	06:43	06:28	05:26	04:55	21:14 (3) 05:13	21:03	20:02 (5) 06:58	07:52	07:51	08:37	
16:34	17:34	18:28	20:26	21:20	21:58	8 21:22 (3) 21:50	20:57	20:28 (5) 19:44	18:31	16:29	16:05	
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16:36	17:36	18:30	20:28	21:22	21:59	9 21:23 (3) 21:48	20:55	20:25 (5) 19:42	18:29	16:27	16:05	
17 08:34	07:43	06:38	06:23	05:22	04:54	21:15 (3) 05:16	21:06	20:03 (5) 07:01	07:55	07:55	08:38	
16:38	17:38	18:32	20:30	21:23	21:59	8 21:23 (3) 21:47	20:53	20:23 (5) 19:39	18:26	16:26	16:05	
18 08:33	07:41	06:35	06:21	05:21	04:54	21:15 (3) 05:17	21:07	20:04 (5) 07:03	07:57	07:57	08:39	
16:40	17:40	18:34	20:31	21:25	21:59	9 21:24 (3) 21:46	20:50	20:22 (5) 19:37	18:24	16:25	16:05	
19 08:32	07:39	06:33	06:18	05:19	04:54	21:15 (3) 05:18	21:08	20:04 (5) 07:05	07:59	07:59	08:40	
16:41	17:42	18:36	20:33	21:27	22:00	9 21:24 (3) 21:45	20:48	20:19 (5) 19:34	18:22	16:23	16:05	
20 08:31	07:36	06:31	06:16	05:18	04:54	21:15 (3) 05:20	21:09	20:05 (5) 07:06	08:01	08:00	08:41	
16:43	17:44	18:38	20:35	21:28	22:00	9 21:24 (3) 21:43	20:46	20:17 (5) 19:32	18:20	16:22	16:06	
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16:45	17:46	18:40	20:37	5 20:08 (5) 21:30	22:00	9 21:24 (3) 21:42	20:44	20:15 (5) 19:29	18:17	16:20	16:06	
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16:47	17:48	18:41	20:39	9 20:10 (5) 21:31	22:01	9 21:25 (3) 21:41	20:42	20:12 (5) 19:27	18:15	16:19	16:07	
23 08:27	07:30	06:23	06:09	05:13	04:55	21:16 (3) 05:24	21:07	20:09 (5) 07:12	08:07	08:06	08:42	
16:49	17:50	18:43	20:41	13 20:12 (5) 21:33	22:01	9 21:25 (3) 21:39	20:39	20:13 (5) 19:24	18:13	16:18	16:07	
24 08:26	07:28	06:21	06:07	05:12	04:55	21:16 (3) 05:26	21:09	20:09 (5) 07:13	08:09	08:07	08:43	
16:51	17:52	18:45	20:42	15 20:13 (5) 21:34	22:01	9 21:25 (3) 21:38	20:37	20:14 (5) 19:22	18:11	16:17	16:08	
25 08:24	07:25	06:18	06:05	05:11	04:56	21:17 (3) 05:27	21:07	20:09 (5) 07:15	08:11	08:09	08:43	
16:52	17:54	18:47	20:44	18 20:15 (5) 21:36	22:01	8 21:25 (3) 21:36	20:35	20:15 (5) 19:19	17:09	16:16	16:08	
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16:54	17:56	18:49	20:46	21 20:17 (5) 21:37	22:01	9 21:25 (3) 21:35	20:32	20:16 (5) 19:17	17:06	16:15	16:09	
27 08:21	07:21	06:13	06:01	05:08	04:56	21:16 (3) 05:30	21:08	20:09 (5) 07:19	08:14	08:13	08:44	
16:56	17:58	18:51	20:48	24 20:19 (5) 21:39	22:01	8 21:24 (3) 21:33	20:30	20:17 (5) 19:14	17:04	16:14	16:10	
28 08:20	07:18	06:11	05:58	05:07	04:57	21:17 (3) 05:32	21:09	20:10 (5) 07:21	08:16	08:14	08:44	
16:58	18:00	18:53	20:50	26 20:21 (5) 21:40	22:01	8 21:25 (3) 21:32	20:28	20:18 (5) 19:12	17:02	16:13	16:11	
29 08:18	07:09	05:56	05:44	05:06	04:58	21:18 (3) 05:34	21:10	20:11 (5) 07:22	08:18	08:16	08:44	
17:00	19:54	20:52	21:41	22:00	7 21:25 (3) 21:30	20:25	20:19 (5) 19:09	20:10 (5) 17:00	16:12	16:11	16:11	
30 08:17	07:06	05:54	05:42	05:05	04:58	21:17 (3) 05:35	20:29	20:11 (5) 07:24	08:17	08:17	08:44	
17:02	19:56	20:53	21:43	22:00	7 21:24 (3) 21:28	20:23	20:12 (5) 19:07	20:10 (5) 16:58	16:11	16:12	16:12	
31 08:15	07:04	05:52	05:40	05:04	04:56	21:16 (3) 05:36	20:30	20:11 (5) 07:25	08:18	08:18	08:44	
17:04	19:58	20:55	21:44	22:00	21:26	9 20:23 (5) 20:21	20:13	20:11 (5) 16:56	16:12	16:13	16:13	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				188	285	182	36	469				
Sun reduction				0.35	0.38	0.32	0.32	0.34				
Oper. time red.				1.00	1.00	1.00	1.00	1.00				
Wind dir. red.				0.65	0.65	0.61	0.62	0.65				
Total reduction				0.23	0.25	0.19	0.20	0.22				
Total, real				43	70	35	7	104				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AD - H30

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	20:20 (5)	05:03	04:59	05:39	20:24 (5)	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:55	6	20:26 (5)	21:45	22:00	21:25	20:50 (5)	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	20:19 (5)	05:02	05:00	05:40	20:24 (5)	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	8	20:27 (5)	21:46	22:00	21:23	20:50 (5)	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48	20:17 (5)	05:01	05:00	05:42	20:23 (5)	06:36	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	12	20:29 (5)	21:48	21:59	21:21	20:50 (5)	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46	20:16 (5)	05:00	05:01	05:44	20:24 (5)	06:38	07:31	07:30	08:23		
	16:18	17:12	18:07	20:06	21:01	14	20:30 (5)	21:49	21:59	21:19	20:48 (5)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44	20:15 (5)	04:59	05:02	05:45	20:23 (5)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:03	17	20:32 (5)	21:50	21:58	21:17	20:46 (5)	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42	20:14 (5)	04:59	05:03	05:47	20:24 (5)	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	19	20:33 (5)	21:51	21:57	21:15	20:45 (5)	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40	20:15 (5)	04:58	05:04	05:49	20:25 (5)	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	21	20:36 (5)	21:52	21:57	21:13	20:43 (5)	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38	20:14 (5)	04:57	05:05	05:51	20:25 (5)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	23	20:37 (5)	21:53	21:56	21:11	20:41 (5)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36	20:13 (5)	04:57	05:06	05:52	20:26 (5)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	25	20:38 (5)	21:54	21:55	21:09	20:39 (5)	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34	20:13 (5)	04:56	05:07	05:54	20:26 (5)	06:49	07:42	07:42	08:31		
	16:27	17:24	18:19	20:17	21:11	26	20:39 (5)	21:54	21:54	21:07	20:37 (5)	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33	20:14 (5)	04:56	05:08	05:56	20:28 (5)	06:50	07:44	07:43	08:33		
	16:28	17:26	18:21	20:18	21:13	26	20:40 (5)	21:55	21:54	21:05	20:35 (5)	19:54	18:40	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31	20:13 (5)	04:55	05:09	05:58	20:30 (5)	06:52	07:46	07:45	08:34		
	16:30	17:28	18:23	20:20	21:15	26	20:39 (5)	21:56	21:53	21:03	20:34 (5)	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29	20:13 (5)	04:55	05:11	05:59	06:54	07:48	07:47	08:35			
	16:31	17:30	18:25	20:22	21:17	26	20:39 (5)	21:57	21:52	21:01	19:49	18:36	16:32	16:05		
14	08:37	07:49	06:45	06:30	05:27	20:14 (5)	04:55	05:12	06:01	06:56	07:50	07:49	08:36			
	16:33	17:32	18:27	20:24	21:18	25	20:39 (5)	21:57	21:51	20:59	19:47	18:33	16:31	16:05		
15	08:36	07:47	06:43	06:28	05:26	20:14 (5)	04:55	05:13	06:03	06:58	07:52	07:51	08:37			
	16:34	17:34	18:28	20:26	21:20	24	20:38 (5)	21:58	21:50	20:57	19:44	18:31	16:29	16:05		
16	08:35	07:45	06:40	06:25	05:24	20:15 (5)	04:54	05:14	06:05	06:59	07:54	07:53	08:37			
	16:36	17:36	18:30	20:28	21:22	23	20:38 (5)	21:59	21:48	20:55	19:42	18:29	16:27	16:05		
17	08:34	07:43	06:38	06:23	05:22	20:15 (5)	04:54	05:16	06:06	07:01	07:55	07:55	08:38			
	16:38	17:38	18:32	20:30	21:23	22	20:37 (5)	21:59	21:47	20:53	19:39	18:26	16:26	16:05		
18	08:33	07:41	06:35	06:21	05:21	20:16 (5)	04:54	05:17	06:08	07:03	07:57	07:57	08:39			
	16:40	17:40	18:34	20:31	21:25	21	20:37 (5)	21:59	21:46	20:50	19:37	18:24	16:25	16:05		
19	08:32	07:39	06:33	06:18	05:19	20:17 (5)	04:54	05:18	06:10	07:05	07:59	07:59	08:40			
	16:41	17:42	18:36	20:33	21:27	20	20:37 (5)	22:00	21:45	20:48	19:34	18:22	16:23	16:05		
20	08:31	07:36	06:31	06:16	05:18	20:17 (5)	04:54	05:20	06:12	07:06	08:01	08:00	08:41			
	16:43	17:44	18:38	20:35	21:28	18	20:35 (5)	22:00	21:43	8	20:41 (5)	20:46	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	20:19 (5)	04:54	05:21	06:13	07:08	08:03	08:02	08:41			
	16:45	17:46	18:40	20:37	21:30	16	20:35 (5)	22:00	21:42	12	20:43 (5)	20:44	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	05:15	20:20 (5)	04:55	05:23	06:15	07:10	08:05	08:04	08:42			
	16:47	17:48	18:41	20:39	21:31	14	20:34 (5)	22:01	21:41	15	20:44 (5)	20:42	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	05:13	20:21 (5)	04:55	05:24	06:17	07:12	08:07	08:06	08:42			
	16:49	17:50	18:43	20:41	21:33	11	20:32 (5)	22:01	21:39	17	20:46 (5)	20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	20:24 (5)	04:55	05:26	06:19	07:13	08:09	08:07	08:43			
	16:51	17:52	18:45	20:42	21:34	5	20:29 (5)	22:01	21:38	19	20:46 (5)	20:37	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	05:11	20:14 (5)	04:56	05:27	06:20	07:15	07:11	08:09	08:43			
	16:52	17:54	18:47	20:44	21:36	22:01	21:36	21	20:48 (5)	20:35	19:19	17:09	16:16	16:08		
26	08:23	07:23	06:16	06:03	05:09	20:14 (5)	04:56	05:29	06:22	07:17	07:13	08:11	08:43			
	16:54	17:56	18:49	20:46	21:37	22:01	21:35	22	20:48 (5)	20:32	19:17	17:06	16:15	16:09		
27	08:21	07:21	06:13	06:01	05:08	20:14 (5)	04:56	05:30	06:24	07:19	07:14	08:13	08:43			
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	23	20:49 (5)	20:30	19:14	17:04	16:14	16:10		
28	08:20	07:18	06:11	05:58	05:07	20:14 (5)	04:57	05:32	06:26	07:21	07:16	08:14	08:44			
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	24	20:49 (5)	20:28	19:12	17:02	16:13	16:11		
29	08:18		07:08	05:56	05:06	20:14 (5)	04:58	05:34	06:28	07:22	07:18	08:16	08:44			
	17:00		19:54	20:52	21:41	22:00	21:30	25	20:50 (5)	20:25	19:09	17:00	16:12	16:11		
30	08:17		07:06	05:54	20:23 (5)	20:14 (5)	04:58	05:35	06:29	07:24	07:20	08:17	08:44			
	17:02		19:56	20:53	1	20:24 (5)	22:00	21:28	26	20:50 (5)	20:23	19:07	16:58	16:11	16:12	
31	08:15		07:04		05:04			05:37		06:31	07:22	07:18	08:14	08:44		
	17:04		19:58		21:44			21:26	26	20:50 (5)	20:21		16:56		16:13	
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233			
Total, worst case				1	448			238	216							
Sun reduction				0.35	0.38			0.32	0.34							
Oper. time red.				1.00	1.00			1.00	1.00							
Wind dir. red.				0.64	0.64			0.64	0.64							
Total reduction				0.23	0.24			0.21	0.22							
Total, real				0	110			49	47							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AE - H31

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	09:18 (2)	08:14	09:33 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	09:02 (2)	
	16:15	67	14:41 (1)	17:06	21	09:54 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	14:24 (1)
2	08:44	09:18 (2)	08:12	09:35 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	09:03 (2)	
	16:16	68	14:42 (1)	17:08	17	09:52 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	14:26 (1)
3	08:44	09:18 (2)	08:10	09:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	09:03 (2)	
	16:17	67	14:41 (1)	17:10	11	09:49 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	14:26 (1)
4	08:43	09:18 (2)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	09:04 (2)	
	16:18	68	14:42 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	14:27 (1)
5	08:43	09:18 (2)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	09:04 (2)	
	16:20	68	14:42 (1)	17:14		18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	14:27 (1)
6	08:43	09:19 (2)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	09:05 (2)	
	16:21	68	14:43 (1)	17:16		18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	16:07	14:29 (1)
7	08:42	09:19 (2)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	09:05 (2)	
	16:22	67	14:42 (1)	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	14:29 (1)
8	08:42	09:19 (2)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	09:06 (2)	
	16:24	66	14:42 (1)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	11	09:20 (2)
9	08:41	09:20 (2)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	09:07 (2)	
	16:25	67	14:43 (1)	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	17	09:23 (2)
10	08:40	09:20 (2)	07:57		06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32	09:07 (2)	
	16:27	66	14:43 (1)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	21	09:25 (2)
11	08:40	09:20 (2)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:34	09:08 (2)	
	16:28	65	14:42 (1)	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	24	09:27 (2)
12	08:39	09:20 (2)	07:53		06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	09:09 (2)	
	16:30	64	14:42 (1)	17:28		18:23	20:20	21:15	21:56	21:53	21:04	19:52	18:38	16:34	27	09:28 (2)
13	08:38	09:20 (2)	07:51		06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:35	09:11 (2)	
	16:31	64	14:42 (1)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	28	09:29 (2)
14	08:37	09:21 (2)	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	09:12 (2)	
	16:33	60	14:41 (1)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	30	09:30 (2)
15	08:36	09:21 (2)	07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:39	09:13 (2)	
	16:34	60	14:41 (1)	17:34		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	32	09:31 (2)
16	08:36	09:21 (2)	07:45		06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:39	09:13 (2)	
	16:36	58	14:40 (1)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	33	09:32 (2)
17	08:34	09:21 (2)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39	09:14 (2)	
	16:38	53	14:38 (1)	17:38		18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	34	09:32 (2)
18	08:33	09:22 (2)	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	09:15 (2)	
	16:40	48	14:36 (1)	17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	35	09:33 (2)
19	08:32	09:22 (2)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	09:16 (2)	
	16:41	37	09:59 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	36	09:34 (2)
20	08:31	09:22 (2)	07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:41	09:16 (2)	
	16:43	37	09:59 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	36	09:34 (2)
21	08:30	09:23 (2)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	09:17 (2)	
	16:45	36	09:59 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	37	09:35 (2)
22	08:29	09:23 (2)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42	09:17 (2)	
	16:47	36	09:59 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	37	09:35 (2)
23	08:27	09:24 (2)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	09:18 (2)	
	16:49	36	10:00 (2)	17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	37	09:35 (2)
24	08:26	09:24 (2)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43	09:18 (2)	
	16:51	35	09:59 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	48	14:13 (1)
25	08:25	09:25 (2)	07:25		06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09	08:43	09:18 (2)	
	16:52	34	09:59 (2)	17:54		18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	53	14:16 (1)
26	08:23	09:26 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:59	09:19 (2)	
	16:54	33	09:59 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15	58	14:18 (1)
27	08:22	09:27 (2)	07:21		06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13	09:00	09:20 (2)	
	16:56	32	09:59 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	60	14:20 (1)
28	08:20	09:28 (2)	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14	09:01	09:20 (2)	
	16:58	30	09:58 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	60	14:21 (1)
29	08:19	09:29 (2)			07:09	05:56	05:06	04:57	05:34	06:28	07:23	07:19	08:16	09:00	09:20 (2)	
	17:00	28	09:57 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	14:22 (1)	64	14:22 (1)
30	08:17	09:30 (2)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	09:01	09:20 (2)	
	17:02	26	09:56 (2)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	64	14:23 (1)	
31	08:15	09:32 (2)			07:04		05:04		05:37	06:31		07:22		08:44	09:18 (2)	
	17:04	24	09:56 (2)		19:58		21:44		21:27	20:21		16:56		16:13	66	14:40 (1)
Potential sun hours	250		273		367		494		510	512	460	382	328	259		233
Total, worst case	1568		49											882		2034
Sun reduction	0.24		0.23											0.27		0.21
Oper. time red.	1.00		1.00											1.00		1.00
Wind dir. red.	0.62		0.60											0.61		0.63
Total reduction	0.15		0.14											0.16		0.13
Total, real	235		7											142		264

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AF - H32

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	09:10 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	08:54 (2)
	16:15	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	7	09:01 (2)
2	08:44	08:12	09:13 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	08:56 (2)
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	5	09:01 (2)
3	08:44	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	08:57 (2)	
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08	3	09:00 (2)
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	08:59 (2)	
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	1	09:00 (2)
5	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07		
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27		
	16:21	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	16:07		
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06		
8	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06		
9	08:41	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	08:43 (2)	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	7	08:50 (2)	16:05
10	08:41	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:30	08:40 (2)	08:32
	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	13	08:53 (2)	16:05
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:32	08:39 (2)	16:03
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	15	08:54 (2)	16:05
12	08:39	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	08:37 (2)	16:04
	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	19	08:56 (2)	16:05
13	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:36	08:36 (2)	16:05
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	21	08:57 (2)	16:05
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	08:36 (2)	16:06
	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	22	08:58 (2)	16:05
15	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:35	08:35 (2)	16:07
	16:34	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	23	08:58 (2)	16:05
16	08:36	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:35	08:35 (2)	16:06
	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	24	08:59 (2)	16:05
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:35	08:35 (2)	16:06
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	24	08:59 (2)	16:05
18	08:33	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:35	08:35 (2)	16:06
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	25	09:00 (2)	16:05
19	08:32	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:35	08:35 (2)	16:06
	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	25	09:00 (2)	16:05
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:35	08:35 (2)	16:06
	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	26	09:01 (2)	16:06
21	08:30	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:35	08:35 (2)	16:07
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	26	09:01 (2)	16:06
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:35	08:37 (2)	16:07
	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	24	09:01 (2)	16:07
23	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:35	08:39 (2)	16:07
	16:49	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	22	09:01 (2)	16:07
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:35	08:41 (2)	16:08
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	20	09:01 (2)	16:08
25	08:25	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:09	08:35	08:43 (2)	16:08
	16:52	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	19	09:02 (2)	16:08
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:35	08:45 (2)	16:09
	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	17	09:02 (2)	16:09
27	08:22	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13	08:35	08:47 (2)	16:10
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:14	15	09:02 (2)	16:10
28	08:20	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:15	08:35	08:49 (2)	16:11
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	13	09:02 (2)	16:11
29	08:19	07:18	07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16	08:35	08:50 (2)	16:12
	17:00	18:02	18:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	11	09:01 (2)	16:11
30	08:17	07:17	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:35	08:52 (2)	16:12
	17:02	18:04	18:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	9	09:01 (2)	16:12
31	08:15	07:15	07:04	05:54	05:04	04:57	05:37	06:31	07:22	07:18	08:16	08:35	08:54 (2)	16:13
	17:04	18:06	18:58	20:56	21:44	22:01	21:27	20:21	19:05	16:56	16:11	9	09:01 (2)	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	163	233	
Total, worst case	414	17									420		16	
Sun reduction	0.24	0.23									0.27		0.21	
Oper. time red.	1.00	1.00									1.00		1.00	
Wind dir. red.	0.61	0.61									0.61		0.61	
Total reduction	0.15	0.14									0.16		0.13	
Total, real	61	2									68		2	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AG - H33

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		11:17 (1)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		07:54 (2)	08:19						
	16:15	26	11:43 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	9	08:03 (2)	16:10						
2	08:44		11:19 (1)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		07:56 (2)	08:21						
	16:16	24	11:43 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	6	08:02 (2)	16:09						
3	08:44		11:19 (1)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		07:58 (2)	08:22						
	16:17	23	11:42 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	3	08:01 (2)	16:08						
4	08:43		11:21 (1)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30			08:24						
	16:18	21	11:42 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48			16:08	6					
5	08:43		11:22 (1)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32			08:25						
	16:20	19	11:41 (1)	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46			16:07	12					
6	08:43		11:24 (1)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34			08:27						
	16:21	17	11:41 (1)	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:45			16:07	16					
7	08:42		11:26 (1)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36			08:28						
	16:22	13	11:39 (1)	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43			16:06	19					
8	08:42		11:29 (1)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38			08:29						
	16:24	7	11:36 (1)	17:20	3	08:31 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41			16:06	21					
9	08:41			07:59		08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47		07:40			08:30						
	16:25			17:22	6	08:32 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39			16:05	23					
10	08:41			07:57		08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42			11:08 (1)						
	16:27			17:24	9	08:33 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37			16:05	24					
11	08:40			07:55		08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44			08:33						
	16:28			17:26	12	08:34 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36			16:05	26					
12	08:39			07:53		08:20 (2)	06:50	06:35	05:31	04:55	05:09	06:52	07:46		16:35			08:40						
	16:30			17:28	15	08:35 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34			16:05	27					
13	08:38			07:51		08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48			08:35						
	16:31			17:30	17	08:35 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32			16:05	33					
14	08:37			07:49		08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49			08:36						
	16:33			17:32	19	08:34 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31			16:05	36					
15	08:36			07:47		08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51			08:37						
	16:35			17:34	21	08:34 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29			16:05	39					
16	08:36			07:45		08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53			08:38						
	16:36			17:36	23	08:34 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28			16:05	41					
17	08:35			07:43		08:10 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55			08:39						
	16:38			17:38	24	08:34 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26			16:05	41					
18	08:33			07:41		08:11 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57			08:39						
	16:40			17:40	23	08:34 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25			16:05	42					
19	08:32			07:39		08:11 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:50 (2)		08:40						
	16:41			17:42	21	08:32 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	5	08:55 (2)	16:05	43					
20	08:31			07:37		08:12 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01			08:41						
	16:43			17:44	19	08:31 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	13	08:59 (2)	16:22	16:06	43					
21	08:30			07:34		08:14 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:03			08:41						
	16:45			17:46	16	08:30 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	17	09:01 (2)	16:20	16:06	44					
22	08:29			07:32		08:15 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04			08:42						
	16:47			17:48	12	08:27 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	20	09:02 (2)	16:19	16:07	44					
23	08:27			07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:07			08:42						
	16:49			17:50			18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	22	09:03 (2)	16:18	16:07	43					
24	08:26			07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:09			08:43						
	16:51			17:52			18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	23	09:03 (2)	16:17	16:08	43					
25	08:25			07:25			06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11				08:43						
	16:52			17:54			18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	25	08:04 (2)	16:16	16:08	43					
26	08:23			07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13				08:44						
	16:54			17:56			18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	23	08:04 (2)	16:15	16:09	41					
27	08:22			07:21			06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15				08:44						
	16:56			17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	21	08:04 (2)	16:14	16:10	40					
28	08:20			07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17				08:44						
	16:58			18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	19	08:04 (2)	16:13	16:11	39					
29	08:19						07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19				08:44						
	17:00						19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16	08:03 (2)	16:12	16:11	37					
30	08:17						07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20				08:44						
	17:02						19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	14	08:04 (2)	16:11	16:12	35					
31	08:15						07:04		05:04		05:37	06:31		07:22				08:44						
	17:04						19:58		21:44		21:27	20:21		16:56	11	08:03 (2)		16:13	29					
Potential sun hours	250						367	420	494	510	512	460	382	328				259						
Total, worst case	150		240												229			18					930	
Sun reduction	0.24		0.23												0.29			0.27					0.21	
Oper. time red.	1.00		1.00												1.00			1.00					1.00	
Wind dir. red.	0.60		0.63												0.63			0.63					0.60	
Total reduction	0.15		0.15</																					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AH - H34

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:13 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	20:50 (4) 04:59	21:01 (4) 05:39	06:33 07:26	07:24 08:19	07:24 08:19	08:19
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	20:51 (4) 05:00	21:01 (4) 05:40	06:35 07:28	07:26 08:21	07:26 08:21	08:21
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	20:51 (4) 05:00	21:00 (4) 05:42	06:36 07:30	07:28 08:22	07:28 08:22	08:22
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	20:52 (4) 05:01	21:00 (4) 05:44	06:38 07:31	07:30 08:23	07:30 08:23	08:23
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	20:52 (4) 05:02	21:01 (4) 05:45	06:40 07:33	07:32 08:25	07:32 08:25	08:25
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	20:53 (4) 05:03	21:13 (4) 05:47	06:42 07:35	07:34 08:26	07:34 08:26	08:26
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	20:53 (4) 05:04	21:14 (4) 05:49	06:43 07:37	07:36 08:28	07:36 08:28	08:28
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	20:54 (4) 05:05	21:14 (4) 05:50	06:45 07:39	07:38 08:29	07:38 08:29	08:29
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	20:54 (4) 05:06	21:15 (4) 05:52	06:47 07:41	07:40 08:30	07:40 08:30	08:30
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	20:55 (4) 05:07	21:16 (4) 05:54	06:49 07:42	07:42 08:31	07:42 08:31	08:31
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	20:56 (4) 05:08	21:16 (4) 05:56	06:50 07:44	07:43 08:32	07:43 08:32	08:32
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	20:56 (4) 05:09	21:17 (4) 05:57	06:52 07:46	07:45 08:34	07:45 08:34	08:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	20:57 (4) 05:11	21:18 (4) 05:59	06:54 07:48	07:47 08:35	07:47 08:35	08:35
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	05:27 21:18	04:55 21:57	21:05 (4) 05:12	21:19 (4) 06:01	06:56 07:50	07:49 08:36	07:49 08:36	08:36
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	20:59 (4) 05:13	21:20 (4) 06:03	06:57 07:52	07:51 08:37	07:51 08:37	08:37
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:00 (4) 05:14	21:21 (4) 06:04	06:59 07:53	07:53 08:37	07:53 08:37	08:37
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:01 (4) 05:16	21:22 (4) 06:06	07:01 07:55	07:55 08:38	07:55 08:38	08:38
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:04 (4) 05:17	21:23 (4) 06:08	07:03 07:57	07:57 08:39	07:57 08:39	08:39
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:05 (4) 05:18	21:24 (4) 06:10	07:05 07:59	07:58 08:40	07:58 08:40	08:40
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:06 (4) 05:20	21:25 (4) 06:12	07:06 08:01	08:00 08:40	08:00 08:40	08:40
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:07 (4) 05:21	21:26 (4) 06:13	07:07 08:02	08:02 08:41	08:02 08:41	08:41
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:08 (4) 05:23	21:27 (4) 06:15	07:08 08:03	08:03 08:42	08:03 08:42	08:42
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:09 (4) 05:24	21:28 (4) 06:17	07:09 08:04	08:04 08:43	08:04 08:43	08:43
24	08:26 16:50	07:27 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:10 (4) 05:26	21:29 (4) 06:19	07:10 08:05	08:05 08:44	08:05 08:44	08:44
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:11 (4) 05:27	21:30 (4) 06:20	07:11 08:06	08:06 08:45	08:06 08:45	08:45
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:12 (4) 05:29	21:31 (4) 06:22	07:12 08:07	08:07 08:46	08:07 08:46	08:46
27	08:21 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	21:13 (4) 05:30	21:32 (4) 06:23	07:13 08:08	08:08 08:47	08:08 08:47	08:47
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:14 (4) 05:32	21:33 (4) 06:24	07:14 08:09	08:09 08:48	08:09 08:48	08:48
29	08:18 17:00	07:08 18:05	05:56 20:52	05:06 21:41	05:06 21:41	04:57 22:01	21:15 (4) 05:34	21:34 (4) 06:25	07:15 08:10	08:10 08:49	08:10 08:49	08:49
30	08:17 17:02	07:06 18:06	05:54 20:53	05:05 21:43	05:05 21:43	04:58 22:00	21:16 (4) 05:35	21:35 (4) 06:26	07:16 08:11	08:11 08:50	08:11 08:50	08:50
31	08:15 17:04	07:04 18:08	05:04 20:58	05:04 21:44	05:04 21:44	04:58 22:00	21:17 (4) 05:37	21:36 (4) 06:27	07:17 08:12	08:12 08:51	08:12 08:51	08:51
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					162	241	329					
Sun reduction					0.38	0.32	0.32					
Oper. time red.					1.00	1.00	1.00					
Wind dir. red.					0.62	0.62	0.62					
Total reduction					0.24	0.20	0.20					
Total, real					38	48	66					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AI - H35

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 18:02	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 18:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 18:01	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 18:01	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 18:00	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:31 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 18:00	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 17:59	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 17:57	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 17:55	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 17:51	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 18:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 18:20	05:31 21:15	04:56 21:53	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 18:22	05:29 21:17	04:55 21:52	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 18:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 18:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 18:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 18:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 18:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 18:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 18:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 18:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 18:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 18:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 18:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 18:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 18:09	07:11 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 18:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 18:07	07:13 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 18:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 18:05	07:15 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 18:49	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 18:02	07:17 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 19:57	05:06 20:52	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 18:00	07:19 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 19:57	05:05 20:54	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 18:00	07:21 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:54 19:58	05:04 21:44	04:57 21:27	05:37 20:21	06:31 20:21	07:22 18:00	07:22 17:00	07:22 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction		53	184							237		
Oper. time red.		0.23	0.27							0.29		
Wind dir. red.		1.00	1.00							1.00		
Total reduction		0.65	0.65							0.65		
Total, real		0.15	0.18							0.19		
		8	32							45		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AJ - H36

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	06:31 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:41	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	06:31 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:57	05:48	06:14 (1)	05:01	05:01	05:42	06:37	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	06:30 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09
4	08:43	08:09	07:09	06:54	05:46	06:13 (1)	05:00	05:01	05:44	06:38	07:32	07:30	08:24
	16:18	17:12	18:08	20:06	21:01	06:29 (1)	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	06:14 (1)	05:00	05:02	05:46	06:29 (1)	06:40	07:33	07:32
	16:20	17:14	18:10	20:08	21:03	06:28 (1)	21:50	21:58	21:18	5	06:34 (1)	20:09	18:55
6	08:43	08:05	07:05	06:49	05:42	06:16 (1)	04:59	05:03	05:47	06:26 (1)	06:42	07:35	07:34
	16:21	17:16	18:12	20:10	21:05	06:28 (1)	21:51	21:58	21:16	10	06:36 (1)	20:06	18:53
7	08:42	08:03	07:02	06:47	05:40	06:17 (1)	04:58	05:04	05:49	06:25 (1)	06:44	07:37	07:36
	16:22	17:18	18:13	20:11	21:06	06:26 (1)	21:52	21:57	21:14	13	06:38 (1)	20:04	18:50
8	08:42	08:01	07:00	06:44	05:38		04:57	05:05	05:51	06:23 (1)	06:45	07:39	07:38
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:12	15	06:38 (1)	20:02	18:48
9	08:41	07:59	06:58	06:42	05:36		04:57	05:06	05:52	06:22 (1)	06:47	07:41	07:40
	16:25	17:22	18:17	20:15	21:10		21:54	21:56	21:10	17	06:39 (1)	19:59	18:45
10	08:41	07:57	06:55	06:40	05:35		04:56	05:07	05:54	06:24 (1)	06:49	07:43	07:42
	16:27	17:24	18:19	20:17	21:12		21:55	21:55	21:08	16	06:40 (1)	19:57	18:43
11	08:40	07:55	06:53	06:37	05:33		04:56	05:08	05:56	06:25 (1)	06:51	07:45	07:44
	16:28	17:26	18:21	20:19	21:13		21:56	21:54	21:06	15	06:40 (1)	19:54	18:41
12	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	06:27 (1)	06:52	07:46	07:46
	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	13	06:40 (1)	19:52	18:38
13	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	06:29 (1)	06:54	07:48	07:48
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:02	11	06:40 (1)	19:49	18:36
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:30 (1)	06:56	07:50	07:49
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	9	06:39 (1)	19:47	18:34
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:32 (1)	06:58	07:52	07:51
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	7	06:39 (1)	19:44	18:31
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	06:34 (1)	07:00	07:54	07:53
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	5	06:39 (1)	19:42	18:29
17	08:35	07:43	06:38	06:23	05:22		04:55	05:16	06:07	06:35 (1)	07:01	07:56	07:55
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	2	06:37 (1)	19:39	18:27
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08		07:03	07:58	07:57
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51		19:37	18:24	16:25
19	08:32	07:39	06:33	06:19	05:19		04:54	05:19	06:10		07:05	07:59	07:59
	16:42	17:42	18:36	20:34	21:27		22:00	21:45	20:49		19:34	18:22	16:23
20	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12		07:07	08:01	08:01
	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46		19:32	18:20	16:22
21	08:30	07:34	06:28	06:14	05:16		04:55	05:22	06:14		07:08	08:03	08:02
	16:45	17:46	18:40	20:37	21:30		22:01	21:42	20:44		19:29	18:18	16:21
22	08:29	07:32	06:26	06:12	05:15		04:55	05:23	06:15		07:10	08:05	08:04
	16:47	17:48	18:42	20:39	21:32		22:01	21:41	20:42		19:27	18:15	16:19
23	08:27	07:30	06:23	06:10	05:13		04:55	05:24	06:17		07:12	08:07	08:06
	16:49	17:50	18:44	20:41	21:33		22:01	21:40	20:40		19:24	18:13	16:18
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26	06:19		07:14	08:09	08:08
	16:51	17:52	18:45	20:43	21:35		22:01	21:38	20:37		19:22	18:11	16:17
25	08:25	07:26	06:19	06:05	05:11		04:56	05:28	06:21		07:15	07:11	08:09
	16:53	17:54	18:47	20:45	21:36		22:01	21:37	20:35		19:20	17:09	16:16
26	08:23	07:23	06:16	06:03	05:10	06:28 (1)	04:56	05:29	06:22		07:17	07:13	08:11
	16:55	17:56	18:49	20:46	3	06:31 (1)	22:01	21:35	20:33		19:17	17:07	16:15
27	08:22	07:21	06:14	06:01	05:08	06:26 (1)	04:57	05:31	06:24		07:19	07:15	08:13
	16:56	17:58	18:51	20:48	5	06:31 (1)	22:01	21:33	20:30		19:15	17:05	16:14
28	08:20	07:19	06:11	05:59	05:07	06:24 (1)	04:57	05:32	06:26		07:21	07:17	08:15
	16:58	18:00	18:53	20:50	8	06:32 (1)	22:01	21:32	20:28		19:12	17:02	16:13
29	08:19		07:09	05:56	05:06	06:22 (1)	04:58	05:34	06:28		07:23	07:19	08:16
	17:00		19:55	20:52	10	06:32 (1)	22:01	21:30	20:26		19:10	17:00	16:12
30	08:17		07:06	05:54	05:05	06:20 (1)	04:58	05:36	06:30		07:24	07:21	08:18
	17:02		19:57	20:54	12	06:32 (1)	22:01	21:28	20:23		19:07	16:58	16:11
31	08:15		07:04		05:04			05:37	06:31			07:22	
	17:04		19:58		21:44			21:27	20:21			16:56	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259
Total, worst case						95			138				
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.68	0.68				0.68				
Total reduction				0.24	0.26				0.23				
Total, real				9	24				32				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AK - H37
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time
N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	08:42 (1) 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:08 (1) 16:10
2	08:44 16:16	08:12 17:08	08:40 (1) 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:07 (1) 16:09
3	08:44 16:17	08:10 17:10	08:38 (1) 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:06 (1) 16:09
4	08:44 16:18	08:09 17:12	08:36 (1) 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:05 (1) 16:08
5	08:43 16:20	08:07 17:14	08:35 (1) 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:05 (1) 16:07
6	08:43 16:21	08:05 17:16	08:35 (1) 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:05 (1) 16:07
7	08:42 16:22	08:03 17:18	08:36 (1) 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:07 (1) 16:06
8	08:42 16:24	08:01 17:20	08:36 (1) 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:09 (1) 16:06
9	08:41 16:25	07:59 17:22	08:37 (1) 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:11 (1) 16:05
10	08:41 16:27	07:57 17:24	08:39 (1) 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:13 (1) 16:05
11	08:40 16:28	07:55 17:26	08:53 (1) 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:15 (1) 16:05
12	08:39 16:30	07:53 17:28	08:43 (1) 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:17 (1) 16:05
13	08:38 16:31	07:51 17:30	08:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:19 (1) 16:05
14	08:38 16:33	07:49 17:32	08:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:23 (1) 16:05
15	08:37 16:35	07:47 17:34	08:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	08:41 18:31	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	08:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	08:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	08:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	08:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	08:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	08:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	08:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	08:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	08:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	08:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	08:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	08:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00	08:47 (1) 08:51 (1)	07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	07:23 16:12	08:44 16:12
30	08:17 17:02	08:45 (1) 08:52 (1)	07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	07:21 16:11	08:44 16:13
31	08:16 17:04	08:44 (1) 08:54 (1)	07:04 19:58	05:54 20:58	05:04 21:44	04:58 22:01	05:37 21:27	06:31 20:21	07:23 16:56	07:23 16:13	08:09 (1) 08:22 (1)	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	21	191								20	194	
Sun reduction	0.24	0.23								0.29	0.27	
Oper. time red.	1.00	1.00								1.00	1.00	
Wind dir. red.	0.61	0.61								0.61	0.61	
Total reduction	0.15	0.14								0.18	0.16	
Total, real	3	27								4	31	

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Minutes with flicker First time (hh:mm) with flicker (WTG causing flicker first time)
Sun set (hh:mm) Last time (hh:mm) with flicker (WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AL - H38
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AM - H39

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AN - H40

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
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Wind dir. red.												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AO - H41

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AP - H42

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AQ - H43

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AR - H44

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AS - H45

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	08:14	07:16	07:01		05:52		05:03		05:39		07:24	08:19
16:15	17:06	18:02	20:00		20:55		21:45		21:25	11	07:25 (5)	16:10
2 08:44	08:12	07:14	06:59		05:50		05:02		05:40		07:26	08:21
16:16	17:08	18:04	20:02	3	07:26 (5)	20:57	21:47		21:23	10	07:26 (5)	16:09
3 08:44	08:10	07:12	06:56		05:48		05:01		05:42		07:28	08:22
16:17	17:10	18:06	20:04	7	07:27 (5)	20:59	21:48		21:21	9	07:28 (5)	16:09
4 08:43	08:09	07:09	06:54		05:46		05:00		05:44		07:30	08:24
16:18	17:12	18:08	20:06	10	07:28 (5)	21:01	21:49		21:19	8	07:32 (5)	16:08
5 08:43	08:07	07:07	06:52		05:44		04:59		05:46		07:33	08:25
16:20	17:14	18:10	20:08	13	07:28 (5)	21:03	2 06:12 (4)	21:50	21:17	6	07:35 (5)	16:07
6 08:43	08:05	07:05	06:49		05:42		06:09 (4)	04:59	05:47		07:36	08:26
16:21	17:16	18:11	20:09	15	07:28 (5)	21:04	4 06:13 (4)	21:51	21:16	5	07:37 (5)	16:07
7 08:42	08:03	07:02	06:47		05:40		06:07 (4)	04:58	05:49		07:38	08:28
16:22	17:18	18:13	20:11	18	07:29 (5)	21:06	5 06:12 (4)	21:52	21:14	3	07:39 (5)	16:06
8 08:42	08:01	07:00	06:44		05:38		06:05 (4)	04:57	05:51		07:40	08:29
16:24	17:20	18:15	20:13	20	07:28 (5)	21:08	7 06:12 (4)	21:53	21:12	1	07:41 (5)	16:06
9 08:41	07:59	06:57	06:42		05:36		06:03 (4)	04:57	05:52		07:42 (5)	16:06
16:25	17:22	18:17	20:15	22	07:28 (5)	21:10	8 06:11 (4)	21:54	21:10		07:43 (5)	16:06
10 08:40	07:57	06:55	06:40		05:35		06:02 (4)	04:56	05:54		07:44 (5)	16:05
16:27	17:24	18:19	20:17	24	07:27 (5)	21:12	9 06:11 (4)	21:55	21:08		07:45 (5)	16:05
11 08:40	07:55	06:53	06:37		05:33		06:00 (4)	04:56	05:56	4	07:46 (5)	16:05
16:28	17:26	18:21	20:19	26	07:27 (5)	21:13	10 06:10 (4)	21:55	21:06		07:47 (5)	16:05
12 08:39	07:53	06:50	06:35		05:31		05:58 (4)	04:56	05:58		07:48 (5)	16:05
16:30	17:28	18:23	20:20	27	07:26 (5)	21:15	11 06:09 (4)	21:56	21:03		07:49 (5)	16:05
13 08:38	07:51	06:48	06:32		05:29		05:57 (4)	04:55	05:59		07:50 (5)	16:05
16:31	17:30	18:25	20:22	27	07:25 (5)	21:17	12 06:09 (4)	21:57	21:01		07:51 (5)	16:05
14 08:37	07:49	06:45	06:30		05:27		05:55 (4)	04:55	06:01		07:52 (5)	16:05
16:33	17:32	18:27	20:24	26	07:24 (5)	21:18	12 06:07 (4)	21:58	21:01		07:53 (5)	16:05
15 08:36	07:47	06:43	06:28		05:26		05:57 (4)	04:55	06:03		07:54 (5)	16:05
16:35	17:34	18:29	20:26	24	07:23 (5)	21:20	9 06:06 (4)	21:58	21:03		07:55 (5)	16:05
16 08:35	07:45	06:41	06:25		05:24		06:05 (4)	04:55	06:05		07:56 (5)	16:05
16:36	17:36	18:30	20:28	20	07:21 (5)	21:22	06:04 (4)	21:59	21:06		07:57 (5)	16:05
17 08:34	07:43	06:38	06:23		05:22		06:03 (4)	04:54	06:06		07:58 (5)	16:05
16:38	17:38	18:32	20:30	17	07:18 (5)	21:23	06:02 (4)	21:59	21:03		07:59 (5)	16:05
18 08:33	07:41	06:36	06:21		05:21		06:01 (4)	04:54	06:08		08:00 (5)	16:05
16:40	17:40	18:34	20:32	12	07:16 (5)	21:25	06:00 (4)	21:56	21:04		08:01 (5)	16:05
19 08:32	07:39	06:33	06:18		05:19		06:00 (4)	04:54	06:10		08:02 (5)	16:05
16:42	17:42	18:36	20:33		21:27		06:00 (4)	21:56	21:04		08:03 (5)	16:05
20 08:31	07:37	06:31	06:16		05:18		06:00 (4)	21:56	21:04		08:04 (5)	16:05
16:43	17:44	18:38	20:35		21:28		06:00 (4)	21:56	21:04		08:05 (5)	16:05
21 08:30	07:34	06:28	06:14		05:16		06:00 (4)	21:56	21:04		08:06 (5)	16:05
16:45	17:46	18:40	20:37		21:30		06:00 (4)	21:56	21:04		08:07 (5)	16:05
22 08:29	07:32	06:26	06:12		05:15		06:00 (4)	21:56	21:04		08:08 (5)	16:05
16:47	17:48	18:42	20:39		21:31		06:00 (4)	21:56	21:04		08:09 (5)	16:05
23 08:27	07:30	06:23	06:09		05:13		06:00 (4)	21:56	21:04		08:10 (5)	16:05
16:49	17:50	18:44	20:41		21:33		06:00 (4)	21:56	21:04		08:11 (5)	16:05
24 08:26	07:28	06:21	06:07		05:12		06:00 (4)	21:56	21:04		08:12 (5)	16:05
16:51	17:52	18:45	20:43		21:34		06:00 (4)	21:56	21:04		08:13 (5)	16:05
25 08:25	07:25	06:18	06:05		05:11		06:00 (4)	21:56	21:04		08:14 (5)	16:05
16:53	17:54	18:47	20:44		21:36		06:00 (4)	21:56	21:04		08:15 (5)	16:05
26 08:23	07:23	06:16	06:03		05:09		06:00 (4)	21:56	21:04		08:16 (5)	16:05
16:54	17:56	18:49	20:46		21:37		06:00 (4)	21:56	21:04		08:17 (5)	16:05
27 08:22	07:21	06:14	06:01		05:08		06:00 (4)	21:56	21:04		08:18 (5)	16:05
16:56	17:58	18:51	20:48		21:39		06:00 (4)	21:56	21:04		08:19 (5)	16:05
28 08:20	07:19	06:11	05:59		05:07		06:00 (4)	21:56	21:04		08:20 (5)	16:05
16:58	18:00	18:53	20:50		21:40		06:00 (4)	21:56	21:04		08:21 (5)	16:05
29 08:19		07:09	05:56		05:06		06:00 (4)	21:56	21:04		08:22 (5)	16:05
17:00		19:55	20:52		21:41		06:00 (4)	21:56	21:04		08:23 (5)	16:05
30 08:17		07:06	05:54		05:05		06:00 (4)	21:56	21:04		08:24 (5)	16:05
17:02		19:56	20:54		21:43		06:00 (4)	21:56	21:04		08:25 (5)	16:05
31 08:15		07:04			05:04		06:00 (4)	21:56	21:04		08:26 (5)	16:05
17:04		19:58			21:44		06:00 (4)	21:56	21:04		08:27 (5)	16:05
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				311	89		40	211	158			
Sun reduction				0.35	0.38		0.32	0.34	0.32			
Oper. time red.				1.00	1.00		1.00	1.00	1.00			
Wind dir. red.				0.67	0.67		0.67	0.67	0.67			
Total reduction				0.24	0.25		0.22	0.23	0.22			
Total, real				74	23		9	48	34			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AT - H46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March			April			May			June	July	August			September	October	November	December			
1	08:44	08:14	07:16			07:01		07:45 (5)	05:52			06:18 (4)	05:03	04:59	05:39		06:33	07:26	07:24	08:19			
	16:15	17:06	18:02			20:00	22	08:07 (5)	20:55	13		06:31 (4)	21:45	22:00	21:25		20:18	19:05	16:54	16:10			
2	08:44	08:12	07:14			06:59		07:48 (5)	05:50			06:16 (4)	05:02	05:00	05:40		06:35	07:28	07:26	08:21			
	16:16	17:08	18:04			20:02	17	08:05 (5)	20:57	14		06:30 (4)	21:47	22:00	21:23		20:16	19:02	16:52	16:09			
3	08:44	08:10	07:12			06:56		07:51 (5)	05:48			06:14 (4)	05:01	05:00	05:42		06:36	07:30	07:28	08:22			
	16:17	17:10	18:06			20:04	9	08:00 (5)	20:59	15		06:29 (4)	21:48	21:59	21:21		20:14	19:00	16:50	16:09			
4	08:43	08:09	07:09			06:54			05:46			06:12 (4)	05:00	05:01	05:44		06:38	07:32	07:30	08:24			
	16:18	17:12	18:08			20:06			21:01	17		06:29 (4)	21:49	21:59	21:19	6	06:31 (4)	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07			06:52			05:44			06:10 (4)	04:59	05:02	05:46		06:22 (4)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:10			20:08			21:03	17		06:27 (4)	21:50	21:58	21:17	12	06:34 (4)	20:09	18:55	16:46	16:07		
6	08:43	08:05	07:05			06:49			05:42			06:10 (4)	04:59	05:03	05:47		06:20 (4)	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11			20:09			21:04	17		06:27 (4)	21:51	21:58	21:16	15	06:35 (4)	20:06	18:53	16:45	16:07		
7	08:42	08:03	07:02			06:47			05:40			06:11 (4)	04:58	05:04	05:49		06:19 (4)	06:44	07:37	07:36	08:28		
	16:22	17:18	18:13			20:11			21:06	14		06:25 (4)	21:52	21:57	21:14	18	06:37 (4)	20:04	18:50	16:43	16:06		
8	08:42	08:01	07:00			06:44			05:38			06:13 (4)	04:57	05:05	05:51		06:20 (4)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15			20:13			21:08	10		06:23 (4)	21:53	21:56	21:12	17	06:37 (4)	20:01	18:48	16:41	16:06		
9	08:41	07:59	06:57			06:42			05:36				04:57	05:06	05:52		06:22 (4)	06:47	7:45 (5)	07:41	07:40	08:30	
	16:25	17:22	18:17			20:15			21:10				21:54	21:55	21:10	16	06:38 (4)	19:59	07:53 (5)	18:45	16:39	16:06	
10	08:40	07:57	06:55			06:40			05:35				04:56	05:07	05:54		06:24 (4)	06:49	07:41 (5)	07:43	07:42	08:32	
	16:27	17:24	18:19			20:17			21:12				21:55	21:55	21:08	15	06:39 (4)	19:57	07:58 (5)	18:43	16:37	16:05	
11	08:40	07:55	06:53			06:37			05:33				04:56	05:08	05:56		06:25 (4)	06:51	07:38 (5)	07:44	07:44	08:33	
	16:28	17:26	18:21			20:19			21:13				21:55	21:54	21:06	14	06:39 (4)	19:54	21	07:59 (5)	18:41	16:36	16:05
12	08:39	07:53	06:50			06:35			05:31				04:56	05:09	05:58		06:27 (4)	06:52	07:36 (5)	07:46	07:46	08:34	
	16:30	17:28	18:23			20:20			21:15				21:56	21:53	21:03	12	06:39 (4)	19:52	25	08:01 (5)	18:38	16:34	16:05
13	08:38	07:51	06:48		07:12 (5)	06:32			05:29				04:55	05:11	05:59		06:28 (4)	06:54	07:34 (5)	07:48	07:47	08:35	
	16:31	17:30	18:25	1	07:13 (5)	20:22			21:17				21:57	21:52	21:17	11	06:39 (4)	19:49	28	08:02 (5)	18:22	16:32	16:05
14	08:37	07:49	06:45		07:09 (5)	06:30			05:27				04:55	05:12	06:01		06:30 (4)	06:56	07:32 (5)	07:50	07:49	08:36	
	16:33	17:32	18:27	5	07:14 (5)	20:24			21:18				21:58	21:51	20:59	9	06:39 (4)	19:47	30	08:02 (5)	18:34	16:31	16:05
15	08:36	07:47	06:43		07:07 (5)	06:28			05:26				04:55	05:13	06:03		06:32 (4)	06:58	07:31 (5)	07:52	07:51	08:37	
	16:35	17:34	18:29	9	07:16 (5)	20:26			21:20				21:58	21:50	20:57	7	06:39 (4)	19:44	32	08:03 (5)	18:31	16:29	16:05
16	08:35	07:45	06:40		07:04 (5)	06:25			05:24				04:55	05:14	06:05		06:33 (4)	06:59	07:30 (5)	07:54	07:53	08:38	
	16:36	17:36	18:30	12	07:16 (5)	20:28			21:22				21:59	21:49	20:55	5	06:38 (4)	19:42	34	08:04 (5)	18:29	16:28	16:05
17	08:34	07:43	06:38		07:02 (5)	06:23			05:22				04:54	05:16	06:06		06:35 (4)	07:01	07:29 (5)	07:56	07:55	08:39	
	16:38	17:38	18:32	15	07:17 (5)	20:30			21:23				21:59	21:47	20:53	3	06:38 (4)	19:39	35	08:04 (5)	18:27	16:26	16:05
18	08:33	07:41	06:36		06:59 (5)	06:21			05:21				04:54	05:17	06:08		06:37 (4)	07:03	07:29 (5)	07:57	07:57	08:39	
	16:40	17:40	18:34	18	07:17 (5)	20:32			21:25				22:00	21:46	20:51	1	06:38 (4)	19:37	35	08:04 (5)	18:24	16:25	16:05
19	08:32	07:39	06:33		06:57 (5)	06:18			05:19				04:54	05:19	06:10			07:05	07:31 (5)	07:59	07:59	08:40	
	16:41	17:42	18:36	21	07:18 (5)	20:33			21:27				22:00	21:45	20:48			19:54	33	08:04 (5)	18:22	16:23	16:05
20	08:31	07:37	06:31		06:54 (5)	06:16			05:18				04:54	05:20	06:12			07:06		07:45 (5)	18:01	16:21	16:05
	16:43	17:44	18:38	24	07:19 (5)	20:35			21:28				22:00	21:44	20:46			19:26	31	08:04 (5)	18:20	16:22	16:06
21	08:30	07:34	06:28		06:52 (5)	06:14			05:16				04:55	05:21	06:13			07:08		07:35 (5)	08:03	08:02	08:41
	16:45	17:46	18:40	26	07:18 (5)	20:37			21:30				22:01	21:42	20:44			19:29	29	08:04 (5)	18:18	16:21	16:06
22	08:29	07:32	06:26		06:49 (5)	06:12			05:15				04:55	05:23	06:15			07:10		07:36 (5)	08:05	08:04	08:42
	16:47	17:48	18:42	28	07:17 (5)	20:39			21:31				22:01	21:41	20:42			19:27	27	08:03 (5)	18:15	16:19	16:07
23	08:27	07:30	06:23		06:47 (5)	06:09			05:13				04:55	05:24	06:17			07:12		07:38 (5)	08:07	08:06	08:42
	16:49	17:50	18:43	30	07:17 (5)	20:41			21:33				22:01	21:39	20:39			19:24	24	08:02 (5)	18:13	16:18	16:07
24	08:26	07:28	06:21		06:45 (5)	06:07			05:12				04:55	05:26	06:19			07:14		07:40 (5)	08:09	08:08	08:43
	16:51	17:52	18:45	32	07:17 (5)	20:43			21:34				22:01	21:38	20:37			19:22	22	08:02 (5)	18:11	16:17	16:08
25	08:25	07:25	06:18		06:42 (5)	06:05		06:30 (4)	05:11				04:56	05:27	06:21			07:15		07:42 (5)	07:11	08:09	08:43
	16:53	17:54	18:47	34	07:16 (5)	20:44	1	06:31 (4)	21:36				22:01	21:36	20:35			19:19	19	08:01 (5)	17:09	16:16	16:08
26	08:23	07:23	06:16		06:41 (5)	06:03		06:28 (4)	05:09				04:56	05:29	06:22			07:17		07:43 (5)	07:13	08:11	08:43
	16:54	17:56	18:49	35	07:16 (5)	20:46		06:32 (4)	21:37				22:01	21:35	20:32			19:17		07:59 (5)	17:07	16:15	16:09
27	08:22	07:21	06:14		06:41 (5)	06:01			05:08				04:57	05:31	06:24			07:15	16	07:45 (5)	07:07	08:13	08:44
	16:56	17:58	18:51	34	07:15 (5)	20:48	6	06:32 (4)	21:39				22:01	21:33	20:30			19:15	13	07:58 (5)	17:04	16:14	16:10
28	08:20	07:19	06:11		06:41 (5)	05:59		06:24 (4)	05:07				04:57	05:32	06:26			07:21		07:47 (5)	07:17	08:14	08:44
	16:58	18:00	18:53	33	07:14 (5)	20:50	8	06:32 (4)	21:40				22:01	21:32	20:28			19:12	10	07:57 (5)	17:02	16:13	16:11
29	08:19		07:09		07:41 (5)	05:56		06:22 (4)	05:06				04:58	05:34	06:28			07:23		07:49 (5)	07:18	08:16	08:44
	17:00		19:55	31	08:12 (5)	20:52	10	06:32 (4)	21:41				22:01	21:30	20:25			19:10	6	07:55 (5)	17:00	16:12	16:12
30	08:17		07:06		07:43 (5)	05:54		06:20 (4)	05:05				04:58	05:35	06:29			07:24		07:51 (5)	07:20	08:18	08:44
	17:02		19:56	28	08:11 (5)	20:54	11	06:31 (4)	21:43				22:00	21:28	20:23			19:07	2	07:53 (5)	16:58	16:11	16:13
31	08:15		07:04		07:43 (5)				05:04					05:37	06:31					07:22			08:44
	17:04		19:58	26	08:09 (5)				21:44					21:27	20:21					16:56			16:14
Potential sun hours	250	273	367			420			494			510	512		460		382			328	259		233
Total, worst case				442		88			117						161		497						
Sun reduction				0.27		0.35			0.38						0.34		0.32						
Oper. time red.				1.00		1.00			1.00		</												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AU - H47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 21:03	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:11 (5) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:12 (5) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:14 (5) 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:24 (5) 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:01
31	08:15 17:04		07:04 19:58	05:54 20:54	05:04 21:44	04:58 22:01
Potential sun hours	250	273	367	420	494	510
Total, worst case			6	112	140	138
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.65	0.65
Total reduction			0.18	0.24	0.25	0.21
Total, real			1	27	35	29

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AU - H47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 3	05:45 (3) 05:48 (3) 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00 6	05:44 (3) 05:50 (3) 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	05:00 21:59 8	05:43 (3) 05:51 (3) 21:21	06:37 20:14	07:12 (5) 07:22 (5) 19:00	07:28 16:50	08:22 16:09
4	05:01 21:59 10	05:42 (3) 05:52 (3) 21:19	06:38 20:11	07:09 (5) 07:23 (5) 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58 11	05:42 (3) 05:53 (3) 21:17	06:40 20:09	07:07 (5) 07:24 (5) 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58 13	05:41 (3) 05:54 (3) 21:16	06:42 20:06	07:09 (5) 07:25 (5) 18:53	07:35 16:45	08:26 16:07
7	05:04 21:57 14	05:41 (3) 05:55 (3) 21:14	06:44 20:04	07:10 (5) 07:25 (5) 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56 15	05:41 (3) 05:56 (3) 21:12	06:45 20:01	07:12 (5) 07:25 (5) 18:48	07:39 16:41	08:29 16:06
9	05:06 21:55 17	05:40 (3) 05:57 (3) 21:10	06:47 19:59	07:14 (5) 07:26 (5) 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55 17	05:40 (3) 05:57 (3) 21:08	06:49 19:57	07:16 (5) 07:26 (5) 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54 17	05:41 (3) 05:58 (3) 21:06	06:51 19:54	07:17 (5) 07:24 (5) 18:41	07:44 16:36	08:33 16:05
12	05:10 21:53 16	05:42 (3) 05:58 (3) 21:04	06:52 19:52	07:19 (5) 07:24 (5) 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52 16	05:43 (3) 05:59 (3) 21:01	06:54 19:49	07:21 (5) 07:23 (5) 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51 15	05:44 (3) 05:59 (3) 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	05:13 21:50 15	05:45 (3) 06:00 (3) 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	05:15 21:49 14	05:47 (3) 06:01 (3) 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	05:16 21:47 13	05:48 (3) 06:01 (3) 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46 12	05:49 (3) 06:01 (3) 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45 11	05:51 (3) 06:02 (3) 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44 10	05:52 (3) 06:02 (3) 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42 8	05:53 (3) 06:01 (3) 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41 7	05:55 (3) 06:02 (3) 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39 6	05:56 (3) 06:02 (3) 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38 4	05:57 (3) 06:01 (3) 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:36 3	05:59 (3) 06:02 (3) 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35 1	06:00 (3) 06:01 (3) 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	282		121			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.65		0.68			
Total reduction	0.21		0.22			
Total, real	60		26			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AV - H48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 21:03	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:13 (5) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:14 (5) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:01
31	08:15 17:04		07:04 19:58	05:52 20:54	05:04 21:44	04:58 22:01
Potential sun hours	250	273	367	420	494	510
Total, worst case			7	97	180	23
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.66	0.66
Total reduction			0.18	0.24	0.25	0.21
Total, real			1	23	45	5

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AV - H48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52	05:59 21:03	06:54 19:50	07:48 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	06:00 21:01	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	05:13 21:50	06:01 20:59	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	05:15 21:49	06:03 20:57	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	05:16 21:47	06:04 20:55	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46	06:05 20:53	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:06 20:51	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:07 20:49	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:08 20:47	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	06:09 20:45	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39	06:10 20:43	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:11 20:41	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:37	06:12 20:39	07:15 19:19	08:11 18:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:13 20:37	07:17 19:17	08:13 18:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:14 20:35	07:19 19:15	08:15 18:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:15 20:33	07:21 19:12	08:17 18:03	08:14 16:13	08:44 16:11
29	05:34 21:30	06:16 20:31	07:23 19:10	08:19 18:01	08:16 16:12	08:44 16:12
30	05:36 21:28	06:17 20:29	07:24 19:07	08:21 17:59	08:18 16:11	08:44 16:13
31	05:37 21:27	06:18 20:27		08:22 17:57		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	204		105			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	43		23			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AW - H49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:44 (4) 20:55	05:03 20:29 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:46 (4) 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	19:12 (3) 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	19:14 (3) 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	20:31 (2) 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:28 (2) 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:27 (2) 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:26 (2) 21:53
9	08:41 16:25	07:59 17:22	16:50 (5) 18:17	06:57 20:15	05:36 21:10	20:25 (2) 21:54
10	08:40 16:26	07:57 17:24	16:48 (5) 18:19	06:55 20:17	05:34 21:11	20:24 (2) 21:55
11	08:40 16:28	07:55 17:26	16:47 (5) 18:21	06:52 20:19	05:33 21:13	20:24 (2) 21:55
12	08:39 16:30	07:53 17:28	16:46 (5) 18:23	06:50 20:20	05:31 21:15	20:23 (2) 21:56
13	08:38 16:31	07:51 17:30	16:45 (5) 18:25	06:48 20:22	05:29 21:17	20:22 (2) 21:57
14	08:37 16:33	07:49 17:32	16:45 (5) 18:27	06:45 20:24	05:27 21:18	20:22 (2) 21:57
15	08:36 16:34	07:47 17:34	16:45 (5) 18:28	06:43 20:26	05:26 21:20	20:22 (2) 21:58
16	08:35 16:36	07:45 17:36	16:45 (5) 18:30	06:40 20:28	05:24 21:22	20:22 (2) 21:59
17	08:34 16:38	07:43 17:38	16:45 (5) 18:32	06:38 20:30	05:22 21:23	20:21 (2) 21:59
18	08:33 16:40	07:41 17:40	16:44 (5) 18:34	06:35 20:31	05:21 21:25	20:22 (2) 22:00
19	08:32 16:41	07:39 17:42	16:45 (5) 18:36	06:33 20:33	05:19 21:27	20:22 (2) 22:00
20	08:31 16:43	07:36 17:44	16:46 (5) 18:38	06:31 20:35	05:18 21:28	20:22 (2) 22:00
21	08:30 16:45	07:34 17:46	16:47 (5) 18:40	06:28 20:37	05:16 21:30	20:23 (2) 22:01
22	08:28 16:47	07:32 17:48	16:47 (5) 18:41	06:26 20:39	05:15 21:31	20:23 (2) 22:01
23	08:27 16:49	07:30 17:50	16:49 (5) 18:43	06:23 20:41	05:13 21:33	20:23 (2) 22:01
24	08:26 16:50	07:28 17:52	16:53 (5) 18:45	06:21 20:42	05:12 21:34	20:23 (2) 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:24 (2) 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	20:25 (2) 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:25 (2) 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	20:26 (2) 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	20:27 (2) 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	20:28 (2) 22:00
31	08:15 17:04		07:04 19:58	05:41 19:31 (3)	05:04 21:44	20:28 (2) 20:45 (2)
Potential sun hours	250	273	367	420	494	510
Total, worst case		249	650	94	558	55
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.67	0.67	0.64	0.64
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		38	119	22	135	11

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AW - H49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	20 20:53 (2)	06:33 20:18		07:26 19:05	8 18:36 (4)	07:24 16:54	5 16:23 (5)	16:18 (5) 16:10	08:19 16:10
2	04:59 22:00	05:40 21:23	18 20:52 (2)	06:35 20:16		07:28 19:02	2 18:33 (4)	07:26 16:52	1 16:21 (5)	16:09 16:09	08:22 16:08
3	05:00 21:59	05:42 21:21	16 20:54 (2)	06:36 20:13		07:30 19:00		07:28 16:50		16:08 16:08	08:24 16:08
4	05:01 21:59	05:44 21:19	13 20:55 (2)	06:38 20:11		07:31 18:57		07:30 16:48		16:08 16:08	08:25 16:07
5	05:02 21:58	05:45 21:17	10 20:56 (2)	06:40 20:09		07:33 18:55		07:32 16:46		16:07 16:07	08:26 16:07
6	05:03 21:58	05:47 21:15	8 20:57 (2)	06:42 20:06		07:35 18:52		07:34 16:44		16:07 16:07	08:28 16:06
7	05:04 21:57	05:49 21:13	4 20:58 (2)	06:43 20:04		07:37 18:50		07:36 16:43		16:06 16:06	08:29 16:06
8	05:05 21:56	05:50 20:49 (2)		06:45 20:01	10 19:19 (3)	07:39 19:19 (3)		07:38 16:41		16:06 16:06	08:30 16:05
9	05:06 21:55	05:52 20:50 (2)		06:47 19:59	15 19:21 (3)	07:41 18:45		07:40 16:39		16:05 16:05	08:31 16:05
10	05:07 21:55	05:54 20:52 (2)		06:49 19:56	27 19:21 (3)	07:42 18:43		07:42 16:37		16:05 16:05	08:33 16:05
11	05:08 21:54	05:56 20:53 (2)		06:50 19:54	37 19:22 (3)	07:44 18:40		07:44 16:35		16:05 16:05	08:34 16:05
12	05:09 21:53	05:57 20:54 (2)		06:52 19:51	43 19:23 (3)	07:46 18:38		07:45 16:34		16:05 16:05	08:35 16:05
13	05:10 21:52	05:59 20:55 (2)		06:54 19:49	46 19:22 (3)	07:48 18:36		07:47 16:32		16:05 16:05	08:36 16:05
14	05:12 21:51	06:01 20:56 (2)		06:56 19:47	46 19:18 (3)	07:50 18:33		07:49 16:31		16:04 16:04	08:37 16:05
15	05:13 21:50	06:03 20:57 (2)		06:58 19:44	47 19:16 (3)	07:52 18:31		07:51 16:29		16:05 16:05	08:38 16:05
16	05:14 21:49	06:04 20:58 (2)		06:59 19:42	46 19:14 (3)	07:54 18:29		07:53 16:27		16:05 16:05	08:38 16:05
17	05:16 21:47	06:06 20:59 (2)		07:01 19:39	46 19:11 (3)	07:55 18:26		07:55 16:26		16:05 16:05	08:39 16:05
18	05:17 21:46	06:08 20:58 (2)		07:03 19:37	42 19:08 (3)	07:57 18:24	9 17:23 (5)	07:57 16:24		16:05 16:05	08:40 16:05
19	05:18 21:45	06:10 20:58 (2)		07:05 19:34	41 19:06 (3)	07:59 18:22	15 17:35 (5)	07:59 16:23		16:05 16:05	08:41 16:06
20	05:20 21:44	06:12 20:59 (2)		07:06 19:32	38 19:04 (3)	08:01 18:20	18 17:36 (5)	08:00 16:22		16:06 16:06	08:41 16:06
21	05:21 21:42	06:13 20:59 (2)		07:08 19:29	36 18:59 (4)	08:03 18:17	20 17:37 (5)	08:02 16:20		16:06 16:06	08:42 16:06
22	05:23 21:41	06:15 20:59 (2)		07:10 19:27	35 18:58 (4)	08:05 18:15	21 17:38 (5)	08:04 16:19		16:06 16:06	08:42 16:07
23	05:24 21:39	06:17 21:00 (2)		07:12 19:24	33 18:56 (4)	08:07 18:13	23 17:38 (5)	08:06 16:18		16:07 16:07	08:43 16:08
24	05:26 21:38	06:19 21:00 (2)		07:13 19:22	31 18:54 (4)	08:09 18:11	23 17:38 (5)	08:08 16:17		16:08 16:08	08:43 16:08
25	05:27 21:36	06:20 21:01 (2)		07:15 19:19	29 18:51 (4)	07:11 17:09	24 16:14 (5)	08:09 16:16		16:08 16:08	08:44 16:09
26	05:29 21:35	06:22 21:00 (2)		07:17 19:17	25 18:48 (4)	07:13 17:06	22 16:14 (5)	08:11 16:14		16:09 16:09	08:44 16:10
27	05:30 21:33	06:24 21:00 (2)		07:19 19:14	23 18:46 (4)	07:14 17:04	20 16:14 (5)	08:13 16:13		16:10 16:10	08:44 16:11
28	05:32 21:32	06:26 20:59 (2)		07:21 19:12	20 18:44 (4)	07:16 17:02	17 16:15 (5)	08:14 16:12		16:11 16:11	08:44 16:12
29	05:34 21:30	06:27 20:57 (2)		07:22 19:09	16 18:41 (4)	07:18 17:00	14 16:15 (5)	08:16 16:12		16:12 16:12	08:44 16:13
30	05:35 21:28	06:29 20:56 (2)		07:24 19:07	12 18:38 (4)	07:20 16:58	12 16:16 (5)	08:18 16:11		16:13 16:13	08:44 16:13
31	05:37 21:26	06:31 20:55 (2)				07:22 16:56	9 16:25 (5)			16:14 16:13	08:44 16:13
Potential sun hours	512	460		382		328		259		233	
Total, worst case	527	89		744		257		6			
Sun reduction	0.32	0.34		0.32		0.29		0.27			
Oper. time red.	1.00	1.00		1.00		1.00		1.00			
Wind dir. red.	0.64	0.64		0.67		0.66		0.66			
Total reduction	0.21	0.22		0.22		0.19		0.18			
Total, real	108	19		161		50		1			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AX - H50

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	12:51 (2) 08:14 13:45 (2) 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	15:58 (1) 08:19 16:23 (1) 16:10
2	08:44 16:16	12:52 (2) 08:12 13:46 (2) 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	15:58 (1) 08:21 16:21 (1) 16:09
3	08:44 16:17	12:52 (2) 08:10 13:45 (2) 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	15:59 (1) 08:22 16:19 (1) 16:08
4	08:43 16:18	12:53 (2) 08:08 13:46 (2) 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	15:59 (1) 08:24 16:17 (1) 16:08
5	08:43 16:19	12:54 (2) 08:07 13:46 (2) 17:14	07:07 18:09	06:51 20:07	05:44 21:03	05:00 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	16:00 (1) 08:25 16:14 (1) 16:07
6	08:43 16:21	12:55 (2) 08:05 13:47 (2) 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	16:01 (1) 08:26 16:12 (1) 16:07
7	08:42 16:22	12:55 (2) 08:03 13:46 (2) 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	16:03 (1) 08:28 16:10 (1) 16:06
8	08:42 16:24	12:56 (2) 08:01 13:46 (2) 17:20	08:01 18:15	07:00 20:13	07:39 21:08	07:00 21:53	05:51 21:56	07:00 21:12	07:39 20:01	07:30 18:48	07:38 16:41	16:05 (1) 08:29 16:08 (1) 16:06
9	08:41 16:25	12:57 (2) 07:59 13:47 (2) 17:22	07:59 18:17	06:57 20:15	06:42 21:10	05:36 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	16:08 (1) 08:30 16:05 (1) 08:32
10	08:40 16:26	12:58 (2) 07:57 13:47 (2) 17:24	07:55 18:19	06:55 20:17	06:39 21:12	05:34 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:39 16:37	16:05 (1) 08:33 16:05 (1) 08:35
11	08:40 16:28	12:59 (2) 07:55 13:47 (2) 17:26	07:53 18:21	06:53 20:19	06:37 21:13	05:33 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	07:44 16:35	16:05 (1) 08:33 16:05 (1) 08:35
12	08:39 16:30	12:59 (2) 07:53 13:47 (2) 17:28	07:53 18:23	06:50 20:20	06:35 21:15	05:31 21:56	05:09 21:53	05:57 21:03	06:52 19:52	07:46 18:38	07:46 16:34	16:05 (1) 08:34 16:05 (1) 08:35
13	08:38 16:31	13:00 (2) 07:51 13:47 (2) 17:30	07:51 18:25	06:48 20:22	06:32 21:17	05:29 21:57	05:10 21:58	05:59 21:17	06:54 19:49	07:48 18:37	07:47 16:33	16:05 (1) 08:35 16:05 (1) 08:36
14	08:37 16:33	13:01 (2) 07:49 13:47 (2) 17:32	07:49 18:27	06:45 20:24	06:30 21:18	05:27 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:49 18:30	07:49 16:31	16:05 (1) 08:36 16:04 (1) 08:37
15	08:36 16:34	13:02 (2) 07:47 13:47 (2) 17:34	07:47 18:28	06:43 20:26	06:28 21:20	05:26 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	16:05 (1) 08:37 16:05 (1) 08:38
16	08:35 16:36	13:04 (2) 07:45 13:46 (2) 17:36	07:45 18:30	06:40 20:28	06:25 21:22	05:24 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:27	16:05 (1) 08:38 16:05 (1) 08:39
17	08:34 16:38	13:04 (2) 07:43 13:45 (2) 17:38	07:43 18:32	06:38 20:30	06:23 21:23	05:22 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	16:05 (1) 08:39 13:07 (2) 16:05
18	08:33 16:40	13:06 (2) 07:41 13:45 (2) 17:40	07:41 18:34	06:36 20:32	06:21 21:25	05:21 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	16:05 (1) 08:40 13:11 (2) 16:05
19	08:32 16:41	13:07 (2) 07:39 13:45 (2) 17:42	07:39 18:36	06:33 20:33	06:18 21:27	05:19 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	16:05 (1) 08:41 13:13 (2) 16:05
20	08:31 16:43	13:08 (2) 07:37 13:46 (2) 17:44	07:37 18:38	06:31 20:35	06:16 21:28	05:20 22:00	05:16 21:46	06:12 20:46	07:06 19:32	07:58 18:20	07:57 16:22	16:05 (1) 08:42 13:15 (2) 16:06
21	08:30 16:45	13:10 (2) 07:34 13:42 (2) 17:46	07:34 18:40	06:28 20:37	06:14 21:30	05:16 22:01	05:13 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:03 16:20	16:05 (1) 08:43 17:09 (1) 16:20
22	08:29 16:47	13:12 (2) 07:32 13:41 (2) 17:48	07:32 18:42	06:12 20:39	05:15 21:31	05:05 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 16:19	16:05 (1) 08:44 17:05 (1) 16:19
23	08:27 16:49	13:15 (2) 07:30 13:39 (2) 17:50	07:30 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	16:05 (1) 08:45 17:03 (1) 16:18
24	08:26 16:50	13:17 (2) 07:28 13:37 (2) 17:52	07:28 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	16:05 (1) 08:46 17:01 (1) 16:17
25	08:25 16:52	13:22 (2) 07:25 13:34 (2) 17:54	07:25 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	07:11 16:16	16:05 (1) 08:47 16:00 (1) 16:16
26	08:23 16:54	13:24 (2) 07:23 13:36 (2) 17:56	07:23 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	07:13 16:12	16:05 (1) 08:48 15:59 (1) 16:14
27	08:22 16:56	13:26 (2) 07:21 13:38 (2) 17:58	07:21 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:28 21:33	06:24 20:30	07:18 19:14	07:13 17:04	07:13 16:11	16:05 (1) 08:49 15:58 (1) 16:13
28	08:20 16:58	13:28 (2) 07:19 13:40 (2) 18:00	07:19 18:53	06:11 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	07:17 16:12	16:05 (1) 08:50 15:58 (1) 16:12
29	08:19 17:00	13:30 (2) 07:17 13:42 (2) 18:02	07:17 18:55	06:09 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	07:18 16:11	16:05 (1) 08:51 15:57 (1) 16:12
30	08:17 17:02	13:32 (2) 07:15 13:44 (2) 18:04	07:15 18:56	06:07 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	07:20 16:22	16:05 (1) 08:52 15:57 (1) 16:11
31	08:15 17:04	13:34 (2) 07:13 13:46 (2) 18:06	07:13 18:58	06:05 20:56	05:04 21:44	04:59 22:01	05:37 21:27	06:31 20:21	07:22 16:56	07:22 16:23	07:22 16:23	16:05 (1) 08:53 15:58 (1) 16:10
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	1064	335										
Sun reduction	0.24	0.23										
Oper. time red.	1.00	1.00										
Wind dir. red.	0.63	0.65										
Total reduction	0.15	0.15										
Total, real	163	51										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AY - H51

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February	March	April	May	June	July	August	September	October	November	December		
1	08:44		08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19	08:54 (2)
	16:15		17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10	11 09:05 (2)
2	08:44		08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26		08:21	08:56 (2)
	16:16		17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09	9 09:05 (2)
3	08:44		08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22	08:57 (2)
	16:17		17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50		16:08	7 09:04 (2)
4	08:43		08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24	08:59 (2)
	16:18		17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48		16:08	6 09:05 (2)
5	08:43		09:16 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	09:00 (2)
	16:20	1	09:17 (2)	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07	4 09:04 (2)
6	08:43		09:16 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	09:02 (2)
	16:21	2	09:18 (2)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	16:07	3 09:05 (2)
7	08:42		09:15 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28	09:03 (2)
	16:22	4	09:19 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	1 09:04 (2)
8	08:42		09:14 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	
	16:24	6	09:20 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	
9	08:41		09:14 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	
	16:25	7	09:21 (2)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	
10	08:41		09:13 (2)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32	
	16:27	9	09:22 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05	
11	08:40		09:12 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	
	16:28	10	09:22 (2)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05	
12	08:39		09:11 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	
	16:30	12	09:23 (2)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	5 08:51 (2)	16:05
13	08:38		09:10 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:35	
	16:31	14	09:24 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	11 08:54 (2)	16:05
14	08:37		09:09 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:41 (2)	08:36
	16:33	15	09:24 (2)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	15 08:56 (2)	16:05
15	08:37		09:08 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:40 (2)	08:37
	16:34	17	09:25 (2)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	18 08:58 (2)	16:05
16	08:36		09:07 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:39 (2)	08:38
	16:36	19	09:26 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	20 08:59 (2)	16:05
17	08:35		09:05 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39 (2)	08:39
	16:38	21	09:26 (2)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	21 09:00 (2)	16:05
18	08:33		09:04 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:38 (2)	08:39
	16:40	22	09:26 (2)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	22 09:00 (2)	16:05
19	08:32		09:03 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:38 (2)	08:40
	16:41	24	09:27 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	23 09:01 (2)	16:05
20	08:31		09:02 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:38 (2)	08:41
	16:43	24	09:26 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	23 09:01 (2)	16:06
21	08:30		09:03 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:38 (2)	08:41
	16:45	24	09:27 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	24 09:02 (2)	16:06
22	08:29		09:04 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:38 (2)	08:42
	16:47	23	09:27 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	24 09:02 (2)	16:07
23	08:27		09:04 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:39 (2)	08:42
	16:49	23	09:27 (2)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	24 09:03 (2)	16:07
24	08:26		09:04 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:41 (2)	08:43
	16:51	22	09:26 (2)	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	22 09:03 (2)	16:08
25	08:25		09:06 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09	08:43 (2)	08:43
	16:52	21	09:27 (2)	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	21 09:04 (2)	16:08
26	08:23		09:06 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:45 (2)	08:44
	16:54	20	09:26 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	19 09:04 (2)	16:09
27	08:22		09:08 (2)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13	08:47 (2)	08:44
	16:56	18	09:26 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	16:14	17 09:04 (2)	16:10
28	08:20		09:09 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:15	08:49 (2)	08:44
	16:58	15	09:24 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16 09:05 (2)	16:11
29	08:19		09:11 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16	08:51 (2)	08:44
	17:00	11	09:22 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	14 09:05 (2)	16:11
30	08:17		09:14 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	08:52 (2)	08:44
	17:02	5	09:19 (2)		19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	12 09:04 (2)	16:12
31	08:15				07:04		05:04		05:37	06:31		07:22		08:44	
	17:04				19:58		21:44		21:27	20:21		16:56		16:13	
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259		233	
Total, worst case		389											351		41
Sun reduction		0.24											0.27		0.21
Oper. time red.		1.00											1.00		1.00
Wind dir. red.		0.61											0.61		0.61
Total reduction		0.15											0.16		0.13
Total, real		57											56		5

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AZ - H52

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	09:18 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24											08:19	09:00 (2)
	16:15	19	09:37 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54									16:10	24	09:24 (2)
2	08:44	09:18 (2)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26										08:21	09:00 (2)	
	16:16	20	09:38 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52									16:09	24	09:24 (2)
3	08:44	09:17 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28										08:22	09:00 (2)	
	16:17	21	09:38 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50									16:08	24	09:24 (2)
4	08:43	09:17 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30										08:24	09:01 (2)	
	16:18	22	09:39 (2)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48									16:08	24	09:25 (2)
5	08:43	09:16 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32										08:25	09:00 (2)	
	16:20	23	09:39 (2)	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46									16:07	25	09:25 (2)
6	08:43	09:16 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34										08:27	09:02 (2)	
	16:21	24	09:40 (2)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44									16:07	24	09:26 (2)
7	08:42	09:15 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36										08:28	09:03 (2)	
	16:22	25	09:40 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43									16:06	23	09:26 (2)
8	08:42	09:17 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38										08:29	09:05 (2)	
	16:24	24	09:41 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41									16:06	22	09:27 (2)
9	08:41	09:17 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40										08:30	09:06 (2)	
	16:25	24	09:41 (2)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39									16:05	21	09:27 (2)
10	08:41	09:17 (2)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42										08:32	09:07 (2)	
	16:27	24	09:41 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37									16:05	20	09:27 (2)
11	08:40	09:18 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44										08:33	09:08 (2)	
	16:28	24	09:42 (2)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36									16:05	19	09:27 (2)
12	08:39	09:18 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46										08:34	09:10 (2)	
	16:30	24	09:42 (2)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34									16:05	18	09:28 (2)
13	08:38	09:19 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48										08:35	09:11 (2)	
	16:31	23	09:42 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32									16:05	18	09:29 (2)
14	08:37	09:19 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49										08:36	09:12 (2)	
	16:33	23	09:42 (2)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31									16:05	17	09:29 (2)
15	08:37	09:20 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51										08:37	09:13 (2)	
	16:34	22	09:42 (2)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29									16:05	16	09:29 (2)
16	08:36	09:21 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53										08:38	09:13 (2)	
	16:36	21	09:42 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28									16:05	16	09:29 (2)
17	08:35	09:21 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55										08:39	09:14 (2)	
	16:38	20	09:41 (2)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26									16:05	16	09:30 (2)
18	08:33	09:23 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57										08:39	09:15 (2)	
	16:40	18	09:41 (2)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25									16:05	15	09:30 (2)
19	08:32	09:24 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59										08:40	09:16 (2)	
	16:41	17	09:41 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23									16:05	15	09:31 (2)
20	08:31	09:25 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01		09:04 (2)								08:41	09:16 (2)	
	16:43	14	09:39 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	7	09:11 (2)							16:06	15	09:31 (2)
21	08:30	09:27 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02		09:02 (2)								08:41	09:17 (2)	
	16:45	12	09:39 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	12	09:14 (2)							16:06	15	09:32 (2)
22	08:29	09:30 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		09:01 (2)								08:42	09:17 (2)	
	16:47	7	09:37 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	14	09:15 (2)							16:06	15	09:32 (2)
23	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		09:00 (2)								08:42	09:18 (2)	
	16:49		17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18		09:17 (2)								16:07	15	09:33 (2)
24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08		09:00 (2)								08:43	09:18 (2)	
	16:51		17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17		09:18 (2)								16:08	15	09:33 (2)
25	08:25		07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11	08:09		09:00 (2)								08:43	09:18 (2)	
	16:52		17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16		09:19 (2)								16:08	15	09:33 (2)
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11		08:59 (2)								08:44	09:19 (2)	
	16:54		17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15		09:20 (2)								16:09	15	09:34 (2)
27	08:22		07:21	06:14	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13		08:59 (2)								08:44	09:19 (2)	
	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:14		09:21 (2)								16:10	16	09:35 (2)
28	08:20		07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:15		09:00 (2)								08:44	09:19 (2)	
	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13		09:22 (2)								16:11	16	09:35 (2)
29	08:19			07:09	05:56	05:06	04:57	05:34	06:28	07:23	08:19	08:16		09:00 (2)								08:44	09:19 (2)	
	17:00			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12		09:23 (2)								16:11	17	09:36 (2)
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18		08:59 (2)								08:44	09:19 (2)	
	17:02			19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11		09:23 (2)								16:12	17	09:36 (2)
31	08:15			07:04		05:04		05:37	06:31		07:22			08:44								08:44	09:18 (2)	
	17:04			19:58		21:44		21:27	20:21		16:56			16:13										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BA - H53

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15 16	09:35 (1) 09:36 (1) 17:06	08:14 18:02 17:14	07:16 18:04 20:02	05:52 20:56 20:57	05:03 21:46 22:00	04:59 22:00 21:25	05:39 21:25 20:18	06:33 20:18 19:05	07:26 19:05 16:54	07:24 16:54 16:10	08:19 16:10 16:10
2	08:44 16:16 15	09:38 (1) 09:51 (1) 17:08	08:10 18:04 20:02	07:12 18:04 20:02	05:58 20:57 20:57	05:01 21:47 22:00	05:00 21:47 22:00	05:42 21:23 20:16	06:37 20:16 19:02	07:30 19:02 16:52	07:28 16:52 16:09	08:22 16:09 16:09
3	08:44 16:17 14	09:38 (1) 09:52 (1) 17:10	08:09 18:06 20:04	07:09 18:06 20:04	05:54 20:59 20:59	05:00 21:48 21:59	05:01 21:59 21:21	05:44 21:21 20:14	06:38 20:14 19:00	07:32 19:00 16:50	07:30 16:50 16:08	08:24 16:08 16:08
4	08:44 16:18 13	09:38 (1) 09:51 (1) 17:12	08:09 18:08 20:06	07:09 18:08 20:06	05:54 21:01 21:49	05:00 21:59 21:59	05:01 21:59 21:19	05:44 21:19 20:11	06:38 18:57 16:48	07:32 16:48 16:08	07:30 16:08 16:08	08:24 16:08 3
5	08:43 16:20 11	09:40 (1) 09:51 (1) 17:14	08:07 18:10 20:08	07:07 18:10 20:08	05:52 21:03 21:03	04:59 21:50 21:58	05:02 21:58 21:18	05:45 21:18 20:09	06:40 18:55 16:46	07:33 16:46 16:07	07:32 16:07 16:07	08:25 16:07 7
6	08:43 16:21 11	09:40 (1) 09:51 (1) 17:16	08:05 18:11 20:09	07:05 18:11 20:09	05:42 21:05 21:51	04:59 21:51 21:58	05:03 21:58 21:16	05:47 21:16 20:06	06:42 18:53 16:45	07:35 16:45 16:07	07:34 16:07 16:07	08:27 16:07 10
7	08:42 16:22 7	09:42 (1) 09:49 (1) 17:18	08:03 18:13 20:11	07:02 18:13 20:11	05:40 21:06 21:52	04:58 21:52 21:57	05:04 21:57 21:14	05:49 21:14 20:04	06:44 18:50 16:43	07:37 16:43 16:06	07:36 16:06 16:06	08:28 16:06 11
8	08:42 16:24 3	09:45 (1) 09:48 (1) 17:20	08:01 18:15 20:13	07:00 18:15 20:13	05:38 21:08 21:53	04:57 21:56 21:56	05:05 21:56 21:12	05:51 21:12 20:01	06:45 18:48 16:41	07:39 16:41 16:06	07:38 16:06 16:06	08:29 16:06 13
9	08:41 16:25 10	09:48 (1) 17:22 17:22	07:59 18:17 20:15	06:58 18:17 20:15	06:42 21:10 21:54	05:36 21:54 21:56	05:06 21:56 21:10	05:52 21:10 19:59	06:47 18:45 16:39	07:41 16:39 16:05	07:40 16:05 16:05	08:31 16:05 14
10	08:41 16:27 11	09:48 (1) 17:24 17:24	07:57 18:19 20:17	06:55 18:19 20:17	06:40 21:12 21:55	05:34 21:12 21:55	05:07 21:55 21:08	05:54 21:08 19:57	06:49 18:43 16:37	07:43 16:37 16:05	07:42 16:05 16:05	08:32 16:05 15
11	08:40 16:28 12	09:48 (1) 17:26 17:26	07:55 18:21 20:19	06:53 18:21 20:19	06:37 21:13 21:56	05:33 21:13 21:54	05:08 21:54 21:06	05:56 21:06 19:54	06:51 18:41 16:36	07:44 16:36 16:05	07:44 16:05 16:05	08:33 16:05 16
12	08:39 16:30 13	09:48 (1) 17:28 17:28	07:53 18:23 20:21	06:50 18:23 20:21	06:35 21:15 21:56	05:31 21:15 21:53	05:09 21:53 21:04	05:58 21:04 19:52	06:52 18:38 16:34	07:46 16:34 16:05	07:46 16:05 16:05	08:34 16:05 17
13	08:38 16:31 14	09:48 (1) 17:30 17:30	07:51 18:25 20:22	06:48 18:25 20:22	06:32 21:17 21:57	05:29 21:17 21:52	05:11 21:52 21:02	05:59 21:02 19:49	06:54 18:36 16:32	07:48 16:32 16:05	07:48 16:05 16:05	08:35 16:05 17
14	08:37 16:33 15	09:48 (1) 17:32 17:32	07:49 18:27 20:24	06:45 18:27 20:24	06:30 21:19 21:58	05:27 21:19 21:51	05:12 21:51 20:59	06:01 20:59 19:47	06:56 18:34 16:31	07:50 16:31 16:05	07:50 16:05 16:05	08:36 16:05 17
15	08:37 16:35 16	09:48 (1) 17:34 17:34	07:47 18:29 20:26	06:43 18:29 20:26	06:28 21:20 21:58	05:26 21:20 21:50	05:13 21:50 20:57	06:03 20:57 19:44	06:58 18:31 16:29	07:52 16:29 16:05	07:51 16:05 16:05	08:37 16:05 18
16	08:36 16:36 17	09:48 (1) 17:36 17:36	07:45 18:30 20:28	06:41 18:30 20:28	06:25 21:22 21:59	05:24 21:22 21:49	05:14 21:49 20:55	06:05 19:42 18:29	06:59 17:56 16:28	07:54 16:28 16:05	07:53 16:05 16:05	08:38 16:05 18
17	08:35 16:38 18	09:48 (1) 17:38 17:38	07:43 18:32 20:30	06:38 18:32 20:30	06:23 21:24 21:59	05:22 21:24 21:48	05:16 21:48 20:53	06:06 19:39 18:27	07:01 18:27 16:26	07:56 16:26 16:05	07:55 16:05 16:05	08:39 16:05 18
18	08:34 16:40 19	09:48 (1) 17:40 17:40	07:41 18:34 20:32	06:36 18:34 20:32	06:21 21:25 22:00	05:21 21:25 22:00	05:17 21:46 21:51	06:08 20:51 19:37	07:03 18:24 16:25	07:58 16:25 16:05	07:57 16:05 16:05	08:39 16:05 18
19	08:32 16:41 20	09:48 (1) 17:42 17:42	07:39 18:36 20:34	06:33 18:36 20:34	06:18 21:27 22:00	05:19 21:27 22:00	05:19 21:45 20:49	06:10 20:49 19:34	07:05 18:22 16:23	07:59 16:23 16:05	07:59 16:05 16:05	08:40 16:05 19
20	08:31 16:43 21	09:48 (1) 17:44 17:44	07:37 18:38 20:35	06:31 18:38 20:35	06:16 21:28 22:01	05:18 21:28 22:01	05:20 21:44 20:46	06:12 20:46 19:32	07:07 18:20 16:22	08:01 16:22 16:06	08:01 16:06 16:06	08:41 16:06 18
21	08:30 16:45 22	09:48 (1) 17:46 17:46	07:34 18:40 20:37	06:28 18:40 20:37	06:14 21:30 22:01	05:16 21:30 22:01	05:21 21:42 20:44	06:13 20:44 19:29	07:08 18:18 16:21	08:03 16:21 16:06	08:02 16:06 16:06	08:41 16:06 18
22	08:29 16:47 23	09:48 (1) 17:48 17:48	07:32 18:42 20:39	06:26 18:42 20:39	06:12 21:32 22:01	05:15 21:32 22:01	05:23 21:41 20:42	06:15 20:42 19:27	07:10 18:15 16:19	08:05 16:19 16:07	08:04 16:07 16:07	08:42 16:07 18
23	08:27 16:49 24	09:48 (1) 17:50 17:50	07:30 18:44 20:41	06:23 18:44 20:41	06:09 21:33 22:01	05:13 21:33 22:01	05:24 21:40 20:40	06:17 20:40 19:24	07:12 18:13 16:18	08:07 16:18 16:07	08:06 16:07 16:07	08:43 16:07 18
24	08:26 16:51 25	09:48 (1) 17:52 17:52	07:28 18:45 20:43	06:21 18:45 20:43	06:07 21:35 22:01	05:12 21:35 22:01	05:26 21:38 20:37	06:19 20:37 19:22	07:14 18:11 16:17	08:09 16:17 16:08	08:08 16:08 16:08	08:43 16:08 19
25	08:25 16:53 26	09:48 (1) 17:54 17:54	07:26 18:47 20:45	06:18 18:47 20:45	06:05 21:36 22:01	05:11 21:36 22:01	05:27 21:37 20:35	06:21 20:35 19:20	07:15 17:09 16:16	07:11 16:16 16:08	08:10 16:08 16:08	08:43 16:08 19
26	08:23 16:54 27	09:48 (1) 17:56 17:56	07:23 18:49 20:46	06:16 18:49 20:46	06:03 21:38 22:01	05:09 21:38 22:01	05:29 21:35 20:33	06:22 20:33 19:17	07:17 17:07 16:15	07:13 16:15 16:09	08:11 16:09 16:09	08:44 16:09 18
27	08:22 16:56 28	09:48 (1) 17:58 17:58	07:21 18:51 20:48	06:14 18:51 20:48	06:01 21:39 22:01	05:08 21:39 22:01	05:31 21:33 20:30	06:24 20:30 19:15	07:19 17:05 16:14	07:15 16:14 16:10	08:13 16:10 16:10	08:44 16:10 18
28	08:20 16:58 29	09:48 (1) 18:00 18:00	07:19 18:53 20:50	06:11 18:53 20:50	05:59 21:40 22:01	05:07 21:40 22:01	05:32 21:32 20:28	06:26 20:28 19:12	07:21 17:02 16:13	07:17 16:13 16:11	08:15 16:11 16:11	08:44 16:11 17
29	08:19 17:00 30	09:48 (1) 19:55 19:55	07:09 19:55 20:52	05:56 19:55 20:52	05:06 21:42 22:01	05:06 21:42 22:01	05:34 21:30 20:26	06:28 20:26 19:10	07:23 17:00 16:12	07:19 16:12 16:12	08:16 16:12 16:12	08:44 16:12 18
30	08:17 17:02 31	09:48 (1) 19:57 19:57	07:06 19:57 20:54	05:54 19:57 20:54	05:05 21:43 22:01	05:05 21:43 22:01	05:35 21:28 20:23	06:29 20:23 19:07	07:24 16:58 16:11	07:21 16:11 16:11	08:18 16:11 16:11	08:44 16:11 17
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	90											445
Sun reduction	0.24											0.21
Oper. time red.	1.00											1.00
Wind dir. red.	0.59											0.59
Total reduction	0.14											0.12
Total, real	13											55

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BB - H54
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time													
N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	08:11 (1) 08:17 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:21 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	08:22 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:24 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	08:25 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:27 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:28 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	08:29 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:30 16:39	08:30 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:32 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:54	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:33 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:53	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:34 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:35 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:36 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:37 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	08:38 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	06:59 19:39	07:56 18:27	08:39 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:40 16:25	08:40 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	08:41 16:23	08:41 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:42 16:22	08:42 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:43 16:21	08:43 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:44 16:19	08:44 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:45 16:18	08:45 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:46 16:17	08:46 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	08:11 18:09	08:47 16:16	08:47 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 18:07	08:48 16:15	08:48 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 18:05	08:49 16:14	08:49 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 18:02	08:50 16:13	08:50 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 18:00	08:51 16:12	08:51 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	08:21 18:00	08:52 16:11	08:52 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21	07:22 18:56			
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		304	6							312		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.64	0.64							0.64		
Total reduction		0.15	0.17							0.19		
Total, real		45	1							58		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BC - H55

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	09:21 (3) 08:14		07:16 07:01	05:52 05:03	04:59 05:39	06:33 07:26				07:24	08:19	09:11 (3)
2 08:44	09:22 (3) 08:12		07:12 06:59	05:50 05:02	04:59 05:40	06:36 07:28				07:26	08:21	09:11 (3)
3 08:44	09:23 (3) 08:09		07:09 06:54	05:46 05:00	04:59 05:41	06:38 07:32				07:30	08:24	09:11 (3)
4 08:44	09:24 (3) 08:07		07:07 06:52	05:44 04:59	04:59 05:42	06:40 07:33				07:32	08:25	09:11 (3)
5 08:44	09:25 (3) 08:05		07:05 06:49	05:42 04:59	04:59 05:42	06:42 07:35				07:34	08:27	09:11 (3)
6 08:44	09:26 (3) 08:03		07:03 06:47	05:40 04:58	04:58 05:41	06:44 07:37				07:36	08:28	09:11 (3)
7 08:44	09:27 (3) 08:01		07:01 06:45	05:38 04:57	04:57 05:40	06:46 07:39				07:38	08:29	09:11 (3)
8 08:44	09:28 (3) 07:59		06:59 06:43	05:36 04:55	04:55 05:38	06:48 07:41				07:40	08:30	09:11 (3)
9 08:44	09:29 (3) 07:57		06:57 06:41	05:34 04:53	04:53 05:36	06:50 07:43				07:42	08:32	09:11 (3)
10 08:44	09:30 (3) 07:55		06:55 06:39	05:32 04:51	04:51 05:34	06:52 07:45				07:44	08:34	09:11 (3)
11 08:44	09:31 (3) 07:53		06:53 06:37	05:30 04:49	04:49 05:32	06:54 07:47				07:46	08:36	09:11 (3)
12 08:44	09:32 (3) 07:51		06:51 06:35	05:28 04:47	04:47 05:30	06:56 07:49				07:48	08:38	09:11 (3)
13 08:44	09:33 (3) 07:49		06:49 06:33	05:26 04:45	04:45 05:28	06:58 07:51				07:50	08:40	09:11 (3)
14 08:44	09:34 (3) 07:47		06:47 06:31	05:24 04:43	04:43 05:26	07:00 07:53				07:52	08:42	09:11 (3)
15 08:44	09:35 (3) 07:45		06:45 06:29	05:22 04:41	04:41 05:24	07:02 07:55				07:54	08:44	09:11 (3)
16 08:44	09:36 (3) 07:43		06:43 06:27	05:20 04:39	04:39 05:22	07:04 07:57				07:56	08:46	09:11 (3)
17 08:44	09:37 (3) 07:41		06:41 06:25	05:18 04:37	04:37 05:20	07:06 07:59				07:58	08:48	09:11 (3)
18 08:44	09:38 (3) 07:39		06:39 06:23	05:16 04:35	04:35 05:18	07:08 08:01				08:00	08:50	09:11 (3)
19 08:44	09:39 (3) 07:37		06:37 06:21	05:14 04:33	04:33 05:16	07:10 08:03				08:02	08:52	09:11 (3)
20 08:44	09:40 (3) 07:35		06:35 06:19	05:12 04:31	04:31 05:14	07:12 08:05				08:04	08:54	09:11 (3)
21 08:44	09:41 (3) 07:33		06:33 06:17	05:10 04:29	04:29 05:12	07:14 08:07				08:06	08:56	09:11 (3)
22 08:44	09:42 (3) 07:31		06:31 06:15	05:08 04:27	04:27 05:10	07:16 08:09				08:08	08:58	09:11 (3)
23 08:44	09:43 (3) 07:29		06:29 06:13	05:06 04:25	04:25 05:08	07:18 08:11				08:10	08:60	09:11 (3)
24 08:44	09:44 (3) 07:27		06:27 06:11	05:04 04:23	04:23 05:06	07:20 08:13				08:12	08:62	09:11 (3)
25 08:44	09:45 (3) 07:25		06:25 06:09	05:02 04:21	04:21 05:04	07:22 08:15				08:14	08:64	09:11 (3)
26 08:44	09:46 (3) 07:23		06:23 06:07	05:00 04:19	04:19 05:02	07:24 08:17				08:16	08:66	09:11 (3)
27 08:44	09:47 (3) 07:21		06:21 06:05	04:58 04:17	04:17 05:00	07:26 08:19				08:18	08:68	09:11 (3)
28 08:44	09:48 (3) 07:19		06:19 06:03	04:56 04:15	04:15 04:58	07:28 08:21				08:20	08:70	09:11 (3)
29 08:44	09:49 (3) 07:17		06:17 06:01	04:54 04:13	04:13 04:56	07:30 08:23				08:22	08:72	09:11 (3)
30 08:44	09:50 (3) 07:15		06:15 05:59	04:52 04:11	04:11 04:54	07:32 08:25				08:24	08:74	09:11 (3)
31 08:44	09:51 (3) 07:13		06:13 05:57	04:50 04:09	04:09 04:52	07:34 08:27				08:26	08:76	09:11 (3)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	1026	203								208	321	2133
Sun reduction	0.24	0.23								0.29	0.27	0.21
Oper. time red.	1.00	1.00								1.00	1.00	1.00
Wind dir. red.	0.60	0.64								0.64	0.60	0.60
Total reduction	0.15	0.15								0.19	0.16	0.12
Total, real	149	30								39	51	264

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BD - H56

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	09:27 (3) 11:27 (1)	08:14 17:06	07:16 18:02	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	09:28 (3) 11:28 (1)	08:12 17:08	07:14 18:04	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:11
3	08:44 16:17	09:29 (3) 11:27 (1)	08:10 17:10	07:12 18:06	05:56 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	09:29 (3) 11:28 (1)	08:09 17:12	07:09 18:08	05:54 20:56	05:46 21:01	05:00 21:49	05:01 21:59	05:44 20:11	06:38 18:57	07:32 16:48	08:24 16:08
5	08:43 16:20	09:29 (3) 11:28 (1)	08:07 17:14	07:07 18:10	05:44 20:58	05:44 21:50	05:02 21:58	05:45 21:18	05:45 20:09	06:40 18:55	07:33 16:46	08:25 16:07
6	08:43 16:21	09:31 (3) 11:28 (1)	08:05 17:16	07:05 18:11	05:49 20:59	05:42 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	09:31 (3) 11:28 (1)	08:03 17:18	07:02 18:13	05:47 20:59	05:40 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	09:32 (3) 11:27 (1)	08:01 17:20	07:00 18:15	05:44 20:58	05:38 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	09:34 (3) 11:28 (1)	07:59 17:22	06:57 18:17	05:42 20:56	05:36 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:41 16:27	09:36 (3) 11:28 (1)	07:57 17:24	06:55 18:19	05:40 20:57	05:34 21:52	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	09:37 (3) 11:27 (1)	07:55 17:26	06:53 18:21	05:37 20:59	05:33 21:53	05:08 21:56	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	09:40 (3) 11:27 (1)	07:53 17:28	06:50 18:23	05:35 20:21	05:31 21:15	05:09 21:56	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	10:53 (1) 11:26 (1)	07:51 17:30	06:48 18:25	05:32 20:22	05:29 21:17	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	10:55 (1) 11:26 (1)	07:49 17:32	06:45 18:18 (2)	05:27 20:24	05:55 21:19	05:12 21:58	06:01 21:51	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	10:56 (1) 11:25 (1)	07:47 17:34	06:43 18:19 (2)	05:26 20:26	05:55 21:20	05:13 21:58	06:03 21:50	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:07
16	08:36 16:36	10:58 (1) 11:24 (1)	07:45 17:36	06:41 18:20 (2)	05:24 20:28	05:54 21:22	05:14 21:59	06:05 21:49	06:59 19:42	07:54 18:28	07:53 16:28	08:38 16:05
17	08:35 16:38	10:59 (1) 11:22 (1)	07:43 17:38	06:38 18:21 (2)	05:22 20:30	05:54 21:24	05:16 21:59	06:06 21:48	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	11:02 (1) 11:21 (1)	07:41 17:40	06:36 18:22 (2)	05:21 20:32	05:51 21:25	05:17 22:00	06:08 21:46	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	11:05 (1) 11:18 (1)	07:39 17:42	06:33 18:21 (2)	05:19 20:33	05:19 21:27	05:18 22:00	06:10 21:45	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	11:18 (1) 17:44	07:37 17:44	06:31 18:21 (2)	05:18 20:35	05:18 21:28	05:20 22:00	06:12 21:44	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	17:44 17:46	07:34 17:46	06:28 18:21 (2)	05:16 20:37	05:16 21:30	05:21 22:01	06:13 21:42	07:08 19:29	08:03 18:18	08:02 16:20	08:41 16:06
22	08:29 16:47	17:46 17:48	07:32 17:48	06:26 18:20 (2)	05:15 20:39	05:15 21:31	05:23 22:01	06:15 21:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	17:50 17:52	07:30 17:50	06:23 18:20 (2)	05:13 20:41	05:13 21:33	05:24 22:01	06:17 21:40	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	17:52 17:55	07:28 17:52	06:21 18:19 (2)	05:12 20:43	05:12 21:35	05:26 22:01	06:19 21:38	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	17:55 17:57	07:25 17:55	06:18 18:18 (2)	05:11 20:45	05:11 21:36	05:27 22:01	06:21 21:37	07:15 19:19	08:09 18:11	08:09 16:16	08:43 16:08
26	08:23 16:54	17:56 17:58	07:23 17:56	06:16 18:16 (2)	05:09 20:46	05:09 21:37	05:29 22:01	06:22 21:35	07:17 19:17	08:11 18:13	08:11 16:15	08:44 16:09
27	08:22 16:56	17:58 17:59	07:21 17:58	06:14 18:14 (2)	05:08 20:48	05:08 21:39	05:31 22:01	06:24 21:33	07:19 19:15	08:13 18:14	08:13 16:14	08:44 16:10
28	08:20 16:58	18:00 18:00	07:19 18:00	06:11 18:06 (2)	05:58 20:50	05:58 21:40	05:32 22:01	06:26 21:32	07:21 19:12	08:15 18:12	08:15 16:13	08:44 16:11
29	08:19 17:00	18:01 18:01	07:17 18:01	06:09 18:09 (2)	05:56 20:52	05:56 21:42	05:34 22:01	06:28 21:30	07:23 19:10	08:19 18:12	08:19 16:12	08:44 16:12
30	08:17 17:02	18:02 18:02	07:15 18:02	06:07 18:07 (2)	05:54 20:54	05:54 21:43	05:35 22:01	06:29 21:28	07:24 19:07	08:20 18:11	08:20 16:11	08:44 16:12
31	08:15 17:04	18:03 18:03	07:13 18:03	06:05 18:05 (2)	05:52 20:52	05:52 21:44	05:37 22:01	06:31 21:27	07:22 19:07	08:21 18:12	08:21 16:13	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	858	220										2030
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.60	0.64										0.60
Total reduction	0.15	0.15										0.12
Total, real	125	33										252

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BE - H57

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	08:14			07:16		07:41 (1)	07:01	05:52		05:03	04:59	05:39	06:33	07:26			08:25 (1)	07:24		08:19			
	16:15	17:06			18:02	19	08:00 (1)	20:00	20:56		21:45	22:00	21:25	20:18	19:05		3	08:28 (1)	16:54		16:10			
2	08:44	08:12			07:14		07:39 (1)	06:59	05:50		05:02	05:00	05:40	06:35	07:28			08:19 (1)	07:26		08:21			
	16:16	17:08			18:04	22	08:01 (1)	20:02	20:57		21:47	22:00	21:23	20:16	19:02		12	08:31 (1)	16:52		16:09			
3	08:44	08:10			07:12		07:37 (1)	06:56	05:48		05:01	05:00	05:42	06:37	07:30			08:17 (1)	07:28		08:22			
	16:17	17:10			18:06	24	08:01 (1)	20:04	20:59		21:48	21:59	21:21	20:14	19:00		16	08:33 (1)	16:50		16:09			
4	08:43	08:09			07:09		07:37 (1)	06:54	05:46		05:00	05:01	05:44	06:38	07:32			08:15 (1)	07:30		08:24			
	16:18	17:12			18:08	24	08:01 (1)	20:06	21:01		21:49	21:59	21:19	20:11	18:57		19	08:34 (1)	16:48		16:08			
5	08:43	08:07			07:07		07:36 (1)	06:52	05:44		04:59	05:02	05:46	06:40	07:33			08:14 (1)	07:32		08:25			
	16:20	17:14			18:10	24	08:00 (1)	20:08	21:03		21:50	21:58	21:18	20:09	18:55		21	08:35 (1)	16:46		16:07			
6	08:43	08:05			07:05		07:36 (1)	06:49	05:42		04:59	05:03	05:47	06:42	07:35			08:13 (1)	07:34		08:27			
	16:21	17:16			18:12	24	08:00 (1)	20:10	21:05		21:51	21:58	21:16	20:06	18:53		23	08:36 (1)	16:45		16:07			
7	08:42	08:03			07:02		07:37 (1)	06:47	05:40		04:58	05:04	05:49	06:44	07:37			08:12 (1)	07:36		08:28			
	16:22	17:18			18:13	23	08:00 (1)	20:11	21:06		21:52	21:57	21:14	20:04	18:50		24	08:36 (1)	16:43		16:06			
8	08:42	08:01			07:00		07:37 (1)	06:44	05:38		04:57	05:05	05:51	06:45	07:39			08:12 (1)	07:38		08:29			
	16:24	17:20			18:15	22	07:59 (1)	20:13	21:08		21:53	21:56	21:12	20:02	18:48		24	08:36 (1)	16:41		16:06			
9	08:41	07:59			06:58		07:38 (1)	06:42	05:36		04:57	05:06	05:52	06:47	07:41			08:11 (1)	07:40		08:30			
	16:25	17:22			18:17	20	07:58 (1)	20:15	21:10		21:54	21:56	21:10	19:59	18:45		24	08:35 (1)	16:39		16:06			
10	08:41	07:57			06:55		07:38 (1)	06:40	05:35		04:56	05:07	05:54	06:49	07:43			08:11 (1)	07:42		08:32			
	16:27	17:24			18:19	18	07:56 (1)	20:17	21:12		21:55	21:55	21:08	19:57	18:43		24	08:35 (1)	16:37		16:05			
11	08:40	07:55			06:53		07:40 (1)	06:37	05:33		04:56	05:08	05:56	06:51	07:44			08:11 (1)	07:44		08:33			
	16:28	17:26			18:21	14	07:54 (1)	20:19	21:13		21:56	21:54	21:06	19:54	18:41		23	08:34 (1)	16:36		16:05			
12	08:39	07:53			06:50		07:42 (1)	06:35	05:31		04:56	05:09	05:58	06:52	07:46			08:13 (1)	07:46		08:34			
	16:30	17:28			18:23	8	07:50 (1)	20:21	21:15		21:56	21:53	21:04	19:52	18:38		21	08:34 (1)	16:34		16:05			
13	08:38	07:51			06:48			06:32	05:29		04:55	05:11	05:59	06:54	07:48			08:15 (1)	07:48		08:35			
	16:31	17:30			18:25			20:22	21:17		21:57	21:52	21:02	19:49	18:36		18	08:33 (1)	16:32		16:05			
14	08:37	07:49			06:45			06:30	05:27		04:55	05:12	06:01	06:56	07:50			08:17 (1)	07:50		08:36			
	16:33	17:32			18:27			20:24	21:19		21:58	21:51	20:59	19:47	18:34		15	08:32 (1)	16:31		16:05			
15	08:37	07:47			06:43			06:28	05:26		04:55	05:13	06:03	06:58	07:52			08:19 (1)	07:51		08:37			
	16:35	17:34			18:29			20:26	21:20		21:58	21:50	20:57	19:44	18:31		11	08:30 (1)	16:29		16:05			
16	08:36	07:45			06:41			06:25	05:24		04:55	05:14	06:05	06:59	07:54			08:21 (1)	07:53		08:38			
	16:36	17:36			18:31			20:28	21:22		21:59	21:49	20:55	19:42	18:29		7	08:28 (1)	16:28		16:05			
17	08:35	07:43			06:38			06:23	05:22		04:54	05:16	06:06	07:01	07:56				07:55		08:39			
	16:38	17:38			18:32			20:30	21:24		21:59	21:48	20:53	19:39	18:27				16:26		16:05			
18	08:34	07:41			06:36			06:21	05:21		04:54	05:17	06:08	07:03	07:58				07:57		08:39			
	16:40	17:40			18:34			20:32	21:25		22:00	21:46	20:51	19:37	18:24				16:25		16:05			
19	08:32	07:39			06:33			06:19	05:19		04:54	05:19	06:10	07:05	07:59				07:59		08:40			
	16:42	17:42			18:36			20:34	21:27		22:00	21:45	20:49	19:34	18:22				16:23		16:05			
20	08:31	07:37			06:31			06:16	05:18		04:54	05:20	06:12	07:07	08:01				08:01		08:41			
	16:43	17:44			18:38			20:35	21:28		22:01	21:44	20:46	19:32	18:20				16:22		16:06			
21	08:30	07:34			06:28			06:14	05:16		04:55	05:21	06:14	07:08	08:03				08:02		08:41			
	16:45	17:46			18:40			20:37	21:30		22:01	21:42	20:44	19:29	18:18				16:21		16:06			
22	08:29	07:32			06:26			06:12	05:15		04:55	05:23	06:15	07:10	08:05				08:04		08:42			
	16:47	17:48			18:42			20:39	21:32		22:01	21:41	20:42	19:27	18:15				16:19		16:07			
23	08:27	07:30			06:23			06:09	05:13		04:55	05:24	06:17	07:12	08:07				08:06		08:42			
	16:49	17:50			18:44			20:41	21:33		22:01	21:40	20:40	19:24	18:13				16:18		16:07			
24	08:26	07:28			06:21			06:07	05:12		04:55	05:26	06:19	07:14	08:09				08:08		08:43			
	16:51	17:52			18:45			20:43	21:35		22:01	21:38	20:37	19:22	18:11				16:17		16:08			
25	08:25	07:26		07:50 (1)	06:19			06:05	05:11		04:56	05:27	06:21	07:15	07:11				08:10		08:43			
	16:53	17:54	3	07:53 (1)	18:47			20:45	21:36		22:01	21:37	20:35	19:20	17:09				16:16		16:08			
26	08:23	07:23		07:48 (1)	06:16			06:03	05:09		04:56	05:29	06:22	07:17	07:13				08:11		08:44			
	16:54	17:56	8	07:56 (1)	18:49			20:46	21:37		22:01	21:35	20:33	19:17	17:07				16:15		16:09			
27	08:22	07:21		07:46 (1)	06:14			06:01	05:08		04:57	05:31	06:24	07:19	07:15				08:13		08:44			
	16:56	17:58	12	07:58 (1)	18:51			20:48	21:39		22:01	21:33	20:30	19:15	17:05				16:14		16:10			
28	08:20	07:19		07:43 (1)	06:11			05:59	05:07		04:57	05:32	06:26	07:21	07:17				08:15		08:44			
	16:58	18:00	16	07:59 (1)	18:53			20:50	21:40		22:01	21:32	20:28	19:12	17:02				16:13		16:11			
29	08:19				07:09			05:56	05:06		04:58	05:34	06:28	07:23	07:19				08:16		08:44			
	17:00				19:55			20:52	21:42		22:01	21:30	20:26	19:10	17:00				16:12		16:12			
30	08:17				07:06			05:54	05:05		04:58	05:35	06:29	07:24	07:21				08:18		08:44			
	17:02				19:57			20:54	21:43		22:01	21:28	20:23	19:07	16:58				16:11		16:13			
31	08:16				07:04				05:04			05:37	06:31		07:22						08:44			
	17:04				19:58				21:44			21:27	20:21		16:56						16:14			
Potential sun hours	250	273			367			420	494		510	512	460	382	328				259		233			
Total, worst case					242										285									
Sun reduction			0.23		0.27										0.29									
Oper. time red.			1.00		1.00										1.00									
Wind dir. red.					0.65										0.65									
Total reduction			0.15		0.18										0.19									
Total, real		6			43										54									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BF - H58

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	07:34 (1) 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:34 (1) 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	11 08:26 (1) 18:55	16:48 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:34 (1) 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	15 08:28 (1) 18:53	16:46 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:35 (1) 18:13	06:47 20:11	05:40 21:06	04:58 21:57	05:04 21:57	05:49 21:14	06:44 20:04	17 08:29 (1) 18:50	16:45 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:35 (1) 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	19 08:30 (1) 18:48	16:43 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:37 (1) 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	20 08:31 (1) 18:45	16:41 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:39 (1) 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	21 08:32 (1) 18:43	16:40 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:46 (1) 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	22 08:33 (1) 18:41	16:39 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:46 (1) 18:23	06:35 20:21	05:31 21:15	04:56 21:53	05:09 21:53	05:58 21:04	06:52 19:52	18 08:34 (1) 18:38	16:36 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:46 (1) 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	16 08:35 (1) 18:36	16:34 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	07:46 (1) 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	13 08:36 (1) 18:34	16:32 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	07:46 (1) 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	10 08:37 (1) 18:31	16:31 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	07:46 (1) 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	6 08:38 (1) 18:29	16:30 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	07:46 (1) 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	2 08:39 (1) 18:27	16:29 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	07:46 (1) 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	18 08:40 (1) 18:24	16:28 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	07:46 (1) 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	17 08:41 (1) 18:22	16:27 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	07:46 (1) 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	16 08:42 (1) 18:20	16:26 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	07:46 (1) 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	15 08:43 (1) 18:18	16:25 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	07:46 (1) 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	14 08:44 (1) 18:15	16:24 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	07:46 (1) 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	13 08:45 (1) 18:13	16:23 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	07:46 (1) 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	12 08:46 (1) 18:11	16:22 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	07:46 (1) 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	11 08:47 (1) 18:10	16:21 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	07:46 (1) 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	10 08:48 (1) 18:09	16:20 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	07:46 (1) 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	9 08:49 (1) 18:07	16:19 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	07:46 (1) 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	8 08:50 (1) 18:05	16:18 16:11
29	08:19 17:00		07:09 19:55	07:46 (1) 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	7 08:51 (1) 18:02	16:17 16:12
30	08:17 17:02		07:06 19:57	07:46 (1) 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	6 08:52 (1) 18:00	16:16 16:13
31	08:16 17:04		07:04 19:58	07:46 (1) 19:58	05:54 21:44	05:04 21:44	04:57 21:27	05:37 20:21	06:31 19:07	07:25 18:00	5 08:53 (1) 17:59	16:15 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		23	167							188		
Sun reduction		0.23	0.27							1.00		
Oper. time red.		1.00	1.00							0.29		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		3	29							36		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BG - H59

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	07:12	07:36 (1)	06:57	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
4	08:44	08:09	07:09	07:35 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08	18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:08
5	08:43	08:07	07:07	07:35 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:34	08:25
	16:20	17:14	18:10	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05	07:05	07:37 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12	18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03	07:02	07:38 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01	07:00	07:41 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:06
9	08:41	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30	08:31
	16:25	17:22	18:17	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06
10	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:33	08:32
	16:27	17:24	18:19	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:35	08:33
	16:28	17:26	18:21	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
12	08:39	07:53	06:50	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:36	08:34
	16:30	17:28	18:23	18:23	20:21	21:15	21:58	21:53	21:04	19:52	18:38	16:05
13	08:38	07:51	06:48	06:33	05:29	04:55	05:11	05:59	06:54	07:48	08:38	08:35
	16:31	17:30	18:25	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:05
14	08:38	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:40	08:36
	16:33	17:32	18:27	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05
15	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:41	08:37
	16:35	17:34	18:29	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
16	08:36	07:45	06:41	06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:43	08:38
	16:36	17:36	18:31	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:45	08:39
	16:38	17:38	18:32	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
18	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:46	08:39
	16:40	17:40	18:34	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:47	08:40
	16:42	17:42	18:36	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:05
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:49	08:41
	16:43	17:44	18:38	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:06
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:50	08:41
	16:45	17:46	18:40	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:51	08:42
	16:47	17:48	18:42	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:07
23	08:27	07:30	06:23	06:10	05:13	04:55	05:24	06:17	07:12	08:07	08:53	08:43
	16:49	17:50	18:44	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:07
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:55	08:43
	16:51	17:52	18:45	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:08
25	08:25	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:56	08:43
	16:53	17:54	18:47	18:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09	16:08
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:12	08:58	08:44
	16:54	17:56	18:49	18:49	20:46	21:38	22:01	21:35	20:33	19:17	18:07	16:09
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:14	09:00	08:44
	16:56	17:58	18:51	18:51	20:48	21:39	22:01	21:34	20:30	19:15	18:05	16:10
28	08:20	07:19	06:11	06:07	05:07	04:57	05:32	06:26	07:21	08:16	09:02	08:44
	16:58	18:00	18:53	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:11
29	08:19		06:09	06:05	05:06	04:58	05:34	06:28	07:23	08:18	09:04	08:44
	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:12	16:12
30	08:17		06:06	05:54	05:05	04:58	05:35	06:29	07:24	08:19	09:05	08:44
	17:02		19:57	20:54	21:43	22:01	21:29	20:23	19:07	18:00	16:13	16:13
31	08:16		06:04	06:04	05:04	04:57	05:37	06:31	07:26	08:21	09:06	08:44
	17:04		19:58	21:44	22:33	23:22	22:27	20:21	19:16	18:11	17:06	16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		24	111							135		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		4	20							26		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BH - H60

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02		07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18		07:26 19:05		07:59 (1) 08:17 (1)	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04		06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16		07:28 19:02	18	07:57 (1) 08:17 (1)	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06		06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14		07:30 19:00	20	07:56 (1) 08:17 (1)	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08		07:34 (1) 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11		07:32 18:57	21	07:58 (1) 08:17 (1)	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	3	07:31 (1) 20:08	05:52 21:03	05:04 21:50	05:02 21:58	05:46 21:18	06:40 20:09		07:33 18:55	19	08:00 (1) 08:17 (1)	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	7	07:29 (1) 20:10	05:49 21:05	05:04 21:51	05:03 21:58	05:47 21:16	06:42 20:06		07:35 18:53	17	08:02 (1) 08:16 (1)	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	10	07:27 (1) 20:11	05:40 21:06	05:04 21:52	05:04 21:57	05:49 21:14	06:44 20:04		07:37 18:50	14	08:04 (1) 08:15 (1)	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	13	07:24 (1) 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02		07:39 18:48	11	08:06 (1) 08:14 (1)	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	15	07:22 (1) 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59		07:41 18:45	8	08:07 (1) 08:12 (1)	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	18	07:19 (1) 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57		07:43 18:43	5	08:09 (1) 08:10 (1)	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	20	07:19 (1) 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54		07:45 18:41	1		07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	20	07:18 (1) 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52		07:46 18:38			07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	19	07:17 (1) 20:22	05:30 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49		07:48 18:36			07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	17	07:20 (1) 20:24	05:29 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47		07:50 18:34			07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	14	07:22 (1) 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44		07:52 18:31			07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	10	07:32 (1) 20:28	05:25 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42		07:54 18:29			07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32		06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39		07:56 18:27			07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34		06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37		07:58 18:24			07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34		07:59 18:22			07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32		08:01 18:20			08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29		08:03 18:18			08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27		08:05 18:15			08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44		06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24		08:07 18:13			08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22		08:09 18:11			08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20		08:11 18:09			08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49		06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17		08:13 18:07			08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51		06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15		08:15 18:05			08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53		05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12		08:17 18:02 (1)			08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55		05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10		08:19 08:00 (1)	8	08:02 (1) 08:15 (1)	07:19 16:10	08:44 16:12
30	08:17 17:02		07:06 19:57		05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07		08:21 08:16 (1)	13	08:00 (1) 08:16 (1)	07:21 16:58	08:44 16:13
31	08:16 17:04		07:04 19:58			05:04 21:44		05:37 21:27	06:31 20:21			07:23 16:56	16		07:23 16:56	08:44 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case				166						37		134				
Sun reduction				0.27						0.32		0.29				
Oper. time red.				1.00						1.00		1.00				
Wind dir. red.				0.65						0.65		0.65				
Total reduction				0.18						0.21		0.19				
Total, real				29						8		25				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BI - H61

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26	07:53 (1)	07:24	08:19	
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	14	08:07 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	11	08:05 (1)	16:52	16:09
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	8	08:04 (1)	16:50	16:09
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	5	08:03 (1)	16:48	16:08
5	08:43	08:07	07:07		06:52	05:44	04:59	05:02	05:46	06:40		07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10		20:08	21:03	21:50	21:58	21:18	20:09		18:55	2	08:02 (1)	16:46	16:07
6	08:43	08:05	07:05		06:49	05:42	04:59	05:03	05:47	06:42		07:35		07:34	08:27	
	16:21	17:16	18:12		20:10	21:05	21:51	21:58	21:16	20:06		18:53		16:45	16:07	
7	08:42	08:03	07:02		06:47	05:40	04:58	05:04	05:49	06:44		07:37		07:36	08:28	
	16:22	17:18	18:13		20:11	21:06	21:52	21:57	21:14	20:04		18:50		16:43	16:06	
8	08:42	08:01	07:00		06:44	05:38	04:57	05:05	05:51	06:45		07:39		07:38	08:29	
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:12	20:02		18:48		16:41	16:06	
9	08:41	07:59	06:58		06:42	05:36	04:57	05:06	05:52	06:47		07:41		07:40	08:31	
	16:25	17:22	18:17	4	07:26 (1)	20:15	21:10	21:54	21:10	19:59		18:45		16:39	16:06	
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43		07:42	08:32	
	16:27	17:24	18:19	7	07:26 (1)	20:17	21:12	21:55	21:08	19:57		18:43		16:37	16:05	
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:45		07:44	08:33	
	16:28	17:26	18:21	10	07:27 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	16:05	
12	08:39	07:53	06:50		07:14 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46		07:46	08:34	
	16:30	17:28	18:23	13	07:27 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	16:05	
13	08:38	07:51	06:48		07:12 (1)	06:33	05:29	04:55	05:11	05:59	06:54	07:48		07:48	08:35	
	16:31	17:30	18:25	15	07:27 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36		16:32	16:05	
14	08:37	07:49	06:45		07:09 (1)	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:50	08:36	
	16:33	17:32	18:27	17	07:26 (1)	20:24	21:19	21:58	21:51	20:59	19:47	18:34		16:31	16:05	
15	08:37	07:47	06:43		07:07 (1)	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51	08:37	
	16:35	17:34	18:29	19	07:26 (1)	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	16:05	
16	08:36	07:45	06:41		07:06 (1)	06:25	05:24	04:55	05:15	06:05	07:00	07:54		07:53	08:38	
	16:36	17:36	18:31	19	07:25 (1)	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28	16:05	
17	08:35	07:43	06:38		07:07 (1)	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55	08:39	
	16:38	17:38	18:32	17	07:24 (1)	20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26	16:05	
18	08:34	07:41	06:36		07:07 (1)	06:21	05:21	04:54	05:17	06:08	07:03	07:58		07:57	08:39	
	16:40	17:40	18:34	15	07:22 (1)	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25	16:05	
19	08:32	07:39	06:33		07:09 (1)	06:19	05:19	04:54	05:19	06:10	07:05	07:59		07:59	08:40	
	16:42	17:42	18:36	11	07:20 (1)	20:34	21:27	22:00	21:45	20:49	19:34	18:22		16:23	16:05	
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01		08:01	08:41	
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20		16:22	16:06	
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03		08:02	08:41	
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18		16:21	16:06	
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05		08:04	08:42	
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15		16:19	16:07	
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07		08:06	08:43	
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13		16:18	16:07	
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09		08:08	08:43	
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	9	08:03 (1)	18:11	16:17	16:08	
25	08:25	07:26	06:19		06:05	05:11	04:56	05:28	06:21	07:15		07:52 (1)	07:11	08:10	08:43	
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	13	08:05 (1)	17:09	16:16	16:08	
26	08:23	07:23	06:16		06:03	05:10	04:56	05:29	06:22	07:17		07:49 (1)	07:13	08:11	08:44	
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	16	08:05 (1)	17:07	16:15	16:09	
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:48 (1)	07:15	08:13	08:44	
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	18	08:06 (1)	17:05	16:14	16:10	
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:47 (1)	07:17	08:15	08:44	
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	20	08:07 (1)	17:02	16:13	16:11	
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:49 (1)	07:19	08:16	08:44	
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	18	08:07 (1)	17:00	16:12	16:12	
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		07:51 (1)	07:21	08:18	08:44	
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	16	08:07 (1)	16:58	16:11	16:13	
31	08:16		07:04			05:04		05:37	06:31			07:23			08:44	
	17:04		19:58			21:44		21:27	20:21			16:56			16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case			147							110		40				
Sun reduction			0.27							0.32		0.29				
Oper. time red.			1.00							1.00		1.00				
Wind dir. red.			0.66							0.66		0.66				
Total reduction			0.18							0.21		0.19				
Total, real			26							23		8				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BJ - H62

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:41 (3)	07:01	07:25 (2)
	16:15	17:06	18:02	8 07:49 (3)	20:00	1 07:26 (2)
2	08:44	08:12	07:14	07:39 (3)	06:59	07:23 (2)
	16:16	17:08	18:04	11 07:50 (3)	20:02	4 07:27 (2)
3	08:44	08:10	07:12	07:36 (3)	06:56	07:20 (2)
	16:17	17:10	18:06	14 07:50 (3)	20:04	16 07:36 (1)
4	08:43	08:09	07:09	07:34 (3)	06:54	07:18 (2)
	16:18	17:12	18:08	16 07:50 (3)	20:06	22 07:40 (1)
5	08:43	08:07	07:07	07:31 (3)	06:52	07:15 (2)
	16:20	17:14	18:10	18 07:49 (3)	20:08	26 07:41 (1)
6	08:43	08:05	07:05	07:29 (3)	06:49	07:13 (2)
	16:21	17:16	18:11	20 07:49 (3)	20:09	30 07:43 (1)
7	08:42	08:03	07:02	07:26 (3)	06:47	07:11 (2)
	16:22	17:18	18:13	22 07:48 (3)	20:11	34 07:45 (1)
8	08:42	08:01	07:00	07:26 (3)	06:44	07:08 (2)
	16:24	17:20	18:15	21 07:47 (3)	20:13	37 07:45 (1)
9	08:41	07:59	06:57	07:27 (3)	06:42	07:06 (1)
	16:25	17:22	18:17	20 07:47 (3)	20:15	41 07:47 (1)
10	08:41	07:57	06:55	07:28 (3)	06:40	07:04 (1)
	16:27	17:24	18:19	16 07:44 (3)	20:17	43 07:47 (1)
11	08:40	07:55	06:53	07:30 (3)	06:37	07:03 (1)
	16:28	17:26	18:21	12 07:42 (3)	20:19	45 07:48 (1)
12	08:39	07:53	06:50	07:34 (3)	06:35	07:03 (1)
	16:30	17:28	18:23	3 07:37 (3)	20:21	45 07:48 (1)
13	08:38	07:51	06:48		06:32	07:02 (1)
	16:31	17:30	18:25		20:22	47 07:49 (1)
14	08:37	07:49	06:45		06:30	07:01 (1)
	16:33	17:32	18:27		20:24	47 07:48 (1)
15	08:36	07:47	06:43		06:28	07:00 (1)
	16:35	17:34	18:29		20:26	49 07:49 (1)
16	08:36	07:45	06:41		06:25	07:00 (1)
	16:36	17:36	18:30		20:28	49 07:49 (1)
17	08:35	07:43	06:38		06:23	06:59 (1)
	16:38	17:38	18:32		20:30	49 07:48 (1)
18	08:33	07:41	06:36		06:21	06:59 (1)
	16:40	17:40	18:34		20:32	49 07:48 (1)
19	08:32	07:39	06:33		06:18	06:59 (1)
	16:41	17:42	18:36		20:33	49 07:48 (1)
20	08:31	07:37	06:31		06:16	06:59 (1)
	16:43	17:44	18:38		20:35	49 07:48 (1)
21	08:30	07:34	06:28		06:14	06:59 (1)
	16:45	17:46	18:40		20:37	49 07:48 (1)
22	08:29	07:32	06:26		06:12	06:58 (1)
	16:47	17:48	18:42		20:39	48 07:46 (1)
23	08:27	07:30	06:23		06:09	06:58 (1)
	16:49	17:50	18:44		20:41	48 07:46 (1)
24	08:26	07:28	06:21		06:07	06:59 (1)
	16:51	17:52	18:45		20:43	47 07:46 (1)
25	08:25	07:25	06:18		06:05	06:59 (1)
	16:53	17:54	18:47		20:45	46 07:45 (1)
26	08:23	07:23	06:16		06:03	06:59 (1)
	16:54	17:56	18:49		20:46	45 07:44 (1)
27	08:22	07:21	07:46 (3)	06:14	06:01	07:00 (1)
	16:56	17:58	2 07:48 (3)	18:51	20:48	43 07:43 (1)
28	08:20	07:19	07:43 (3)	06:11	05:59	07:00 (1)
	16:58	18:00	5 07:48 (3)	18:53	20:50	42 07:42 (1)
29	08:19			07:09	05:56	07:01 (1)
	17:00			19:55	20:52	40 07:41 (1)
30	08:17			07:06	05:54	07:02 (1)
	17:02			19:57	20:54	38 07:40 (1)
31	08:15			07:04		
	17:04			19:58		
Potential sun hours	250	273	367	420	494	510
Total, worst case		7	181	1178	183	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.65	0.67	0.67	
Total reduction		0.15	0.18	0.24	0.26	
Total, real		1	32	280	47	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BJ - H62

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:02 (1) 07:46 (1)	07:26 19:05	07:24 16:54
2	05:00 22:00	05:40 21:23	06:35 20:16	07:03 (1) 07:46 (1)	07:28 19:02	08:09 (3) 16:52
3	05:00 21:59	05:42 21:21	06:37 20:14	07:04 (1) 07:45 (1)	07:30 19:00	08:07 (3) 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	07:05 (2) 07:42 (1)	07:32 18:57	08:05 (3) 16:48
5	05:02 21:58	05:46 21:18	07:28 (1) 07:32 (1)	06:40 20:09	07:33 18:55	08:04 (3) 16:46
6	05:03 21:58	05:47 21:16	07:22 (1) 07:37 (1)	06:42 20:06	07:35 18:53	08:03 (3) 16:45
7	05:04 21:57	05:49 21:14	07:19 (1) 07:40 (1)	06:44 20:04	07:37 18:50	08:04 (3) 16:43
8	05:05 21:56	05:51 21:12	07:17 (1) 07:42 (1)	06:45 20:01	07:39 18:48	08:05 (3) 16:41
9	05:06 21:56	05:52 21:10	07:15 (1) 07:44 (1)	06:47 19:59	07:41 18:45	08:07 (3) 16:39
10	05:07 21:55	05:54 21:08	07:14 (1) 07:46 (1)	06:49 19:57	07:43 18:43	08:09 (3) 16:37
11	05:08 21:54	05:56 21:06	07:12 (1) 07:46 (1)	06:51 19:54	07:44 18:41	08:11 (3) 16:36
12	05:09 21:53	05:58 21:04	07:11 (1) 07:48 (1)	06:52 19:52	07:46 18:38	08:13 (3) 16:34
13	05:11 21:52	05:59 21:01	07:10 (1) 07:49 (1)	06:54 19:49	07:48 18:36	08:15 (3) 16:32
14	05:12 21:51	06:01 20:59	07:08 (1) 07:49 (1)	06:56 19:47	07:50 18:34	08:22 (3) 16:31
15	05:13 21:50	06:03 20:57	07:08 (1) 07:50 (1)	06:58 19:44	07:52 18:31	08:21 (3) 16:29
16	05:14 21:49	06:05 20:55	07:06 (1) 07:50 (1)	06:59 19:42	07:54 18:29	08:24 (3) 16:28
17	05:16 21:48	06:06 20:53	07:06 (1) 07:51 (1)	07:01 19:39	07:56 18:27	08:25 (3) 16:26
18	05:17 21:46	06:08 20:51	07:05 (1) 07:52 (1)	07:03 19:37	07:58 18:24	08:26 (3) 16:25
19	05:19 21:45	06:10 20:48	07:04 (1) 07:51 (1)	07:05 19:34	07:59 18:22	08:27 (3) 16:23
20	05:20 21:44	06:12 20:46	07:04 (1) 07:52 (1)	07:07 19:32	08:01 18:20	08:28 (3) 16:22
21	05:21 21:42	06:13 20:44	07:04 (1) 07:52 (1)	07:08 19:29	08:03 18:18	08:29 (3) 16:21
22	05:23 21:41	06:15 20:42	07:03 (1) 07:52 (1)	07:10 19:27	08:05 18:15	08:30 (3) 16:19
23	05:24 21:40	06:17 20:39	07:02 (1) 07:52 (1)	07:12 19:24	08:07 18:13	08:31 (3) 16:18
24	05:26 21:38	06:19 20:37	07:02 (1) 07:52 (1)	07:14 19:22	08:09 18:11	08:32 (3) 16:17
25	05:27 21:37	06:21 20:35	07:02 (1) 07:51 (1)	07:15 19:19	07:11 17:09	08:33 (3) 16:16
26	05:29 21:35	06:22 20:33	07:02 (1) 07:51 (1)	07:17 19:17	07:13 17:07	08:34 (3) 16:15
27	05:31 21:33	06:24 20:30	07:02 (1) 07:51 (1)	07:19 19:15	07:15 17:05	08:35 (3) 16:14
28	05:32 21:32	06:26 20:28	07:02 (1) 07:51 (1)	07:21 19:12	07:17 17:02	08:36 (3) 16:13
29	05:34 21:30	06:28 20:26	07:02 (1) 07:49 (1)	07:23 19:10	07:19 17:00	08:37 (3) 16:12
30	05:35 21:28	06:29 20:23	07:02 (1) 07:49 (1)	07:24 19:07	07:20 16:58	08:38 (3) 16:11
31	05:37 21:27	06:31 20:21	07:03 (1) 07:48 (1)	07:22 19:05	07:22 16:56	08:39 (3) 16:10
Potential sun hours	512	460	382	328	259	233
Total, worst case		1082		306	191	
Sun reduction		0.34		0.32	0.29	
Oper. time red.		1.00		1.00	1.00	
Wind dir. red.		0.67		0.67	0.65	
Total reduction		0.23		0.22	0.19	
Total, real		249		66	36	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BK - H63

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	05:50 (1) 05:57 (1)	04:59 22:00	05:39 21:25	06:09 (1) 06:10 (1)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47		05:00 22:00	05:41 21:23		06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48		05:01 21:59	05:42 21:21		06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49		05:01 21:59	05:44 21:19		06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50		05:02 21:58	05:46 21:18		06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51		05:03 21:58	05:47 21:16		06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52		05:04 21:57	05:49 21:14		06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53		05:05 21:56	05:51 21:12		06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54		05:06 21:56	05:52 21:10		06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55		05:07 21:55	05:54 21:08		06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56		05:08 21:54	05:59 (1) 06:03 (1)		06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:58 (1) 06:00 (1)	05:10 21:53	05:57 (1) 06:05 (1)	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:57 (1) 06:02 (1)	05:11 21:52	05:56 (1) 06:06 (1)	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:55 (1) 06:02 (1)	05:12 21:51	05:55 (1) 06:07 (1)	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:54 (1) 06:03 (1)	05:13 21:50	05:55 (1) 06:09 (1)	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:52 (1) 06:02 (1)	05:15 21:49	05:54 (1) 06:10 (1)	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:51 (1) 06:03 (1)	05:16 21:48	05:53 (1) 06:10 (1)	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:49 (1) 06:03 (1)	05:17 21:46	05:53 (1) 06:11 (1)	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:48 (1) 06:03 (1)	05:19 21:45	05:53 (1) 06:12 (1)	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:46 (1) 06:02 (1)	05:20 21:44	05:52 (1) 06:12 (1)	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:45 (1) 06:02 (1)	05:22 21:42	05:53 (1) 06:12 (1)	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:44 (1) 06:03 (1)	05:23 21:41	05:55 (1) 06:13 (1)	06:13 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:43 (1) 06:03 (1)	05:24 21:40	05:56 (1) 06:13 (1)	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:42 (1) 06:01 (1)	05:26 21:38	05:57 (1) 06:13 (1)	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:43 (1) 06:01 (1)	05:28 21:37	05:59 (1) 06:13 (1)	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:43 (1) 06:01 (1)	05:29 21:35	06:00 (1) 06:13 (1)	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:44 (1) 06:01 (1)	05:31 21:33	06:02 (1) 06:13 (1)	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:45 (1) 06:00 (1)	05:32 21:32	06:03 (1) 06:13 (1)	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:46 (1) 05:59 (1)	05:34 21:30	06:05 (1) 06:13 (1)	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:47 (1) 05:58 (1)	05:36 21:28	06:06 (1) 06:12 (1)	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:48 (1) 05:57 (1)	05:37 21:27	06:08 (1) 06:12 (1)	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510		512	460		382	328	259	233
Total, worst case					266	7		274	1					
Sun reduction					0.38	0.32		0.32	0.34					
Oper. time red.					1.00	1.00		1.00	1.00					
Wind dir. red.					0.66	0.66		0.66	0.66					
Total reduction					0.25	0.21		0.21	0.23					
Total, real					67	1		59	0					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BL - H64

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		09:20 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24				06:33	07:26	07:24				08:19	09:09 (1)	
	16:15	20	09:40 (1)	17:06	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54				20:18	19:05	16:54				16:10	15	09:24 (1)
2	08:44		09:21 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26				06:35	07:28	07:26				08:21	19	09:09 (1)
	16:16	20	09:41 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				20:16	19:02	16:52				16:09	16	09:25 (1)
3	08:44		09:22 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28				06:37	07:30	07:28				08:22	19	09:08 (1)
	16:17	19	09:41 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50				20:14	19:00	16:50				16:08	17	09:25 (1)
4	08:44		09:22 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30				06:38	07:32	07:30				08:24	19	09:09 (1)
	16:18	19	09:41 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:48				20:11	18:57	16:48				16:08	17	09:26 (1)
5	08:43		09:23 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32				06:40	07:33	07:32				08:25	19	09:08 (1)
	16:20	19	09:42 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46				20:09	18:55	16:46				16:07	19	09:27 (1)
6	08:43		09:23 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34				06:42	07:35	07:34				08:27	19	09:09 (1)
	16:21	19	09:42 (1)	17:16	18:11	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45				20:06	18:53	16:45				16:07	19	09:28 (1)
7	08:42		09:23 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36				06:44	07:37	07:36				08:28	19	09:09 (1)
	16:22	18	09:41 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				20:04	18:50	16:43				16:06	19	09:28 (1)
8	08:42		09:25 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38				06:45	07:39	07:38				08:29	19	09:10 (1)
	16:24	17	09:42 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:41				20:02	18:48	16:41				16:06	19	09:29 (1)
9	08:41		09:25 (1)	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				06:47	07:41	07:40				08:31	19	09:10 (1)
	16:25	17	09:42 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39				20:09	18:45	16:39				16:05	19	09:29 (1)
10	08:41		09:26 (1)	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42				06:49	07:43	07:42				08:32	19	09:10 (1)
	16:27	16	09:42 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37				20:08	18:43	16:37				16:05	20	09:30 (1)
11	08:40		09:27 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44				06:51	07:44	07:44				08:33	19	09:10 (1)
	16:28	15	09:42 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36				20:06	18:41	16:36				16:05	20	09:30 (1)
12	08:39		09:28 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46				06:52	07:46	07:46				08:34	19	09:11 (1)
	16:30	13	09:41 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34				20:04	18:38	16:34				16:05	20	09:31 (1)
13	08:38		09:29 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48				06:54	07:48	07:48				08:35	19	09:11 (1)
	16:31	11	09:40 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32				20:02	18:36	16:32				16:05	21	09:32 (1)
14	08:38		09:31 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50				06:56	07:50	07:50				08:36	19	09:12 (1)
	16:33	9	09:40 (1)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31				20:05	18:34	16:31				16:05	20	09:32 (1)
15	08:37		09:34 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51				06:58	07:52	07:51				08:37	19	09:13 (1)
	16:35	4	09:38 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				20:07	18:31	16:29				16:05	20	09:33 (1)
16	08:36			07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53				06:59	07:54	07:53				08:38	19	09:14 (1)
	16:36			17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28				20:06	18:29	16:28				16:05	19	09:33 (1)
17	08:35			07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55				06:59	07:01	07:56				08:39	19	09:14 (1)
	16:38			17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26				20:07	18:27	16:26				16:05	19	09:33 (1)
18	08:34			07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57				07:03	07:58	07:57				08:40	19	09:15 (1)
	16:40			17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25				20:08	18:24	16:25				16:05	19	09:34 (1)
19	08:32			07:39	06:33	06:18	05:19	04:54	05:19	06:10	07:05	07:59	07:59				07:05	07:59	07:59				08:40	19	09:16 (1)
	16:41			17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23				20:09	18:22	16:23				16:05	18	09:34 (1)
20	08:31			07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01				07:07	08:01	08:01				08:41	19	09:16 (1)
	16:43			17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22				20:10	18:20	16:22				16:06	18	09:34 (1)
21	08:30			07:34	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:02				07:08	08:03	08:02				08:42	19	09:17 (1)
	16:45			17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21				20:11	18:18	16:21				16:06	18	09:35 (1)
22	08:29			07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04				07:10	08:05	08:04				08:42	19	09:18 (1)
	16:47			17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19				20:12	18:15	16:19				16:07	18	09:36 (1)
23	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				07:12	08:07	08:06				08:43	19	09:18 (1)
	16:49			17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18				20:13	18:13	16:18				16:07	18	09:36 (1)
24	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08				07:14	08:09	08:08				08:43	19	09:18 (1)
	16:51			17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17				20:14	18:11	16:17				16:08	18	09:36 (1)
25	08:25			07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:10				07:15	08:11	08:10				08:43	19	09:19 (1)
	16:53			17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16				20:16	17:09	16:16				16:08	18	09:37 (1)
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11				07:17	08:13	08:11				08:44	19	09:19 (1)
	16:54			17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15				20:18	17:07	16:15				16:09	19	09:38 (1)
27	08:22			07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13				07:19	08:15	08:13			09:13 (1)	08:44	19	09:19 (1)
	16:56			17:58	18:51	20:48	21:39	22:01	21:34	20:30	19:15	17:05	16:14	3			20:16	17:05	16:14	3		09:16 (1)	16:10	19	09:38 (1)
28	08:20			07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:15				07:21	08:17	08:15			09:11 (1)	08:44	19	09:19 (1)
	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	9			20:13	17:02	16:1						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BM - H65

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:25 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24				06:33	07:26	07:24				08:19	09:17 (1)
	16:15	20	09:45 (1)	17:06	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54				06:35	07:28	07:26				16:10	9 09:26 (1)
2	08:44		09:26 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26				06:37	07:30	07:28				08:21	09:16 (1)
	16:16	19	09:45 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				06:37	07:30	07:28				16:09	12 09:28 (1)
3	08:44		09:27 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28				06:38	07:32	07:30				08:22	09:15 (1)
	16:17	19	09:46 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50				06:38	07:32	07:30				16:08	14 09:29 (1)
4	08:44		09:28 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30				06:40	07:33	07:32				08:24	09:15 (1)
	16:18	18	09:46 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:48				06:40	07:33	07:32				16:08	15 09:30 (1)
5	08:43		09:29 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32				06:42	07:35	07:34				08:25	09:15 (1)
	16:20	17	09:46 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46				06:42	07:35	07:34				16:07	16 09:31 (1)
6	08:43		09:29 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34				06:42	07:35	07:34				08:27	09:15 (1)
	16:21	17	09:46 (1)	17:16	18:11	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45				06:44	07:37	07:36				16:07	17 09:32 (1)
7	08:42		09:30 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36				06:44	07:37	07:36				08:28	09:15 (1)
	16:22	16	09:46 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				06:45	07:39	07:38				16:06	17 09:32 (1)
8	08:42		09:31 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38				06:45	07:39	07:38				08:29	09:16 (1)
	16:24	15	09:46 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41				06:45	07:39	07:38				16:06	18 09:34 (1)
9	08:41		09:32 (1)	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				06:47	07:41	07:40				08:31	09:16 (1)
	16:25	14	09:46 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39				06:47	07:41	07:40				16:05	18 09:34 (1)
10	08:41		09:33 (1)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42				06:49	07:43	07:42				08:32	09:15 (1)
	16:27	12	09:45 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37				06:49	07:43	07:42				16:05	19 09:34 (1)
11	08:40		09:34 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44				06:51	07:44	07:44				08:33	09:16 (1)
	16:28	10	09:44 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36				06:51	07:44	07:44				16:05	19 09:35 (1)
12	08:39		09:36 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46				06:52	07:46	07:46				08:34	09:17 (1)
	16:30	7	09:43 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34				06:52	07:46	07:46				16:05	19 09:36 (1)
13	08:38			07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48				06:54	07:48	07:48				08:35	09:17 (1)
	16:31			17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32				06:54	07:48	07:48				16:05	20 09:37 (1)
14	08:38			07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50				06:56	07:50	07:50				08:36	09:17 (1)
	16:33			17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31				06:56	07:50	07:50				16:05	20 09:37 (1)
15	08:37			07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51				06:58	07:52	07:51				08:37	09:18 (1)
	16:35			17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				06:58	07:52	07:51				16:05	20 09:38 (1)
16	08:36			07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53				06:59	07:54	07:53				08:38	09:18 (1)
	16:36			17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28				06:59	07:54	07:53				16:05	20 09:38 (1)
17	08:35			07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55				06:59	07:56	07:55				08:39	09:18 (1)
	16:38			17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26				06:59	07:56	07:55				16:05	20 09:38 (1)
18	08:34			07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57				06:59	07:58	07:57				08:39	09:18 (1)
	16:40			17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25				06:59	07:58	07:57				16:05	21 09:39 (1)
19	08:32			07:39	06:33	06:18	05:19	04:54	05:19	06:10	07:05	07:59	07:59				06:59	07:59	07:59				08:40	09:19 (1)
	16:41			17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23				06:59	07:59	07:59				16:05	21 09:40 (1)
20	08:31			07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01				06:59	07:59	07:59				08:41	09:19 (1)
	16:43			17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22				06:59	07:59	07:59				16:06	20 09:39 (1)
21	08:30			07:34	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:02				06:59	07:59	07:59				08:41	09:19 (1)
	16:45			17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21				06:59	07:59	07:59				16:06	20 09:40 (1)
22	08:29			07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04				06:59	07:59	07:59				08:42	09:21 (1)
	16:47			17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19				06:59	07:59	07:59				16:07	20 09:41 (1)
23	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				06:59	07:59	07:59				08:43	09:21 (1)
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24	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08				06:59	07:59	07:59				08:43	09:21 (1)
	16:51			17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17				06:59	07:59	07:59				16:08	21 09:42 (1)
25	08:25			07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:10				06:59	07:59	07:59				08:43	09:22 (1)
	16:53			17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16				06:59	07:59	07:59				16:08	21 09:43 (1)
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11				06:59	07:59	07:59				08:44	09:23 (1)
	16:54			17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15				06:59	07:59	07:59				16:09	20 09:43 (1)
27	08:22			07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13				06:59	07:59	07:59				08:44	09:23 (1)
	16:56			17:58	18:51	20:48	21:39	22:01	21:34	20:30	19:15	17:05	16:14				06:59	07:59	07:59				16:10	20 09:43 (1)
28	08:20			07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:15				06:59	07:59	07:59				08:44	09:23 (1)
	16:58				18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13				06:59	07:59	07:59				16:11	21 09:44 (1)
29	08:19				07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16				06:59	07:59	07:59				08:44	09:24 (1)
	17:00				19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12				06:59	07:59	07:59				16:12	20 09:44 (1)
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:18				06:59	07:59	07:59					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BN - H66

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March		April		May	June	July	August		September		October		November	December		
1	08:44	08:14	07:16		07:01	07:25 (1)	05:52	05:03	04:59	05:39		06:33	07:07 (1)	07:26		07:58 (3)	07:24	08:19		
	16:15	17:06	18:02		20:00	07:35 (1)	20:56	21:45	22:00	21:25		20:18	07:43 (1)	19:05	15	08:13 (3)	16:54	16:10		
2	08:44	08:12	07:14		06:59	07:23 (1)	05:50	05:02	05:00	05:40		06:35	07:07 (1)	07:28		07:57 (3)	07:26	08:21		
	16:16	17:08	18:04		20:02	07:38 (1)	20:57	21:47	22:00	21:23		20:16	07:43 (1)	19:02	17	08:14 (3)	16:52	16:09		
3	08:44	08:10	07:12		06:56	07:20 (1)	05:48	05:01	05:00	05:42		06:37	07:07 (1)	07:30		07:56 (3)	07:28	08:22		
	16:17	17:10	18:06		20:04	07:40 (1)	20:59	21:48	21:59	21:21		20:14	07:42 (1)	19:00	19	08:15 (3)	16:50	16:09		
4	08:43	08:09	07:09	07:34 (3)	06:54	07:18 (1)	05:46	05:00	05:01	05:44		06:38	07:07 (1)	07:32		07:58 (3)	07:30	08:24		
	16:18	17:12	18:08	4	07:38 (3)	20:06	23	07:41 (1)	21:01	21:49	21:59	20:11	07:41 (1)	18:57	17	08:15 (3)	16:48	16:08		
5	08:43	08:07	07:07		07:31 (3)	06:52	07:15 (1)	05:44	04:59	05:02	05:46		07:07 (1)	07:33		08:00 (3)	07:32	08:25		
	16:20	17:14	18:10	7	07:38 (3)	20:08	27	07:42 (1)	21:03	21:50	21:58	20:09	07:40 (1)	18:55	15	08:15 (3)	16:46	16:07		
6	08:43	08:05	07:05		07:29 (3)	06:49	07:13 (1)	05:42	04:59	05:03	05:47		07:09 (1)	07:35		08:02 (3)	07:34	08:27		
	16:21	17:16	18:11	10	07:39 (3)	20:09	30	07:43 (1)	21:05	21:51	21:58	20:06	07:39 (1)	18:53	13	08:15 (3)	16:45	16:07		
7	08:42	08:03	07:02		07:27 (3)	06:47	07:11 (1)	05:40	04:58	05:04	05:49		07:10 (1)	07:37		08:04 (3)	07:36	08:28		
	16:22	17:18	18:13	12	07:39 (3)	20:11	33	07:44 (1)	21:06	21:52	21:57	20:04	07:37 (1)	18:50	11	08:15 (3)	16:43	16:06		
8	08:42	08:01	07:00		07:24 (3)	06:44	07:10 (1)	05:38	04:57	05:05	05:51		07:12 (1)	07:39		08:06 (3)	07:38	08:29		
	16:24	17:20	18:15	14	07:38 (3)	20:13	34	07:44 (1)	21:08	21:53	21:56	20:01	07:36 (1)	18:48	8	08:14 (3)	16:41	16:06		
9	08:41	07:59	06:57		07:22 (3)	06:42	07:09 (1)	05:36	04:57	05:06	05:52		07:14 (1)	07:41		08:07 (3)	07:40	08:30		
	16:25	17:22	18:17	16	07:38 (3)	20:15	35	07:44 (1)	21:10	21:54	21:56	20:09	07:34 (1)	18:45	5	08:12 (3)	16:39	16:06		
10	08:41	07:57	06:55		07:19 (3)	06:40	07:09 (1)	05:35	04:56	05:07	05:54		07:16 (1)	07:43		08:09 (3)	07:42	08:32		
	16:27	17:24	18:19	18	07:37 (3)	20:17	36	07:45 (1)	21:12	21:55	21:55	20:09	07:32 (1)	18:43	2	08:11 (3)	16:37	16:05		
11	08:40	07:55	06:53		07:19 (3)	06:37	07:08 (1)	05:33	04:56	05:08	05:56		07:17 (1)	07:44		07:44	08:33			
	16:28	17:26	18:21	17	07:36 (3)	20:19	36	07:44 (1)	21:13	21:56	21:54	20:06	07:28 (1)	18:41		16:36	16:05			
12	08:39	07:53	06:50		07:19 (3)	06:35	07:08 (1)	05:31	04:56	05:09	05:58			07:46		07:46	08:34			
	16:30	17:28	18:23	15	07:34 (3)	20:21	36	07:44 (1)	21:15	21:56	21:53	20:04		18:38		16:34	16:05			
13	08:38	06:48		22	07:21 (3)		36	07:08 (1)	05:29	04:55	05:11	07:54		18:36		16:48	08:35			
	16:31	17:30	18:25	12	07:33 (3)	20:22	36	07:44 (1)	21:17	21:57	21:52	20:01		18:49		16:36	16:05			
14	08:37	07:49	06:45		07:23 (3)	06:30	07:07 (1)	05:27	04:55	05:12	06:01			07:50		07:49	08:36			
	16:33	17:32	18:27	6	07:29 (3)	20:24	36	07:43 (1)	21:19	21:58	21:51	20:59		18:34		16:31	16:05			
15	08:37	07:47	06:43		06:28	07:07 (1)	05:26	04:55	05:13	06:03				07:52		07:51	08:37			
	16:35	17:34	18:29		20:26	07:43 (1)	21:20	21:58	21:50	20:57		19:44		18:31		16:29	16:05			
16	08:36	07:45	06:41		06:25	07:08 (1)	05:24	04:55	05:14	06:05		06:59		07:54		07:53	08:38			
	16:36	17:36	18:30		20:28	07:42 (1)	21:22	21:59	21:49	20:55		19:42		18:29		16:28	16:05			
17	08:35	07:43	06:38		06:23	07:07 (1)	05:22	04:54	05:16	06:06		07:01		07:56		07:55	08:39			
	16:38	17:38	18:32		20:30	07:41 (1)	21:24	21:59	21:48	20:53		19:39		18:27		16:26	16:05			
18	08:33	07:41	06:36		06:21	07:08 (1)	05:21	04:54	05:17	06:08		07:25 (1)	07:03		07:58		07:57	08:39		
	16:40	17:40	18:34		20:32	07:40 (1)	21:25	22:00	21:46	20:51	8	07:33 (1)	19:37		18:24		16:25	16:05		
19	08:32	07:39	06:33		06:19	07:08 (1)	05:19	04:54	05:19	06:10		07:20 (1)	07:05		07:59		07:59	08:40		
	16:42	17:42	18:36		20:33	07:39 (1)	21:27	22:00	21:45	20:46	16	07:36 (1)	19:32		18:22		16:23	16:05		
20	08:31	06:31		20	06:16	07:09 (1)	05:18	04:54	05:20	06:10		07:18 (1)	07:07		08:11		08:01	08:40		
	16:43	17:44	18:38		20:35	07:38 (1)	21:28	22:00	21:44	20:46	20	07:38 (1)	19:32		18:20		16:22	16:06		
21	08:30	07:44	06:28		06:14	07:11 (1)	05:16	04:55	05:21	06:14		07:16 (1)	07:08		08:03		08:02	08:41		
	16:45	17:46	18:40		20:37	07:37 (1)	21:30	22:01	21:42	20:44	24	07:40 (1)	19:29		18:18		16:21	16:06		
22	08:29	07:32	06:26		06:12	07:11 (1)	05:15	04:55	05:23	06:15		07:14 (1)	07:10		08:05		08:04	08:42		
	16:47	17:48	18:42		20:39	07:34 (1)	21:31	22:01	21:41	20:42	27	07:41 (1)	19:27		18:15		16:19	16:07		
23	08:27	07:30	06:23		06:09	07:13 (1)	05:13	04:55	05:24	06:17		07:13 (1)	07:12		08:07		08:06	08:42		
	16:49	17:50	18:44		20:41	07:32 (1)	21:33	22:01	21:40	20:39	29	07:42 (1)	19:24		18:13		16:18	16:07		
24	08:26	07:28	06:21		06:07	07:15 (1)	05:12	04:55	05:26	06:19		07:12 (1)	07:14		08:09		08:08	08:43		
	16:51	17:52	18:45		20:43	07:29 (1)	21:35	22:01	21:38	20:37	31	07:43 (1)	19:22		18:11		16:17	16:08		
25	08:25	07:26	06:18		06:05	07:19 (1)	05:11	04:56	05:27	06:21		07:11 (1)	07:15		07:11		08:09	08:43		
	16:53	17:54	18:47		20:45	6	07:25 (1)	21:36	22:01	21:37	33	07:44 (1)	19:19		17:09		16:16	16:08		
26	08:23	07:23	06:16		06:03		05:09	04:56	05:29	06:22		07:10 (1)	07:17		07:13		08:11	08:44		
	16:54	17:56	18:49		20:46		21:37	22:01	21:35	20:33	33	07:43 (1)	19:17		17:07		16:15	16:08		
27	08:22	07:21	06:14		06:01	07:09 (1)	05:08	04:57	05:31	06:24		07:09 (1)	07:19		07:15		08:13	08:44		
	16:56	17:58	18:51		20:48		21:39	22:01	21:33	20:30	35	07:44 (1)	19:15		17:05		16:14	16:10		
28	08:20	07:19	06:11		05:59		05:07	04:57	05:32	06:26		07:09 (1)	07:21		07:17		08:15	08:44		
	16:58	18:00			20:50		21:40	22:01	21:32	20:28	35	07:44 (1)	19:12		17:02		16:13	16:11		
29	08:19		07:09		05:56		05:06	04:58	05:34	06:28		07:08 (1)	07:23		07:19		08:16	08:44		
	17:00		19:55		20:52		21:42	22:01	21:30	20:26	36	07:44 (1)	19:10		17:00		16:12	16:12		
30	08:17		07:06		05:54		05:05	04:58	05:35	06:29		07:08 (1)	07:24				08:18	08:44		
	17:02		19:57		20:54		21:43	22:00	21:28	20:23	36	07:44 (1)	19:07	10	08:12 (3)		16:58	16:13		
31	08:15		07:04				05:04		05:37	06:31		07:08 (1)					07:22	08:44		
	17:04		19:58				21:44		21:27	20:21	36	07:44 (1)					16:56	16:14		
Potential sun hours	250	273	367		420		494		510	512	460		382		328		259	233		
Total, worst case			131		691							399		312		122				
Sun reduction			0.27		0.30							0.34		0.32		0.29				
Oper. time red.			1.00		1.00							1.00		1.00		1.00				
Wind dir. red.			0.65		0.68							0.67		0.67		0.65				
Total reduction			0.18		0.24							0.23		0.22		0.19				
Total, real			.23		165						92				.23					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BO - H67

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26	07:53 (1)	07:24	08:19	
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	13	08:06 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	10	08:04 (1)	16:52	16:09
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	8	08:04 (1)	16:50	16:09
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	5	08:03 (1)	16:48	16:08
5	08:43	08:07	07:07		06:52	05:44	04:59	05:02	05:46	06:40		07:34		08:00 (1)	07:32	08:25
	16:20	17:14	18:10		20:08	21:03	21:50	21:58	21:18	20:09		18:55	1	08:01 (1)	16:46	16:07
6	08:43	08:05	07:05		06:49	05:42	04:59	05:03	05:47	06:42		07:35		07:34	08:27	
	16:21	17:16	18:12		20:10	21:05	21:51	21:58	21:16	20:06		18:53		16:45	16:07	
7	08:42	08:03	07:02		06:47	05:40	04:58	05:04	05:49	06:44		07:37		07:36	08:28	
	16:22	17:18	18:13		20:11	21:06	21:52	21:57	21:14	20:04		18:50		16:43	16:06	
8	08:42	08:01	07:00		06:44	05:38	04:57	05:05	05:51	06:45		07:39		07:38	08:29	
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:12	20:02		18:48		16:41	16:06	
9	08:41	07:59	06:58		06:42	05:36	04:57	05:06	05:52	06:47		07:41		07:40	08:31	
	16:25	17:22	18:17	3	07:25 (1)	20:15	21:10	21:54	21:10	19:59		18:45		16:39	16:06	
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43		07:42	08:32	
	16:27	17:24	18:19	7	07:26 (1)	20:17	21:12	21:55	21:08	19:57		18:43		16:37	16:05	
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:45		07:44	08:33	
	16:28	17:26	18:21	9	07:26 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	16:05	
12	08:39	07:53	06:50		07:14 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46		07:46	08:34	
	16:30	17:28	18:23	12	07:26 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	16:05	
13	08:38	07:51	06:48		07:12 (1)	06:33	05:29	04:55	05:11	05:59	06:54	07:48		07:48	08:35	
	16:31	17:30	18:25	14	07:26 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36		16:32	16:05	
14	08:37	07:49	06:45		07:09 (1)	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:50	08:36	
	16:33	17:32	18:27	16	07:25 (1)	20:24	21:19	21:58	21:51	20:59	19:47	18:34		16:31	16:05	
15	08:37	07:47	06:43		07:07 (1)	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51	08:37	
	16:35	17:34	18:29	18	07:25 (1)	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	16:05	
16	08:36	07:45	06:41		07:06 (1)	06:25	05:24	04:55	05:15	06:05	07:00	07:54		07:53	08:38	
	16:36	17:36	18:31	17	07:23 (1)	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28	16:05	
17	08:35	07:43	06:38		07:08 (1)	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55	08:39	
	16:38	17:38	18:32	14	07:22 (1)	20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26	16:05	
18	08:34	07:41	06:36		07:10 (1)	06:21	05:21	04:54	05:17	06:08	07:03	07:58		07:57	08:39	
	16:40	17:40	18:34	11	07:21 (1)	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25	16:05	
19	08:32	07:39	06:33		07:12 (1)	06:19	05:19	04:54	05:19	06:10	07:05	07:59		07:59	08:40	
	16:42	17:42	18:36	4	07:16 (1)	20:34	21:27	22:00	21:45	20:49	19:34	18:22		16:23	16:05	
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01		08:01	08:41	
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20		16:22	16:06	
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03		08:02	08:41	
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18		16:21	16:06	
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05		08:04	08:42	
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15		16:19	16:07	
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07		08:06	08:43	
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13		16:18	16:07	
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09		08:08	08:43	
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22		18:11		16:17	16:08	
25	08:25	07:26	06:19		06:05	05:11	04:56	05:28	06:21	07:15		07:53 (1)		08:10	08:43	
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	10	08:03 (1)		16:16	16:08	
26	08:23	07:23	06:16		06:03	05:10	04:56	05:29	06:22	07:17		07:50 (1)		08:11	08:44	
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	14	08:04 (1)		16:15	16:09	
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:48 (1)		08:13	08:44	
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	17	08:05 (1)		16:14	16:10	
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:47 (1)		08:15	08:44	
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	19	08:06 (1)		16:13	16:11	
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:49 (1)		08:16	08:44	
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17	08:06 (1)		16:12	16:12	
30	08:17		07:06		05:54	05:05	04:58	05:36	06:29	07:24		07:51 (1)		08:18	08:44	
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	15	08:06 (1)		16:11	16:13	
31	08:16		07:04			05:04		05:37	06:31			07:23			08:44	
	17:04		19:58			21:44		21:27	20:21			16:56			16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case				125						92		37				
Sun reduction				0.27						0.32		0.29				
Oper. time red.				1.00						1.00		1.00				
Wind dir. red.				0.66						0.66		0.66				
Total reduction				0.18						0.21		0.19				
Total, real				22						19		7				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BP - H68

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15 08:44 16:16 08:44 16:17 08:44 16:18	08:14 17:06 08:12 17:08 08:10 17:10 08:09 17:12	07:16 18:02 07:14 18:04 07:12 18:06 07:09 18:08	07:01 20:00 06:59 20:02 06:57 20:04 06:54 20:06	05:52 20:56 05:50 20:57 05:48 20:59 05:46 21:01	05:03 21:46 05:02 21:47 05:01 21:48 05:01 21:49	04:59 22:00 05:00 22:00 05:00 21:59 05:01 21:59	05:39 21:25 05:40 21:23 05:42 21:21 05:44 21:20	06:33 20:18 06:35 20:16 06:37 20:14 06:38 20:11	07:26 19:05 07:28 19:02 07:30 19:00 07:32 18:57	07:24 16:54 07:26 16:52 07:28 16:50 07:30 16:48	08:19 16:10 08:21 16:09 08:22 16:09 08:24 16:08
2	08:44 16:16 08:44 16:17 08:44 16:18	08:12 17:08 08:10 17:10 08:09 17:12	07:14 18:04 07:12 18:06 07:09 18:08	06:59 20:02 06:57 20:04 06:54 20:06	05:50 20:57 05:48 20:59 05:46 21:01	05:02 21:47 05:01 21:48 05:01 21:49	05:00 22:00 05:00 21:59 05:01 21:59	05:40 21:23 05:42 21:21 05:44 21:20	06:35 20:18 06:37 20:16 06:38 20:14	07:28 19:02 07:30 19:00 07:32 18:57	07:26 16:52 07:28 16:50 07:30 16:48	08:21 16:09 08:22 16:09 08:24 16:08
3	08:44 16:17 08:44 16:18	08:10 17:10 08:09 17:12	07:12 18:06 07:09 18:08	06:57 20:04 06:54 20:06	05:48 20:59 05:46 21:01	05:01 21:48 05:01 21:49	05:00 21:59 05:01 21:59	05:42 21:21 05:44 21:20	06:37 20:14 06:38 20:11	07:30 19:00 07:32 18:57	07:28 16:50 07:30 16:48	08:22 16:09 08:24 16:08
4	08:44 16:18 08:43 16:20 08:43 16:21	08:09 17:12 08:07 17:14 08:05 17:16	07:09 18:08 07:07 18:10 07:05 18:12	06:54 20:06 06:52 20:08 06:49 20:10	05:46 21:01 05:44 21:03 05:42 21:05	05:00 21:49 05:02 21:50 05:03 21:51	05:01 21:59 05:02 21:58 05:04 21:58	05:44 21:20 05:46 21:18 05:47 21:16	06:38 20:11 06:40 20:09 06:42 20:06	07:32 18:57 07:34 18:55 07:35 18:53	07:30 16:48 07:32 16:46 07:34 16:45	08:24 16:08 08:25 16:07 08:27 16:07
5	08:43 16:20 08:43 16:21	08:07 17:14 08:05 17:16	07:07 18:10 07:05 18:12	06:52 20:08 06:49 20:10	05:44 21:03 05:42 21:05	05:02 21:50 05:03 21:51	05:02 21:58 05:04 21:58	05:46 21:18 05:47 21:16	06:40 20:09 06:42 20:06	07:34 18:55 07:35 18:53	07:32 16:46 07:34 16:45	08:25 16:07 08:27 16:07
6	08:43 16:21 08:42 16:22	08:05 17:16 08:03 17:18	07:05 18:12 07:02 18:13	06:49 20:10 06:47 20:11	05:42 21:05 05:40 21:06	05:03 21:51 05:04 21:52	05:03 21:58 05:04 21:57	05:47 21:16 05:49 21:14	06:42 20:06 06:44 20:04	07:35 18:53 07:37 18:50	07:34 16:45 07:36 16:43	08:27 16:07 08:28 16:06
7	08:42 16:22 08:42 16:23	08:03 17:18 08:01 17:20	07:02 18:13 07:00 18:15	06:47 20:11 06:44 20:12	05:40 21:06 05:38 21:07	05:04 21:52 05:05 21:51	05:04 21:58 05:05 21:56	05:49 21:16 05:51 21:12	06:44 20:06 06:45 20:02	07:37 18:53 07:39 18:48	07:36 16:45 07:38 16:41	08:28 16:06 08:29 16:05
8	08:42 16:24 08:41 16:25	08:01 17:20 07:59 17:22	07:00 18:15 06:58 18:17	06:44 20:13 06:42 20:15	05:38 21:08 05:36 21:10	04:57 21:53 04:57 21:54	05:05 21:56 05:06 21:56	05:51 21:12 05:52 21:10	06:45 20:02 06:47 19:59	07:39 18:48 07:41 18:45	07:38 16:41 07:40 16:39	08:29 16:06 08:31 16:06
9	08:41 16:25 08:41 16:27	07:59 17:22 07:57 17:24	06:58 18:17 06:55 18:19	06:42 20:15 06:40 20:17	05:36 21:10 05:35 21:12	04:57 21:54 04:56 21:55	05:06 21:56 05:07 21:55	05:52 21:10 05:54 21:08	06:47 19:59 06:49 19:57	07:41 18:45 07:43 18:43	07:40 16:39 07:42 16:37	08:31 16:06 08:32 16:05
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11	08:40 16:28 08:39 16:30	07:55 17:26 07:53 17:28	06:53 18:21 06:50 18:23	06:37 20:19 06:35 20:21	05:33 21:13 05:31 21:15	04:56 21:56 04:56 21:56	05:08 21:54 05:09 21:53	05:56 21:06 05:58 21:04	06:51 19:54 06:52 19:52	07:45 18:41 07:46 18:38	07:44 16:36 07:46 16:34	08:33 16:05 08:34 16:05
12	08:39 16:30 08:38 16:31	07:53 17:28 07:51 17:30	06:50 18:23 06:48 18:25	06:35 20:21 06:32 20:22	05:31 21:15 05:29 21:17	04:56 21:56 04:55 21:57	05:09 21:53 05:11 21:52	05:58 21:04 05:59 21:02	06:52 19:52 06:54 19:49	07:46 18:38 07:48 18:36	07:46 16:34 07:48 16:32	08:34 16:05 08:35 16:05
13	08:38 16:31 08:38 16:33	07:51 17:30 07:49 17:32	06:48 18:25 06:45 18:27	06:32 20:22 06:30 20:24	05:29 21:17 05:27 21:19	04:55 21:57 04:55 21:58	05:11 21:52 05:12 21:51	05:59 21:02 06:01 20:59	06:54 19:49 06:56 19:47	07:48 18:36 07:50 18:34	07:48 16:32 07:50 16:31	08:35 16:05 08:36 16:05
14	08:38 16:33 08:37 16:35	07:49 17:32 07:47 17:34	06:45 18:27 06:43 18:29	06:30 20:24 06:28 20:26	05:27 21:19 05:26 21:20	04:55 21:58 04:55 21:58	05:12 21:51 05:13 21:50	06:01 20:59 06:03 20:57	06:56 19:47 06:58 19:44	07:50 18:34 07:52 18:31	07:50 16:31 07:51 16:29	08:36 16:05 08:37 16:05
15	08:37 16:35 08:36 16:36	07:47 17:34 07:45 17:36	06:43 18:29 06:41 18:31	06:28 20:26 06:25 20:28	05:26 21:20 05:24 21:22	04:55 21:58 04:55 21:59	05:13 21:50 05:14 21:49	06:03 20:57 06:05 20:55	06:58 19:44 07:00 19:42	07:52 18:31 07:54 18:29	07:51 16:29 07:53 16:28	08:37 16:05 08:38 16:05
16	08:36 16:36 08:35 16:38	07:45 17:36 07:43 17:38	06:41 18:31 06:38 18:32	06:25 20:28 06:23 20:30	05:24 21:22 05:22 21:24	04:55 21:59 04:54 21:59	05:14 21:49 05:16 21:48	06:05 20:55 06:06 20:53	07:00 19:42 07:01 19:39	07:54 18:29 07:56 18:27	07:53 16:28 07:55 16:26	08:38 16:05 08:39 16:05
17	08:35 16:38 08:34 16:40	07:43 17:38 07:41 17:40	06:38 18:32 06:36 18:34	06:23 20:30 06:21 20:32	05:22 21:24 05:21 21:25	04:54 21:59 04:54 22:00	05:16 21:48 05:17 21:46	06:06 20:53 06:08 20:51	07:01 19:39 07:03 19:37	07:56 18:27 07:58 18:24	07:55 16:26 07:57 16:25	08:39 16:05 08:40 16:05
18	08:34 16:40 08:32 16:42	07:41 17:40 07:39 17:42	06:36 18:34 06:33 18:36	06:21 20:32 06:19 20:34	05:21 21:25 05:19 21:27	04:54 22:00 04:54 22:01	05:17 21:46 05:19 21:45	06:08 20:51 06:10 20:49	07:03 19:37 07:05 19:34	07:58 18:24 07:59 18:22	07:57 16:25 07:59 16:23	08:39 16:05 08:40 16:05
19	08:32 16:42 08:31 16:43	07:39 17:42 07:37 17:44	06:33 18:36 06:31 18:38	06:19 20:34 06:16 20:35	05:19 21:27 05:18 21:28	04:54 22:00 04:54 22:01	05:19 21:45 05:20 21:44	06:10 20:49 06:12 20:46	07:05 19:34 07:07 19:32	07:59 18:22 08:01 18:20	07:59 16:23 08:01 16:22	08:40 16:05 08:41 16:06
20	08:31 16:43 08:30 16:45	07:37 17:44 07:34 17:46	06:31 18:38 06:28 18:40	06:16 20:35 06:14 20:37	05:18 21:28 05:16 21:30	04:54 22:01 04:55 22:01	05:20 21:44 05:21 21:42	06:12 20:46 06:14 20:44	07:07 19:32 07:08 19:29	08:01 18:20 08:03 18:18	08:01 16:22 08:03 16:21	08:41 16:06 08:42 16:06
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22	08:29 16:47 08:27 16:49	07:32 17:48 07:30 17:50	06:26 18:42 06:23 18:44	06:12 20:39 06:09 20:41	05:15 21:32 05:13 21:33	04:55 22:01 04:55 22:01	05:23 21:41 05:24 21:40	06:15 20:42 06:17 20:40	07:10 19:27 07:12 19:24	08:05 18:18 08:07 18:13	08:05 16:19 08:07 16:18	08:04 16:07 08:08 16:08
23	08:27 16:49 08:26 16:51	07:30 17:50 07:28 17:52	06:23 18:44 06:21 18:45	06:09 20:41 06:07 20:43	05:13 21:33 05:12 21:35	04:55 22:01 04:55 22:01	05:24 21:40 05:26 21:38	06:17 20:40 06:19 20:37	07:12 19:24 07:14 19:22	08:07 18:13 08:09 18:11	08:06 16:18 08:08 16:17	08:43 16:07 08:43 16:08
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25	08:25 16:53 08:23 16:54	07:26 17:54 07:23 17:56	06:19 18:47 06:16 18:49	06:05 20:45 06:03 20:46	05:11 21:36 05:09 21:38	04:56 22:01 04:56 22:01	05:27 21:37 05:29 21:35	06:21 20:35 06:22 20:33	07:15 19:20 07:17 19:17	07:17 17:09 07:19 17:07	07:15 17:09 07:43 16:15	08:43 16:08 08:44 16:14
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27	08:22 16:56 08:20 16:58	07:21 17:58 07:19 18:00	06:14 18:51 06:11 18:53	06:01 20:48 05:59 20:50	05:08 21:39 05:07 21:40	04:57 22:01 04:57 22:01	05:31 21:34 05:32 21:32	06:24 20:30 06:26 20:28	07:19 19:15 07:2			

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BQ - H69

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		10:49 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24									08:19		10:45 (2)
2	16:15	57	15:37 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54									16:10	42	15:25 (1)
	08:44		10:50 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26									08:21		10:44 (2)
3	16:16	58	15:38 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52									16:09	46	15:26 (1)
	08:44		10:51 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28									08:22		10:42 (2)
4	16:17	56	15:38 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50									16:08	49	15:26 (1)
	08:43		10:52 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30									08:24		10:42 (2)
5	16:18	56	15:39 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48									16:08	50	15:26 (1)
	08:43		10:53 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32									08:25		10:40 (2)
6	16:20	55	15:39 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46									16:07	53	15:26 (1)
	08:43		10:54 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34									08:27		10:41 (2)
7	16:21	54	15:40 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44									16:07	54	15:27 (1)
	08:42		10:55 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36									08:28		10:40 (2)
8	16:22	53	15:41 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43									16:06	55	15:26 (1)
	08:42		10:56 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38									08:29		10:40 (2)
9	16:24	51	15:41 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41									16:06	56	15:27 (1)
	08:41		10:59 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40									08:30		10:40 (2)
10	16:25	48	15:42 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39									16:05	56	15:27 (1)
	08:40		11:00 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42									08:32		10:40 (2)
11	16:26	47	15:43 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37									16:05	57	15:27 (1)
	08:40		11:03 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44									08:33		10:39 (2)
12	16:28	42	15:43 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36									16:05	57	15:27 (1)
	08:39		11:06 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46						15:03 (1)			08:34		10:39 (2)
13	16:30	37	15:44 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	5					15:08 (1)			16:05	58	15:27 (1)
	08:38		15:14 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47						14:59 (1)			08:35		10:40 (2)
14	16:31	30	15:44 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	13					15:12 (1)			16:05	57	15:27 (1)
	08:37		15:14 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49						14:57 (1)			08:36		10:41 (2)
15	16:33	31	15:45 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	17					15:14 (1)			16:05	56	15:27 (1)
	08:36		15:15 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51						14:56 (1)			08:37		10:41 (2)
16	16:34	30	15:45 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	20					15:16 (1)			16:05	56	15:27 (1)
	08:35		15:15 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53						14:55 (1)			08:38		10:40 (2)
17	16:36	31	15:46 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	22					15:17 (1)			16:05	56	15:26 (1)
	08:34		15:15 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55						14:54 (1)			08:39		10:41 (2)
18	16:38	30	15:45 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	24					15:18 (1)			16:05	57	15:27 (1)
	08:33		15:16 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57						14:53 (1)			08:39		10:41 (2)
19	16:40	30	15:46 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	26					15:19 (1)			16:05	56	15:27 (1)
	08:32		15:16 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59						14:53 (1)			08:40		10:42 (2)
20	16:41	30	15:46 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	26					15:19 (1)			16:05	56	15:28 (1)
	08:31		15:16 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01						14:53 (1)			08:41		10:42 (2)
21	16:43	29	15:45 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	27					15:20 (1)			16:06	55	15:27 (1)
	08:30		15:17 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02						14:52 (1)			08:41		10:43 (2)
22	16:45	29	15:46 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	29					15:21 (1)			16:06	55	15:28 (1)
	08:29		15:18 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04						14:52 (1)			08:42		10:43 (2)
23	16:47	27	15:45 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	29					15:21 (1)			16:06	55	15:28 (1)
	08:27		15:19 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06						14:52 (1)			08:42		10:44 (2)
24	16:49	26	15:45 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	30					15:22 (1)			16:07	55	15:29 (1)
	08:26		15:19 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08						14:53 (1)			08:43		10:44 (2)
25	16:51	26	15:45 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	30					15:23 (1)			16:08	55	15:29 (1)
	08:25		15:21 (1)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09						14:53 (1)			08:43		10:44 (2)
26	16:52	24	15:45 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:08	16:16	30					15:23 (1)			16:08	56	15:30 (1)
	08:23		15:22 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11						14:53 (1)			08:43		10:46 (2)
27	16:54	22	15:44 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:07	16:15	31					15:24 (1)			16:09	56	15:31 (1)
	08:22		15:24 (1)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13						14:54 (1)			08:44		10:46 (2)
28	16:56	20	15:44 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	30					15:24 (1)			16:10	56	15:32 (1)
	08:20		15:25 (1)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14						14:54 (1)			08:44		10:47 (2)
29	16:58	17	15:42 (1)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	31					15:25 (1)			16:11	56	15:33 (1)
	08:19		15:28 (1)		07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16						14:54 (1)			08:44		10:47 (2)
30	17:00	12	15:40 (1)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:12	30					15:24 (1)			16:11	57	15:34 (1)
	08:17		15:31 (1)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18						10:48 (2)			08:44		10:48 (2)
31	17:02	5	15:36 (1)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	36					15:25 (1)			16:12	58	15:35 (1)
	08:15				07:04		05:04		05:37	06:31		07:22										08:44		10:48 (2)
Potential sun hours	17:04																							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BR - H70

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	12:23 (2) 08:14	16:24 (1) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:50 (1) 08:19	12:13 (2)
16:15	51 13:14 (2) 17:06	10 16:34 (1) 18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	26 16:16 (1) 16:10	44 12:57 (2)
2 08:44	12:24 (2) 08:12	16:23 (1) 07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	15:49 (1) 08:21	12:13 (2)
16:16	51 13:15 (2) 17:08	14 16:37 (1) 18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	27 16:16 (1) 16:09	46 12:59 (2)
3 08:44	12:24 (2) 08:10	16:22 (1) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	15:49 (1) 08:22	12:12 (2)
16:17	51 13:15 (2) 17:10	17 16:39 (1) 18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	27 16:16 (1) 16:08	47 12:59 (2)
4 08:43	12:25 (2) 08:08	16:21 (1) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	15:50 (1) 08:24	12:13 (2)
16:18	50 13:15 (2) 17:12	20 16:41 (1) 18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	25 16:15 (1) 16:08	47 13:00 (2)
5 08:43	12:25 (2) 08:07	16:21 (1) 07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	15:50 (1) 08:25	12:12 (2)
16:19	50 13:15 (2) 17:14	22 16:43 (1) 18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	24 16:14 (1) 16:07	48 13:00 (2)
6 08:43	12:27 (2) 08:05	16:20 (1) 07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	15:50 (1) 08:26	12:13 (2)
16:21	49 13:16 (2) 17:16	25 16:45 (1) 18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	22 16:12 (1) 16:07	49 13:02 (2)
7 08:42	12:27 (2) 08:03	16:20 (1) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	15:51 (1) 08:28	12:12 (2)
16:22	48 13:15 (2) 17:18	26 16:46 (1) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	19 16:10 (1) 16:06	50 13:02 (2)
8 08:42	12:28 (2) 08:01	16:20 (1) 07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	15:52 (1) 08:29	12:12 (2)
16:24	47 13:15 (2) 17:20	26 16:46 (1) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16 16:08 (1) 16:06	50 13:02 (2)
9 08:41	12:29 (2) 07:59	16:20 (1) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	15:54 (1) 08:30	12:13 (2)
16:25	47 13:16 (2) 17:22	26 16:46 (1) 18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	13 16:07 (1) 16:05	51 13:04 (2)
10 08:40	12:30 (2) 07:57	16:20 (1) 06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	15:55 (1) 08:32	12:13 (2)
16:26	46 13:16 (2) 17:24	26 16:46 (1) 18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	10 16:05 (1) 16:05	51 13:04 (2)
11 08:40	12:31 (2) 07:55	16:20 (1) 06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	15:57 (1) 08:33	12:13 (2)
16:28	44 13:15 (2) 17:26	26 16:46 (1) 18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36	6 16:03 (1) 16:05	51 13:04 (2)
12 08:39	12:32 (2) 07:53	16:21 (1) 06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	16:00 (1) 08:34	12:13 (2)
16:30	43 13:15 (2) 17:28	25 16:46 (1) 18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	1 16:01 (1) 16:05	52 13:05 (2)
13 08:38	12:33 (2) 07:51	16:20 (1) 06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	16:05 (1) 08:35	12:14 (2)
16:31	42 13:15 (2) 17:30	25 16:45 (1) 18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05 (1) 08:36	52 13:06 (2)
14 08:37	12:34 (2) 07:49	16:21 (1) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	16:06 (1) 08:37	12:15 (2)
16:33	40 13:14 (2) 17:32	23 16:44 (1) 18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:05 (1) 08:38	52 13:07 (2)
15 08:36	12:35 (2) 07:47	16:22 (1) 06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	16:07 (1) 08:37	12:14 (2)
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17 08:34	12:38 (2) 07:43	16:26 (1) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	16:09 (1) 08:39	12:15 (2)
16:38	34 13:12 (2) 17:38	15 16:41 (1) 18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05 (1) 08:40	53 13:08 (2)
18 08:33	12:40 (2) 07:41	16:28 (1) 06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	16:10 (1) 08:40	53 13:09 (2)
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19 08:32	12:42 (2) 07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	16:11 (1) 08:41	12:16 (2)
16:41	29 13:11 (2) 17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05 (1) 08:41	53 13:09 (2)
20 08:31	12:43 (2) 07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	12:25 (2) 08:41	12:16 (2)
16:43	25 13:08 (2) 17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	13 12:38 (2) 08:41	53 13:09 (2)
21 08:30	12:47 (2) 07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	12:22 (2) 08:41	12:17 (2)
16:45	20 13:07 (2) 17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	20 12:42 (2) 08:42	53 13:10 (2)
22 08:29	12:50 (2) 07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	12:20 (2) 08:42	12:17 (2)
16:47	13 13:03 (2) 17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	24 12:44 (2) 08:42	53 13:10 (2)
23 08:27	12:51 (2) 07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	12:18 (2) 08:42	12:18 (2)
16:49	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	29 12:47 (2) 08:43	53 13:11 (2)
24 08:26	12:52 (2) 07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	12:17 (2) 08:43	12:18 (2)
16:50	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	31 12:48 (2) 08:43	53 13:11 (2)
25 08:25	12:53 (2) 07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:10	12:16 (2) 08:43	12:18 (2)
16:52	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:08	16:16	34 12:50 (2) 08:44	54 13:12 (2)
26 08:23	12:54 (2) 07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	12:15 (2) 08:43	12:20 (2)
16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:07	16:18	37 12:52 (2) 08:44	53 13:13 (2)
27 08:22	12:55 (2) 07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13	12:15 (2) 08:44	12:20 (2)
16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:19	21 12:53 (2) 08:44	53 13:13 (2)
28 08:20	12:56 (2) 07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14	12:14 (2) 08:44	12:21 (2)
16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:14	41 12:55 (2) 08:44	52 13:13 (2)
29 08:19	12:57 (2) 07:17	07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16	12:13 (2) 08:44	12:21 (2)
17:00	17:00	19:55	20:52	21:41	22:01	21:30	20:25	19:10	18:00	16:14	42 12:56 (2) 08:44	53 13:14 (2)
30 08:17	12:58 (2) 07:16	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	12:13 (2) 08:44	12:22 (2)
17:02	1 16:29 (1) 17:02	19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:15	43 12:56 (2) 08:44	52 13:14 (2)
31 08:15	12:59 (2) 07:15	07:04	05:54	05:04	04:57	05:37	06:31	07:26	08:22	08:20	12:14 (2) 08:44	12:22 (2)
17:04	6 16:31 (1) 17:04	19:58	20:56	21:44	22:01	21:27	20:21	19:05	18:00	16:16	26 12:57 (2) 08:44	52 13:14 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	894	377									167	1589
Sun reduction	0.24	0.23									0.29	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.63	0.66									0.66	0.63
Total reduction	0.15	0.15									0.19	0.13
Total, real	137	58									32	207

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BS - H71
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	13:34 (2) 08:14	13:54 (2) 07:16	14:02 (2) 07:01	14:38 (2) 06:52	15:03	15:22	15:39	15:59	16:33	17:26	18:19	13:20 (2)
2 08:44	13:35 (2) 08:12	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
3 08:44	13:35 (2) 08:10	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
4 08:43	13:35 (2) 08:08	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
5 08:43	13:35 (2) 08:07	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
6 08:43	13:35 (2) 08:05	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
7 08:42	13:35 (2) 08:03	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
8 08:42	13:35 (2) 08:01	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
9 08:41	13:35 (2) 07:59	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
10 08:40	13:35 (2) 07:57	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
11 08:40	13:35 (2) 07:55	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
12 08:39	13:35 (2) 07:53	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
13 08:38	13:35 (2) 07:51	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
14 08:37	13:35 (2) 07:49	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
15 08:36	13:35 (2) 07:47	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
16 08:35	13:35 (2) 07:45	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
17 08:34	13:35 (2) 07:43	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
18 08:33	13:35 (2) 07:41	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
19 08:32	13:35 (2) 07:39	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
20 08:31	13:35 (2) 07:36	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
21 08:30	13:35 (2) 07:34	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
22 08:29	13:35 (2) 07:32	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
23 08:27	13:35 (2) 07:30	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
24 08:26	13:35 (2) 07:28	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
25 08:25	13:35 (2) 07:25	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
26 08:23	13:35 (2) 07:23	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
27 08:22	13:35 (2) 07:21	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
28 08:20	13:35 (2) 07:19	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
29 08:19	13:35 (2) 07:17	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
30 08:17	13:35 (2) 07:15	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
31 08:15	13:35 (2) 07:13	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06	14:38 (2) 07:06
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	2045
Total, worst case	1813	512										2045
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.65	0.66										0.65
Total reduction	0.16	0.15										0.13
Total, real	285	78										274

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BT - H72

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	23 16:11 (2) 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:12 (2)	08:19 16:10	15:25 (3) 15:34 (3)
2	08:44 16:16	08:12 17:08	27 16:10 (2) 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:11 (2)	08:21 16:09	15:25 (3) 15:32 (3)
3	08:44 16:17	08:10 17:10	30 16:09 (2) 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:11 (2)	08:22 16:08	15:26 (3) 15:32 (3)
4	08:43 16:18	08:08 17:12	36 16:09 (2) 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:11 (2)	08:24 16:08	15:27 (3) 15:32 (3)
5	08:43 16:19	08:07 17:14	30 16:08 (2) 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:10 (2)	08:25 16:07	15:28 (3) 15:30 (3)
6	08:43 16:21	15:43 (3) 17:16	32 16:08 (2) 17:16	07:04 18:11	06:49 20:09	05:42 21:04	05:03 21:51	05:47 21:58	06:42 21:15	07:35 20:06	07:35 18:52	07:34 16:10 (2)	08:26 16:07	15:29 (3) 15:30 (3)
7	08:42 16:22	15:43 (3) 17:18	33 16:08 (2) 17:18	07:02 18:13	06:47 20:11	05:40 21:06	05:04 21:52	05:49 21:57	06:43 21:14	07:37 20:04	07:37 18:50	07:36 16:09 (2)	08:28 16:06	
8	08:42 16:24	15:42 (3) 17:20	33 16:07 (2) 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	07:39 20:01	07:39 18:48	07:38 16:09 (2)	08:29 16:06	
9	08:41 16:25	15:43 (3) 17:22	35 16:07 (2) 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:07 (2)	08:30 16:05	
10	08:40 16:26	15:43 (3) 17:24	35 16:07 (2) 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:05 (2)	08:31 16:05	
11	08:40 16:28	15:43 (3) 17:26	35 16:08 (2) 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:03 (2)	08:33 16:05	
12	08:39 16:30	15:52 (3) 17:28	34 16:42 (2) 17:28	18:21 18:23	20:19 20:20	21:13 21:15	21:55 21:56	21:54 21:53	21:05 21:03	19:54 19:51	18:40 18:38	18:35 16:01 (2)	16:05 16:05	
13	08:38 16:31	15:43 (3) 17:30	34 16:07 (2) 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 15:59 (2)	08:35 16:04	
14	08:37 16:33	15:43 (3) 17:32	33 16:08 (2) 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 15:57 (2)	08:36 16:04	
15	08:36 16:34	15:44 (3) 17:34	32 16:09 (2) 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04	
16	08:35 16:36	15:43 (3) 17:36	31 16:09 (2) 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 15:23 (3)	08:38 16:05	
17	08:34 16:38	15:44 (3) 17:38	29 16:10 (2) 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 15:22 (3)	08:38 16:05	
18	08:33 16:40	15:45 (3) 17:40	27 16:11 (2) 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05	
19	08:33 16:41	15:45 (3) 17:42	25 16:12 (2) 17:42	06:34 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05	
20	08:31 16:43	15:45 (3) 17:44	21 16:14 (2) 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	16:50 (2) 17:01 (2)	08:00 16:22	15:21 (3) 16:06
21	08:30 16:45	15:46 (3) 17:46	16 16:17 (2) 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	16:46 (2) 17:04 (2)	08:02 16:20	15:21 (3) 16:06
22	08:29 16:47	15:46 (3) 17:48	9 16:33 (2) 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	16:44 (2) 17:06 (2)	08:04 16:19	15:21 (3) 16:06
23	08:27 16:49	15:47 (3) 17:50	16 16:37 (2) 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	16:42 (2) 17:07 (2)	08:06 16:18	15:21 (3) 16:07
24	08:26 16:50	15:48 (3) 17:52	16 16:38 (2) 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	16:41 (2) 17:08 (2)	08:08 16:17	15:21 (3) 16:08
25	08:25 16:52	15:50 (3) 17:54	16 16:39 (2) 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	08:11 18:09	16:42 (2) 16:09 (2)	08:09 16:16	15:22 (3) 16:08
26	08:23 16:54	15:51 (3) 17:56	16 16:40 (2) 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 18:06	16:22 (3) 16:10 (2)	08:43 16:14	15:22 (3) 16:09
27	08:22 16:56	15:52 (3) 17:58	16 16:41 (2) 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	08:15 18:04	16:23 (2) 16:10 (2)	08:13 16:13	15:23 (3) 16:10
28	08:20 16:58	15:56 (3) 17:00	16 16:42 (2) 17:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 18:02	16:24 (2) 16:11 (2)	08:14 16:12	15:23 (3) 16:10
29	08:19 17:00	16:15 (2) 17:22	16 16:43 (2) 17:22	06:08 18:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	08:18 18:04	16:25 (2) 16:11 (2)	08:16 16:11	15:23 (3) 16:11
30	08:17 17:02	16:16 (2) 17:24	16 16:44 (2) 17:24	06:06 18:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:19 18:05	16:26 (2) 16:11 (2)	08:18 16:11	15:24 (3) 16:12
31	08:15 17:04	16:17 (2) 17:26	16 16:45 (2) 17:26	06:04 18:58	05:04 21:44	05:04 21:44	04:58 21:44	05:35 21:27	06:29 20:21	07:25 19:06	08:20 18:06	16:27 (2) 16:12 (2)	08:19 16:12	15:25 (3) 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case	360	638											30	
Sun reduction	0.24	0.23											0.21	
Oper. time red.	1.00	1.00											1.00	
Wind dir. red.	0.66	0.66											0.66	
Total reduction	0.16	0.15											0.14	
Total, real	58	98											4	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BU - H73

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:34 (3)	08:14	15:58 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24							15:29 (2)	08:19		15:19 (3)	
	16:15	3	15:37 (3)	17:06	31	16:29 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05					16:54	30	15:59 (2)	16:10	15	15:34 (3)
2	08:44	15:35 (3)	08:12	15:57 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26							15:28 (2)	08:21		15:18 (3)	
	16:16	4	15:39 (3)	17:08	32	16:29 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02					16:52	31	15:59 (2)	16:09	14	15:32 (3)
3	08:44	15:34 (3)	08:10	15:57 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28							15:28 (2)	08:22		15:19 (3)	
	16:17	5	15:39 (3)	17:10	33	16:30 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00					16:50	32	16:00 (2)	16:08	13	15:32 (3)
4	08:43	15:35 (3)	08:08	15:57 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30							15:27 (2)	08:24		15:20 (3)	
	16:18	6	15:41 (3)	17:12	33	16:30 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57					16:48	33	16:00 (2)	16:08	12	15:32 (3)
5	08:43	15:35 (3)	08:07	15:57 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32							15:27 (2)	08:25		15:20 (3)	
	16:19	7	15:42 (3)	17:14	33	16:30 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55					16:46	33	16:00 (2)	16:07	10	15:30 (3)
6	08:43	15:36 (3)	08:05	15:57 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34							15:27 (2)	08:26		15:22 (3)	
	16:21	8	15:44 (3)	17:16	33	16:30 (2)	18:11	20:08	21:04	21:51	21:58	21:15	20:06	18:52					16:44	33	16:00 (2)	16:07	8	15:30 (3)
7	08:42	15:35 (3)	08:03	15:58 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36							15:27 (2)	08:28		15:22 (3)	
	16:22	10	15:45 (3)	17:18	32	16:30 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50					16:43	33	16:00 (2)	16:06	7	15:29 (3)
8	08:42	15:35 (3)	08:01	15:58 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38							15:27 (2)	08:29		15:22 (3)	
	16:24	11	15:46 (3)	17:20	32	16:30 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48					16:41	32	15:59 (2)	16:06	6	15:28 (3)
9	08:41	15:36 (3)	07:59	15:58 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40							15:28 (2)	08:30		15:24 (3)	
	16:25	13	15:49 (3)	17:22	32	16:30 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45					16:39	32	16:00 (2)	16:05	4	15:28 (3)
10	08:40	15:36 (3)	07:57	15:59 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42							15:29 (2)	08:32		15:24 (3)	
	16:26	14	15:50 (3)	17:24	30	16:29 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43					16:37	31	16:00 (2)	16:05	4	15:28 (3)
11	08:40	15:37 (3)	07:55	16:00 (2)	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44							15:29 (2)	08:33		15:24 (3)	
	16:28	15	15:52 (3)	17:26	29	16:29 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40					16:35	30	15:59 (2)	16:05	3	15:27 (3)
12	08:39	15:37 (3)	07:53	16:01 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46							15:30 (2)	08:34		15:25 (3)	
	16:30	17	15:54 (3)	17:28	27	16:28 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38					16:34	29	15:59 (2)	16:05	2	15:27 (3)
13	08:38	15:37 (3)	07:51	16:01 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47							15:30 (2)	08:35		15:26 (3)	
	16:31	18	15:56 (3)	17:30	25	16:26 (2)	18:22	20:22	21:17	21:57	21:52	21:01	19:49	18:36					16:32	28	15:58 (2)	16:04		15:25 (3)
14	08:37	15:38 (3)	07:49	16:03 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49							15:31 (2)	08:36		15:24 (3)	
	16:33	19	15:57 (3)	17:32	22	16:25 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33					16:31	26	15:57 (2)	16:04		15:23 (3)
15	08:36	15:38 (3)	07:47	16:05 (2)	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51							15:32 (2)	08:37		15:22 (3)	
	16:34	21	15:59 (3)	17:34	19	16:24 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31					16:29	24	15:56 (2)	16:04		15:21 (3)
16	08:35	15:38 (3)	07:45	16:07 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53							15:33 (2)	08:38		15:20 (3)	
	16:36	20	15:58 (3)	17:36	15	16:22 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29					16:27	21	15:54 (2)	16:05		15:19 (3)
17	08:34	15:39 (3)	07:43	16:12 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55							15:24 (3)	08:38		15:18 (3)	
	16:38	20	15:59 (3)	17:38	5	16:17 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26					16:26	20	15:52 (2)	16:05		15:17 (3)
18	08:33	15:39 (3)	07:41	06:35	06:21	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57							15:20 (3)	08:39		15:16 (3)	
	16:40	20	15:59 (3)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	23					16:24	23	15:50 (2)	16:05		15:15 (3)
19	08:32	15:41 (3)	07:39	06:33	06:18	05:19	04:54	05:18	05:18	06:10	07:05	07:59	07:59							15:19 (3)	08:40		15:14 (3)	
	16:41	18	15:59 (3)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	23					16:23	23	15:49 (2)	16:05		15:13 (3)
20	08:31	15:41 (3)	07:36	06:31	06:13	05:07	04:56	05:17	05:17	06:12	07:06	07:59	07:59							15:18 (3)	08:41		15:12 (3)	
	16:43	18	15:59 (3)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	21					16:22	21	15:47 (2)	16:06		15:11 (3)
21	08:30	15:42 (3)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:03	08:02							15:17 (3)	08:41		15:10 (3)	
	16:45	17	15:59 (3)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	17					16:20	17	15:34 (3)	16:06		15:09 (3)
22	08:29	15:43 (3)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:05	08:04							15:17 (3)	08:42		15:08 (3)	
	16:47	21	16:12 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	18					16:19	18	15:35 (3)	16:06		15:07 (3)
23	08:27	15:45 (3)	07:30	06:23	06:09	05:13	04:55	05:24	06:12	07:07	08:02	08:07	08:06							15:17 (3)	08:42		15:06 (3)	
	16:49	23	16:15 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	18					16:18	18	15:35 (3)	16:07		15:05 (3)
24	08:26	15:46 (3)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:09	08:08							15:17 (3)	08:43		15:04 (3)	
	16:50	23	16:16 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	19					16:17	19	15:36 (3)	16:08		15:03 (3)
25	08:25	15:51 (3)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:11								15:17 (3)	08:43		15:02 (3)	
	16:52	19	16:19 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09								8	15:48 (2)	16:16	20	15:37 (3)
26	08:23	16:00 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:13								15:36 (2)	08:11		15:31 (3)	
	16:54	21	16:21 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16							16	15:52 (2)	16:14	21	15:38 (3)
27	08:22	15:59 (2)	07:21	06:19	06:05	05:11	04:56	05:28	06:21	07:16	08:12	08:12									15:54 (2)	16:13		15:37 (3)
	16:56	24	16:23 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	20							20	15:54 (2)	16:13	21	15:38 (3)
28	08:20	15:59 (2)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:16									15:32 (2)	08:14		15:36 (3)
	16:58	27	16:26 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	23							23	15:55 (2)	16:12	19	15:37 (3)
29	08:19	15:58 (2)		07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:18									15:30 (2)	08:16		15:36 (3)
	17:00	28	16:26 (2)		19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	26							26	15:56 (2)	16:11	19	15:36 (3)
30	08:17	15:58 (2)		07:06	05:54	05:05	04:58	05:35																

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BV - H74

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
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18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BW - H75

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
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18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
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24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BX - H76

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BY - H77

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		08:14		09:02 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24										08:19	
	16:15		17:06	17	09:19 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54										16:10	
2	08:44		08:12		09:04 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26										08:21	
	16:16		17:08	13	09:17 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52										16:09	
3	08:44		08:10		09:06 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28										08:22	
	16:17		17:10	9	09:15 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50										16:08	
4	08:43		08:09			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30										08:24	
	16:18		17:12			18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48										16:08	
5	08:43		08:07			07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32										08:25	
	16:20		17:14			18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46										16:07	
6	08:43		08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34										08:27	
	16:21		17:16			18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44										16:07	
7	08:42		08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36										08:28	
	16:22		17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43										16:06	
8	08:42		08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38										08:29	
	16:24		17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	10									08:46 (2)	
9	08:41		07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40										08:34 (2)	
	16:25		17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	14									08:48 (2)	
10	08:41		07:57			06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42										08:33 (2)	
	16:27		17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	17									08:50 (2)	
11	08:40		07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44										08:32 (2)	
	16:28		17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	19									08:51 (2)	
12	08:39		09:11 (2)			07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46										08:31 (2)	
	16:30	1	09:12 (2)			17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	21									08:52 (2)	
13	08:38		09:10 (2)			07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48										08:30 (2)	
	16:31	4	09:14 (2)			17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	23									08:53 (2)	
14	08:37		09:09 (2)			07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50										08:30 (2)	
	16:33	6	09:15 (2)			17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	23									08:53 (2)	
15	08:37		09:08 (2)			07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52										08:30 (2)	
	16:34	8	09:16 (2)			17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	24									08:54 (2)	
16	08:36		09:07 (2)			07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54										08:29 (2)	
	16:36	10	09:17 (2)			17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	25									08:54 (2)	
17	08:35		09:05 (2)			07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56										08:29 (2)	
	16:38	12	09:17 (2)			17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	25									08:54 (2)	
18	08:33		09:04 (2)			07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57										08:29 (2)	
	16:40	14	09:18 (2)			17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	26									08:55 (2)	
19	08:32		09:03 (2)			07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59										08:31 (2)	
	16:41	16	09:19 (2)			17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	24									08:55 (2)	
20	08:31		09:01 (2)			07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01										08:33 (2)	
	16:43	18	09:19 (2)			17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	22									08:55 (2)	
21	08:30		09:00 (2)			07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03										08:35 (2)	
	16:45	20	09:20 (2)			17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	20									08:55 (2)	
22	08:29		08:59 (2)			07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05										08:37 (2)	
	16:47	22	09:21 (2)			17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	18									08:55 (2)	
23	08:27		08:57 (2)			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07										08:39 (2)	
	16:49	24	09:21 (2)			17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16									08:55 (2)	
24	08:26		08:55 (2)			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09										08:41 (2)	
	16:51	26	09:21 (2)			17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	14									08:55 (2)	
25	08:25		08:56 (2)			07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11										08:43 (2)	
	16:52	25	09:21 (2)			17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:09	12									08:55 (2)	
26	08:23		08:56 (2)			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13										08:45 (2)	
	16:54	25	09:21 (2)			17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	10									08:55 (2)	
27	08:22		08:58 (2)			07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15										08:47 (2)	
	16:56	24	09:22 (2)			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	8									08:55 (2)	
28	08:20		08:58 (2)			07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17										08:49 (2)	
	16:58	23	09:21 (2)			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	6									08:55 (2)	
29	08:19		08:58 (2)				07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19										08:50 (2)	
	17:00	23	09:21 (2)				19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00										08:54 (2)	
30	08:17		08:59 (2)				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	4									08:52 (2)	
	17:02	21	09:20 (2)				19:56	20:54	21:43	22:01	21:28	20:23	19:07	18:00	1									08:53 (2)	
31	08:15		09:01 (2)				07:04		05:04		05:37	06:31		07:22										08:44	
	17:04	19	09:20 (2)				19:58		21:44		21:27	20:21		16:56										16:13	
Potential sun hours	250			273			367		420		494		510		512		460		382		328		259		233
Total, worst case	341			39																		382			
Sun reduction	0.24			0.23																		0.27			
Oper. time red.	1.00			1.00																		1.00			
Wind dir. red.	0.61			0.61																		0.61			
Total reduction	0.15			0.14																		0.16			
Total, real	50			6																		62			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BZ - H78
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
2 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
3 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
4 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
5 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
6 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
7 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
8 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
9 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
10 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
11 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
12 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
13 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
14 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
15 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
16 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
17 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
18 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
19 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
20 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
21 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
22 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
23 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
24 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
25 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
26 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
27 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
28 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
29 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
30 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
31 08:44	09:18 (4) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 05:39	06:33 06:33	07:26 07:26	08:19 08:19	09:12 09:12	10:05 10:05	10:58 10:58	11:51 11:51
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	336	394										994
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.61	0.62										0.62
Total reduction	0.15	0.14										0.13
Total, real	50	57										127

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CA - H79
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	09:18 (4) 08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
2 16:15	38 12:39 (1) 17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	19:05
3 08:44	09:18 (4) 08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21
4 16:16	38 12:39 (1) 17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
5 08:44	09:17 (4) 08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
6 16:17	39 12:39 (1) 17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08
7 08:43	09:17 (4) 08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24
8 16:18	38 12:39 (1) 17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
9 08:43	09:16 (4) 08:07		08:34 (2) 07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25
10 16:20	38 12:38 (1) 17:14	4 08:38 (2) 18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	7 08:09 (2) 16:07	37 12:23 (1)
11 08:43	09:16 (4) 08:05		08:32 (2) 07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27
12 16:21	38 12:39 (1) 17:16	8 08:40 (2) 18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	4 08:08 (2) 16:07	38 12:25 (1)
13 08:42	09:15 (4) 08:03		08:30 (2) 07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28
14 16:22	37 12:38 (1) 17:18	11 08:41 (2) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43		38 12:25 (1)
15 08:42	09:14 (4) 08:01		08:28 (2) 07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29
16 16:24	36 12:37 (1) 17:20	14 08:42 (2) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41		38 12:27 (1)
17 08:41	09:14 (4) 07:59		08:26 (2) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
18 16:25	36 12:37 (1) 17:22	17 08:43 (2) 18:17	20:15	21:10	21:54	21:56	21:10	20:00	18:45	16:39		39 12:28 (1)
19 08:40	09:13 (4) 07:57		08:24 (2) 06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32
20 16:27	34 12:36 (1) 17:24	19 08:43 (2) 18:19	20:17	21:12	21:55	21:55	21:08	20:00	18:43	16:37		38 12:28 (1)
21 08:40	09:12 (4) 07:55		08:22 (2) 06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33
22 16:28	32 12:35 (1) 17:26	22 08:44 (2) 18:21	20:19	21:13	21:56	21:54	21:06	20:00	18:41	16:36		38 12:29 (1)
23 08:39	09:11 (4) 07:53		08:20 (2) 06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34
24 16:30	28 12:33 (1) 17:28	25 08:45 (2) 18:23	20:21	21:15	21:56	21:53	21:04	20:00	18:38	16:34		39 12:30 (1)
25 08:38	09:10 (4) 07:51		08:18 (2) 06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:35
26 16:31	21 12:29 (1) 17:30	27 08:45 (2) 18:25	20:22	21:17	21:57	21:52	21:01	20:00	18:36	16:32		38 12:31 (1)
27 08:37	09:09 (4) 07:49		08:16 (2) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36
28 16:33	16 09:25 (4) 17:32	28 08:44 (2) 18:27	20:24	21:18	21:58	21:51	20:59	20:00	18:33	16:31		38 12:32 (1)
29 08:36	09:08 (4) 07:47		08:16 (2) 06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37
30 16:35	17 09:25 (4) 17:34	28 08:44 (2) 18:29	20:26	21:20	21:58	21:50	20:57	20:00	18:31	16:29		39 12:33 (1)
31 08:36	09:09 (4) 07:45		08:16 (2) 06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38
32 16:36	16 09:25 (4) 17:36	28 08:44 (2) 18:30	20:28	21:22	21:59	21:49	20:55	20:00	18:29	16:28		40 12:33 (1)
33 08:35	09:10 (4) 07:43		08:17 (2) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39
34 16:38	14 09:24 (4) 17:38	27 08:44 (2) 18:32	20:30	21:24	21:59	21:48	20:53	20:00	18:27	16:26		39 12:33 (1)
35 08:33	09:11 (4) 07:41		08:18 (2) 06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39
36 16:40	13 09:24 (4) 17:40	25 08:43 (2) 18:34	20:32	21:25	22:00	21:46	20:51	20:00	18:24	16:25		40 12:34 (1)
37 08:32	09:13 (4) 07:39		08:18 (2) 06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40
38 16:41	10 09:23 (4) 17:42	24 08:42 (2) 18:36	20:33	21:27	22:00	21:45	20:48	20:00	18:22	16:23		40 12:35 (1)
39 08:31	09:15 (4) 07:37		08:19 (2) 06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:41
40 16:43	6 09:21 (4) 17:44	22 08:41 (2) 18:38	20:35	21:28	22:00	21:44	20:46	20:00	18:20	16:22		40 12:35 (1)
41 08:30			08:21 (2) 06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:03	08:41
42 16:45		18 08:39 (2) 18:40	20:37	21:30	22:01	21:42	20:44	20:00	18:18	16:20		40 12:36 (1)
43 08:29			08:22 (2) 06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:05	08:42
44 16:47		14 08:36 (2) 18:42	20:39	21:31	22:01	21:41	20:42	20:00	18:15	16:19	6 08:57 (4) 16:07	40 12:36 (1)
45 08:27			08:25 (2) 06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:07	08:42
46 16:49		8 08:33 (2) 18:43	20:41	21:33	22:01	21:40	20:39	20:00	18:13	16:18	10 08:59 (4) 16:07	40 12:37 (1)
47 08:26			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:09	08:43
48 16:51			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	26 09:13 (2) 16:17	13 09:01 (4) 16:08
49 08:25			06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	07:46 (2) 08:09	08:48 (4) 08:43
50 16:52			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	27 08:13 (2) 16:16	14 09:02 (4) 16:08
51 08:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	07:46 (2) 08:11	16 09:03 (4) 16:09
52 16:54			18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	27 08:13 (2) 16:15	16 09:03 (4) 16:09
53 08:22			06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	07:45 (2) 08:13	16 09:03 (4) 16:09
54 16:56			18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	27 08:14 (2) 16:14	17 09:04 (4) 16:10
55 08:20			06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	07:45 (2) 08:14	16 09:04 (4) 16:10
56 16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	29 08:14 (2) 16:13	16 09:05 (4) 16:11
57 08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	07:47 (2) 08:16	16 09:05 (4) 16:11
58 17:00			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	26 08:13 (2) 16:12	19 12:08 (1) 16:11
59 08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	07:50 (2) 08:18	16 09:05 (4) 16:11
60 17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	17:58	24 08:14 (2) 16:11	28 12:14 (1) 16:12
61 08:15			07:04	05:04	04:54	04:57	05:37	06:31	07:22	08:18	07:52 (2) 08:18	28 12:14 (1) 16:12
62 17:04			19:58	21:44	21:44	21:27	20:21	19:16	17:56	16:56	22 08:14 (2) 16:11	28 12:14 (1) 16:12
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	545	369										1191
Sun reduction	0.24	0.23									0.27	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.61	0.63									0.61	0.62
Total reduction	0.15	0.15									0.16	0.13
Total, real	81	54									34	153

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CB - H80

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		11:45 (1)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26			07:24		07:54 (2)	08:19			08:54 (4)		
	16:15	38	12:23 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05			16:54	12	08:06 (2)	16:10	30		12:01 (1)		
2	08:44		11:46 (1)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28			07:26		07:56 (2)	08:21			08:56 (4)		
	16:16	37	12:23 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02			16:52	9	08:05 (2)	16:09	32		12:04 (1)		
3	08:44		11:46 (1)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30			07:28		07:58 (2)	08:22			08:57 (4)		
	16:17	37	12:23 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00			16:50	5	08:03 (2)	16:08	34		12:05 (1)		
4	08:43		11:48 (1)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32			07:30		08:00 (2)	08:24			08:59 (4)		
	16:18	35	12:23 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57			16:48	1	08:01 (2)	16:08	33		12:06 (1)		
5	08:43		11:48 (1)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33			07:32			08:25			09:00 (4)		
	16:20	35	12:23 (1)	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55			16:46			08:27	34		12:07 (1)		
6	08:43		09:16 (4)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35			07:34			08:27			08:02 (4)		
	16:21	35	12:23 (1)	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53			16:44			16:07	35		12:09 (1)		
7	08:42		09:15 (4)	08:03		08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44			07:36			08:28			09:03 (4)		
	16:22	34	12:22 (1)	17:18	2	08:32 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04			16:43			16:06	35		12:10 (1)		
8	08:42		09:14 (4)	08:01		08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45			07:38			08:29			11:36 (1)		
	16:24	33	12:21 (1)	17:20	6	08:34 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01			16:41			16:06	35		12:11 (1)		
9	08:41		09:14 (4)	07:59		08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47			07:40			08:30			11:36 (1)		
	16:25	33	12:22 (1)	17:22	9	08:35 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59			16:39			16:05	36		12:12 (1)		
10	08:41		09:13 (4)	07:57		08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49			07:42			08:32			11:35 (1)		
	16:27	33	12:21 (1)	17:24	12	08:36 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57			16:37			16:05	37		12:12 (1)		
11	08:40		09:12 (4)	07:55		08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51			07:44			08:33			11:35 (1)		
	16:28	31	12:20 (1)	17:26	15	08:37 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54			16:36			16:05	38		12:13 (1)		
12	08:39		09:11 (4)	07:53		08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52			07:46			08:34			11:36 (1)		
	16:30	28	12:18 (1)	17:28	18	08:38 (2)	18:22	20:20	21:15	21:58	21:56	21:23	20:16			16:38			16:04	39		12:15 (1)		
13	08:38		09:10 (4)	07:51		08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54			07:48			08:35			11:36 (1)		
	16:31	25	12:16 (1)	17:30	20	08:38 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49			16:32			16:05	39		12:15 (1)		
14	08:37		09:09 (4)	07:49		08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56			07:50			08:36			11:36 (1)		
	16:33	16	12:11 (1)	17:32	23	08:38 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47			16:33			16:05	40		12:16 (1)		
15	08:36		09:08 (4)	07:47		08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58			07:52			08:37			11:37 (1)		
	16:35	13	09:21 (4)	17:34	25	08:38 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44			16:31			16:05	40		12:17 (1)		
16	08:36		09:07 (4)	07:45		08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59			07:54			08:38			09:53 (3)		
	16:36	14	09:21 (4)	17:36	27	08:38 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42			16:28			16:05	45		12:17 (1)		
17	08:35		09:05 (4)	07:43		08:11 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01			07:56		08:54 (2)	07:55			09:52 (3)		
	16:38	15	09:20 (4)	17:38	27	08:38 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39			18:27	3	08:57 (2)	16:26			12:17 (1)		
18	08:33		09:04 (4)	07:41		08:12 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03			07:57		08:49 (2)	07:57			09:53 (3)		
	16:40	16	09:20 (4)	17:40	26	08:38 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37			18:24	13	09:02 (2)	16:25			12:18 (1)		
19	08:32		09:06 (4)	07:39		08:11 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05			07:59		08:46 (2)	07:59			09:53 (3)		
	16:41	14	09:20 (4)	17:42	26	08:37 (2)	18:30	20:28	21:21	22:00	21:46	20:51	19:37			18:23	18	09:04 (2)	16:23			12:15 (1)		
20	08:31		09:06 (4)	07:37		08:12 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06			08:01		08:45 (2)	08:01			09:53 (3)		
	16:43	13	09:19 (4)	17:44	24	08:36 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32			18:20	20	09:05 (2)	16:22			12:19 (1)		
21	08:30		09:08 (4)	07:34		08:14 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08			08:03		08:44 (2)	08:02			09:53 (3)		
	16:45	10	09:18 (4)	17:46	22	08:36 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29			18:18	22	09:06 (2)	16:20			12:20 (1)		
22	08:29		09:10 (4)	07:32		08:14 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10			08:05		08:42 (2)	08:04			09:53 (3)		
	16:47	6	09:16 (4)	17:48	19	08:33 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27			18:15	25	09:07 (2)	16:19			12:20 (1)		
23	08:27			07:30		08:16 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12			08:07		08:42 (2)	08:06			09:55 (3)		
	16:49		17:50		16	08:32 (2)	18:43	20:41	21:33	22:01	21:40	20:39	19:24			18:13	25	09:07 (2)	16:18			12:21 (1)		
24	08:26		07:28			08:19 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14			08:09		08:41 (2)	08:08			09:55 (3)		
	16:51		17:52	10	08:29 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11			17:08	27	09:08 (2)	16:17			12:21 (1)		
25	08:25		07:25			06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11			07:41 (2)	08:09	08:43 (4)	08:43			09:55 (3)		
	16:54		17:54			18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09			07:08 (2)	16:16	15	08:58 (4)	16:08			12:21 (1)	
26	08:21		07:23			06:16	06:03	05:09	04:56	05:09	06:22	07:17	07:13			07:41 (2)	08:11	08:45 (4)	08:44			09:57 (3)		
	16:52		17:56			18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07			07:08 (2)	16:15	14	08:59 (4)	16:09			12:22 (1)	
27	08:22		07:21			06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15			07:43 (2)	08:13	08:47 (4)	08:44			09:58 (3)		
	16:56		17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04			08:08 (2)	16:14	13	09:00 (4)	16:10	45		12:22 (1)	
28	08:20		07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17			07:45 (2)	08:14	08:49 (4)	08:44			10:00 (3)		
	16:58		18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02			08:07 (2)	16:13	14	11:50 (1)	16:11	43		12:23 (1)	
29	08:19					07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19			07:47 (2)	08:16	08:50 (4)	08:44			11:43 (1)		
	17:00					19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00			20	08:07 (2)	16:12	25	11:56 (1)	16:11	40		12:23 (1)
30	08:17					07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20			07:50 (2)	08:18	08:52 (4)	08:44			11:44 (1)		
	17:02					19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58			17	08:07 (2)	16:11	27	11:59 (1)	16:12	39		12:23 (1)
31	08:15					07:04		05:04			05:37	06:31				07:22		07:52 (2)					11:44 (1)	
	17:04					19:58		21:44		21:27	20:21		16:56			15	08:07 (2)						12:23 (1)	
Potential sun hours	250					367		420		494		510				460		382		328				
Total, worst case		551		327														306		195			1281	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CC - H81

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44	14:51 (4)	08:14	16:27 (3)	07:16	17:10 (2)	07:01	05:52	05:03									
	16:15	28	15:19 (4)	17:06	7	16:34 (3)	18:02	24	17:34 (2)	20:00	20:55	21:45						
2	08:44	14:52 (4)	08:12	16:26 (3)	07:14	17:09 (2)	06:59	05:50	05:02									
	16:16	27	15:19 (4)	17:08	11	16:37 (3)	18:04	27	17:36 (2)	20:02	20:57	21:46						
3	08:44	14:52 (4)	08:10	16:26 (3)	07:12	17:08 (2)	06:56	05:48	05:01									
	16:17	27	15:19 (4)	17:10	13	16:39 (3)	18:06	30	17:38 (2)	20:04	20:59	21:48						
4	08:43	14:54 (4)	08:08	16:26 (3)	07:09	17:08 (2)	06:54	05:46	05:00									
	16:18	26	15:20 (4)	17:12	15	16:41 (3)	18:07	33	17:41 (2)	20:06	21:01	21:49						
5	08:43	14:54 (4)	08:07	16:26 (3)	07:07	17:06 (2)	06:51	05:44	04:59									
	16:19	25	15:19 (4)	17:14	17	16:43 (3)	18:09	36	17:42 (2)	20:07	21:03	21:50						
6	08:43	14:55 (4)	08:05	16:26 (3)	07:04	17:06 (2)	06:49	05:42	04:58									
	16:21	25	15:20 (4)	17:16	19	16:45 (3)	18:11	36	17:42 (2)	20:09	21:04	21:51						
7	08:42	14:56 (4)	08:03	16:26 (3)	07:02	17:06 (2)	06:47	05:40	04:58									
	16:22	23	15:19 (4)	17:18	21	16:47 (3)	18:13	35	17:41 (2)	20:11	21:06	21:52						
8	08:42	14:57 (4)	08:01	16:27 (3)	07:00	17:06 (2)	06:44	05:38	04:57									
	16:24	22	15:19 (4)	17:20	21	16:48 (3)	18:15	36	17:42 (2)	20:13	21:08	21:53						
9	08:41	14:58 (4)	07:59	16:28 (3)	06:57	17:05 (2)	06:42	05:36	04:57									
	16:25	22	15:20 (4)	17:22	20	16:48 (3)	18:17	36	17:41 (2)	20:15	21:10	21:54						
10	08:40	14:59 (4)	07:57	16:29 (3)	06:55	17:06 (2)	06:39	05:34	04:56									
	16:26	20	15:19 (4)	17:24	18	16:47 (3)	18:19	35	17:41 (2)	20:17	21:11	21:55						
11	08:40	15:01 (4)	07:55	16:30 (3)	06:53	17:06 (2)	06:37	05:33	04:56									
	16:28	18	15:19 (4)	17:26	16	16:46 (3)	18:21	34	17:40 (2)	20:19	21:13	21:55						
12	08:39	15:02 (4)	07:53	16:32 (3)	06:50	17:06 (2)	06:35	05:31	04:55									
	16:30	16	15:18 (4)	17:28	13	16:45 (3)	18:23	33	17:39 (2)	20:20	21:15	21:56						
13	08:38	15:04 (4)	07:51	16:33 (3)	06:48	17:07 (2)	06:32	05:29	04:55									
	16:31	13	15:17 (4)	17:30	8	16:41 (3)	18:25	31	17:38 (2)	20:22	21:17	21:57						
14	08:37	15:06 (4)	07:49	16:45 (3)	06:45	17:07 (2)	06:30	05:27	04:55									
	16:33	9	15:15 (4)	17:32		18:27	30	17:37 (2)	20:24	21:18	21:58							
15	08:36		07:47	16:43 (3)	06:43	17:09 (2)	06:28	05:26	04:54									
	16:34		17:34	18:28	26	17:35 (2)	20:26	21:20	21:58									
16	08:35		07:45	16:40 (3)	06:40	17:10 (2)	06:25	05:24	04:54									
	16:36		17:36	18:30	23	17:33 (2)	20:28	21:22	21:59									
17	08:34		07:43	16:38 (3)	06:38	17:12 (2)	06:23	05:22	04:54									
	16:38		17:38	18:32	19	17:31 (2)	20:30	21:23	21:59									
18	08:33		07:41	16:35 (3)	06:35	17:15 (2)	06:21	05:21	04:54									
	16:40		17:40	18:34	12	17:27 (2)	20:31	21:25	22:00									
19	08:32		07:39	16:33 (3)	06:33		06:18	05:19	04:54									
	16:41		17:42	18:36			20:33	21:27	22:00									
20	08:31		07:36	16:31 (3)	06:31		06:16	05:18	04:54									
	16:43		17:44	18:38			20:35	21:28	22:00									
21	08:30		07:34	16:28 (3)	06:28		06:14	05:16	04:54									
	16:45		17:46	18:40			20:37	21:30	22:01									
22	08:29		07:32	16:26 (3)	06:26		06:12	05:15	04:55									
	16:47		17:48	18:42			20:39	21:31	22:01									
23	08:27		07:30	16:23 (3)	06:23		06:09	05:13	04:55									
	16:49		17:50	18:43			20:41	21:33	22:01									
24	08:26		07:28	17:22 (2)	06:21		06:07	05:12	04:55									
	16:50		17:52	2	17:24 (2)	18:45	20:43	21:34	22:01									
25	08:24		07:25	17:17 (2)	06:18		06:05	05:11	04:55									
	16:52		17:54	9	17:26 (2)	18:47	20:44	21:36	22:01									
26	08:23		07:23	17:15 (2)	06:16		06:03	05:09	04:56									
	16:54		17:56	13	17:28 (2)	18:49	20:46	21:37	22:01									
27	08:22		07:21	17:13 (2)	06:13		06:00	05:08	04:56									
	16:56		17:58	18	17:31 (2)	18:51	20:48	21:39	22:01									
28	08:20		07:18	17:11 (2)	06:11		05:58	05:07	04:57									
	16:58		18:00	21	17:32 (2)	18:53	20:50	21:40	22:01									
29	08:19				07:08		05:56	05:06	04:57									
	17:00				19:54		20:52	21:41	22:01									
30	08:17		16:27 (3)		07:06		05:54	05:05	04:58									
	17:02	2	16:29 (3)		19:56		20:54	21:43	22:00									
31	08:15		16:26 (3)		07:04			05:04										
	17:04	5	16:31 (3)		19:58			21:44										
Potential sun hours	250		273		367		420	494	510									
Total, worst case	308		262		536													
Sun reduction	0.24		0.23		0.27													
Oper. time red.	1.00		1.00		1.00													
Wind dir. red.	0.65		0.66		0.68													
Total reduction	0.16		0.15		0.18													
Total, real	48		40		98													

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CC - H81

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:45 (2) 18:18 (2)	07:24 16:17 (3)	15:58 (3) 16:10	08:19 18	14:43 (4) 15:01 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:44 (2) 18:18 (2)	07:26 16:52	15:57 (3) 16:18 (3)	08:21 19	14:42 (4) 15:01 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:44 (2) 18:18 (2)	07:28 16:50	15:56 (3) 16:18 (3)	08:22 22	14:41 (4) 15:03 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:43 (2) 18:19 (2)	07:30 16:48	15:56 (3) 16:17 (3)	08:24 21	14:42 (4) 15:04 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:43 (2) 18:19 (2)	07:32 16:46	15:56 (3) 16:15 (3)	08:25 19	14:41 (4) 15:04 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:43 (2) 18:18 (2)	07:34 16:44	15:56 (3) 16:12 (3)	08:26 16	14:41 (4) 15:06 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:41 (2) 18:17 (2)	07:36 16:43	15:56 (3) 16:10 (3)	08:28 14	14:41 (4) 15:06 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:41 (2) 18:17 (2)	07:38 16:41	15:56 (3) 16:08 (3)	08:29 12	14:41 (4) 15:07 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:42 (2) 18:16 (2)	07:40 16:39	15:57 (3) 16:07 (3)	08:30 10	14:41 (4) 15:08 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:42 (2) 18:14 (2)	07:42 16:37	15:58 (3) 16:05 (3)	08:31 7	14:41 (4) 15:08 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:42 (2) 18:11 (2)	07:44 16:35	15:58 (3) 16:03 (3)	08:33 5	14:41 (4) 15:09 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:43 (2) 18:09 (2)	07:45 16:34	15:59 (3) 16:01 (3)	08:34 2	14:41 (4) 15:09 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:44 (2) 18:07 (2)	07:47 16:32	16:05 (3) 16:05	08:35 28	14:42 (4) 15:10 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:45 (2) 18:04 (2)	07:49 16:31	16:06 (3) 16:04	08:36 28	14:42 (4) 15:10 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:46 (2) 18:02 (2)	07:51 16:29	16:05 (3) 16:04	08:37 29	14:42 (4) 15:11 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:48 (2) 17:59 (2)	07:53 16:27	16:06 (3) 16:05	08:38 29	14:43 (4) 15:12 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:51 (2) 17:57 (2)	07:55 16:26	16:07 (3) 16:05	08:38 29	14:43 (4) 15:12 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:57 (2) 16:24	07:57 16:24	16:08 (3) 16:05	08:39 29	14:44 (4) 15:13 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:59 (2) 16:23	07:59 16:23	16:05 (3) 16:05	08:40 29	14:45 (4) 15:14 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	18:00 16:22	08:00 16:22	16:06 (3) 16:06	08:41 29	14:45 (4) 15:14 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	18:02 (3) 16:20	08:02 16:20	16:07 (3) 16:06	08:42 30	14:45 (4) 15:15 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	18:04 (3) 16:19	08:04 16:19	16:10 (3) 16:06	08:43 30	14:45 (4) 15:15 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	18:06 (3) 16:18	08:06 16:18	16:11 (3) 16:07	08:44 30	14:46 (4) 15:16 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	18:08 (3) 16:17	08:08 16:17	16:12 (3) 16:08	08:45 29	14:47 (4) 15:16 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	17:59 (2) 18:09 (2)	07:11 17:09	08:09 16:16	08:43 16:08	08:43 29	14:47 (4) 15:16 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	17:55 (2) 18:12 (2)	07:13 17:06	08:11 16:14	08:43 16:09	08:43 29	14:47 (4) 15:16 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	17:52 (2) 18:14 (2)	07:15 17:04	08:13 16:13	08:44 16:10	08:44 28	14:49 (4) 15:17 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	17:50 (2) 18:16 (2)	07:16 17:02	08:14 16:12	14:47 (4) 14:55 (4)	08:44 8	14:49 (4) 16:10
29	05:34 21:30	06:27 20:25	07:22 19:09	17:49 (2) 18:17 (2)	07:18 17:00	08:16 16:12	14:44 (4) 14:57 (4)	08:44 13	14:50 (4) 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	17:46 (2) 18:17 (2)	07:20 16:58	08:18 16:14	14:43 (4) 14:59 (4)	08:44 16	14:49 (4) 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56	15:58 (3) 16:15 (3)	08:44 16:13	14:50 (4) 15:18 (4)		08:44 28
Potential sun hours	512	460	382	328	259	233			
Total, worst case			134	517	205	839			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.68	0.68	0.65	0.65			
Total reduction			0.22	0.20	0.17	0.13			
Total, real			29	102	36	112			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CD - H82

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	08:14	16:02 (5)	07:16	16:42 (4)	07:01	05:52	19:39 (2)	05:03		
	16:15	17:06	12 16:14 (5)	18:02	11 16:53 (4)	20:00	20:55	27 20:06 (2)	21:45		
2	08:44	08:12	16:05 (5)	07:14		06:59	05:50		05:02		
	16:16	17:08	5 16:10 (5)	18:04		20:02	20:57	25 20:05 (2)	21:46		
3	08:44	08:10		07:12		17:37 (3)	06:56		05:48		
	16:17	17:10		18:06	1 17:38 (3)	20:04	20:59	22 20:03 (2)	21:48		
4	08:43	08:08	16:38 (4)	07:09		17:36 (3)	06:54		05:46		
	16:18	17:12	3 16:41 (4)	18:07	5 17:41 (3)	20:06	21:01	20 20:02 (2)	21:49		
5	08:43	08:07	16:37 (4)	07:07		17:34 (3)	06:51		05:44		
	16:19	17:14	6 16:43 (4)	18:09	8 17:42 (3)	20:07	21:03	16 20:00 (2)	21:50		
6	08:43	08:05	16:35 (4)	07:04		17:33 (3)	06:49		05:42		
	16:21	17:16	10 16:45 (4)	18:11	12 17:45 (3)	20:09	21:04	11 19:57 (2)	21:51		
7	08:42	08:03	16:34 (4)	07:02		17:32 (3)	06:47		05:40		
	16:22	17:18	13 16:47 (4)	18:13	14 17:46 (3)	20:11	21:06		21:52		
8	08:42	08:01	16:33 (4)	07:00		17:32 (3)	06:44		05:38		
	16:24	17:20	17 16:50 (4)	18:15	16 17:48 (3)	20:13	21:08		21:53		
9	08:41	07:59	16:32 (4)	06:57		17:31 (3)	06:42		05:36		
	16:25	17:22	20 16:52 (4)	18:17	19 17:50 (3)	20:15	21:10		21:54		
10	08:40	07:57	16:32 (4)	06:55		17:31 (3)	06:39		05:34		
	16:26	17:24	22 16:54 (4)	18:19	21 17:52 (3)	20:17	21:11		21:55		
11	08:40	07:55	16:31 (4)	06:52		17:32 (3)	06:37		05:33		
	16:28	17:26	25 16:56 (4)	18:21	23 17:55 (3)	20:19	21:13		21:55		
12	08:39	07:53	16:30 (4)	06:50		17:32 (3)	06:35		05:31		
	16:30	17:28	28 16:58 (4)	18:23	22 17:54 (3)	20:20	19:51 (2)	21:15	21:56		
13	08:38	15:54 (5)	07:51	16:29 (4)	06:48	17:33 (3)	06:32	2 19:53 (2)	05:29		
	16:31	1 15:55 (5)	17:30	17:00 (4)	18:25	20 17:53 (3)	20:22	7 19:54 (2)	21:17		
14	08:37	15:54 (5)	07:49	16:29 (4)	06:45	17:34 (3)	06:30		05:27		
	16:33	3 15:57 (5)	17:32	17:02 (4)	18:27	17 17:51 (3)	20:24	11 19:56 (2)	21:18		
15	08:36	15:54 (5)	07:47	16:29 (4)	06:43	17:36 (3)	06:28		05:26		
	16:34	5 15:59 (5)	17:34	17:05 (4)	18:28	13 17:49 (3)	20:26	15 19:58 (2)	21:20		
16	08:35	15:53 (5)	07:45	16:29 (4)	06:40	17:38 (3)	06:25		05:24		
	16:36	7 16:00 (5)	17:36	17:07 (4)	18:30	7 17:45 (3)	20:28	18 20:00 (2)	21:22		
17	08:34	15:53 (5)	07:43	16:29 (4)	06:38		06:23		05:22		
	16:38	10 16:03 (5)	17:38	17:08 (4)	18:32		20:30	21 20:01 (2)	21:23		
18	08:33	15:53 (5)	07:41	16:29 (4)	06:35		06:21		05:21		
	16:40	12 16:05 (5)	17:40	17:07 (4)	18:34		20:31	24 20:03 (2)	21:25		
19	08:32	15:53 (5)	07:39	16:29 (4)	06:33		06:18		05:19		
	16:41	14 16:07 (5)	17:42	17:07 (4)	18:36		20:33	26 20:05 (2)	21:27		
20	08:31	15:53 (5)	07:36	16:30 (4)	06:31		06:16		05:18		
	16:43	15 16:08 (5)	17:44	17:07 (4)	18:38		20:35	29 20:07 (2)	21:28		
21	08:30	15:53 (5)	07:34	16:30 (4)	06:28		06:14		05:16		
	16:45	18 16:11 (5)	17:46	17:07 (4)	18:40		20:37	31 20:08 (2)	21:30		
22	08:29	15:53 (5)	07:32	16:30 (4)	06:26		06:12		05:15		
	16:47	19 16:12 (5)	17:48	17:05 (4)	18:42		20:39	34 20:10 (2)	21:31		
23	08:27	15:54 (5)	07:30	16:31 (4)	06:23		06:09		05:13		
	16:49	21 16:15 (5)	17:50	17:05 (4)	18:43		20:41	34 20:10 (2)	21:33		
24	08:26	15:54 (5)	07:28	16:32 (4)	06:21		06:07		05:12		
	16:50	23 16:17 (5)	17:52	17:04 (4)	18:45		20:43	34 20:10 (2)	21:34		
25	08:24	15:55 (5)	07:25	16:33 (4)	06:18		06:05		05:11		
	16:52	23 16:18 (5)	17:54	17:02 (4)	18:47		20:44	34 20:10 (2)	21:36		
26	08:23	15:55 (5)	07:23	16:34 (4)	06:16		06:03		05:09		
	16:54	22 16:17 (5)	17:56	17:01 (4)	18:49		20:46	34 20:10 (2)	21:37		
27	08:22	15:55 (5)	07:21	16:37 (4)	06:13		06:01		05:07		
	16:56	22 16:17 (5)	17:58	16:59 (4)	18:51		20:48	32 20:09 (2)	21:39		
28	08:20	15:57 (5)	07:18	16:38 (4)	06:11		05:58		05:07		
	16:58	20 16:17 (5)	18:00	16:56 (4)	18:53		20:50	32 20:09 (2)	21:40		
29	08:18	15:57 (5)		07:08			05:56		05:06		
	17:00	19 16:16 (5)		19:54			20:52	30 20:08 (2)	21:41		
30	08:17	15:58 (5)		07:06			05:54		05:05		
	17:02	18 16:16 (5)		19:56			20:54	29 20:07 (2)	21:43		
31	08:15	15:59 (5)		07:04					05:04		
	17:04	15 16:14 (5)		19:58					21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case		287		685		209		477		121	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.66		0.68		0.65		0.65	
Total reduction		0.16		0.15		0.18		0.23		0.25	
Total, real		46		105		38		109		30	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CD - H82

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:11 (3) 16:54	16:01 (4) 16:23 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:10 (3) 16:52	16:02 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:10 (3) 16:50	16:03 (4) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:09 (3) 16:48	16:04 (4) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:09 (3) 16:46	16:05 (4) 16:07
6	05:03 21:58	05:47 21:15	20:00 (2) 20:06	07:35 18:52	18:09 (3) 16:44	16:07 (4) 16:07
7	05:04 21:57	05:49 21:13	19:56 (2) 20:04	07:37 18:50	18:08 (3) 16:43	16:08 (4) 16:06
8	05:05 21:56	05:50 21:12	19:52 (2) 20:01	07:39 18:48	18:08 (3) 16:41	16:08 (4) 16:06
9	05:06 21:55	05:52 21:10	19:51 (2) 19:59	07:41 18:45	18:09 (3) 16:39	15:35 (5) 16:05
10	05:07 21:55	05:54 21:07	19:49 (2) 19:56	07:42 18:43	18:10 (3) 16:37	15:33 (5) 16:05
11	05:08 21:54	05:56 21:05	19:48 (2) 19:54	07:44 18:40	17:44 16:35	15:31 (5) 16:05
12	05:09 21:53	05:57 21:03	19:47 (2) 19:51	07:46 18:38	17:45 16:34	15:30 (5) 16:05
13	05:10 21:52	05:59 21:01	19:45 (2) 19:49	07:48 18:36	17:13 (4) 16:32	15:29 (5) 16:05
14	05:12 21:51	06:01 20:59	19:45 (2) 19:47	07:50 18:33	17:10 (4) 16:31	15:28 (5) 16:04
15	05:13 21:50	06:03 20:57	19:44 (2) 19:44	07:52 18:31	17:08 (4) 16:29	15:28 (5) 16:05
16	05:14 21:49	06:04 20:55	19:43 (2) 19:42	07:54 18:29	17:06 (4) 16:27	15:28 (5) 16:05
17	05:16 21:47	06:06 20:53	19:43 (2) 19:39	07:55 18:26	17:04 (4) 16:26	15:28 (5) 16:05
18	05:17 21:46	06:08 20:51	19:43 (2) 19:37	07:57 18:24	17:03 (4) 16:24	15:28 (5) 16:05
19	05:18 21:45	06:10 20:48	19:42 (2) 19:34	07:59 18:22	17:02 (4) 16:23	15:28 (5) 16:05
20	05:20 21:44	06:12 20:46	19:42 (2) 19:32	08:01 18:20	17:01 (4) 16:22	15:28 (5) 16:06
21	05:21 21:42	06:13 20:44	19:42 (2) 19:29	08:03 18:17	17:00 (4) 16:20	15:28 (5) 16:06
22	05:23 21:41	06:15 20:42	19:41 (2) 19:27	08:05 18:15	17:00 (4) 16:19	15:29 (5) 16:06
23	05:24 21:39	06:17 20:39	19:42 (2) 19:24	08:07 18:13	16:59 (4) 16:18	15:29 (5) 16:07
24	05:26 21:38	06:19 20:37	19:42 (2) 19:22	08:09 18:11	16:59 (4) 16:17	15:30 (5) 16:08
25	05:27 21:36	06:20 20:35	19:42 (2) 19:19	07:11 17:09	15:59 (4) 16:16	15:31 (5) 16:08
26	05:29 21:35	06:22 20:32	19:43 (2) 19:17	07:13 17:06	15:59 (4) 16:14	15:32 (5) 16:09
27	05:30 21:33	06:24 20:30	19:44 (2) 19:14	07:15 18:23 (3)	15:59 (4) 17:04	15:33 (5) 16:10
28	05:32 21:32	06:26 20:28	19:44 (2) 19:12	07:16 18:17 (3)	15:59 (4) 17:02	15:34 (5) 16:11
29	05:34 21:30	06:27 20:25	19:46 (2) 19:09	07:18 18:15 (3)	15:59 (4) 17:00	15:34 (5) 16:11
30	05:35 21:28	06:29 20:23	19:48 (2) 19:07	07:20 18:12 (3)	15:59 (4) 16:58	15:35 (5) 16:12
31	05:37 21:26	06:31 20:21	19:50 (2) 19:52 (2)	07:22 16:56	16:00 (4) 16:25 (4)	16:00 (4) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		609	48	750	394	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.68	0.66	0.66	
Total reduction		0.22	0.22	0.19	0.18	
Total, real		135	10	146	69	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CE - H83

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June	
1	08:44		08:14	16:26 (5)	07:16	17:16 (4)	07:01		05:52	20:06 (2)	05:03	
	16:15		17:06	9 16:35 (5)	18:02	18 17:34 (4)	20:00		20:55	20 20:26 (2)	21:45	
2	08:44		08:12	16:25 (5)	07:14	17:14 (4)	06:59		05:50	20:05 (2)	05:02	
	16:16		17:08	12 16:37 (5)	18:04	22 17:36 (4)	20:02		20:57	22 20:27 (2)	21:46	
3	08:43		08:10	16:25 (5)	07:12	17:14 (4)	06:56		05:48	20:04 (2)	05:01	
	16:17		17:10	14 16:39 (5)	18:06	24 17:38 (4)	20:04		20:59	25 20:29 (2)	21:48	
4	08:43		08:08	16:24 (5)	07:09	17:13 (4)	06:54		05:46	20:04 (2)	05:00	
	16:18		17:12	17 16:41 (5)	18:07	28 17:41 (4)	20:06		21:01	26 20:30 (2)	21:49	
5	08:43		08:07	16:24 (5)	07:07	17:12 (4)	06:51		05:44	20:03 (2)	04:59	
	16:19		17:14	19 16:43 (5)	18:09	30 17:42 (4)	20:07		21:03	29 20:32 (2)	21:50	
6	08:42		08:05	16:24 (5)	07:04	17:12 (4)	06:49		05:42	20:03 (2)	04:59	
	16:21		17:16	21 16:45 (5)	18:11	33 17:45 (4)	20:09		21:04	30 20:33 (2)	21:51	
7	08:42		08:03	16:24 (5)	07:02	17:11 (4)	06:47		05:40	20:04 (2)	04:58	
	16:22		17:18	23 16:47 (5)	18:13	35 17:46 (4)	20:11		21:06	30 20:34 (2)	21:52	
8	08:42		08:01	16:25 (5)	07:00	17:11 (4)	06:44		05:38	20:04 (2)	04:57	
	16:24		17:20	23 16:48 (5)	18:15	37 17:48 (4)	20:13		21:08	29 20:33 (2)	21:53	
9	08:41		07:59	16:25 (5)	06:57	17:10 (4)	06:42		05:36	20:03 (2)	04:57	
	16:25		17:22	23 16:48 (5)	18:17	37 17:47 (4)	20:15		21:10	30 20:33 (2)	21:54	
10	08:40		07:57	16:26 (5)	06:55	17:11 (4)	06:39		05:34	20:03 (2)	04:56	
	16:26		17:24	21 16:47 (5)	18:19	36 17:47 (4)	20:17		21:11	29 20:32 (2)	21:55	
11	08:40		07:55	16:27 (5)	06:52	17:11 (4)	06:37		05:33	20:04 (2)	04:56	
	16:28		17:26	20 16:47 (5)	18:21	36 17:47 (4)	20:19		21:13	29 20:33 (2)	21:55	
12	08:39		07:53	16:27 (5)	06:50	17:11 (4)	06:35		05:31	20:04 (2)	04:55	
	16:30		17:28	18 16:45 (5)	18:23	35 17:46 (4)	20:20		21:15	28 20:32 (2)	21:56	
13	08:38		07:51	16:29 (5)	06:48	17:12 (4)	06:32		05:29	20:05 (2)	04:55	
	16:31		17:30	14 16:43 (5)	18:25	33 17:45 (4)	20:22		21:17	26 20:31 (2)	21:57	
14	08:37		07:49	16:31 (5)	06:45	17:12 (4)	06:30		05:27	20:06 (2)	04:55	
	16:33		17:32	10 16:41 (5)	18:27	32 17:44 (4)	20:24		21:18	25 20:31 (2)	21:57	
15	08:36		07:47		06:43	17:13 (4)	06:28		05:26	20:06 (2)	04:55	
	16:34		17:34		18:28	32 18:02 (3)	20:26		21:20	23 20:29 (2)	21:58	
16	08:35		07:45		06:40	17:14 (4)	06:25		05:24	20:08 (2)	04:54	
	16:36		17:36		18:30	33 18:04 (3)	20:28		21:22	21 20:29 (2)	21:59	
17	08:34		07:43		06:38	17:16 (4)	06:23		05:22	20:08 (2)	04:54	
	16:38		17:38		18:32	32 18:06 (3)	20:30		21:23	20 20:28 (2)	21:59	
18	08:33		07:41		06:35	17:17 (4)	06:21		05:21	20:10 (2)	04:54	
	16:40		17:40		18:34	31 18:07 (3)	20:31		21:25	17 20:27 (2)	22:00	
19	08:32		07:39		06:33	17:21 (4)	06:18		05:19	20:12 (2)	04:54	
	16:41		17:42		18:36	27 18:10 (3)	20:33		21:27	14 20:26 (2)	22:00	
20	08:31		07:36		06:31	17:54 (3)	06:16		05:18	20:13 (2)	04:54	
	16:43		17:44		18:38	17 18:11 (3)	20:35		21:28	10 20:23 (2)	22:00	
21	08:30		07:34		06:28	17:54 (3)	06:14		05:16		04:54	
	16:45		17:46		18:40	19 18:13 (3)	20:37		21:30		22:01	
22	08:28		07:32		06:26	17:54 (3)	06:12		05:15		04:55	
	16:47		17:48		18:41	21 18:15 (3)	20:39		21:31		22:01	
23	08:27		07:30		06:23	17:55 (3)	06:09		05:13		04:55	
	16:49		17:50		18:43	21 18:16 (3)	20:41		21:33		22:01	
24	08:26		07:28		06:21	17:55 (3)	06:07		05:12		04:55	
	16:50		17:52		18:45	19 18:14 (3)	20:42		21:34		22:01	
25	08:24		07:25	17:23 (4)	06:18	17:56 (3)	06:05		05:11		04:55	
	16:52		17:54	3 17:26 (4)	18:47	17 18:13 (3)	20:44		21:36		22:01	
26	08:23		07:23	17:21 (4)	06:16	17:57 (3)	06:03	20:12 (2)	05:09		04:56	
	16:54		17:56	7 17:28 (4)	18:49	14 18:11 (3)	20:46	5 20:17 (2)	21:37		22:01	
27	08:22		07:21	17:19 (4)	06:13	18:00 (3)	06:01	20:10 (2)	05:08		04:56	
	16:56		17:58	12 17:31 (4)	18:51	8 18:08 (3)	20:48	9 20:19 (2)	21:39		22:01	
28	08:20		07:18	17:17 (4)	06:11		05:58	20:09 (2)	05:07		04:57	
	16:58		18:00	15 17:32 (4)	18:53		20:50	12 20:21 (2)	21:40		22:01	
29	08:18				07:08		05:56	20:07 (2)	05:06		04:57	
	17:00				19:54		20:52	15 20:22 (2)	21:41		22:01	
30	08:17	16:27 (5)			07:06		05:54	20:06 (2)	05:05		04:58	
	17:02	3 16:30 (5)			19:56		20:53	18 20:24 (2)	21:43		22:00	
31	08:15	16:26 (5)			07:04				05:04			
	17:04	6 16:32 (5)			19:58				21:44			
Potential sun hours	250		273		367		420		494		510	
Total, worst case	9		281		727		59		483			
Sun reduction	0.24		0.23		0.27		0.35		0.38			
Oper. time red.	1.00		1.00		1.00		1.00		1.00			
Wind dir. red.	0.66		0.66		0.68		0.65		0.65			
Total reduction	0.16		0.15		0.18		0.23		0.25			
Total, real	1		43		133		13		119			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CE - H83

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1 04:59	05:39	20:15 (2) 06:33	07:26	17:50 (4) 07:24	15:55 (5) 08:19	
22:00	21:25	27 20:42 (2) 20:18	19:05	34 18:24 (4) 16:54	22 16:17 (5) 16:10	
2 04:59	05:40	20:15 (2) 06:35	07:28	17:49 (4) 07:26	15:55 (5) 08:21	
22:00	21:23	28 20:43 (2) 20:16	19:02	36 18:25 (4) 16:52	22 16:17 (5) 16:09	
3 05:00	05:42	20:14 (2) 06:36	07:30	17:49 (4) 07:28	15:54 (5) 08:22	
21:59	21:21	29 20:43 (2) 20:13	19:00	36 18:25 (4) 16:50	24 16:18 (5) 16:08	
4 05:01	05:44	20:14 (2) 06:38	07:31	17:48 (4) 07:30	15:54 (5) 08:24	
21:59	21:19	29 20:43 (2) 20:11	18:57	37 18:25 (4) 16:48	23 16:17 (5) 16:08	
5 05:02	05:45	20:13 (2) 06:40	07:33	17:48 (4) 07:32	15:54 (5) 08:25	
21:58	21:17	30 20:43 (2) 20:09	18:55	37 18:25 (4) 16:46	21 16:15 (5) 16:07	
6 05:03	05:47	20:13 (2) 06:42	07:35	17:48 (4) 07:34	15:54 (5) 08:26	
21:58	21:15	30 20:43 (2) 20:06	18:52	36 18:24 (4) 16:44	18 16:12 (5) 16:07	
7 05:04	05:49	20:13 (2) 06:43	07:37	17:47 (4) 07:36	15:54 (5) 08:28	
21:57	21:13	30 20:43 (2) 20:04	18:50	34 18:21 (4) 16:43	16 16:10 (5) 16:06	
8 05:05	05:50	20:13 (2) 06:45	07:39	17:47 (4) 07:38	15:54 (5) 08:29	
21:56	21:12	28 20:41 (2) 20:01	18:48	31 18:18 (4) 16:41	14 16:08 (5) 16:06	
9 05:06	05:52	20:13 (2) 06:47	07:41	17:47 (4) 07:40	15:55 (5) 08:30	
21:55	21:10	26 20:39 (2) 19:59	18:45	29 18:16 (4) 16:39	11 16:06 (5) 16:05	
10 05:07	05:54	20:13 (2) 06:49	07:42	17:47 (4) 07:42	15:57 (5) 08:31	
21:55	21:07	24 20:37 (2) 19:56	18:43	27 18:14 (4) 16:37	8 16:05 (5) 16:05	
11 05:08	05:56	20:13 (2) 06:50	07:44	17:48 (4) 07:44	15:58 (5) 08:33	
21:54	21:05	22 20:35 (2) 19:54	18:40	23 18:11 (4) 16:35	5 16:03 (5) 16:05	
12 05:09	05:57	20:14 (2) 06:52	07:46	17:49 (4) 07:45	15:59 (5) 08:34	
21:53	21:03	20 20:34 (2) 19:51	18:38	20 18:09 (4) 16:34	2 16:01 (5) 16:05	
13 05:10	05:59	20:14 (2) 06:54	07:48	17:50 (4) 07:47	08:35	
21:52	21:01	17 20:31 (2) 19:49	18:36	17 18:07 (4) 16:32	16:05	
14 05:12	06:01	20:15 (2) 06:56	07:50	17:51 (4) 07:49	08:36	
21:51	20:59	14 20:29 (2) 19:47	18:33	13 18:04 (4) 16:31	16:04	
15 05:13	06:03	20:16 (2) 06:58	07:52	17:52 (4) 07:51	08:37	
21:50	20:57	12 20:28 (2) 19:44	18:31	10 18:02 (4) 16:29	16:05	
16 05:14	06:04	20:17 (2) 06:59	6 18:50 (3) 07:54	17:54 (4) 07:53	08:38	
21:49	20:55	8 20:25 (2) 19:42	6 18:56 (3) 18:29	5 17:59 (4) 16:27	16:05	
17 05:16	06:06	20:19 (2) 07:01	18:46 (3) 07:55	07:55	08:38	
21:47	20:53	4 20:23 (2) 19:39	13 18:59 (3) 18:26	16:26	16:05	
18 05:17	06:08	07:03	18:44 (3) 07:57	07:57	08:39	
21:46	20:50	19:37	16 19:00 (3) 18:24	16:24	16:05	
19 05:18	06:10	07:05	18:42 (3) 07:59	07:59	08:40	
21:45	20:48	19:34	19 19:01 (3) 18:22	16:23	16:05	
20 05:20	06:12	07:06	18:41 (3) 08:01	08:00	08:41	
21:44	20:46	19:32	21 19:02 (3) 18:20	16:22	16:06	
21 05:21	06:13	07:08	18:40 (3) 08:03	08:02	08:41	
21:42	20:44	19:29	21 19:01 (3) 18:17	16:20	16:06	
22 05:23	06:15	07:10	18:39 (3) 08:05	08:04	08:42	
21:41	20:42	19:27	19 18:58 (3) 18:15	16:19	16:06	
23 05:24	20:26 (2) 06:17	07:12	18:39 (3) 08:07	08:06	08:42	
21:39	6 20:32 (2) 20:39	19:24	17 18:56 (3) 18:13	16:18	16:07	
24 05:26	20:23 (2) 06:19	07:13	18:06 (4) 08:09	08:08	08:43	
21:38	12 20:35 (2) 20:37	19:22	25 18:54 (3) 18:11	16:17	16:08	
25 05:27	20:21 (2) 06:20	07:15	18:01 (4) 07:11	08:09	08:43	
21:36	16 20:37 (2) 20:35	19:19	30 18:51 (3) 17:09	16:16	16:08	
26 05:29	20:20 (2) 06:22	07:17	17:58 (4) 07:13	08:11	08:43	
21:35	18 20:38 (2) 20:32	19:17	32 18:48 (3) 17:06	16:14	16:09	
27 05:30	20:18 (2) 06:24	07:19	17:56 (4) 07:15	16:04 (5) 08:13	08:44	
21:33	20 20:38 (2) 20:30	19:14	33 18:46 (3) 17:04	4 16:08 (5) 16:13	16:10	
28 05:32	20:18 (2) 06:26	07:21	17:54 (4) 07:16	16:00 (5) 08:14	08:44	
21:32	22 20:40 (2) 20:28	19:12	33 18:44 (3) 17:02	12 16:12 (5) 16:12	16:11	
29 05:34	20:16 (2) 06:27	07:22	17:53 (4) 07:18	15:58 (5) 08:16	08:44	
21:30	24 20:40 (2) 20:25	19:09	31 18:24 (4) 17:00	15 16:13 (5) 16:12	16:11	
30 05:35	20:16 (2) 06:29	07:24	17:51 (4) 07:20	15:56 (5) 08:18	08:44	
21:28	25 20:41 (2) 20:23	19:07	33 18:24 (4) 16:58	18 16:14 (5) 16:11	16:12	
31 05:37	20:16 (2) 06:31	07:22	16:55	15:55 (5) 08:18	08:44	
21:26	26 20:42 (2) 20:21	16:56	20 16:15 (5) 16:13	16:13	16:13	
Potential sun hours	512	460	382	328	259	233
Total, worst case	169	378	349	494	186	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.65	0.65	0.68	0.67	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.17	
Total, real	35	83	76	98	32	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CF - H84

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	16:21 (5) 18:02	07:16 17:34 (4)	07:01 20:00	05:52 20:26 (2)
2	08:44 16:16	08:12 17:08	16:20 (5) 18:04	07:14 17:36 (4)	06:59 20:02	20:26 (2) 20:50 (2)
3	08:43 16:17	08:10 17:10	16:20 (5) 18:06	07:12 17:38 (4)	06:56 20:04	20:50 (2) 20:52 (2)
4	08:43 16:18	08:08 17:12	16:20 (5) 18:07	07:09 17:41 (4)	06:54 20:06	20:52 (2) 20:30 (2)
5	08:43 16:19	08:07 17:14	16:20 (5) 18:09	07:07 17:42 (4)	06:51 20:07	20:30 (2) 20:32 (2)
6	08:42 16:21	08:05 17:16	16:20 (5) 18:11	07:04 17:45 (4)	06:49 20:09	20:32 (2) 20:33 (2)
7	08:42 16:22	08:03 17:18	16:21 (5) 18:13	07:02 17:44 (4)	06:47 20:11	20:33 (2) 20:35 (2)
8	08:42 16:24	08:01 17:20	16:21 (5) 18:15	07:00 17:44 (4)	06:44 20:13	20:35 (2) 20:34 (2)
9	08:41 16:25	07:59 17:22	16:22 (5) 18:17	06:57 17:43 (4)	06:42 20:15	20:34 (2) 20:34 (2)
10	08:40 16:26	07:57 17:24	16:23 (5) 18:19	06:55 17:43 (4)	06:39 20:17	20:34 (2) 20:33 (2)
11	08:40 16:28	07:55 17:26	16:24 (5) 18:21	06:52 17:43 (4)	06:37 20:19	20:33 (2) 20:34 (2)
12	08:39 16:30	07:53 17:28	16:25 (5) 18:23	06:50 17:41 (4)	06:35 20:20	20:34 (2) 20:33 (2)
13	08:38 16:31	07:51 17:30	16:28 (5) 18:25	06:48 17:40 (4)	06:32 20:22	20:33 (2) 20:32 (2)
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 18:00 (3)	06:30 20:24	20:32 (2) 20:32 (2)
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 18:02 (3)	06:28 20:26	20:31 (2) 20:31 (2)
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 18:04 (3)	06:25 20:28	20:31 (2) 20:31 (2)
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 18:06 (3)	06:23 20:30	20:31 (2) 20:29 (2)
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 18:07 (3)	06:21 20:31	20:28 (2) 20:29 (2)
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 18:10 (3)	06:18 20:33	20:28 (2) 20:28 (2)
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 18:11 (3)	06:16 20:35	20:27 (2) 20:26 (2)
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 18:13 (3)	06:14 20:37	20:26 (2) 20:25 (2)
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 18:14 (3)	06:12 20:39	20:24 (2) 20:22 (2)
23	08:27 16:49	07:30 17:50	06:23 17:19 (4)	06:09 17:53 (3)	06:09 20:41	20:21 (2) 20:21 (2)
24	08:26 16:50	07:28 17:52	06:21 17:24 (4)	06:07 18:12 (3)	06:07 20:42	20:20 (2) 20:20 (2)
25	08:24 16:52	07:25 17:54	06:18 17:14 (4)	06:05 17:55 (3)	06:05 20:44	20:19 (2) 20:19 (2)
26	08:23 16:54	07:23 17:56	06:16 17:16 (4)	06:03 18:11 (3)	06:03 20:46	20:18 (2) 20:18 (2)
27	08:22 16:56	07:21 17:58	06:13 17:12 (4)	06:01 18:08 (3)	06:01 20:48	20:17 (2) 20:17 (2)
28	08:20 16:58	07:18 18:00	06:11 17:10 (4)	05:58 20:50	05:58 20:50	20:16 (2) 20:16 (2)
29	08:18 17:00	16:22 (5) 16:28 (5)	07:08 19:54	05:56 20:52	05:56 20:52	20:15 (2) 20:15 (2)
30	08:17 17:02	16:21 (5) 16:30 (5)	07:06 19:56	05:54 20:53	05:54 20:53	20:14 (2) 20:14 (2)
31	08:15 17:04	16:20 (5) 16:32 (5)	07:04 19:58	05:52 21:44	05:52 21:44	20:13 (2) 20:13 (2)
Potential sun hours	250	273	367	420	494	510
Total, worst case	30	320	741	57	534	
Sun reduction	0.24	0.23	0.27	0.35	0.38	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.66	0.66	0.68	0.64	0.64	
Total reduction	0.16	0.15	0.18	0.23	0.25	
Total, real	5	49	136	13	131	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CF - H84

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1 04:59	05:39	20:14 (2) 06:33	07:26	17:46 (4) 07:24	15:52 (5) 08:19	
22:00	21:25	29 20:43 (2) 20:18	19:05	34 18:20 (4) 16:54	20 16:12 (5) 16:10	
2 04:59	05:40	20:14 (2) 06:35	07:28	17:45 (4) 07:26	15:52 (5) 08:21	
22:00	21:23	30 20:44 (2) 20:16	19:02	35 18:20 (4) 16:52	21 16:13 (5) 16:09	
3 05:00	05:42	20:13 (2) 06:36	07:30	17:44 (4) 07:28	15:51 (5) 08:22	
21:59	21:21	31 20:44 (2) 20:13	19:00	37 18:21 (4) 16:50	22 16:13 (5) 16:08	
4 05:01	05:44	20:13 (2) 06:38	07:31	17:44 (4) 07:30	15:50 (5) 08:24	
21:59	21:19	31 20:44 (2) 20:11	18:57	37 18:21 (4) 16:48	24 16:14 (5) 16:08	
5 05:02	05:45	20:13 (2) 06:40	07:33	17:43 (4) 07:32	15:50 (5) 08:25	
21:58	21:17	31 20:44 (2) 20:09	18:55	38 18:21 (4) 16:46	24 16:14 (5) 16:07	
6 05:03	05:47	20:13 (2) 06:42	07:35	17:43 (4) 07:34	15:50 (5) 08:26	
21:58	21:15	31 20:44 (2) 20:06	18:52	38 18:21 (4) 16:44	22 16:12 (5) 16:07	
7 05:04	05:49	20:13 (2) 06:43	07:37	17:42 (4) 07:36	15:50 (5) 08:28	
21:57	21:13	30 20:43 (2) 20:04	18:50	38 18:20 (4) 16:43	20 16:10 (5) 16:06	
8 05:05	05:50	20:13 (2) 06:45	07:39	17:41 (4) 07:38	15:50 (5) 08:29	
21:56	21:12	28 20:41 (2) 20:01	18:48	37 18:18 (4) 16:41	18 16:08 (5) 16:06	
9 05:06	05:52	20:13 (2) 06:47	07:41	17:41 (4) 07:40	15:50 (5) 08:30	
21:55	21:10	26 20:39 (2) 19:59	18:45	35 18:16 (4) 16:39	16 16:06 (5) 16:05	
10 05:07	05:54	20:13 (2) 06:49	07:42	17:42 (4) 07:42	15:51 (5) 08:31	
21:55	21:07	24 20:37 (2) 19:56	18:43	32 18:14 (4) 16:37	14 16:05 (5) 16:05	
11 05:08	05:56	20:13 (2) 06:50	07:44	17:42 (4) 07:44	15:52 (5) 08:33	
21:54	21:05	22 20:35 (2) 19:54	18:40	29 18:11 (4) 16:35	11 16:03 (5) 16:05	
12 05:09	05:57	20:14 (2) 06:52	07:46	17:42 (4) 07:45	15:53 (5) 08:34	
21:53	21:03	20 20:34 (2) 19:51	18:38	27 18:09 (4) 16:34	8 16:01 (5) 16:05	
13 05:10	05:59	20:14 (2) 06:54	07:48	17:43 (4) 07:47	15:54 (5) 08:35	
21:52	21:01	17 20:31 (2) 19:49	18:36	24 18:07 (4) 16:32	5 15:59 (5) 16:05	
14 05:12	06:01	20:15 (2) 06:56	07:50	17:43 (4) 07:49	15:55 (5) 08:36	
21:51	20:59	14 20:29 (2) 19:47	18:33	21 18:04 (4) 16:31	3 15:58 (5) 16:04	
15 05:13	06:03	20:17 (2) 06:58	07:52	17:44 (4) 07:51	08:37	
21:50	20:57	11 20:28 (2) 19:44	18:31	18 18:02 (4) 16:29	16:05	
16 05:14	06:04	20:17 (2) 06:59	07:54	17:45 (4) 07:53	08:38	
21:49	20:55	8 20:25 (2) 19:42	18:29	14 17:59 (4) 16:27	16:05	
17 05:16	06:06	20:20 (2) 07:01	18:46 (3) 07:55	17:47 (4) 07:55	08:38	
21:47	20:53	3 20:23 (2) 19:39	9 18:55 (3) 18:26	10 17:57 (4) 16:26	16:05	
18 05:17	06:08	07:03	18:43 (3) 07:57	17:49 (4) 07:57	08:39	
21:46	20:50	19:37	15 18:58 (3) 18:24	6 17:55 (4) 16:24	16:05	
19 05:18	06:10	07:05	18:41 (3) 07:59	07:59	08:40	
21:45	20:48	19:34	18 18:59 (3) 18:22	16:23	16:05	
20 05:20	06:12	07:06	18:40 (3) 08:01	08:00	08:41	
21:44	20:46	19:32	20 19:00 (3) 18:20	16:22	16:06	
21 05:21	06:13	07:08	18:38 (3) 08:03	08:02	08:41	
21:42	20:44	19:29	22 19:00 (3) 18:17	16:20	16:06	
22 05:23	20:24 (2) 06:15	07:10	18:37 (3) 08:05	08:04	08:42	
21:41	9 20:33 (2) 20:42	19:27	21 18:58 (3) 18:15	16:19	16:06	
23 05:24	20:22 (2) 06:17	07:12	18:37 (3) 08:07	08:06	08:42	
21:39	14 20:36 (2) 20:39	19:24	19 18:56 (3) 18:13	16:18	16:07	
24 05:26	20:20 (2) 06:19	07:13	18:37 (3) 08:09	08:08	08:43	
21:38	17 20:37 (2) 20:37	19:22	17 18:54 (3) 18:11	16:17	16:08	
25 05:27	20:20 (2) 06:20	07:15	18:01 (4) 07:11	08:09	08:43	
21:36	19 20:39 (2) 20:35	19:19	23 18:51 (3) 17:09	16:16	16:08	
26 05:29	20:18 (2) 06:22	07:17	17:57 (4) 07:13	08:11	08:43	
21:35	22 20:40 (2) 20:32	19:17	28 18:48 (3) 17:06	16:14	16:09	
27 05:30	20:17 (2) 06:24	07:19	17:54 (4) 07:15	08:13	08:44	
21:33	23 20:40 (2) 20:30	19:14	32 18:46 (3) 17:04	16:13	16:10	
28 05:32	20:17 (2) 06:26	07:21	17:52 (4) 07:16	08:14	08:44	
21:32	24 20:41 (2) 20:28	19:12	32 18:44 (3) 17:02	16:12	16:11	
29 05:34	20:15 (2) 06:27	07:22	17:50 (4) 07:18	15:57 (5) 08:16	08:44	
21:30	27 20:42 (2) 20:25	19:09	32 18:41 (3) 17:00	9 16:06 (5) 16:12	16:11	
30 05:35	20:15 (2) 06:29	07:24	17:47 (4) 07:20	15:54 (5) 08:18	08:44	
21:28	28 20:43 (2) 20:23	19:07	32 18:19 (4) 16:58	15 16:09 (5) 16:11	16:12	
31 05:37	20:15 (2) 06:31	07:22	07:22	15:53 (5) 08:12	08:44	
21:26	29 20:44 (2) 20:21	16:56	17 16:10 (5) 08:12	16:13	16:13	
Potential sun hours	512	460	382	328	259	233
Total, worst case	212	386	320	551	228	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.64	0.64	0.68	0.68	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.17	
Total, real	44	85	69	109	40	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CG - H85

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:15 (5)	07:16	17:02 (4)	07:01				05:52		20:05 (2)	05:03			
	16:15			17:06	20 16:35 (5)	18:02	32 17:34 (4)	20:00				20:55	21	20:26 (2)	21:45			
2	08:44			08:12	16:15 (5)	07:14	17:01 (4)	06:59				05:50		20:04 (2)	05:02			
	16:16			17:08	22 16:37 (5)	18:04	35 17:36 (4)	20:02				20:57	23	20:27 (2)	21:46			
3	08:43			08:10	16:15 (5)	07:12	17:01 (4)	06:56				05:48		20:04 (2)	05:01			
	16:17			17:10	24 16:39 (5)	18:06	37 17:38 (4)	20:04				20:59	25	20:29 (2)	21:48			
4	08:43			08:08	16:15 (5)	07:09	17:01 (4)	06:54				05:46		20:03 (2)	05:00			
	16:18			17:12	25 16:40 (5)	18:07	40 17:41 (4)	20:06				21:01	27	20:30 (2)	21:49			
5	08:43			08:07	16:16 (5)	07:07	17:00 (4)	06:51				05:44		20:03 (2)	04:59			
	16:19			17:14	24 16:40 (5)	18:09	40 17:40 (4)	20:07				21:03	29	20:32 (2)	21:50			
6	08:42			08:05	16:16 (5)	07:04	17:01 (4)	06:49				05:42		20:02 (2)	04:59			
	16:21			17:16	23 16:39 (5)	18:11	39 17:40 (4)	20:09				21:04	31	20:33 (2)	21:51			
7	08:42			08:03	16:17 (5)	07:02	17:00 (4)	06:47				05:40		20:03 (2)	04:58			
	16:22			17:18	22 16:39 (5)	18:13	39 17:39 (4)	20:11				21:06	32	20:35 (2)	21:52			
8	08:42			08:01	16:18 (5)	07:00	17:01 (4)	06:44				05:38		20:03 (2)	04:57			
	16:24			17:20	20 16:38 (5)	18:15	38 17:39 (4)	20:13				21:08	32	20:35 (2)	21:53			
9	08:41			07:59	16:19 (5)	06:57	17:01 (4)	06:42				05:36		20:02 (2)	04:57			
	16:25			17:22	18 16:37 (5)	18:17	37 17:38 (4)	20:15				21:10	32	20:34 (2)	21:54			
10	08:40			07:57	16:21 (5)	06:55	17:01 (4)	06:39				05:34		20:02 (2)	04:56			
	16:26			17:24	15 16:36 (5)	18:19	36 17:37 (4)	20:17				21:11	32	20:34 (2)	21:55			
11	08:40			07:55	16:23 (5)	06:52	17:03 (4)	06:37				05:33		20:03 (2)	04:56			
	16:28			17:26	11 16:34 (5)	18:21	34 17:37 (4)	20:19				21:13	31	20:34 (2)	21:55			
12	08:39			07:53		06:50	17:03 (4)	06:35				05:31		20:03 (2)	04:55			
	16:30			17:28		18:23	32 17:35 (4)	20:20				21:15	31	20:34 (2)	21:56			
13	08:38			07:51		06:48	17:04 (4)	06:32				05:29		20:03 (2)	04:55			
	16:31			17:30		18:25	32 17:58 (3)	20:22				21:17	30	20:33 (2)	21:57			
14	08:37			07:49		06:45	17:05 (4)	06:30				05:27		20:04 (2)	04:55			
	16:33			17:32		18:27	32 18:00 (3)	20:24				21:18	29	20:33 (2)	21:58			
15	08:36			07:47		06:43	17:07 (4)	06:28				05:26		20:04 (2)	04:55			
	16:34			17:34		18:28	32 18:02 (3)	20:26				21:20	28	20:32 (2)	21:58			
16	08:35			07:45		06:40	17:09 (4)	06:25				05:24		20:05 (2)	04:54			
	16:36			17:36		18:30	29 18:04 (3)	20:28				21:22	27	20:32 (2)	21:59			
17	08:34			07:43		06:38	17:15 (4)	06:23				05:22		20:05 (2)	04:54			
	16:38			17:38		18:32	22 18:06 (3)	20:30				21:23	26	20:31 (2)	21:59			
18	08:33			07:41		06:35	17:50 (3)	06:21				05:21		20:07 (2)	04:54			
	16:40			17:40		18:34	17 18:07 (3)	20:31				21:25	23	20:30 (2)	22:00			
19	08:32			07:39		06:33	17:51 (3)	06:18				05:19		20:08 (2)	04:54			
	16:41			17:42		18:36	19 18:10 (3)	20:33				21:27	22	20:30 (2)	22:00			
20	08:31			07:36		06:31	17:50 (3)	06:16				05:18		20:09 (2)	04:54			
	16:43			17:44		18:38	21 18:11 (3)	20:35				21:28	19	20:28 (2)	22:00			
21	08:30			07:34		06:28	17:50 (3)	06:14				05:16		20:10 (2)	04:54			
	16:45			17:46	5 17:18 (4)	18:40	23 18:13 (3)	20:37				21:30	17	20:27 (2)	22:01			
22	08:29			07:32		06:26	17:50 (3)	06:12				05:15		20:12 (2)	04:55			
	16:47			17:48	9 17:19 (4)	18:42	22 18:12 (3)	20:39				21:31	14	20:26 (2)	22:01			
23	08:27			07:30		06:23	17:51 (3)	06:09				05:13		20:14 (2)	04:55			
	16:49			17:50	13 17:22 (4)	18:43	20 18:11 (3)	20:41				21:33	9	20:23 (2)	22:01			
24	08:26			07:28		06:21	17:52 (3)	06:07				05:12		04:55				
	16:50			17:52	17 17:24 (4)	18:45	17 18:09 (3)	20:42				21:34		22:01				
25	08:24		16:18 (5)	07:25		06:18	17:54 (3)	06:05				05:11		04:55				
	16:52	1	16:19 (5)	17:54	21 17:26 (4)	18:47	13 18:07 (3)	20:44				21:36		22:01				
26	08:23		16:17 (5)	07:23		06:16	17:58 (3)	06:03		20:13 (2)	05:09			04:56				
	16:54	4	16:21 (5)	17:56	23 17:28 (4)	18:49	6 18:04 (3)	20:46		4 20:17 (2)	21:37			22:01				
27	08:22		16:16 (5)	07:21		06:13		06:01		20:10 (2)	05:08			04:56				
	16:56	7	16:23 (5)	17:58	27 17:31 (4)	18:51		20:48		9 20:19 (2)	21:39			22:01				
28	08:20		16:16 (5)	07:18		06:11		05:58		20:09 (2)	05:07			04:57				
	16:58	10	16:26 (5)	18:00	29 17:32 (4)	18:53		20:50		12 20:21 (2)	21:40			22:01				
29	08:18		16:15 (5)			07:08		05:56		20:07 (2)	05:06			04:57				
	17:00	13	16:28 (5)			19:54		20:52		15 20:22 (2)	21:41			22:01				
30	08:17		16:15 (5)			07:06		05:54		20:06 (2)	05:05			04:58				
	17:02	15	16:30 (5)			19:56		20:53		18 20:24 (2)	21:43			22:00				
31	08:15		16:15 (5)			07:04					05:04							
	17:04	17	16:32 (5)			19:58					21:44							
Potential sun hours	250			273			367		420		494				510			
Total, worst case		67		368			744			58		590						
Sun reduction		0.24		0.23			0.27			0.35		0.38						
Oper. time red.		1.00		1.00			1.00			1.00		1.00						
Wind dir. red.		0.66		0.67			0.68			0.64		0.64						
Total reduction		0.16		0.15			0.18			0.23		0.25						
Total, real		11		57			136			13		145						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CG - H85

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July			August			September			October			November			December	
	1	04:59		05:39	20:13 (2)	06:33		07:26	17:42 (4)	07:24		15:50 (5)	08:19				
		22:00		21:25	31 20:44 (2)	20:18		19:05	31 18:13 (4)	16:54	16	16:06 (5)	16:10				
	2	04:59		05:40	20:13 (2)	06:35		07:28	17:41 (4)	07:26		15:49 (5)	08:21				
		22:00		21:23	32 20:45 (2)	20:16		19:02	33 18:14 (4)	16:52	18	16:07 (5)	16:09				
	3	05:00		05:42	20:12 (2)	06:36		07:30	17:40 (4)	07:28		15:47 (5)	08:22				
		21:59		21:21	32 20:44 (2)	20:13		19:00	35 18:15 (4)	16:50	21	16:08 (5)	16:08				
	4	05:01		05:44	20:13 (2)	06:38		07:31	17:39 (4)	07:30		15:47 (5)	08:24				
		21:59		21:19	32 20:45 (2)	20:11		18:57	37 18:16 (4)	16:48	22	16:09 (5)	16:08				
	5	05:02		05:45	20:12 (2)	06:40		07:33	17:38 (4)	07:32		15:46 (5)	08:25				
		21:58		21:17	32 20:44 (2)	20:09		18:55	38 18:16 (4)	16:46	23	16:09 (5)	16:07				
	6	05:03		05:47	20:12 (2)	06:42		07:35	17:37 (4)	07:34		15:46 (5)	08:26				
		21:58		21:15	33 20:45 (2)	20:06		18:52	39 18:16 (4)	16:44	23	16:09 (5)	16:07				
	7	05:04		05:49	20:13 (2)	06:43		07:37	17:36 (4)	07:36		15:45 (5)	08:28				
		21:57		21:13	30 20:43 (2)	20:04		18:50	39 18:15 (4)	16:43	25	16:10 (5)	16:06				
	8	05:05		05:51	20:12 (2)	06:45		07:39	17:36 (4)	07:38		15:45 (5)	08:29				
		21:56		21:12	29 20:41 (2)	20:01		18:48	39 18:15 (4)	16:41	23	16:08 (5)	16:06				
	9	05:06		05:52	20:13 (2)	06:47		07:41	17:35 (4)	07:40		15:45 (5)	08:30				
		21:55		21:10	26 20:39 (2)	19:59		18:45	40 18:15 (4)	16:39	21	16:06 (5)	16:05				
	10	05:07		05:54	20:12 (2)	06:49		07:42	17:35 (4)	07:42		15:46 (5)	08:31				
		21:55		21:07	25 20:37 (2)	19:56		18:43	39 18:14 (4)	16:37	19	16:05 (5)	16:05				
	11	05:08		05:56	20:13 (2)	06:50		07:44	17:35 (4)	07:44		15:46 (5)	08:33				
		21:54		21:05	22 20:35 (2)	19:54		18:40	36 18:11 (4)	16:35	17	16:03 (5)	16:05				
	12	05:09		05:57	20:14 (2)	06:52		07:46	17:35 (4)	07:45		15:47 (5)	08:34				
		21:53		21:03	20 20:34 (2)	19:51		18:38	34 18:09 (4)	16:34	14	16:01 (5)	16:05				
	13	05:10		05:59	20:14 (2)	06:54		07:48	17:36 (4)	07:47		15:47 (5)	08:35				
		21:52		21:01	17 20:31 (2)	19:49		18:36	31 18:07 (4)	16:32	12	15:59 (5)	16:05				
	14	05:12		06:01	20:15 (2)	06:56		07:50	17:36 (4)	07:49		15:48 (5)	08:36				
		21:51		20:59	14 20:29 (2)	19:47		18:33	28 18:04 (4)	16:31	10	15:58 (5)	16:04				
	15	05:13		06:03	20:17 (2)	06:58		07:52	17:36 (4)	07:51		15:49 (5)	08:37				
		21:50		20:57	11 20:28 (2)	19:44		18:31	26 18:02 (4)	16:29	7	15:56 (5)	16:05				
	16	05:14		06:04	20:17 (2)	06:59		07:54	17:37 (4)	07:53		15:50 (5)	08:38				
		21:49		20:55	8 20:25 (2)	19:42		18:29	22 17:59 (4)	16:27	4	15:54 (5)	16:05				
	17	05:16		06:06	20:20 (2)	07:01	18:47 (3)	07:55	17:38 (4)	07:55		15:51 (5)	08:38				
		21:47		20:53	3 20:23 (2)	19:39	3 18:50 (3)	18:26	19 17:57 (4)	16:26	1	15:52 (5)	16:05				
	18	05:17		06:08		07:03	18:42 (3)	07:57	17:39 (4)	07:57			08:39				
		21:46		20:50		19:37	12 18:54 (3)	18:24	16 17:55 (4)	16:24			16:05				
	19	05:18		06:10		07:05	18:40 (3)	07:59	17:40 (4)	07:59			08:40				
		21:45		20:48		19:34	16 18:56 (3)	18:22	12 17:52 (4)	16:23			16:05				
	20	05:20	20:26 (2)	06:12		07:06	18:38 (3)	08:01	17:42 (4)	08:00			08:41				
		21:44	6 20:32 (2)	20:46		19:32	19 18:57 (3)	18:20	8 17:50 (4)	16:22			16:06				
	21	05:21	20:23 (2)	06:13		07:08	18:36 (3)	08:03	17:44 (4)	08:02			08:41				
		21:42	12 20:35 (2)	20:44		19:29	21 18:57 (3)	18:17	4 17:48 (4)	16:20			16:06				
	22	05:23	20:21 (2)	06:15		07:10	18:35 (3)	08:05		08:04			08:42				
		21:41	15 20:36 (2)	20:42		19:27	23 18:58 (3)	18:15		16:19			16:06				
	23	05:24	20:20 (2)	06:17		07:12	18:35 (3)	08:07		08:06			08:42				
		21:39	18 20:38 (2)	20:39		19:24	21 18:56 (3)	18:13		16:18			16:07				
	24	05:26	20:19 (2)	06:19		07:13	18:34 (3)	08:09		08:08			08:43				
		21:38	20 20:39 (2)	20:37		19:22	20 18:54 (3)	18:11		16:17			16:08				
	25	05:27	20:18 (2)	06:20		07:15	18:33 (3)	07:11		08:09			08:43				
		21:36	23 20:41 (2)	20:35		19:19	18 18:51 (3)	17:09		16:16			16:08				
	26	05:29	20:17 (2)	06:22		07:17	18:33 (3)	07:13		08:11			08:43				
		21:35	24 20:41 (2)	20:32		19:17	15 18:48 (3)	17:06		16:14			16:09				
	27	05:30	20:16 (2)	06:24		07:19	17:53 (4)	07:15		08:13			08:44				
		21:33	25 20:41 (2)	20:30		19:14	27 18:46 (3)	17:04		16:13			16:10				
	28	05:32	20:15 (2)	06:26		07:21	17:49 (4)	07:16		08:14			08:44				
		21:32	27 20:42 (2)	20:28		19:12	31 18:44 (3)	17:02		16:12			16:11				
	29	05:34	20:14 (2)	06:27		07:22	17:47 (4)	07:18		08:16			08:44				
		21:30	29 20:43 (2)	20:25		19:09	32 18:41 (3)	17:00		16:12			16:11				
	30	05:35	20:14 (2)	06:29		07:24	17:44 (4)	07:20		15:55 (5)	08:18		08:44				
		21:28	29 20:43 (2)	20:23		19:07	31 18:38 (3)	16:58	4	15:59 (5)	16:11		16:12				
	31	05:37	20:14 (2)	06:31				07:22		15:51 (5)			08:44				
		21:26	30 20:44 (2)	20:21				16:56	12	16:03 (5)			16:13				
Potential sun hours	512			460			382		328		259		233				
Total, worst case		258		397			289		622		276						
Sun reduction		0.32		0.34			0.32		0.29		0.27						
Oper. time red.		1.00		1.00			1.00		1.00		1.00						
Wind dir. red.		0.64		0.64			0.67		0.68		0.66						
Total reduction		0.21		0.22			0.22		0.20		0.18						
Total, real		54		87			62		123		48						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CH - H86

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44 16:15	08:14 17:06	25	16:34 (5) 18:02	07:16 18:02	41	16:53 (4) 17:34 (4)	07:01 20:00	05:52 20:55	20:06 (2) 20:26 (2)	05:03 21:45
2	08:44 16:16	08:12 17:08	25	16:34 (5) 18:04	07:14 18:04	41	16:53 (4) 17:34 (4)	06:59 20:02	05:50 20:57	20:05 (2) 20:27 (2)	05:02 21:46
3	08:44 16:17	08:10 17:10	24	16:10 (5) 18:06	07:12 18:06	42	16:53 (4) 17:35 (4)	06:56 20:04	05:48 20:59	20:04 (2) 20:29 (2)	05:01 21:48
4	08:43 16:18	08:08 17:12	23	16:10 (5) 18:07	07:09 18:07	42	16:53 (4) 17:35 (4)	06:54 20:06	05:46 21:01	20:03 (2) 20:30 (2)	05:00 21:49
5	08:43 16:19	08:07 17:14	22	16:11 (5) 18:09	07:07 18:09	41	16:53 (4) 17:34 (4)	06:51 20:07	05:44 21:03	20:03 (2) 20:32 (2)	04:59 21:50
6	08:42 16:21	08:05 17:16	20	16:12 (5) 18:11	07:04 18:11	40	16:53 (4) 17:33 (4)	06:49 20:09	05:42 21:04	20:02 (2) 20:33 (2)	04:59 21:51
7	08:42 16:22	08:03 17:18	18	16:13 (5) 18:13	07:02 18:13	39	16:53 (4) 17:32 (4)	06:47 20:11	05:40 21:06	20:03 (2) 20:36 (2)	04:58 21:52
8	08:42 16:24	08:01 17:20	15	16:15 (5) 18:15	07:00 18:15	38	16:54 (4) 17:32 (4)	06:44 20:13	05:38 21:08	20:02 (2) 20:36 (2)	04:57 21:53
9	08:41 16:25	07:59 17:22	11	16:17 (5) 18:17	06:57 18:17	36	16:54 (4) 17:30 (4)	06:42 20:15	05:36 21:10	20:02 (2) 20:36 (2)	04:57 21:54
10	08:40 16:26	07:57 17:24		06:55 18:19	06:55 18:19	34	16:55 (4) 17:29 (4)	06:39 20:17	05:34 21:11	20:02 (2) 20:35 (2)	04:56 21:55
11	08:40 16:28	07:55 17:26		06:52 18:21	06:52 18:21	31	16:57 (4) 17:28 (4)	06:37 20:19	05:33 21:13	20:02 (2) 20:36 (2)	04:56 21:55
12	08:39 16:30	07:53 17:28		06:50 18:23	06:50 18:23	31	16:58 (4) 17:56 (3)	06:35 20:20	05:31 21:15	20:02 (2) 20:35 (2)	04:55 21:56
13	08:38 16:31	07:51 17:30		06:48 18:25	06:48 18:25	30	17:00 (4) 17:58 (3)	06:32 20:22	05:29 21:17	20:02 (2) 20:35 (2)	04:55 21:57
14	08:37 16:33	07:49 17:32		06:45 18:27	06:45 18:27	29	17:02 (4) 18:00 (3)	06:30 20:24	05:27 21:18	20:03 (2) 20:35 (2)	04:55 21:58
15	08:36 16:34	07:47 17:34		06:43 18:28	06:43 18:28	24	17:06 (4) 18:02 (3)	06:28 20:26	05:26 21:20	20:03 (2) 20:34 (2)	04:55 21:58
16	08:35 16:36	07:45 17:36		06:40 18:30	06:40 18:30	16	17:48 (3) 18:04 (3)	06:25 20:28	05:24 21:22	20:04 (2) 20:34 (2)	04:54 21:59
17	08:34 16:38	07:43 17:38		06:38 17:09 (4)	06:38 17:09 (4)	18	17:48 (3) 18:06 (3)	06:23 20:30	05:22 21:23	20:04 (2) 20:33 (2)	04:54 21:59
18	08:33 16:40	07:41 17:40	6	06:35 17:11 (4)	06:35 17:11 (4)	20	17:47 (3) 18:07 (3)	06:21 20:31	05:21 21:25	20:05 (2) 20:33 (2)	04:54 22:00
19	08:32 16:41	07:39 17:42	10	06:33 17:13 (4)	06:33 17:13 (4)	22	17:48 (3) 18:10 (3)	06:18 20:33	05:19 21:27	20:06 (2) 20:33 (2)	04:54 22:00
20	08:31 16:43	07:36 17:44	15	06:31 17:16 (4)	06:31 17:16 (4)	24	17:47 (3) 18:11 (3)	06:16 20:35	05:18 21:28	20:06 (2) 20:31 (2)	04:54 22:00
21	08:30 16:45	07:34 17:46	18	06:28 17:18 (4)	06:28 17:18 (4)	22	17:48 (3) 18:10 (3)	06:14 20:37	05:16 21:30	20:08 (2) 20:31 (2)	04:54 22:01
22	08:29 16:47	07:32 16:12 (5)	21	06:26 17:19 (4)	06:26 17:19 (4)	21	17:48 (3) 18:09 (3)	06:12 20:39	05:15 21:31	20:09 (2) 20:30 (2)	04:55 22:01
23	08:27 16:49	07:30 16:10 (5)	25	06:23 17:22 (4)	06:23 17:22 (4)	19	17:49 (3) 18:08 (3)	06:09 20:41	05:13 21:33	20:10 (2) 20:28 (2)	04:55 22:01
24	08:26 16:50	07:28 16:09 (5)	27	06:21 17:24 (4)	06:21 17:24 (4)	15	17:50 (3) 18:05 (3)	06:07 20:43	05:12 21:34	20:11 (2) 20:27 (2)	04:55 22:01
25	08:24 16:52	07:25 16:09 (5)	31	06:18 17:26 (4)	06:18 17:26 (4)	9	17:53 (3) 18:02 (3)	06:05 20:44	05:11 21:36	20:13 (2) 20:26 (2)	04:55 22:01
26	08:23 16:54	07:23 16:21 (5)	33	06:16 17:28 (4)	06:16 17:28 (4)		06:03 20:46	05:09 20:17 (2)	05:09 21:37	20:15 (2) 20:24 (2)	04:56 22:01
27	08:22 16:56	07:21 16:08 (5)	37	06:13 17:31 (4)	06:13 17:31 (4)		06:01 20:48	05:07 20:19 (2)	05:08 21:39	20:12 (2) 20:19 (2)	04:56 22:01
28	08:20 16:58	07:18 16:09 (5)	39	06:11 16:53 (4)	06:11 16:53 (4)		05:58 20:50	05:07 20:10 (2)	05:07 21:40	20:10 (2) 20:21 (2)	04:57 22:01
29	08:18 17:00	07:18 16:26 (5)		06:08 17:32 (4)	06:08 17:32 (4)		05:56 20:52	05:06 20:08 (2)	05:06 21:41	20:08 (2) 20:22 (2)	04:57 22:01
30	08:17 17:02	07:18 16:28 (5)		06:06 17:30 (5)	06:06 17:30 (5)		05:54 20:53	05:05 20:07 (2)	05:05 21:43	20:15 (2) 20:24 (2)	04:58 22:01
31	08:15 17:04	07:18 16:28 (5)		06:04 17:32 (5)	06:04 17:32 (5)		05:54 20:53	05:05 21:43	05:05 21:44	20:15 (2) 21:44	04:58 22:01
Potential sun hours	250	273		367	420		494		510		
Total, worst case	135	446		725	52		690				
Sun reduction	0.24	0.23		0.27	0.35		0.38				
Oper. time red.	1.00	1.00		1.00	1.00		1.00				
Wind dir. red.	0.66	0.67		0.67	0.64		0.64				
Total reduction	0.16	0.16		0.18	0.23		0.25				
Total, real	22	69		133	12		169				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CH - H86

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July		August		September		October		November		December	
1	04:59		05:39	20:13 (2)	06:33		07:26	17:37 (4)	07:24	15:51 (5)	08:19	
	22:00		21:25	33 20:46 (2)	20:18		19:05	32 18:36 (3)	16:54	3 15:54 (5)	16:10	
2	04:59		05:40	20:13 (2)	06:35		07:28	17:36 (4)	07:26	15:46 (5)	08:21	
	22:00		21:23	33 20:46 (2)	20:16		19:02	30 18:06 (4)	16:52	12 15:58 (5)	16:09	
3	05:00		05:42	20:12 (2)	06:36		07:30	17:34 (4)	07:28	15:44 (5)	08:22	
	21:59		21:21	34 20:46 (2)	20:13		19:00	33 18:07 (4)	16:50	16 16:00 (5)	16:08	
4	05:01		05:44	20:12 (2)	06:38		07:31	17:33 (4)	07:30	15:43 (5)	08:24	
	21:59		21:19	34 20:46 (2)	20:11		18:57	35 18:08 (4)	16:48	18 16:01 (5)	16:08	
5	05:02		05:45	20:12 (2)	06:40		07:33	17:31 (4)	07:32	15:41 (5)	08:25	
	21:58		21:17	34 20:46 (2)	20:09		18:55	37 18:08 (4)	16:46	21 16:02 (5)	16:07	
6	05:03		05:47	20:12 (2)	06:42		07:35	17:31 (4)	07:34	15:41 (5)	08:26	
	21:58		21:15	33 20:45 (2)	20:06		18:52	38 18:09 (4)	16:44	22 16:03 (5)	16:07	
7	05:04		05:49	20:13 (2)	06:43		07:37	17:29 (4)	07:36	15:40 (5)	08:28	
	21:57		21:13	30 20:43 (2)	20:04		18:50	39 18:08 (4)	16:43	23 16:03 (5)	16:06	
8	05:05		05:51	20:12 (2)	06:45		07:39	17:28 (4)	07:38	15:39 (5)	08:29	
	21:56		21:12	29 20:41 (2)	20:01		18:48	41 18:09 (4)	16:41	25 16:04 (5)	16:06	
9	05:06		05:52	20:13 (2)	06:47		07:41	17:28 (4)	07:40	15:39 (5)	08:30	
	21:55		21:10	26 20:39 (2)	19:59		18:45	41 18:09 (4)	16:39	25 16:04 (5)	16:05	
10	05:07		05:54	20:13 (2)	06:49		07:42	17:27 (4)	07:42	15:40 (5)	08:31	
	21:55		21:07	24 20:37 (2)	19:56		18:43	42 18:09 (4)	16:37	25 16:05 (5)	16:05	
11	05:08		05:56	20:14 (2)	06:50		07:44	17:27 (4)	07:44	15:40 (5)	08:33	
	21:54		21:05	21 20:35 (2)	19:54		18:40	42 18:09 (4)	16:35	23 16:03 (5)	16:05	
12	05:09		05:57	20:15 (2)	06:52		07:46	17:27 (4)	07:45	15:40 (5)	08:34	
	21:53		21:03	19 20:34 (2)	19:51		18:38	42 18:09 (4)	16:34	21 16:01 (5)	16:05	
13	05:10		05:59	20:15 (2)	06:54		07:48	17:27 (4)	07:47	15:40 (5)	08:35	
	21:52		21:01	16 20:31 (2)	19:49		18:36	40 18:07 (4)	16:32	19 15:59 (5)	16:05	
14	05:12		06:01	20:16 (2)	06:56		07:50	17:27 (4)	07:49	15:41 (5)	08:36	
	21:51		20:59	13 20:29 (2)	19:47		18:33	37 18:04 (4)	16:31	17 15:58 (5)	16:04	
15	05:13		06:03	20:18 (2)	06:58		07:52	17:27 (4)	07:51	15:41 (5)	08:37	
	21:50		20:57	10 20:28 (2)	19:44		18:31	35 18:02 (4)	16:29	15 15:56 (5)	16:05	
16	05:14		06:04	20:19 (2)	06:59		07:54	17:27 (4)	07:53	15:42 (5)	08:38	
	21:49		20:55	6 20:25 (2)	19:42		18:29	32 17:59 (4)	16:27	12 15:54 (5)	16:05	
17	05:16		06:06	20:22 (2)	07:01		07:55	17:27 (4)	07:55	15:42 (5)	08:38	
	21:47	5	20:32 (2)	1 20:23 (2)	19:39		18:26	30 17:57 (4)	16:26	10 15:52 (5)	16:05	
18	05:17		20:24 (2)	06:08	07:03	18:42 (3)	07:57	17:28 (4)	07:57	15:43 (5)	08:39	
	21:46	11	20:35 (2)	20:51	19:37	7 18:49 (3)	18:24	27 17:55 (4)	16:24	8 15:51 (5)	16:05	
19	05:18		20:22 (2)	06:10	07:05	18:38 (3)	07:59	17:29 (4)	07:59	15:44 (5)	08:40	
	21:45	14	20:36 (2)	20:48	19:34	14 18:52 (3)	18:22	23 17:52 (4)	16:23	5 15:49 (5)	16:05	
20	05:20		20:21 (2)	06:12	07:06	18:36 (3)	08:01	17:30 (4)	08:00	15:45 (5)	08:41	
	21:44	17	20:38 (2)	20:46	19:32	18 18:54 (3)	18:20	20 17:50 (4)	16:22	2 15:47 (5)	16:06	
21	05:21		20:19 (2)	06:13	07:08	18:34 (3)	08:03	17:31 (4)	08:02		08:41	
	21:42	20	20:39 (2)	20:44	19:29	20 18:54 (3)	18:17	17 17:48 (4)	16:20		16:06	
22	05:23		20:18 (2)	06:15	07:10	18:33 (3)	08:05	17:32 (4)	08:04		08:42	
	21:41	22	20:40 (2)	20:42	19:27	22 18:55 (3)	18:15	13 17:45 (4)	16:19		16:06	
23	05:24		20:18 (2)	06:17	07:12	18:32 (3)	08:07	17:34 (4)	08:06		08:42	
	21:39	24	20:42 (2)	20:39	19:24	23 18:55 (3)	18:13	9 17:43 (4)	16:18		16:07	
24	05:26		20:16 (2)	06:19	07:13	18:31 (3)	08:09	17:36 (4)	08:08		08:43	
	21:38	26	20:42 (2)	20:37	19:22	23 18:54 (3)	18:11	5 17:41 (4)	16:17		16:08	
25	05:27		20:16 (2)	06:20	07:15	18:30 (3)	07:11		08:09		08:43	
	21:36	27	20:43 (2)	20:35	19:19	21 18:51 (3)	17:09		16:16		16:08	
26	05:29		20:15 (2)	06:22	07:17	18:30 (3)	07:13		08:11		08:43	
	21:35	29	20:44 (2)	20:32	19:17	18 18:48 (3)	17:06		16:14		16:09	
27	05:30		20:14 (2)	06:24	07:19	18:30 (3)	07:15		08:13		08:44	
	21:33	30	20:44 (2)	20:30	19:14	16 18:46 (3)	17:04		16:13		16:10	
28	05:32		20:14 (2)	06:26	07:21	17:50 (4)	07:16		08:14		08:44	
	21:32	31	20:45 (2)	20:28	19:12	19 18:44 (3)	17:02		16:12		16:11	
29	05:34		20:13 (2)	06:27	07:22	17:44 (4)	07:18		08:16		08:44	
	21:30	32	20:45 (2)	20:25	19:09	28 18:41 (3)	17:00		16:12		16:11	
30	05:35		20:13 (2)	06:29	07:24	17:40 (4)	07:20		08:18		08:44	
	21:28	32	20:45 (2)	20:23	19:07	30 18:38 (3)	16:58		16:11		16:12	
31	05:37		20:13 (2)	06:31			07:22				08:44	
	21:26	33	20:46 (2)	20:21			16:56				16:13	
Potential sun hours	512		460		382		328		259		233	
Total, worst case		353		396	259		740		322			
Sun reduction		0.32		0.34	0.32		0.29		0.27			
Oper. time red.		1.00		1.00	1.00		1.00		1.00			
Wind dir. red.		0.64		0.64	0.67		0.67		0.66			
Total reduction		0.21		0.22	0.22		0.20		0.18			
Total, real		74		87	56		146		56			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CI - H87
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CJ - H88
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CK - H89

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CL - H90

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CM - H91

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

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Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CN - H92

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

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Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CO - H93

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CP - H94

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CQ - H95

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CR - H96

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CS - H97
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CT - H98

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:01
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:01
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	19:41 (5) 21:06	04:58 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	19:39 (5) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	19:38 (5) 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	19:36 (5) 21:11	04:56 21:54
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	19:36 (5) 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	19:36 (5) 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:35 (5) 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	19:36 (5) 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:36 (5) 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:36 (5) 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:38 (5) 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:41 (5) 21:25	04:54 21:59
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	19:46 (5) 21:26	04:54 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:19 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:18 21:30	04:54 22:00
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:00
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58		05:04 21:44	04:58 21:03
Potential sun hours	250	273	367	420	494	510
Total, worst case				146	251	126
Sun reduction				0.35	0.38	0.32
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.66	0.63	0.63
Total reduction				0.23	0.24	0.20
Total, real				34	60	25

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CT - H98

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:35 (5) 19:50 (5)	07:26 19:05	07:24 16:54
2	05:00 21:59	20:58 (4) 21:03 (4)	06:35 20:16	19:35 (5) 19:48 (5)	07:28 19:02	16:54 16:09
3	05:00 21:59	20:57 (4) 21:04 (4)	06:36 20:13	19:35 (5) 19:45 (5)	07:30 19:00	16:09 16:08
4	05:01 21:59	20:56 (4) 21:05 (4)	06:38 20:11	19:36 (5) 19:43 (5)	07:31 18:57	16:08 16:08
5	05:02 21:58	20:56 (4) 21:06 (4)	06:40 20:09	19:38 (5) 19:41 (5)	07:33 18:55	16:08 16:07
6	05:03 21:57	20:56 (4) 21:07 (4)	06:42 20:06	19:41 (5) 18:52	18:55 16:44	16:07 16:07
7	05:04 21:57	20:55 (4) 21:08 (4)	06:43 20:04	18:52 18:50	16:44 16:43	16:07 16:06
8	05:05 21:56	20:55 (4) 21:09 (4)	06:45 20:01	18:50 18:48	16:43 16:41	16:06 16:06
9	05:06 21:55	20:54 (4) 21:10 (4)	06:47 19:59	18:48 18:45	16:41 16:39	16:06 16:05
10	05:07 21:54	20:54 (4) 21:10 (4)	06:49 19:56	18:45 18:43	16:39 16:37	16:05 16:05
11	05:08 21:54	20:54 (4) 21:11 (4)	06:50 19:54	18:43 18:40	16:37 16:35	16:05 16:05
12	05:09 21:53	20:53 (4) 21:11 (4)	06:52 19:51	18:40 18:38	16:35 16:34	16:05 16:05
13	05:11 21:52	20:53 (4) 21:12 (4)	06:54 19:49	18:38 18:36	16:34 16:32	16:05 16:05
14	05:12 21:51	20:53 (4) 21:12 (4)	06:56 19:46	18:36 18:33	16:32 16:31	16:05 16:05
15	05:13 21:50	20:52 (4) 21:12 (4)	06:57 19:44	18:33 18:31	16:31 16:29	16:05 16:05
16	05:14 21:48	20:52 (4) 21:12 (4)	06:59 19:42	18:31 18:29	16:29 16:27	16:05 16:05
17	05:16 21:47	20:53 (4) 21:13 (4)	07:01 19:39	18:29 18:26	16:27 16:26	16:05 16:05
18	05:17 21:46	20:52 (4) 21:12 (4)	07:03 19:37	18:26 18:24	16:26 16:24	16:05 16:05
19	05:18 21:45	20:52 (4) 21:11 (4)	07:05 19:34	18:24 18:22	16:24 16:23	16:05 16:05
20	05:20 21:43	20:53 (4) 21:10 (4)	07:06 19:32	18:22 18:20	16:23 16:22	16:05 16:06
21	05:21 21:42	20:52 (4) 21:09 (4)	07:08 19:29	18:20 18:17	16:22 16:20	16:06 16:06
22	05:23 21:41	20:52 (4) 21:07 (4)	07:10 19:27	18:17 18:15	16:20 16:19	16:06 16:06
23	05:24 21:39	20:53 (4) 21:07 (4)	07:12 19:24	18:15 18:13	16:19 16:18	16:06 16:07
24	05:26 21:38	20:53 (4) 21:05 (4)	07:13 19:22	18:13 18:11	16:18 16:17	16:07 16:08
25	05:27 21:36	20:54 (4) 21:04 (4)	19:43 (5) 19:50 (5)	07:15 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	20:54 (4) 21:02 (4)	19:41 (5) 19:52 (5)	17:09 17:06	16:16 16:14	16:08 16:09
27	05:30 21:33	20:54 (4) 21:00 (4)	19:39 (5) 19:53 (5)	17:06 17:04	16:14 16:13	16:09 16:10
28	05:32 21:31	20:55 (4) 20:59 (4)	19:37 (5) 19:53 (5)	17:04 17:02	16:13 16:12	16:10 16:11
29	05:34 21:30	20:56 (4) 20:57 (4)	19:35 (5) 19:54 (5)	17:02 17:00	16:12 16:12	16:11 16:11
30	05:35 21:28	20:57 (4) 20:25	19:36 (5) 19:35 (5)	17:00 16:58	16:12 16:11	16:11 16:12
31	05:37 21:26	20:21	19:35 (5) 19:52 (5)	16:58 16:56	16:11 16:10	16:12 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case	377	100	48			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.63	0.66	0.66			
Total reduction	0.20	0.23	0.21			
Total, real	76	23	10			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CU - H99

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	20:35 (4) 20:53 (4)	06:33 20:18	07:26 19:04	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	04:59 21:59	05:40 21:23	20:36 (4) 20:52 (4)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	20:35 (4) 20:50 (4)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 20:30 (4)	05:01 21:49	05:44 21:19	20:36 (4) 20:48 (4)	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	05:00 20:32 (4)	05:02 21:50	05:45 21:17	20:35 (4) 20:46 (4)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	05:00 20:26 (4)	05:03 21:57	05:47 21:15	20:36 (4) 20:45 (4)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	05:04 20:36 (4)	05:04 21:57	05:49 21:13	20:37 (4) 20:43 (4)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	05:05 20:26 (4)	05:05 21:56	05:50 21:11	20:37 (4) 20:41 (4)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	05:06 20:25 (4)	05:06 21:55	05:52 21:09	06:47 20:41 (4)	06:47 20:01	07:41 18:48	07:40 16:41	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	05:07 20:25 (4)	05:07 21:54	05:54 21:07	06:49 20:40 (4)	07:42 20:04	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	05:08 20:25 (4)	05:08 21:54	05:56 21:05	06:50 20:42 (4)	07:44 20:06	07:43 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	05:09 20:25 (4)	05:09 21:53	05:57 21:03	06:52 20:43 (4)	07:46 20:06	07:45 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	05:10 20:25 (4)	05:10 21:52	05:59 21:01	06:54 20:44 (4)	07:48 20:08	07:47 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	05:27 21:18	05:12 20:26 (4)	05:12 21:51	06:01 20:59	06:56 20:45 (4)	07:50 20:09	07:49 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	05:13 20:26 (4)	05:13 21:50	06:03 20:57	06:57 20:44 (4)	07:52 20:07	07:51 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	05:14 20:27 (4)	05:14 21:48	06:04 20:55	06:59 20:41 (4)	07:54 20:19	07:53 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	05:16 20:27 (4)	05:16 21:47	06:06 20:53	07:01 20:29 (4)	07:55 20:44	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	05:17 20:29 (4)	05:17 21:46	06:08 20:50	07:03 20:32 (4)	07:57 20:48	07:57 18:22	07:57 16:23	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	05:18 20:30 (4)	05:18 21:45	06:10 20:48	07:05 20:36 (4)	07:59 20:46	07:58 18:20	07:58 16:22	08:40 16:06
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:20 20:32 (4)	05:20 21:43	06:12 20:46	07:06 20:39 (4)	08:01 20:28	08:00 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:21 20:34 (4)	05:21 21:42	06:13 20:44	07:08 20:41	08:03 20:07	08:02 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:11 20:39	05:15 21:31	05:23 22:01	05:23 21:41	06:15 20:41	07:10 20:24 (4)	08:05 20:17	08:04 18:07	08:04 16:18	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	05:24 22:01	05:24 21:39	06:17 20:47 (4)	07:12 20:41 (4)	08:07 20:37	08:06 18:09	08:06 16:17	08:42 16:08
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	05:26 22:01	05:26 21:38	06:19 20:50 (4)	07:13 20:37	08:09 20:30	08:07 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	05:27 22:01	05:27 21:36	06:20 20:52 (4)	07:15 20:35	08:11 20:26	08:09 18:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	05:29 22:01	05:29 21:35	06:22 20:39 (4)	07:17 20:53 (4)	08:11 20:32	08:11 18:06	08:11 16:14	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	05:30 22:01	05:30 21:33	06:24 20:37 (4)	07:19 20:53 (4)	08:13 20:30	08:13 18:07	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	05:32 22:01	05:32 21:31	06:26 20:54 (4)	07:21 20:28	08:14 20:06	08:14 18:02	08:14 16:12	08:44 16:11
29	08:18 17:00	07:08 19:04	05:56 20:52	05:06 21:41	05:06 22:00	05:34 22:00	05:34 21:30	06:27 20:54 (4)	07:22 20:25	08:18 20:09	08:16 18:00	08:16 16:12	08:44 16:11
30	08:17 17:02	07:06 19:56	05:54 20:53	05:05 21:43	05:05 22:00	05:35 22:00	05:35 21:28	06:29 20:55 (4)	07:24 20:23	08:20 20:01	08:17 18:58	08:17 16:11	08:44 16:12
31	08:15 17:04	07:04 19:58	05:54 21:44	05:04 22:00	05:04 22:00	05:37 22:00	05:37 21:26	06:31 20:55 (4)	07:22 20:21	08:18 20:00	08:16 18:56	08:16 16:11	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case					216		127	91					
Sun reduction					0.38		0.32	0.34					
Oper. time red.					1.00		1.00	1.00					
Wind dir. red.					0.64		0.64	0.64					
Total reduction					0.24		0.21	0.22					
Total, real					53		26	20					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CV - H100

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	21:13 (4)	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:55	21:45	22:00	21:24 (4)	21:25	20:18	19:05	16:54	16:10			
2	08:44	08:12	07:14	06:59	05:50	05:02	21:10 (4)	05:00	21:14 (4)	05:40	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	21:46	21:12 (4)	21:59	21:24 (4)	21:23	20:16	19:02	16:52	16:09		
3	08:43	08:10	07:11	06:56	05:48	05:01	21:09 (4)	05:00	21:13 (4)	05:42	06:36	07:30	07:28	08:22		
	16:17	17:10	18:05	20:04	20:59	21:47	21:13 (4)	21:59	21:23 (4)	21:21	20:13	19:00	16:50	16:08		
4	08:43	08:08	07:09	06:54	05:46	05:00	21:09 (4)	05:01	21:14 (4)	05:44	06:38	07:31	07:30	08:23		
	16:18	17:12	18:07	20:06	21:01	21:49	21:14 (4)	21:59	21:23 (4)	21:19	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	06:51	05:44	04:59	21:09 (4)	05:02	21:15 (4)	05:45	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:02	21:50	21:15 (4)	21:58	21:23 (4)	21:17	20:09	18:55	16:46	16:07		
6	08:42	08:05	07:04	06:49	05:42	04:59	21:09 (4)	05:03	21:15 (4)	05:47	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	21:51	21:16 (4)	21:57	21:22 (4)	21:15	20:06	18:52	16:44	16:07		
7	08:42	08:03	07:02	06:47	05:40	04:58	21:08 (4)	05:04	21:16 (4)	05:49	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	21:52	21:16 (4)	21:57	21:22 (4)	21:13	20:04	18:50	16:43	16:06		
8	08:41	08:01	07:00	06:44	05:38	04:57	21:09 (4)	05:05	21:16 (4)	05:51	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	21:53	21:17 (4)	21:56	21:21 (4)	21:11	20:01	18:48	16:41	16:06		
9	08:41	07:59	06:57	06:42	05:36	04:57	21:08 (4)	05:06	21:17 (4)	05:52	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	21:54	21:18 (4)	21:55	21:21 (4)	21:09	19:59	18:45	16:39	16:05		
10	08:40	07:57	06:55	06:39	05:34	04:56	21:09 (4)	05:07	21:17 (4)	05:54	06:49	07:42	07:42	08:31		
	16:26	17:24	18:19	20:17	21:11	21:54	21:19 (4)	21:54	21:20 (4)	21:07	19:56	18:43	16:37	16:05		
11	08:40	07:55	06:52	06:37	05:33	04:56	21:09 (4)	05:08	21:18 (4)	05:56	06:50	07:44	07:43	08:32		
	16:28	17:26	18:21	20:18	21:13	21:55	21:20 (4)	21:54	21:19 (4)	21:05	19:54	18:40	16:35	16:05		
12	08:39	07:53	06:50	06:35	05:31	04:55	21:08 (4)	05:09		05:57	06:52	07:46	07:45	08:34		
	16:30	17:28	18:23	20:20	21:15	21:56	21:20 (4)	21:53		21:03	19:51	18:38	16:34	16:05		
13	08:38	07:51	06:48	06:32	05:29	04:55	21:09 (4)	05:11		05:59	06:54	07:48	07:47	08:35		
	16:31	17:30	18:25	20:22	21:17	21:57	21:21 (4)	21:52		21:01	19:49	18:36	16:32	16:05		
14	08:37	07:49	06:45	06:30	05:27	04:55	21:09 (4)	05:12		06:01	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:18	21:57	21:22 (4)	21:51		20:59	19:46	18:33	16:31	16:05		
15	08:36	07:47	06:43	06:28	19:57 (5)	05:26	21:09 (4)	05:13		06:03	06:57	07:52	07:51	08:37		
	16:34	17:34	18:28	20:26	19:58 (5)	21:20	21:22 (4)	21:50		20:57	7	20:10 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	19:54 (5)	05:24	21:10 (4)	05:14		06:04	20:00 (5)	06:59	07:54	07:53	08:37	
	16:36	17:36	18:30	20:28	19:59 (5)	21:22	21:23 (4)	21:48		20:55	12	20:12 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	19:53 (5)	05:22	21:10 (4)	05:16		06:06	19:59 (5)	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	20:01 (5)	21:23	21:23 (4)	21:47		20:53	14	20:13 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	19:52 (5)	05:21	21:10 (4)	05:17		06:08	19:58 (5)	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	20:03 (5)	21:25	21:24 (4)	21:46		20:50	16	20:14 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	19:51 (5)	05:19	21:10 (4)	05:18		06:10	19:56 (5)	07:05	07:59	07:58	08:40	
	16:41	17:42	18:36	20:33	20:05 (5)	21:26	22:00	21:44		20:48	18	20:14 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:51 (5)	05:18	21:10 (4)	05:20		06:12	19:56 (5)	07:06	08:01	08:00	08:40	
	16:43	17:44	18:38	20:35	20:07 (5)	21:28	22:00	21:44		20:46	19	20:15 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:50 (5)	05:16	21:10 (4)	05:21		06:13	19:56 (5)	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	20:08 (5)	21:30	22:00	21:44		20:44	19	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:50 (5)	05:15	21:11 (4)	05:23		06:15	19:55 (5)	07:10	08:05	08:04	08:42	
	16:47	17:48	18:41	20:39	20:09 (5)	21:31	22:01	21:44		20:41	17	20:12 (5)	19:27	18:15	16:19	16:06
23	08:27	07:30	06:23	06:09	19:50 (5)	05:13	21:11 (4)	05:24		06:17	19:55 (5)	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	20:09 (5)	21:33	22:01	21:25 (4)		20:39	15	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:51 (5)	05:12	21:11 (4)	05:26		06:19	19:55 (5)	07:13	08:09	08:07	08:43	
	16:50	17:52	18:45	20:42	20:08 (5)	21:34	22:05	21:25 (4)		20:37	14	20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:51 (5)	05:11	21:12 (4)	05:27		06:20	19:55 (5)	07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	20:07 (5)	21:36	22:01	21:25 (4)		20:35	11	20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:52 (5)	05:09	21:12 (4)	05:29		06:22	19:56 (5)	07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	20:06 (5)	21:37	22:01	21:25 (4)		20:32	8	20:04 (5)	19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	19:54 (5)	05:08	21:11 (4)	05:30		06:24	19:57 (5)	07:19	07:14	08:13	08:43	
	16:56	17:58	18:51	20:48	20:05 (5)	21:39	22:01	21:24 (4)		20:30	5	20:02 (5)	19:14	17:04	16:13	16:10
28	08:20	07:18	06:11	05:58	19:57 (5)	05:07	21:12 (4)	05:32		06:26	19:58 (5)	07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	20:02 (5)	21:40	22:01	21:25 (4)		20:28	1	19:59 (5)	19:12	17:02	16:12	16:11
29	08:18		07:08	05:56		05:06	21:13 (4)	05:34		06:27		07:22	07:18	08:16	08:44	
	17:00		19:54	20:52		21:41	22:00	21:25 (4)		20:25		19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54		05:05	21:13 (4)	05:35		06:29		07:24	07:20	08:17	08:44	
	17:02		19:56	20:53		21:43	22:00	21:24 (4)		20:23		19:07	16:58	16:11	16:12	
31	08:15		07:04			05:04		05:37		06:31		07:22		08:18	08:44	
	17:04		19:58			21:44		21:26		20:21		16:56		16:13		
Potential sun hours	250	273	367	420	494	510	512	460		382		328		259	233	
Total, worst case				174		320		74		176						
Sun reduction				0.35		0.32		0.32		0.34						
Oper. time red.				1.00		1.00		1.00		1.00						
Wind dir. red.				0.65		0.61		0.61		0.65						
Total reduction				0.23		0.19		0.20		0.22						
Total, real				40		62		15		39						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CW - H101

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59		06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	21:45		22:00	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02		05:00	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:46		21:59	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48	05:01		05:00	06:36	07:30	07:28	08:22
	16:17	17:10	18:05	20:04	20:59	21:47		21:59	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	05:00		05:01	06:38	07:31	07:30	08:23
	16:18	17:12	18:07	20:06	21:01	21:49		21:59	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	04:59		05:02	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07	21:02	21:50		21:58	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	04:59		05:03	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	21:51	2	21:16 (4)	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58		05:04	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	3	21:16 (4)	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	04:57		05:05	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	4	21:17 (4)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	04:57		05:06	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	5	21:18 (4)	21:09	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34	04:56		05:07	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11	21:54	6	21:19 (4)	21:07	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33	04:56		05:08	06:50	07:44	07:43	08:32
	16:28	17:26	18:21	20:18	21:13	21:55	7	21:20 (4)	21:05	18:40	16:35	16:05
12	08:39	07:53	06:50	06:35	05:31	04:55		05:09	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15	21:56	7	21:20 (4)	21:03	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29	04:55		05:11	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17	21:57	8	21:21 (4)	21:01	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27	04:55		05:12	06:01	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:18	21:57	9	21:22 (4)	20:59	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26	04:55		05:13	06:03	07:52	07:51	08:37
	16:34	17:34	18:29	20:26	21:20	21:58	8	21:22 (4)	20:57	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	19:55 (5)	05:24	04:54		06:04	19:59 (5)	07:54	07:53
	16:36	17:36	18:30	20:28	4	19:59 (5)	21:22	21:59	20:55	19:58 (5)	07:55	07:55
17	08:34	07:43	06:38	06:23	19:54 (5)	05:22	04:54		06:06	19:58 (5)	07:57	07:57
	16:38	17:38	18:32	20:30	7	20:01 (5)	21:23	21:59	20:53	19:58 (5)	07:57	07:57
18	08:33	07:41	06:35	06:21	19:53 (5)	05:21	04:54		06:08	19:58 (5)	07:57	07:57
	16:40	17:40	18:34	20:31	10	20:03 (5)	21:25	21:59	20:50	19:56 (5)	07:59	07:59
19	08:32	07:39	06:33	06:18	19:52 (5)	05:19	04:54		06:10	19:56 (5)	07:59	07:59
	16:41	17:42	18:36	20:33	13	20:05 (5)	21:26	22:00	20:48	19:55 (5)	07:59	07:59
20	08:31	07:36	06:31	06:16	19:52 (5)	05:18	04:54		06:12	19:56 (5)	07:59	07:59
	16:43	17:44	18:38	20:35	15	20:07 (5)	21:28	22:00	20:46	19:56 (5)	07:59	07:59
21	08:30	07:34	06:28	06:14	19:50 (5)	05:16	04:54		06:13	19:56 (5)	07:59	07:59
	16:45	17:46	18:40	20:37	18	20:08 (5)	21:30	22:00	20:44	19:55 (5)	07:59	07:59
22	08:29	07:32	06:26	06:12	19:50 (5)	05:15	04:55		06:15	19:55 (5)	07:59	07:59
	16:47	17:48	18:41	20:39	20	20:10 (5)	21:31	22:01	20:41	19:55 (5)	07:59	07:59
23	08:27	07:30	06:23	06:09	19:50 (5)	05:13	04:55		06:17	19:55 (5)	07:59	07:59
	16:49	17:50	18:43	20:41	20	20:10 (5)	21:33	22:01	20:39	19:56 (5)	07:59	07:59
24	08:26	07:28	06:21	06:07	19:51 (5)	05:12	04:55		06:19	19:56 (5)	07:59	07:59
	16:51	17:52	18:45	20:42	19	20:10 (5)	21:34	22:01	20:37	19:57 (5)	07:59	07:59
25	08:24	07:25	06:18	06:05	19:51 (5)	05:11	04:56		06:20	19:57 (5)	07:59	07:59
	16:52	17:54	18:47	20:44	18	20:09 (5)	21:36	22:01	20:35	19:58 (5)	07:59	07:59
26	08:23	07:23	06:16	06:03	19:52 (5)	05:09	04:56		06:22	19:57 (5)	07:59	07:59
	16:54	17:56	18:49	20:46	16	20:08 (5)	21:37	22:01	20:32	19:58 (5)	07:59	07:59
27	08:21	07:21	06:13	06:01	19:53 (5)	05:08	04:56		06:24	19:58 (5)	07:59	07:59
	16:56	17:58	18:51	20:48	14	20:07 (5)	21:39	22:01	20:30	20:02 (5)	07:59	07:59
28	08:20	07:18	06:11	05:58	19:54 (5)	05:07	04:57		06:26	19:59 (5)	07:59	07:59
	16:58	18:00	18:53	20:50	11	20:05 (5)	21:40	22:01	20:28	20:02 (5)	07:59	07:59
29	08:18		07:08	05:56	19:57 (5)	05:06	04:58		06:27	20:02 (5)	07:59	07:59
	17:00		19:54	20:52	5	20:02 (5)	21:41	22:00	20:25	20:02 (5)	07:59	07:59
30	08:17		07:06	05:54		05:05	04:58		06:29	20:02 (5)	07:59	07:59
	17:02		19:56	20:53		21:43	22:00		20:23	20:02 (5)	07:59	07:59
31	08:15		07:04			05:04			06:31	20:02 (5)	07:59	07:59
	17:04		19:58			21:44			20:21	20:02 (5)	07:59	07:59
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case						197						
Sun reduction						0.35						
Oper. time red.						1.00						
Wind dir. red.						0.61						
Total reduction						0.23						
Total, real						43						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CX - H102

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	19:57 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:55	20:21 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	19:57 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	20:20 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:43	08:10	07:11	06:56	05:48	19:58 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	20:19 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08		
4	08:43	08:08	07:09	06:54	05:46	19:58 (5)	05:00	05:01	05:44	20:16 (5)	06:38	07:31	08:23		
	16:18	17:12	18:07	20:06	21:01	20:18 (5)	21:49	21:59	21:19	5	20:21 (5)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	19:59 (5)	04:59	05:02	05:45	20:12 (5)	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:02	20:17 (5)	21:50	21:58	21:17	11	20:23 (5)	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	20:00 (5)	04:59	05:03	05:47	20:11 (5)	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04	20:16 (5)	21:51	21:57	21:15	14	20:25 (5)	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	20:02 (5)	04:58	05:04	05:49	20:10 (5)	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	13	20:15 (5)	21:52	21:57	17	20:27 (5)	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	20:04 (5)	04:57	05:05	05:51	20:08 (5)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	9	20:13 (5)	21:53	21:56	19	20:27 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	20:07 (5)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	21	20:28 (5)	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	20:06 (5)	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	22	20:28 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:06 (5)	06:50	07:44	07:43	08:33	
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	23	20:29 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:57	20:05 (5)	06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	24	20:29 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	20:04 (5)	06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	25	20:29 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	20:05 (5)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	24	20:29 (5)	19:47	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	20:05 (5)	06:58	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	23	20:28 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	20:04 (5)	06:59	07:54	07:53	08:37	
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	21	20:25 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06	20:05 (5)	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	18	20:23 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	05:21		04:54	05:17	06:08	20:05 (5)	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	21:25		21:59	21:46	20:50	17	20:22 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	05:19		04:54	05:18	06:10	20:05 (5)	07:05	07:59	07:59	08:40	
	16:41	17:42	18:36	20:33	21:27		22:00	21:45	20:48	14	20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	05:18		04:54	05:20	06:12	20:06 (5)	07:06	08:01	08:00	08:41	
	16:43	17:44	18:38	20:35	21:28		22:00	21:43	20:46	11	20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	20:04 (5)	05:16	04:54	05:21	06:13	20:08 (5)	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	4	20:08 (5)	21:30	22:00	21:42	7	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	20:02 (5)	05:15	04:55	05:23	06:15	20:09 (5)	07:10	08:05	08:04	08:42	
	16:47	17:48	18:41	20:39	8	20:10 (5)	21:31	22:01	21:41	3	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	20:00 (5)	05:13	04:55	05:24	06:17		07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	12	20:12 (5)	21:33	22:01	21:39		19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	19:59 (5)	05:12	04:55	05:26	06:19		07:13	08:09	08:07	08:43	
	16:51	17:52	18:45	20:42	14	20:13 (5)	21:34	22:01	21:38		19:22	18:11	16:17	16:08	
25	08:24	07:25	06:18	06:05	19:59 (5)	05:11	04:56	05:27	06:20		07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	16	20:15 (5)	21:36	22:01	21:36		19:19	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	19:58 (5)	05:09	04:56	05:29	06:22		07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	19	20:17 (5)	21:37	22:01	21:35		19:17	17:06	16:15	16:09	
27	08:21	07:21	06:13	06:01	19:58 (5)	05:08	04:56	05:30	06:24		07:19	07:14	08:13	08:43	
	16:56	17:58	18:51	20:48	21	20:19 (5)	21:39	22:01	21:33		19:14	17:04	16:13	16:10	
28	08:20	07:18	06:11	05:58	19:57 (5)	05:07	04:57	05:32	06:26		07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	24	20:21 (5)	21:40	22:01	21:32		19:12	17:02	16:13	16:11	
29	08:18		07:08	05:56	19:57 (5)	05:06	04:58	05:34	06:28		07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	24	20:21 (5)	21:41	22:00	21:30		19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	19:57 (5)	05:05	04:58	05:35	06:29		07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	24	20:21 (5)	21:43	22:00	21:28		19:07	16:58	16:11	16:12	
31	08:15		07:04			05:04			05:37			07:22		08:44	
	17:04		19:58			21:44			21:26			16:56		16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233	
Total, worst case				166	144				319						
Sun reduction				0.35	0.38				0.34						
Oper. time red.				1.00	1.00				1.00						
Wind dir. red.				0.65	0.65				0.65						
Total reduction				0.23	0.25				0.22						
Total, real				38	36				71						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CY - H103

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	20:13 (5)	05:03	04:59	05:39	20:20 (5)	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:55	20:26 (5)	21:45	22:00	21:25	20:45 (5)	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	20:11 (5)	05:02	05:00	05:40	20:20 (5)	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	20:27 (5)	21:46	22:00	21:23	20:45 (5)	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48	20:11 (5)	05:01	05:00	05:42	20:19 (5)	06:36	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	20:29 (5)	21:48	21:59	21:21	20:45 (5)	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46	20:10 (5)	05:00	05:01	05:44	20:19 (5)	06:38	07:31	07:30	08:23	
	16:18	17:12	18:07	20:06	21:01	20:30 (5)	21:49	21:59	21:19	20:45 (5)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44	20:09 (5)	04:59	05:02	05:45	20:18 (5)	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:03	20:32 (5)	21:50	21:58	21:17	20:45 (5)	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42	20:09 (5)	04:59	05:03	05:47	20:19 (5)	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04	20:33 (5)	21:51	21:57	21:15	20:45 (5)	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40	20:09 (5)	04:58	05:04	05:49	20:19 (5)	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	20:36 (5)	21:52	21:57	21:13	20:43 (5)	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38	20:09 (5)	04:57	05:05	05:51	20:19 (5)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	20:35 (5)	21:53	21:56	21:11	20:41 (5)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36	20:09 (5)	04:57	05:06	05:52	20:19 (5)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	20:35 (5)	21:54	21:55	21:09	20:39 (5)	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34	20:09 (5)	04:56	05:07	05:54	20:19 (5)	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11	20:34 (5)	21:54	21:54	21:07	20:37 (5)	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33	20:09 (5)	04:56	05:08	05:56	20:20 (5)	06:50	07:44	07:43	08:33	
	16:28	17:26	18:21	20:18	21:13	20:35 (5)	21:55	21:54	21:05	20:35 (5)	19:54	18:40	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31	20:09 (5)	04:55	05:09	05:58	20:21 (5)	06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15	20:34 (5)	21:56	21:53	21:03	20:34 (5)	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29	20:09 (5)	04:55	05:11	05:59	20:22 (5)	06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17	20:33 (5)	21:57	21:52	21:01	20:31 (5)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27	20:11 (5)	04:55	05:12	06:01	20:23 (5)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18	20:33 (5)	21:57	21:51	20:59	20:29 (5)	19:47	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26	20:11 (5)	04:55	05:13	06:03	20:26 (5)	06:58	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20	20:32 (5)	21:58	21:50	20:57	20:28 (5)	19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24	20:12 (5)	04:54	05:14	06:05		06:59	07:54	07:53	08:37	
	16:36	17:36	18:30	20:28	21:22	20:32 (5)	21:59	21:48	20:55		19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22	20:13 (5)	04:54	05:16	06:06		07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23	20:30 (5)	21:59	21:47	20:53		19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21	20:14 (5)	04:54	05:17	06:08		07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	21:25	20:30 (5)	21:59	21:46	20:50		19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:18	05:19	20:16 (5)	04:54	05:18	06:10		07:05	07:59	07:59	08:40	
	16:41	17:42	18:36	20:33	21:27	20:29 (5)	22:00	21:45	20:48		19:34	18:22	16:23	16:05	
20	08:31	07:36	06:31	06:16	05:18	20:18 (5)	04:54	05:20	06:12		07:06	08:01	08:00	08:41	
	16:43	17:44	18:38	20:35	21:28	20:26 (5)	22:00	21:43	20:46		19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16		04:54	05:21	06:13		07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30		22:00	21:42	20:44		19:29	18:17	16:20	16:06	
22	08:28	07:32	06:26	06:12	05:15		04:55	05:23	06:15		07:10	08:05	08:04	08:42	
	16:47	17:48	18:41	20:39	21:31		22:01	21:41	20:42		19:27	18:15	16:19	16:07	
23	08:27	07:30	06:23	06:09	05:13		04:55	05:24		20:30 (5)	06:17	07:12	08:07	08:42	
	16:49	17:50	18:43	20:41	21:33		22:01	21:39	5	20:35 (5)	20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26		20:27 (5)	06:19	07:13	08:09	08:07	08:43
	16:51	17:52	18:45	20:42	21:34		22:01	21:38	10	20:37 (5)	20:37	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	05:11		04:56	05:27		20:26 (5)	06:20	07:15	07:11	08:09	08:43
	16:52	17:54	18:47	20:44	21:36		22:01	21:36	14	20:40 (5)	20:35	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:09		04:56	05:29		20:24 (5)	06:22	07:17	07:13	08:11	08:43
	16:54	17:56	18:49	20:46	21:37		22:01	21:35	16	20:40 (5)	20:32	19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	05:08		04:56	05:30		20:24 (5)	06:24	07:19	07:14	08:13	08:43
	16:56	17:58	18:51	20:48	21:39		22:01	21:33	18	20:42 (5)	20:30	19:14	17:04	16:14	16:10
28	08:20	07:18	06:11	05:58	20:18 (5)	05:07	04:57	05:32		20:22 (5)	06:26	07:21	07:16	08:14	08:44
	16:58	18:00	18:53	20:50	3	20:21 (5)	21:40	22:01		20:42 (5)	20:28	19:12	17:02	16:13	16:11
29	08:18		07:08	05:56	20:15 (5)	05:06	04:58	05:34		20:22 (5)	06:28	07:22	07:18	08:16	08:44
	17:00		19:54	20:52	7	20:22 (5)	21:41	22:00		20:44 (5)	20:25	19:09	17:00	16:12	16:11
30	08:17		07:06	05:54	20:14 (5)	05:05	04:58	05:35		20:21 (5)	06:29	07:24	07:20	08:17	08:44
	17:02		19:56	20:53	10	20:24 (5)	21:43	22:00		20:44 (5)	20:23	19:07	16:58	16:11	16:12
31	08:15		07:04		05:04			05:37		20:21 (5)	06:31		07:22		08:44
	17:04		19:58		21:44		21:26	20:45 (5)	20:21		16:56				16:13
Potential sun hours	250	273	367	420	494		510	512		460		382	328	259	233
Total, worst case					410			152		284					
Sun reduction				0.35	0.38			0.32		0.34					
Oper. time red.				1.00	1.00			1.00		1.00					
Wind dir. red.				0.64	0.64			0.64		0.64					
Total reduction				0.23	0.25			0.21		0.22					
Total, real				5	101			32		62					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CZ - H104

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	20:14 (5)	05:03	04:59	05:39	20:18 (5)	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:55	20:26 (5)	21:45	22:00	21:25	30	20:48 (5)	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	20:12 (5)	05:02	05:00	05:40	20:18 (5)	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	20:27 (5)	21:46	22:00	21:23	30	20:48 (5)	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48	20:11 (5)	05:01	05:00	05:42	20:18 (5)	06:36	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	20:29 (5)	21:48	21:59	21:21	30	20:48 (5)	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46	20:10 (5)	05:00	05:01	05:44	20:18 (5)	06:38	07:31	07:30	08:24		
	16:18	17:12	18:07	20:06	21:01	20:30 (5)	21:49	21:59	21:19	30	20:48 (5)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44	20:09 (5)	04:59	05:02	05:45	20:18 (5)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:03	20:32 (5)	21:50	21:58	21:17	28	20:46 (5)	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42	20:09 (5)	04:59	05:03	05:47	20:18 (5)	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	20:33 (5)	21:51	21:57	21:15	27	20:45 (5)	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40	20:09 (5)	04:58	05:04	05:49	20:19 (5)	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	20:36 (5)	21:52	21:57	21:13	24	20:43 (5)	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38	20:08 (5)	04:57	05:05	05:51	20:19 (5)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	20:37 (5)	21:53	21:56	21:11	22	20:41 (5)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36	20:08 (5)	04:57	05:06	05:52	20:20 (5)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	20:38 (5)	21:54	21:55	21:09	19	20:39 (5)	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34	20:07 (5)	04:56	05:07	05:54	20:20 (5)	06:49	07:42	07:42	08:31		
	16:27	17:24	18:19	20:17	21:11	20:37 (5)	21:55	21:54	21:07	17	20:37 (5)	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33	20:08 (5)	04:56	05:08	05:56	20:21 (5)	06:50	07:44	07:43	08:33		
	16:28	17:26	18:21	20:18	21:13	20:38 (5)	21:55	21:54	21:05	14	20:35 (5)	19:54	18:40	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31	20:08 (5)	04:55	05:09	05:58	20:23 (5)	06:52	07:46	07:45	08:34		
	16:30	17:28	18:23	20:20	21:15	20:38 (5)	21:56	21:53	21:03	11	20:34 (5)	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29	20:07 (5)	04:55	05:11	05:59	20:24 (5)	06:54	07:48	07:47	08:35		
	16:31	17:30	18:25	20:22	21:17	20:37 (5)	21:57	21:52	21:01	7	20:31 (5)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27	20:08 (5)	04:55	05:12	06:01	20:26 (5)	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:18	20:37 (5)	21:57	21:51	20:59	3	20:29 (5)	19:47	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26	20:08 (5)	04:55	05:13	06:03	20:29 (5)	06:58	07:52	07:51	08:37		
	16:34	17:34	18:28	20:26	21:20	20:37 (5)	21:58	21:50	20:57	19:44	18:31	16:29	16:05			
16	08:35	07:45	06:40	06:25	05:24	20:09 (5)	04:54	05:14	06:05	06:59	07:54	07:53	08:38			
	16:36	17:36	18:30	20:28	21:22	20:37 (5)	21:59	21:48	20:55	19:42	18:29	16:27	16:05			
17	08:34	07:43	06:38	06:23	05:22	20:09 (5)	04:54	05:16	06:06	20:30 (5)	06:06	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23	20:36 (5)	21:59	21:47	7	20:37 (5)	05:53	19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21	20:10 (5)	04:54	05:17	06:08	20:27 (5)	06:08	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	21:25	20:36 (5)	21:59	21:46	12	20:39 (5)	05:50	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:18	05:19	20:11 (5)	04:54	05:18	06:10	20:25 (5)	06:10	07:05	07:59	07:59	08:40	
	16:41	17:42	18:36	20:33	21:27	20:36 (5)	22:00	21:45	15	20:40 (5)	05:48	19:34	18:22	16:23	16:05	
20	08:31	07:36	06:31	06:16	05:18	20:11 (5)	04:54	05:20	06:12	20:25 (5)	06:12	07:06	08:01	08:00	08:41	
	16:43	17:44	18:38	20:35	21:28	20:34 (5)	22:00	21:43	17	20:42 (5)	05:46	19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16	20:12 (5)	04:54	05:21	06:13	20:24 (5)	06:13	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30	20:34 (5)	22:00	21:42	19	20:43 (5)	05:44	19:29	18:17	16:20	16:06	
22	08:28	07:32	06:26	06:12	05:15	20:13 (5)	04:55	05:23	06:15	20:22 (5)	06:15	07:10	08:05	08:04	08:42	
	16:47	17:48	18:42	20:39	21:31	20:33 (5)	22:01	21:41	21	20:43 (5)	05:42	19:27	18:15	16:19	16:07	
23	08:27	07:30	06:23	06:09	05:13	20:14 (5)	04:55	05:24	06:17	20:22 (5)	06:17	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	21:33	20:32 (5)	22:01	21:39	23	20:45 (5)	05:39	19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12	20:15 (5)	04:55	05:26	06:19	20:21 (5)	06:19	07:13	08:09	08:07	08:43	
	16:51	17:52	18:45	20:42	21:34	20:31 (5)	22:01	21:38	24	20:45 (5)	05:37	19:22	18:11	16:17	16:08	
25	08:24	07:25	06:18	06:05	05:11	20:17 (5)	04:56	05:27	06:20	20:21 (5)	06:20	07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	21:36	20:30 (5)	22:01	21:36	25	20:46 (5)	05:35	19:19	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:09	20:19 (5)	04:56	05:29	06:22	20:20 (5)	06:22	07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	21:37	9	20:28 (5)	22:01	21:35	26	20:46 (5)	05:32	19:17	17:07	16:15	16:09
27	08:21	07:21	06:13	06:01	05:08	20:22 (5)	04:56	05:31	06:24	20:20 (5)	06:24	07:19	07:14	08:13	08:44	
	16:56	17:58	18:51	20:48	21:39	3	20:25 (5)	22:01	21:33	27	20:47 (5)	05:30	19:14	17:04	16:14	16:10
28	08:20	07:18	06:11	05:58	05:07	20:21 (5)	04:57	05:32	06:26	20:19 (5)	06:26	07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	28	20:47 (5)	05:28	19:12	17:02	16:13	16:11		
29	08:18		07:09	05:56	20:18 (5)	05:06	04:58	05:34	20:19 (5)	06:28	07:22	07:18	08:16	08:44		
	17:00		19:54	20:52	4	20:22 (5)	21:41	22:00	20:48 (5)	05:25	19:09	17:00	16:12	16:11		
30	08:17		07:06	05:54	20:16 (5)	05:05	04:58	05:35	20:18 (5)	06:29	07:24	07:20	08:17	08:44		
	17:02		19:56	20:53	8	20:24 (5)	21:43	22:00	20:48 (5)	05:23	19:07	16:58	16:11	16:12		
31	08:15		07:04		05:04			05:37	20:19 (5)	06:31		07:22		08:44		
	17:04		19:58		21:44			21:26	29	20:48 (5)	05:21	16:56		16:13		
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233			
Total, worst case																
Sun reduction				0.35	0.38			0.32		0.34						
Oper. time red.				1.00	1.00			1.00		1.00						
Wind dir. red.				0.64	0.64			0.64		0.64						
Total reduction				0.23	0.25			0.21		0.22						
Total, real				3	148			69		64						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DA - H105

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:18 (5) 21:24 (5)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	21:19 (5) 21:24 (5)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	21:19 (5) 21:23 (5)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	21:20 (5) 21:23 (5)	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	21:22 (5) 21:23 (5)	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:15 (5) 21:17 (5)	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:15 (5) 21:19 (5)	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	21:14 (5) 21:19 (5)	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	21:14 (5) 21:20 (5)	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:14 (5) 21:21 (5)	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:13 (5) 21:21 (5)	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:13 (5) 21:21 (5)	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:13 (5) 21:22 (5)	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:13 (5) 21:23 (5)	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:13 (5) 21:23 (5)	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:13 (5) 21:24 (5)	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	21:13 (5) 21:24 (5)	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:13 (5) 21:24 (5)	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	21:13 (5) 21:24 (5)	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	21:14 (5) 21:25 (5)	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:14 (5) 21:25 (5)	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:14 (5) 21:25 (5)	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:15 (5) 21:25 (5)	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:15 (5) 21:25 (5)	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:16 (5) 21:25 (5)	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:16 (5) 21:25 (5)	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13
29	08:18 17:00	07:09 17:54	06:09 18:54	05:56 20:52	05:06 21:41	04:58 22:00	21:17 (5) 21:25 (5)	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12
30	08:17 17:02	07:06 17:56	06:06 18:54	05:54 20:53	05:05 21:43	04:58 22:00	21:17 (5) 21:24 (5)	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11
31	08:15 17:04	07:04 17:58	06:04 18:58	05:04 21:44	05:04 21:44	05:04 21:44	05:37 21:26	05:37 21:26	06:31 20:21	07:22 16:56	07:22 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case							199		19			
Sun reduction							0.32		0.32			
Oper. time red.							1.00		1.00			
Wind dir. red.							0.61		0.61			
Total reduction							0.19		0.20			
Total, real							39		4			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DB - H106

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DC - H107

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DD - H108

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:04	18:04	07:01	20:00	38	18:50 (5)	05:52	20:40 (3)	05:03	21:07 (3)	21:07 (3)
2	08:44	16:16	08:12	17:08	18:04	07:14	18:04	18:04	06:59	20:02	38	18:49 (5)	05:50	20:41 (3)	05:02	21:08 (3)	21:08 (3)
3	08:43	16:17	08:10	17:10	18:06	07:12	18:06	18:06	06:56	20:04	38	18:49 (5)	05:48	20:42 (3)	05:01	21:08 (3)	21:08 (3)
4	08:43	16:18	08:08	17:12	18:07	07:09	18:07	18:07	06:54	20:06	37	18:50 (5)	05:46	20:42 (3)	05:00	21:07 (3)	21:07 (3)
5	08:43	16:20	08:07	17:14	18:09	07:07	18:09	18:09	06:51	20:07	37	18:49 (5)	05:44	20:43 (3)	04:59	21:08 (3)	21:08 (3)
6	08:42	16:21	08:05	17:16	18:11	07:04	18:11	18:11	06:49	20:09	35	18:50 (5)	05:42	20:43 (3)	04:59	21:07 (3)	21:07 (3)
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	18:13	06:47	20:11	35	18:49 (5)	05:40	20:43 (3)	04:58	21:07 (3)	21:07 (3)
8	08:41	16:24	08:01	17:20	18:15	07:00	18:15	18:15	06:44	20:13	33	18:50 (5)	05:38	20:43 (3)	04:57	21:07 (3)	21:07 (3)
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	18:17	06:42	20:15	31	19:23 (5)	05:36	20:44 (3)	04:57	21:08 (3)	21:08 (3)
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	18:19	06:39	20:17	29	19:22 (5)	05:34	20:44 (3)	04:56	21:07 (3)	21:07 (3)
11	08:40	16:28	07:55	17:26	18:21	06:52	18:21	18:21	06:37	20:19	26	19:20 (5)	05:33	20:45 (3)	04:56	21:08 (3)	21:08 (3)
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	18:23	06:35	20:20	23	19:19 (5)	05:31	20:45 (3)	04:55	21:07 (3)	21:07 (3)
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	18:25	06:32	20:22	19	19:18 (5)	05:29	20:45 (3)	04:55	21:08 (3)	21:08 (3)
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	18:27	06:30	20:24	12	19:15 (5)	05:27	20:46 (3)	04:55	21:07 (3)	21:07 (3)
15	08:36	16:34	07:47	17:34	18:28	06:43	18:28	18:28	06:28	20:26		19:11 (5)	05:26	20:46 (3)	04:54	21:07 (3)	21:07 (3)
16	08:35	16:36	07:45	17:36	18:30	06:40	18:30	18:30	06:25	20:28			05:24	20:47 (3)	04:54	21:07 (3)	21:07 (3)
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	18:32	06:23	20:30			05:22	20:48 (3)	04:54	21:07 (3)	21:07 (3)
18	08:33	16:40	07:41	17:40	18:34	06:35	18:34	18:34	06:21	20:31			05:21	20:49 (3)	04:54	21:07 (3)	21:07 (3)
19	08:32	16:41	07:39	17:42	18:36	06:33	18:36	18:36	06:18	20:33			05:19	20:50 (3)	04:54	21:08 (3)	21:08 (3)
20	08:31	16:43	07:36	17:44	18:38	06:31	18:38	18:38	06:16	20:35			05:18	20:51 (3)	04:54	21:08 (3)	21:08 (3)
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	18:40	06:14	20:37			05:16	20:52 (3)	04:54	21:08 (3)	21:08 (3)
22	08:28	16:47	07:32	17:48	18:42	06:26	18:42	18:42	06:12	20:39			05:15	20:53 (3)	04:54	21:08 (3)	21:08 (3)
23	08:27	16:49	07:30	17:50	18:43	06:23	18:43	18:43	06:09	20:41			05:13	20:54 (3)	04:55	21:09 (3)	21:09 (3)
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45	18:45	06:07	20:42			05:12	20:55 (3)	04:55	21:09 (3)	21:09 (3)
25	08:24	16:52	07:25	17:54	18:47	06:18	18:47	18:47	06:05	20:44			05:11	20:56 (3)	04:56	21:09 (3)	21:09 (3)
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	18:49	06:03	20:46			05:10	20:57 (3)	04:56	21:09 (3)	21:09 (3)
27	08:22	16:56	07:21	17:58	18:51	06:13	18:51	18:51	06:01	20:48			05:08	20:58 (3)	04:56	21:09 (3)	21:09 (3)
28	08:20	16:58	07:18	18:00	18:53	06:11	18:53	18:53	05:58	20:50			05:07	20:59 (3)	04:57	21:09 (3)	21:09 (3)
29	08:18	17:00			18:55	07:09	19:54	19:54	05:56	20:52			05:06	21:00 (3)	04:58	21:10 (3)	21:10 (3)
30	08:17	17:02			18:52	07:06	19:56	19:56	05:54	20:53			05:05	21:01 (3)	04:58	21:11 (3)	21:11 (3)
31	08:15	17:04			18:50	07:04	19:58	19:58	05:53	20:53			05:04	21:02 (3)	04:58	21:11 (3)	21:11 (3)
Potential sun hours	250	273	367		420		494		510								
Total, worst case					264		431		321						665		
Sun reduction					0.27		0.35		0.38						0.32		
Oper. time red.					1.00		1.00		1.00						1.00		
Wind dir. red.					0.68		0.68		0.63						0.63		
Total reduction					0.18		0.24		0.24						0.20		
Total, real					48		103		76						133		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DD - H108

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00 22	20:49 (3) 21:11 (3) 21:25	06:33 20:18 26	18:52 (5) 19:18 (5) 19:05	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 23	20:49 (3) 21:12 (3) 21:23	06:35 20:16 29	18:50 (5) 19:19 (5) 19:02	07:28 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 23	20:49 (3) 21:12 (3) 21:21	06:36 20:13 31	18:49 (5) 19:20 (5) 19:00	07:30 16:50 16:08	08:22 16:08 16:08
4	05:01 21:59 23	20:49 (3) 21:12 (3) 21:19	06:38 20:11 33	18:47 (5) 19:20 (5) 18:57	07:31 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 24	20:49 (3) 21:13 (3) 21:17	06:40 20:09 35	18:46 (5) 19:21 (5) 18:55	07:33 16:46 16:07	08:25 16:07 16:07
6	05:03 21:57 25	20:49 (3) 21:14 (3) 21:15	06:42 20:06 35	18:46 (5) 19:21 (5) 18:52	07:35 16:44 16:07	08:26 16:07 16:07
7	05:04 21:57 25	20:49 (3) 21:14 (3) 21:13	06:43 20:04 37	18:44 (5) 19:21 (5) 18:50	07:37 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 25	20:49 (3) 21:14 (3) 21:11	06:45 20:01 37	18:44 (5) 19:21 (5) 18:48	07:39 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 26	20:49 (3) 21:15 (3) 21:09	06:47 19:59 37	18:44 (5) 19:21 (5) 18:45	07:41 16:39 16:05	08:30 16:05 16:05
10	05:07 21:55 26	20:49 (3) 21:15 (3) 21:07	06:49 19:56 37	18:43 (5) 19:20 (5) 18:43	07:42 16:37 16:05	08:31 16:05 16:05
11	05:08 21:54 26	20:49 (3) 21:15 (3) 21:05	06:50 19:54 37	18:43 (5) 19:20 (5) 18:40	07:44 16:36 16:05	08:33 16:05 16:05
12	05:09 21:53 27	20:49 (3) 21:16 (3) 21:03	06:52 19:51 37	18:43 (5) 19:20 (5) 18:38	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 27	20:49 (3) 21:16 (3) 21:01	06:54 19:49 36	18:43 (5) 19:19 (5) 18:36	07:48 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 27	20:49 (3) 21:16 (3) 20:59	06:56 19:47 36	18:42 (5) 19:18 (5) 18:33	07:50 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 27	20:48 (3) 21:15 (3) 20:57	06:58 19:44 33	18:43 (5) 19:16 (5) 18:31	07:52 16:29 16:05	08:37 16:05 16:05
16	05:14 21:49 26	20:49 (3) 21:15 (3) 20:55	06:59 19:42 30	18:44 (5) 19:14 (5) 18:29	07:54 16:27 16:05	08:38 16:05 16:05
17	05:16 21:47 25	20:49 (3) 21:14 (3) 20:53	07:01 19:39 27	18:44 (5) 19:11 (5) 18:26	07:55 16:26 16:05	08:38 16:05 16:05
18	05:17 21:46 23	20:49 (3) 21:12 (3) 20:50	07:03 19:37 23	18:45 (5) 19:08 (5) 18:24	07:57 16:25 16:05	08:39 16:05 16:05
19	05:18 21:45 22	20:49 (3) 21:11 (3) 20:48	07:05 19:34 20	18:46 (5) 19:06 (5) 18:22	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44 20	20:50 (3) 21:10 (3) 20:46	07:06 19:32 16	18:48 (5) 19:04 (5) 18:20	08:00 16:22 16:06	08:41 16:06 16:06
21	05:21 21:42 19	20:50 (3) 21:09 (3) 20:44	07:08 19:29 11	18:50 (5) 19:01 (5) 18:17	08:03 16:20 16:06	08:41 16:06 16:06
22	05:23 21:41 17	20:50 (3) 21:07 (3) 20:42	07:10 19:27 11	08:05 18:15 16:19	08:04 16:19 16:07	08:42 16:07 16:07
23	05:24 21:39 17	20:50 (3) 21:07 (3) 20:39	07:12 19:24 11	08:07 18:13 16:18	08:06 16:18 16:07	08:42 16:07 16:07
24	05:26 21:38 15	20:50 (3) 21:05 (3) 20:37	07:13 19:22 11	08:09 18:11 16:17	08:08 16:17 16:08	08:43 16:08 16:08
25	05:27 21:36 12	20:52 (3) 21:04 (3) 20:35	07:15 19:19 11	07:11 17:09 16:16	08:09 16:16 16:08	08:43 16:08 16:08
26	05:29 21:35 10	20:52 (3) 21:02 (3) 20:32	07:17 19:17 11	07:13 17:07 16:15	08:11 16:15 16:09	08:43 16:09 16:09
27	05:30 21:33 8	20:53 (3) 21:01 (3) 20:30	07:19 19:14 11	07:15 17:04 16:13	08:13 16:13 16:10	08:44 16:10 16:10
28	05:32 21:32 6	20:53 (3) 20:59 (3) 20:28	07:21 19:12 11	07:16 17:02 16:13	08:14 16:13 16:11	08:44 16:11 16:11
29	05:34 21:30 3	20:55 (3) 20:58 (3) 20:25	07:22 19:09 11	07:18 17:00 16:12	08:16 16:12 16:11	08:44 16:11 16:11
30	05:35 21:28 19	06:29 20:23 19	18:57 (5) 19:16 (5) 19:07	07:24 16:58 16:11	08:18 16:11 16:12	08:44 16:12 16:12
31	05:37 21:26 13	06:31 20:21 24	18:53 (5) 19:17 (5) 19:07	07:22 16:56 16:13	08:18 16:13 16:11	08:44 16:11 16:11
Potential sun hours	512	460	382	328	259	233
Total, worst case	599	56	643			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.63	0.68	0.68			
Total reduction	0.20	0.23	0.22			
Total, real	121	13	139			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DE - H109

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:36 (5) 19:05 (5)	05:52 20:55
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:37 (5) 19:02 (5)	05:50 20:57
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	18:39 (5) 19:01 (5)	05:48 20:59
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:41 (5) 18:58 (5)	05:46 21:01
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	18:44 (5) 18:54 (5)	05:44 21:03
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	17:51 (5) 17:58 (5)	06:32 20:22	05:29 21:17
14	08:37 16:33	07:49 17:32	06:45 18:27	17:47 (5) 18:00 (5)	06:30 20:24	05:27 21:18
15	08:36 16:34	07:47 17:34	06:43 18:28	17:44 (5) 18:02 (5)	06:28 20:26	05:26 21:20
16	08:35 16:36	07:45 17:36	06:40 18:30	17:42 (5) 18:04 (5)	06:25 20:28	05:24 21:22
17	08:34 16:38	07:43 17:38	06:38 18:32	17:40 (5) 18:06 (5)	06:23 20:30	05:22 21:23
18	08:33 16:40	07:41 17:40	06:35 18:34	17:38 (5) 18:07 (5)	06:21 20:31	05:21 21:25
19	08:32 16:41	07:39 17:42	06:33 18:36	17:38 (5) 18:10 (5)	06:18 20:33	05:19 21:27
20	08:31 16:43	07:36 17:44	06:31 18:38	17:36 (5) 18:11 (5)	06:16 20:35	05:18 21:28
21	08:30 16:45	07:34 17:46	06:28 18:40	17:36 (5) 18:12 (5)	06:14 20:37	05:16 21:30
22	08:28 16:47	07:32 17:48	06:26 18:42	17:35 (5) 18:11 (5)	06:12 20:39	05:15 21:31
23	08:27 16:49	07:30 17:50	06:23 18:43	17:34 (5) 18:12 (5)	06:09 20:41	05:13 21:33
24	08:26 16:51	07:28 17:52	06:21 18:45	17:33 (5) 18:11 (5)	06:07 20:42	05:12 21:34
25	08:24 16:52	07:25 17:54	06:18 18:47	17:34 (5) 18:11 (5)	06:05 20:44	05:11 21:36
26	08:23 16:54	07:23 17:56	06:16 18:49	17:34 (5) 18:11 (5)	06:03 20:46	05:09 21:37
27	08:22 16:56	07:21 17:58	06:13 18:51	17:33 (5) 18:10 (5)	06:01 20:48	05:08 21:39
28	08:20 16:58	07:18 18:00	06:11 18:53	17:34 (5) 18:10 (5)	05:58 20:50	05:07 21:40
29	08:18 17:00		07:09 19:54	18:34 (5) 19:08 (5)	05:56 20:52	05:06 21:41
30	08:17 17:02		07:06 19:56	18:35 (5) 19:08 (5)	05:54 20:53	05:05 21:43
31	08:15 17:04		07:04 19:58	18:35 (5) 19:06 (5)	05:53 20:53	05:04 21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case			575	103	517	107
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.67	0.63	0.63
Total reduction			0.18	0.24	0.24	0.20
Total, real			105	24	125	21

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DE - H109

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:38 (3) 20:53 (3)	06:33 20:18	07:26 19:05	07:24 16:54
2	05:00 22:00	05:40 21:23	20:39 (3) 20:52 (3)	06:35 20:16	07:28 19:02	07:26 16:52
3	05:00 21:59	05:42 21:21	20:39 (3) 20:50 (3)	06:36 20:13	07:30 19:00	07:28 16:50
4	05:01 21:59	05:44 21:19	20:40 (3) 20:48 (3)	06:38 20:11	07:31 18:57	07:30 16:48
5	05:02 21:58	05:45 21:17	20:40 (3) 20:46 (3)	06:40 20:09	07:33 18:55	07:32 16:46
6	05:03 21:57	20:46 (3) 20:52 (3)	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44
7	05:04 21:57	20:45 (3) 20:54 (3)	05:49 21:13	06:43 20:04	18:40 (5) 18:48 (5)	07:36 16:43
8	05:05 21:56	20:44 (3) 20:55 (3)	05:51 21:11	06:45 20:01	18:36 (5) 18:52 (5)	07:39 18:48
9	05:06 21:55	20:43 (3) 20:56 (3)	05:52 21:09	06:47 19:59	18:33 (5) 18:55 (5)	07:41 18:45
10	05:07 21:55	20:42 (3) 20:57 (3)	05:54 21:07	06:49 19:56	18:30 (5) 18:55 (5)	07:42 18:43
11	05:08 21:54	20:41 (3) 20:58 (3)	05:56 21:05	06:50 19:54	18:29 (5) 18:57 (5)	07:44 18:40
12	05:09 21:53	20:41 (3) 20:59 (3)	05:58 21:03	06:52 19:51	18:27 (5) 18:58 (5)	07:46 18:38
13	05:11 21:52	20:40 (3) 21:00 (3)	05:59 21:01	06:54 19:49	18:26 (5) 18:59 (5)	07:47 18:36
14	05:12 21:51	20:39 (3) 21:00 (3)	06:01 20:59	06:56 19:47	18:24 (5) 18:58 (5)	07:50 18:33
15	05:13 21:50	20:39 (3) 21:01 (3)	06:03 20:57	06:58 19:44	18:24 (5) 18:59 (5)	07:52 18:31
16	05:14 21:49	20:39 (3) 21:02 (3)	06:05 20:55	06:59 19:42	18:23 (5) 18:59 (5)	07:54 18:29
17	05:16 21:47	20:38 (3) 21:03 (3)	06:06 20:53	07:01 19:39	18:21 (5) 18:58 (5)	07:55 18:26
18	05:17 21:46	20:38 (3) 21:03 (3)	06:08 20:50	07:03 19:37	18:21 (5) 18:58 (5)	07:57 18:24
19	05:18 21:45	20:37 (3) 21:03 (3)	06:10 20:48	07:05 19:34	18:21 (5) 18:58 (5)	07:59 18:22
20	05:20 21:44	20:38 (3) 21:04 (3)	06:12 20:46	07:06 19:32	18:21 (5) 18:58 (5)	08:00 18:20
21	05:21 21:42	20:37 (3) 21:04 (3)	06:13 20:44	07:08 19:29	18:20 (5) 18:57 (5)	08:03 18:17
22	05:23 21:41	20:36 (3) 21:04 (3)	06:15 20:42	07:10 19:27	18:20 (5) 18:56 (5)	08:05 18:15
23	05:24 21:39	20:37 (3) 21:05 (3)	06:17 20:39	07:12 19:24	18:21 (5) 18:56 (5)	08:07 18:13
24	05:26 21:38	20:36 (3) 21:05 (3)	06:19 20:37	07:13 19:22	18:21 (5) 18:54 (5)	08:08 18:11
25	05:27 21:36	20:37 (3) 21:04 (3)	06:20 20:35	07:15 19:19	18:21 (5) 18:51 (5)	07:11 17:09
26	05:29 21:35	20:36 (3) 21:02 (3)	06:22 20:32	07:17 19:17	18:22 (5) 18:48 (5)	07:13 17:07
27	05:30 21:33	20:37 (3) 21:01 (3)	06:24 20:30	07:19 19:14	18:23 (5) 18:46 (5)	07:15 17:04
28	05:32 21:32	20:37 (3) 20:59 (3)	06:26 20:28	07:21 19:12	18:24 (5) 18:44 (5)	07:16 17:02
29	05:34 21:30	20:37 (3) 20:58 (3)	06:28 20:25	07:22 19:09	18:26 (5) 18:41 (5)	07:18 17:00
30	05:35 21:28	20:37 (3) 20:56 (3)	06:29 20:23	07:24 19:07	18:28 (5) 18:38 (5)	07:20 16:58
31	05:37 21:26	20:38 (3) 20:55 (3)	06:31 20:21		07:22 16:56	
Potential sun hours	512	460	382	328	259	233
Total, worst case	545	56	681			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.63	0.63	0.67			
Total reduction	0.21	0.22	0.22			
Total, real	112	12	147			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
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abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DF - H110

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	20:00	07:01	20:00	05:52	20:20 (3)	05:03	20:42 (4)			
2	08:44	16:16	08:12	17:08	18:04	07:12	18:04	20:02	06:59	20:02	05:50	20:19 (3)	05:02	20:43 (4)			
3	08:43	16:17	08:10	17:10	18:06	07:12	18:06	20:04	06:56	20:04	05:48	20:18 (3)	05:01	20:42 (4)			
4	08:43	16:18	08:08	17:12	18:07	07:09	18:07	20:06	06:54	20:06	05:46	20:17 (3)	05:00	20:41 (4)			
5	08:43	16:20	08:07	17:14	18:09	07:07	18:09	20:07	06:51	20:07	05:44	20:16 (3)	04:59	20:42 (4)			
6	08:42	16:21	08:05	17:16	18:11	07:04	18:11	20:09	06:49	20:09	05:42	20:15 (3)	04:59	20:41 (4)			
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	20:11	06:47	20:11	05:40	20:15 (3)	04:58	20:41 (4)			
8	08:42	16:24	08:01	17:20	18:15	07:00	18:15	20:13	06:44	20:13	05:38	20:15 (3)	04:57	20:41 (4)			
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	20:15	06:42	20:15	05:36	20:14 (3)	04:57	20:41 (4)			
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	20:17	06:39	20:17	05:34	20:14 (3)	04:56	20:41 (4)			
11	08:40	16:28	07:55	17:26	18:21	06:52	18:21	20:19	06:37	20:19	05:33	20:15 (3)	04:56	20:41 (4)			
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	20:20	06:35	20:20	05:31	20:14 (3)	04:55	20:41 (4)			
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	20:22	06:32	20:22	05:29	20:14 (3)	04:55	20:40 (4)			
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	20:24	06:30	20:24	05:27	20:15 (3)	04:55	20:41 (4)			
15	08:36	16:34	07:47	17:34	18:28	06:43	18:28	20:26	06:28	20:26	05:26	20:15 (3)	04:55	20:41 (4)			
16	08:35	16:36	07:45	17:36	18:30	06:40	18:30	20:28	06:25	20:28	05:24	20:16 (3)	04:54	20:41 (4)			
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	20:30	06:23	20:30	05:22	20:16 (3)	04:54	20:41 (4)			
18	08:33	16:40	07:41	17:40	18:34	06:35	18:34	20:31	06:21	20:31	05:21	20:17 (3)	04:54	20:41 (4)			
19	08:32	16:41	07:39	17:42	18:36	06:33	18:36	20:33	06:18	20:33	05:19	20:18 (3)	04:54	20:41 (4)			
20	08:31	16:43	07:36	17:44	18:38	06:31	18:38	20:35	06:16	20:35	05:18	20:18 (3)	04:54	20:41 (4)			
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	20:37	06:14	20:37	05:16	20:19 (3)	04:54	20:41 (4)			
22	08:28	16:47	07:32	17:48	18:42	06:26	18:42	20:39	06:12	20:39	05:15	20:21 (3)	04:55	20:42 (4)			
23	08:27	16:49	07:30	17:50	18:43	06:23	18:43	20:41	06:09	20:41	05:13	20:21 (3)	04:55	20:42 (4)			
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45	20:42	06:07	20:42	05:12	20:23 (3)	04:55	20:42 (4)			
25	08:24	16:52	07:25	17:54	18:47	06:18	18:47	20:44	06:05	20:44	05:11	20:26 (3)	04:56	20:43 (4)			
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	20:46	06:03	20:46	05:09	21:02 (4)	22:01	21:25 (4)			
27	08:22	16:56	07:21	17:58	18:51	06:13	18:51	20:48	06:01	20:48	05:08	20:46 (4)	22:01	21:25 (4)			
28	08:20	16:58	07:18	18:00	18:53	06:11	18:53	20:50	05:58	20:50	05:07	20:45 (4)	22:01	21:24 (4)			
29	08:18	17:00	07:16	18:02	18:55	06:09	18:55	20:52	05:56	20:52	05:06	20:45 (4)	22:01	21:25 (4)			
30	08:17	17:02	07:15	18:01	18:56	06:08	18:56	20:53	05:54	20:53	05:05	20:44 (4)	22:01	21:25 (4)			
31	08:15	17:04	07:13	18:03	18:57	06:06	18:57	20:54	05:52	20:54	05:04	20:43 (4)	22:01	21:24 (4)			
Potential sun hours	250	273	367	420	494	510	1170	0.32	1.00	0.61	0.20	228					
Total, worst case				620	2	645	1170	0.38	1.00	0.63	0.24	156					
Sun reduction				0.27	0.35	0.38	0.32										
Oper. time red.				1.00	1.00	1.00	1.00										
Wind dir. red.				0.67	0.64	0.63	0.61										
Total reduction				0.18	0.23	0.24	0.20										
Total, real				113	0	156	228										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DF - H110

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:45 (4)	05:39	20:25 (3)	06:33	07:26	18:06 (5)	07:24	08:19		
	22:00	39	21:24 (4)	21:25	28	20:53 (3)	20:18	19:05	30	18:36 (5)	16:54
2	05:00	20:46 (4)	05:40	20:25 (3)	06:35	07:28	18:07 (5)	07:26	08:21		
	22:00	38	21:24 (4)	21:23	27	20:52 (3)	20:16	19:02	26	18:33 (5)	16:52
3	05:00	20:45 (4)	05:42	20:24 (3)	06:36	07:30	18:08 (5)	07:28	08:22		
	21:59	38	21:23 (4)	21:21	26	20:50 (3)	20:13	19:00	23	18:31 (5)	16:50
4	05:01	20:46 (4)	05:44	20:25 (3)	06:38	07:31	18:10 (5)	07:30	08:24		
	21:59	37	21:23 (4)	21:19	23	20:48 (3)	20:11	18:57	19	18:29 (5)	16:48
5	05:02	20:47 (4)	05:45	20:24 (3)	06:40	07:33	18:12 (5)	07:32	08:25		
	21:58	36	21:23 (4)	21:17	22	20:46 (3)	20:09	18:55	14	18:26 (5)	16:46
6	05:03	20:47 (4)	05:47	20:25 (3)	06:42	07:35	18:14 (5)	07:34	08:26		
	21:57	35	21:22 (4)	21:15	20	20:45 (3)	20:06	18:52	10	18:24 (5)	16:44
7	05:04	20:48 (4)	05:49	20:26 (3)	06:43	07:37		07:36	08:28		
	21:57	34	21:22 (4)	21:13	17	20:43 (3)	20:04	18:50		16:43	16:06
8	05:05	20:49 (4)	05:51	20:25 (3)	06:45	07:39		07:38	08:29		
	21:56	32	21:21 (4)	21:11	16	20:41 (3)	20:01	18:48		16:41	16:06
9	05:06	20:49 (4)	05:52	20:26 (3)	06:47	07:41		07:40	08:30		
	21:55	32	21:21 (4)	21:09	13	20:39 (3)	19:59	18:45		16:39	16:05
10	05:07	20:50 (4)	05:54	20:26 (3)	06:49	07:42		07:42	08:31		
	21:55	30	21:20 (4)	21:07	11	20:37 (3)	19:56	18:43		16:37	16:05
11	05:08	20:51 (4)	05:56	20:28 (3)	06:50	07:44		07:44	08:33		
	21:54	28	21:19 (4)	21:05	7	20:35 (3)	19:54	18:40		16:36	16:05
12	05:09	20:51 (4)	05:58	20:29 (3)	06:52	07:46		07:45	08:34		
	21:53	27	21:18 (4)	21:03	5	20:34 (3)	19:51	18:38		16:34	16:05
13	05:11	20:52 (4)	05:59	20:30 (3)	06:54	07:48		07:47	08:35		
	21:52	25	21:17 (4)	21:01	1	20:31 (3)	19:49	18:36		16:32	16:05
14	05:12	20:53 (4)	06:01	06:56		18:25 (5)	07:50	07:49	08:36		
	21:51	23	21:16 (4)	20:59		19:47	8	18:33 (5)	18:33	16:31	16:05
15	05:13	20:54 (4)	06:03	06:58		18:21 (5)	07:52	07:51	08:37		
	21:50	21	21:15 (4)	20:57		19:44	16	18:37 (5)	18:31	16:29	16:05
16	05:14	20:55 (4)	06:05	06:59		18:18 (5)	07:54	07:53	08:38		
	21:49	20	21:15 (4)	20:55		19:42	21	18:39 (5)	18:29	16:27	16:05
17	05:16	20:56 (4)	06:06	07:01		18:15 (5)	07:55	07:55	08:38		
	21:47	18	21:14 (4)	20:53		19:39	25	18:40 (5)	18:26	16:26	16:05
18	05:17	20:58 (4)	06:08	07:03		18:13 (5)	07:57	07:57	08:39		
	21:46	14	21:12 (4)	20:50		19:37	28	18:41 (5)	18:24	16:25	16:05
19	05:18	20:34 (3)	06:10	07:05		18:12 (5)	07:59	07:59	08:40		
	21:45	21	21:11 (4)	20:48		19:34	30	18:42 (5)	18:22	16:23	16:05
20	05:20	20:33 (3)	06:12	07:06		18:11 (5)	08:01	08:00	08:41		
	21:44	20	21:10 (4)	20:46		19:32	32	18:43 (5)	18:20	16:22	16:06
21	05:21	20:31 (3)	06:13	07:08		18:09 (5)	08:03	08:02	08:41		
	21:42	20	21:09 (4)	20:44		19:29	33	18:42 (5)	18:17	16:20	16:06
22	05:23	20:30 (3)	06:15	07:10		18:08 (5)	08:05	08:04	08:42		
	21:41	17	20:47 (3)	20:42		19:27	35	18:43 (5)	18:15	16:19	16:07
23	05:24	20:29 (3)	06:17	07:12		18:08 (5)	08:07	08:06	08:42		
	21:39	20	20:49 (3)	20:39		19:24	35	18:43 (5)	18:13	16:18	16:07
24	05:26	20:28 (3)	06:19	07:13		18:07 (5)	08:09	08:08	08:43		
	21:38	21	20:49 (3)	20:37		19:22	36	18:43 (5)	18:11	16:17	16:08
25	05:27	20:28 (3)	06:20	07:15		18:06 (5)	07:11	08:09	08:43		
	21:36	23	20:51 (3)	20:35		19:19	36	18:42 (5)	17:09	16:16	16:08
26	05:29	20:27 (3)	06:22	07:17		18:06 (5)	07:13	08:11	08:43		
	21:35	24	20:51 (3)	20:32		19:17	36	18:42 (5)	17:07	16:15	16:09
27	05:30	20:27 (3)	06:24	07:19		18:06 (5)	07:15	08:13	08:44		
	21:33	25	20:52 (3)	20:30		19:14	36	18:42 (5)	17:04	16:13	16:10
28	05:32	20:26 (3)	06:26	07:21		18:06 (5)	07:16	08:14	08:44		
	21:32	26	20:52 (3)	20:28		19:12	35	18:41 (5)	17:02	16:13	16:11
29	05:34	20:26 (3)	06:28	07:22		18:06 (5)	07:18	08:16	08:44		
	21:30	27	20:53 (3)	20:25		19:09	35	18:41 (5)	17:00	16:12	16:11
30	05:35	20:25 (3)	06:29	07:24		18:06 (5)	07:20	08:18	08:44		
	21:28	28	20:53 (3)	20:23		19:07	32	18:38 (5)	16:58	16:11	16:12
31	05:37	20:25 (3)	06:31			07:22			08:44		
	21:26	28	20:53 (3)	20:21		16:56			16:13		
Potential sun hours	512		460		382		328		259		233
Total, worst case		827		216		509		122			
Sun reduction		0.32		0.34		0.32		0.29			
Oper. time red.		1.00		1.00		1.00		1.00			
Wind dir. red.		0.62		0.64		0.67		0.67			
Total reduction		0.20		0.22		0.22		0.20			
Total, real		166		47		110		24			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
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abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DG - H111

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:58 (2) 20:10 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	20:01 (2) 20:06 (2)
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	17:39 (4) 17:42 (4)	06:51 20:07	05:44 21:03
6	08:42 16:21	08:05 17:16	07:04 18:11	17:38 (4) 17:45 (4)	06:49 20:09	05:42 21:04
7	08:42 16:22	08:03 17:18	07:02 18:13	17:36 (4) 17:46 (4)	06:47 20:11	05:40 21:06
8	08:41 16:24	08:01 17:20	07:00 18:15	17:35 (4) 17:48 (4)	06:44 20:13	05:38 21:08
9	08:41 16:25	07:59 17:22	06:57 18:17	17:34 (4) 17:50 (4)	06:42 20:15	05:36 21:10
10	08:40 16:26	07:57 17:24	16:53 (5) 16:54 (5)	06:55 18:19	17:34 (4) 17:52 (4)	06:39 20:17
11	08:40 16:28	07:55 17:26	16:52 (5) 16:56 (5)	06:52 18:21	17:34 (4) 17:55 (4)	06:37 20:18
12	08:39 16:30	07:53 17:28	16:51 (5) 16:58 (5)	06:50 18:23	17:33 (4) 17:56 (4)	06:35 20:20
13	08:38 16:31	07:51 17:30	16:50 (5) 17:00 (5)	06:48 18:25	17:33 (4) 17:58 (4)	06:32 20:22
14	08:37 16:33	07:49 17:32	16:50 (5) 17:02 (5)	06:45 18:27	17:33 (4) 17:58 (4)	06:30 20:24
15	08:36 16:34	07:47 17:34	16:50 (5) 17:05 (5)	06:43 18:28	17:34 (4) 17:58 (4)	06:28 20:26
16	08:35 16:36	07:45 17:36	16:51 (5) 17:07 (5)	06:40 18:30	17:34 (4) 17:56 (4)	06:25 20:28
17	08:34 16:38	07:43 17:38	16:51 (5) 17:09 (5)	06:38 18:32	17:35 (4) 18:06 (3)	19:59 (2) 20:01 (2)
18	08:33 16:40	07:41 17:40	16:51 (5) 17:08 (5)	06:35 18:34	17:36 (4) 18:07 (3)	19:58 (2) 20:03 (2)
19	08:32 16:41	07:39 17:42	16:52 (5) 17:07 (5)	06:33 18:36	17:39 (4) 18:10 (3)	19:57 (2) 20:05 (2)
20	08:31 16:43	07:36 17:44	16:54 (5) 17:06 (5)	06:31 18:38	18:01 (3) 18:11 (3)	19:56 (2) 20:07 (2)
21	08:30 16:45	07:34 17:46	16:57 (5) 17:03 (5)	06:28 18:40	18:01 (3) 18:13 (3)	19:54 (2) 20:08 (2)
22	08:28 16:47	07:32 17:48	06:26 18:41	06:26 18:41	18:01 (3) 18:15 (3)	19:54 (2) 20:10 (2)
23	08:27 16:49	07:30 17:50	06:23 18:43	06:23 18:43	18:02 (3) 18:17 (3)	19:54 (2) 20:12 (2)
24	08:26 16:50	07:28 17:52	06:21 18:45	06:21 18:45	18:02 (3) 18:16 (3)	19:53 (2) 20:14 (2)
25	08:24 16:52	07:25 17:54	06:18 18:47	06:18 18:47	18:04 (3) 18:14 (3)	19:54 (2) 20:15 (2)
26	08:23 16:54	07:23 17:56	06:16 18:49	06:16 18:49	20:44 20:46	21:36 21:37
27	08:22 16:56	07:21 17:58	06:13 18:51	06:13 18:51	20:00 20:48	05:08 21:39
28	08:20 16:58	07:18 18:00	06:11 18:53	06:11 18:53	05:58 20:50	05:07 21:40
29	08:18 17:00		07:08 19:54	07:08 19:54	19:56 (2) 20:52	05:06 21:41
30	08:17 17:02		07:06 19:56	07:06 19:56	19:57 (2) 20:53	05:05 21:43
31	08:15 17:04		07:04 19:58	07:04 19:58	20:12 (2) 21:44	05:04 21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case		133	345	210	17	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.66	0.68	0.65	0.65	
Total reduction		0.15	0.18	0.23	0.25	
Total, real		21	63	48	4	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DG - H111

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:12 (4) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:12 (4) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:11 (4) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:12 (4) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:12 (4) 16:46	08:25 16:07
6	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	18:12 (4) 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	18:12 (4) 16:43	08:28 16:06
8	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	18:13 (4) 16:41	08:29 16:06
9	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	18:15 (4) 16:39	08:30 16:05
10	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	18:16 (4) 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	20:09 (2) 19:54	06:50 18:40	07:44 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	20:06 (2) 19:51	06:52 18:38	07:45 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	20:04 (2) 19:49	06:54 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	20:03 (2) 19:46	06:56 18:33	07:49 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	20:02 (2) 19:44	06:57 18:31	07:51 16:29	08:37 16:04
16	05:14 21:49	06:04 20:55	20:01 (2) 19:42	06:59 18:29	07:53 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	20:00 (2) 19:39	07:01 18:26	07:55 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:00 (2) 19:37	07:03 19:01 (3)	07:57 18:24	08:39 16:05
19	05:18 21:45	06:10 20:48	19:59 (2) 19:34	07:05 19:03 (3)	07:59 18:22	08:40 16:23
20	05:20 21:44	06:12 20:46	19:59 (2) 19:32	07:06 19:04 (3)	08:01 18:20	08:41 16:22
21	05:21 21:42	06:13 20:44	19:59 (2) 19:29	07:08 19:01 (3)	08:03 18:17	08:41 16:20
22	05:23 21:41	06:15 20:42	19:59 (2) 19:27	07:10 18:58 (3)	08:05 18:15	08:42 16:19
23	05:24 21:39	06:17 20:39	20:00 (2) 19:24	07:12 18:56 (3)	08:07 18:13	08:42 16:18
24	05:26 21:38	06:19 20:37	20:00 (2) 19:22	07:13 18:54 (3)	08:09 18:11	08:43 16:17
25	05:27 21:36	06:20 20:35	20:01 (2) 19:19	07:15 18:51 (3)	07:11 17:09	08:43 16:16
26	05:29 21:35	06:22 20:32	20:02 (2) 19:17	07:17 18:48 (3)	07:13 17:06	08:43 16:14
27	05:30 21:33	06:24 20:30	20:04 (2) 19:14	07:19 18:46 (4)	07:14 17:04	08:44 16:13
28	05:32 21:32	06:26 20:28	19:12 18:38 (4)	07:21 18:42 (4)	17:02 16:20 (5)	08:44 16:12
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 18:39 (4)	16:20 (5) 17:00	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 18:38 (4)	16:20 (5) 16:58	08:44 16:11
31	05:37 21:26	06:31 20:21		07:22 16:56	16:21 (5) 16:25 (5)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		232	227	256		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.68	0.67		
Total reduction		0.22	0.22	0.20		
Total, real		51	49	50		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DH - H112

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44		15:33 (5)	08:14		16:13 (4)	07:16		07:01		19:32 (1)	05:52		19:48 (2)	05:03			
	16:15	4	15:37 (5)	17:06	22	16:35 (4)	18:02		20:00	1	19:33 (1)	20:55	38	20:26 (2)	21:45			
2	08:44		15:34 (5)	08:12		16:12 (4)	07:14		17:35 (3)	06:59		19:30 (1)	05:50		19:47 (2)	05:02		
	16:16	5	15:39 (5)	17:08	25	16:37 (4)	18:04	1	17:36 (3)	20:02	5	19:35 (1)	20:57	40	20:27 (2)	21:46		
3	08:44		15:33 (5)	08:10		16:12 (4)	07:12		17:34 (3)	06:56		19:30 (1)	05:48		19:47 (2)	05:01		
	16:17	6	15:39 (5)	17:10	27	16:39 (4)	18:06	4	17:38 (3)	20:04	7	19:37 (1)	20:59	40	20:27 (2)	21:48		
4	08:43		15:34 (5)	08:08		16:11 (4)	07:09		17:33 (3)	06:54		19:30 (1)	05:46		19:47 (2)	05:00		
	16:18	7	15:41 (5)	17:12	30	16:41 (4)	18:07	8	17:41 (3)	20:06	9	19:39 (1)	21:01	40	20:27 (2)	21:49		
5	08:43		15:33 (5)	08:07		16:11 (4)	07:07		17:31 (3)	06:51		19:29 (1)	05:44		19:47 (2)	04:59		
	16:19	9	15:42 (5)	17:14	32	16:43 (4)	18:09	11	17:42 (3)	20:07	11	19:40 (1)	21:03	40	20:27 (2)	21:50		
6	08:43		15:34 (5)	08:05		16:10 (4)	07:04		17:31 (3)	06:49		19:29 (1)	05:42		19:46 (2)	04:59		
	16:21	10	15:44 (5)	17:16	35	16:45 (4)	18:11	14	17:45 (3)	20:09	13	19:42 (1)	21:04	41	20:27 (2)	21:51		
7	08:42		15:34 (5)	08:03		16:10 (4)	07:02		17:29 (3)	06:47		19:29 (1)	05:40		19:47 (2)	04:58		
	16:22	11	15:45 (5)	17:18	37	16:47 (4)	18:13	17	17:46 (3)	20:11	14	19:43 (1)	21:06	40	20:27 (2)	21:52		
8	08:42		15:34 (5)	08:01		16:10 (4)	07:00		17:29 (3)	06:44		19:30 (1)	05:38		19:47 (2)	04:57		
	16:24	12	15:46 (5)	17:20	40	16:50 (4)	18:15	19	17:48 (3)	20:13	14	19:44 (1)	21:08	39	20:26 (2)	21:53		
9	08:41		15:35 (5)	07:59		16:09 (4)	06:57		17:28 (3)	06:42		19:32 (1)	05:36		19:47 (2)	04:57		
	16:25	14	15:49 (5)	17:22	43	16:52 (4)	18:17	22	17:50 (3)	20:15	11	19:43 (1)	21:10	39	20:26 (2)	21:54		
10	08:40		15:35 (5)	07:57		16:09 (4)	06:55		17:29 (3)	06:39		19:33 (1)	05:34		19:47 (2)	04:56		
	16:26	15	15:50 (5)	17:24	45	16:54 (4)	18:19	23	17:52 (3)	20:17	6	19:39 (1)	21:11	38	20:25 (2)	21:55		
11	08:40		15:35 (5)	07:55		16:09 (4)	06:53		17:29 (3)	06:37		05:33		19:49 (2)	04:56			
	16:28	17	15:52 (5)	17:26	47	16:56 (4)	18:21	26	17:55 (3)	20:19		21:13	36	20:25 (2)	21:55			
12	08:39		15:35 (5)	07:53		16:09 (4)	06:50		17:29 (3)	06:35		05:31		19:49 (2)	04:55			
	16:30	19	15:54 (5)	17:28	47	16:56 (4)	18:23	26	17:55 (3)	20:20		21:15	35	20:24 (2)	21:56			
13	08:38		15:36 (5)	07:51		16:09 (4)	06:48		17:30 (3)	06:32		05:29		19:49 (2)	04:55			
	16:31	19	15:55 (5)	17:30	47	16:56 (4)	18:25	24	17:54 (3)	20:22		21:17	34	20:23 (2)	21:57			
14	08:37		15:36 (5)	07:49		16:09 (4)	06:45		17:30 (3)	06:30		05:27		19:50 (2)	04:55			
	16:33	21	15:57 (5)	17:32	47	16:56 (4)	18:27	22	17:52 (3)	20:24		21:18	33	20:23 (2)	21:58			
15	08:36		15:36 (5)	07:47		16:10 (4)	06:43		17:32 (3)	06:28		05:26		19:51 (2)	04:55			
	16:34	23	15:59 (5)	17:34	46	16:56 (4)	18:28	19	17:51 (3)	20:26		21:20	31	20:22 (2)	21:58			
16	08:35		15:36 (5)	07:45		16:10 (4)	06:40		17:33 (3)	06:25		05:24		19:52 (2)	04:54			
	16:36	24	16:00 (5)	17:36	46	16:56 (4)	18:30	15	17:48 (3)	20:28		21:22	30	20:22 (2)	21:59			
17	08:34		15:37 (5)	07:43		16:11 (4)	06:38		17:37 (3)	06:23		05:22		19:52 (2)	04:54			
	16:38	26	16:03 (5)	17:38	45	16:56 (4)	18:32	8	17:45 (3)	20:30		21:23	28	20:20 (2)	21:59			
18	08:33		15:37 (5)	07:41		16:10 (4)	06:35		06:21			05:21		19:54 (2)	04:54			
	16:40	26	16:03 (5)	17:40	45	16:55 (4)	18:34		20:31			21:25	26	20:20 (2)	22:00			
19	08:32		15:38 (5)	07:39		16:11 (4)	06:33		06:18		20:04 (2)	05:19		19:56 (2)	04:54			
	16:41	26	16:04 (5)	17:42	43	16:54 (4)	18:36		20:33	1	20:05 (2)	21:27	23	20:19 (2)	22:00			
20	08:31		15:38 (5)	07:36		16:12 (4)	06:31		06:16		20:01 (2)	05:18		19:56 (2)	04:54			
	16:43	25	16:03 (5)	17:44	42	16:54 (4)	18:38		20:35	6	20:07 (2)	21:28	21	20:17 (2)	22:00			
21	08:30		15:39 (5)	07:34		16:13 (4)	06:28		06:14		19:57 (2)	05:16		19:58 (2)	04:54			
	16:45	25	16:04 (5)	17:46	40	16:53 (4)	18:40		20:37	11	20:08 (2)	21:30	18	20:16 (2)	22:01			
22	08:29		15:39 (5)	07:32		16:14 (4)	06:26		06:12		19:55 (2)	05:15		20:01 (2)	04:55			
	16:47	24	16:03 (5)	17:48	37	16:51 (4)	18:42		20:39	15	20:10 (2)	21:31	13	20:14 (2)	22:01			
23	08:27		15:41 (5)	07:30		16:15 (4)	06:23		06:09		19:54 (2)	05:13		20:03 (2)	04:55			
	16:49	22	16:03 (5)	17:50	35	16:50 (4)	18:43		20:41	18	20:12 (2)	21:33	8	20:11 (2)	22:01			
24	08:26		15:41 (5)	07:28		16:17 (4)	06:21		06:07		19:53 (2)	05:12			04:55			
	16:50	21	16:02 (5)	17:52	32	16:49 (4)	18:45		20:43	21	20:14 (2)	21:34			22:01			
25	08:24		15:43 (5)	07:25		16:18 (4)	06:18		06:05		19:52 (2)	05:11			04:55			
	16:52	19	16:02 (5)	17:54	28	16:46 (4)	18:47		20:44	23	20:15 (2)	21:36			22:01			
26	08:23		15:44 (5)	07:23		16:21 (4)	06:16		06:03		19:51 (2)	05:09			04:56			
	16:54	19	16:21 (4)	17:56	23	16:44 (4)	18:49		20:46	26	20:17 (2)	21:37			22:01			
27	08:22		15:46 (5)	07:21		16:24 (4)	06:13		06:01		19:50 (2)	05:08			04:56			
	16:56	19	16:23 (4)	17:58	17	16:41 (4)	18:51		20:48	29	20:19 (2)	21:39			22:01			
28	08:20		15:49 (5)	07:18		16:31 (4)	06:11		05:58		19:49 (2)	05:07			04:57			
	16:58	19	16:26 (4)	18:00	3	16:34 (4)	18:53		20:50	32	20:21 (2)	21:40			22:01			
29	08:18		16:15 (4)				07:09		05:56		19:49 (2)	05:06			04:57			
	17:00	13	16:28 (4)				19:54		20:52	33	20:22 (2)	21:41			22:01			
30	08:17		16:14 (4)				07:06		05:54		19:48 (2)	05:05			04:58			
	17:02	16	16:30 (4)				19:56		20:54	36	20:24 (2)	21:43			22:00			
31	08:15		16:13 (4)				07:04					05:04						
	17:04	19	16:32 (4)				19:58					21:44						
Potential sun hours	250			273			367		420			494			510			
Total, worst case		535		1006			259		342		731							
Sun reduction		0.24		0.23			0.27		0.35		0.38							
Oper. time red.		1.00		1.00			1.00		1.00		1.00							
Wind dir. red.		0.66		0.66			0.68		0.65		0.65							
Total reduction		0.16		0.15			0.18		0.23		0.25							
Total, real		86		154			48		79		180							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DH - H112

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July		August		September		October		November		December		
1	04:59		05:39	19:59 (2)	06:33		07:26	18:08 (3)	07:24	15:39 (4)	08:19	15:17 (5)	
	22:00		21:25	36 20:35 (2)	20:18		19:05	25 18:33 (3)	16:54	44 16:23 (4)	16:10	17 15:34 (5)	
2	04:59		05:40	19:59 (2)	06:35		07:28	18:07 (3)	07:26	15:39 (4)	08:21	15:17 (5)	
	22:00		21:23	37 20:36 (2)	20:16	6	19:38 (1)	19:02	26 18:33 (3)	16:52	42 16:21 (4)	16:09	16 15:33 (5)
3	05:00		05:42	19:58 (2)	06:36		07:30	18:07 (3)	07:28	15:39 (4)	08:22	15:18 (5)	
	21:59		21:21	38 20:36 (2)	20:13	11	19:41 (1)	19:00	24 18:31 (3)	16:50	40 16:19 (4)	16:08	14 15:32 (5)
4	05:01		05:44	19:58 (2)	06:38		07:31	18:06 (3)	07:30	15:40 (4)	08:24	15:19 (5)	
	21:59		21:19	38 20:36 (2)	20:11	14	19:41 (1)	18:57	23 18:29 (3)	16:48	37 16:17 (4)	16:08	13 15:32 (5)
5	05:02		05:45	19:57 (2)	06:40		07:33	18:06 (3)	07:32	15:40 (4)	08:25	15:19 (5)	
	21:58		21:17	39 20:36 (2)	20:09	15	19:41 (1)	18:55	20 18:26 (3)	16:46	35 16:15 (4)	16:07	11 15:30 (5)
6	05:03		05:47	19:57 (2)	06:42		07:35	18:06 (3)	07:34	15:40 (4)	08:26	15:20 (5)	
	21:58		21:15	40 20:37 (2)	20:06	14	19:39 (1)	18:52	18 18:24 (3)	16:44	32 16:12 (4)	16:07	10 15:30 (5)
7	05:04		05:49	19:57 (2)	06:43		07:37	18:05 (3)	07:36	15:41 (4)	08:28	15:21 (5)	
	21:57		21:13	40 20:37 (2)	20:04	11	19:35 (1)	18:50	16 18:21 (3)	16:43	29 16:10 (4)	16:06	8 15:29 (5)
8	05:05		05:51	19:56 (2)	06:45		07:39	18:06 (3)	07:38	15:41 (4)	08:29	15:21 (5)	
	21:56		21:12	40 20:36 (2)	20:01	9	19:33 (1)	18:48	12 18:18 (3)	16:41	27 16:08 (4)	16:06	7 15:28 (5)
9	05:06		05:52	19:56 (2)	06:47		07:41	18:06 (3)	07:40	15:42 (4)	08:30	15:22 (5)	
	21:55		21:10	41 20:37 (2)	19:59	7	19:31 (1)	18:45	10 18:16 (3)	16:39	24 16:06 (4)	16:05	7 15:29 (5)
10	05:07		05:54	19:56 (2)	06:49		07:42	18:07 (3)	07:42	15:44 (4)	08:31	15:23 (5)	
	21:55		21:08	40 20:36 (2)	19:56	5	19:28 (1)	18:43	7 18:14 (3)	16:37	21 16:05 (4)	16:05	5 15:28 (5)
11	05:08		05:56	19:56 (2)	06:50		07:44	18:08 (3)	07:44	15:45 (4)	08:33	15:23 (5)	
	21:54		21:05	39 20:35 (2)	19:54	2	19:26 (1)	18:40	3 18:11 (3)	16:35	18 16:03 (4)	16:05	4 15:27 (5)
12	05:09		05:57	19:56 (2)	06:52		07:46	18:07 (3)	07:45	15:46 (4)	08:34	15:24 (5)	
	21:53		21:03	38 20:34 (2)	19:51		18:38		16:34	15 16:01 (4)	16:05	3 15:27 (5)	
13	05:10		05:59	19:56 (2)	06:54		07:48		07:47	15:47 (4)	08:35	15:24 (5)	
	21:52		21:01	35 20:31 (2)	19:49		18:36		16:32	12 15:59 (4)	16:05	3 15:27 (5)	
14	05:12		06:01	19:56 (2)	06:56		07:50	17:00 (4)	07:49	15:21 (5)	08:36	15:25 (5)	
	21:51		20:59	33 20:29 (2)	19:47		18:33	11 17:11 (4)	16:31	19 15:58 (4)	16:05	1 15:26 (5)	
15	05:13		06:03	19:57 (2)	06:58		07:52	16:55 (4)	07:51	15:19 (5)	08:37		
	21:50		20:57	31 20:28 (2)	19:44		18:31	20 17:15 (4)	16:29	19 15:56 (4)	16:05		
16	05:14		06:04	19:57 (2)	06:59		07:54	16:52 (4)	07:53	15:17 (5)	08:38		
	21:49		20:55	28 20:25 (2)	19:42		18:29	25 17:17 (4)	16:27	19 15:54 (4)	16:05		
17	05:16		06:06	19:57 (2)	07:01		07:55	16:50 (4)	07:55	15:16 (5)	08:38		
	21:47		20:53	26 20:23 (2)	19:39		18:26	29 17:19 (4)	16:26	19 15:35 (5)	16:05		
18	05:17		06:08	19:58 (2)	07:03		07:57	16:48 (4)	07:57	15:15 (5)	08:39		
	21:46		20:51	24 20:22 (2)	19:37		18:24	33 17:21 (4)	16:24	21 15:36 (5)	16:05		
19	05:18		06:10	19:59 (2)	07:05		07:59	16:46 (4)	07:59	15:15 (5)	08:40		
	21:45		20:48	20 20:19 (2)	19:34		18:22	36 17:22 (4)	16:23	22 15:37 (5)	16:05		
20	05:20		06:12	20:00 (2)	07:06		08:01	16:45 (4)	08:00	15:14 (5)	08:41		
	21:44		20:46	17 20:17 (2)	19:32		18:20	38 17:23 (4)	16:22	24 15:38 (5)	16:06		
21	05:21	20:12 (2)	06:13	20:01 (2)	07:08		08:03	16:43 (4)	08:02	15:14 (5)	08:41		
	21:42	11 20:23 (2)	20:44	14 20:15 (2)	19:29		18:17	40 17:23 (4)	16:20	25 15:39 (5)	16:06		
22	05:23	20:09 (2)	06:15	20:02 (2)	07:10		08:05	16:42 (4)	08:04	15:14 (5)	08:42		
	21:41	16 20:25 (2)	20:42	10 20:12 (2)	19:27		18:15	42 17:24 (4)	16:19	25 15:39 (5)	16:06		
23	05:24	20:08 (2)	06:17	20:05 (2)	07:12		08:07	16:42 (4)	08:06	15:14 (5)	08:42		
	21:39	19 20:27 (2)	20:39	5 20:10 (2)	19:24		18:13	43 17:25 (4)	16:18	26 15:40 (5)	16:07		
24	05:26	20:06 (2)	06:19		07:13		08:09	16:41 (4)	08:08	15:14 (5)	08:43		
	21:38	22 20:28 (2)	20:37		19:22		18:11	44 17:25 (4)	16:17	26 15:40 (5)	16:08		
25	05:27	20:05 (2)	06:20		07:15		07:11	15:40 (4)	08:09	15:15 (5)	08:43		
	21:36	25 20:30 (2)	20:35		19:19		17:09	45 16:25 (4)	16:16	26 15:41 (5)	16:08		
26	05:29	20:04 (2)	06:22		07:17	18:20 (3)	07:13	15:39 (4)	08:11	15:15 (5)	08:43		
	21:35	27 20:31 (2)	20:32		19:17	5 18:25 (3)	17:06	47 16:26 (4)	16:14	25 15:40 (5)	16:09		
27	05:30	20:03 (2)	06:24		07:19	18:16 (3)	07:15	15:39 (4)	08:13	15:15 (5)	08:44		
	21:33	29 20:32 (2)	20:30		19:14	13 18:29 (3)	17:04	47 16:26 (4)	16:13	23 15:38 (5)	16:10		
28	05:32	20:02 (2)	06:26		07:21	18:13 (3)	07:16	15:39 (4)	08:14	15:16 (5)	08:44		
	21:32	30 20:32 (2)	20:28		19:12	18 18:31 (3)	17:02	47 16:26 (4)	16:12	22 15:38 (5)	16:11		
29	05:34	20:01 (2)	06:28		07:22	18:12 (3)	07:18	15:38 (4)	08:16	15:16 (5)	08:44	15:33 (5)	
	21:30	32 20:33 (2)	20:25		19:09	21 18:33 (3)	17:00	48 16:26 (4)	16:12	20 15:36 (5)	16:11	1 15:34 (5)	
30	05:35	20:00 (2)	06:29		07:24	18:09 (3)	07:20	15:38 (4)	08:18	15:16 (5)	08:44	15:32 (5)	
	21:28	34 20:34 (2)	20:23		19:07	24 18:33 (3)	16:58	48 16:26 (4)	16:11	19 15:35 (5)	16:12	2 15:34 (5)	
31	05:37	20:00 (2)	06:31				07:22	15:38 (4)			08:44	15:33 (5)	
	21:27	35 20:35 (2)	20:21				16:56	47 16:25 (4)			16:13	2 15:35 (5)	
Potential sun hours	512		460			382		328		259		233	
Total, worst case	280		709			175		874		756		124	
Sun reduction	0.32		0.34			0.32		0.29		0.27		0.21	
Oper. time red.	1.00		1.00			1.00		1.00		1.00		1.00	
Wind dir. red.	0.65		0.65			0.67		0.66		0.66		0.66	
Total reduction	0.21		0.22			0.22		0.19		0.17		0.14	
Total, real	59		157			38		169		132		17	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DI - H113

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:00 (5)	07:16		16:35 (4)	07:01			05:52		19:49 (2)	05:03			
	16:15			17:06	10 16:10 (5)	18:02	27	17:02 (4)	20:00			20:55	36	20:25 (2)	21:45			
2	08:44			08:12		07:14		16:36 (4)	06:59			05:50		19:48 (2)	05:02			
	16:16			17:08		18:04	23	16:59 (4)	20:02			20:57	37	20:25 (2)	21:46			
3	08:44			08:10		07:12		16:39 (4)	06:56			05:48		19:48 (2)	05:01			
	16:17			17:10		18:06	17	16:56 (4)	20:04			20:59	37	20:25 (2)	21:48			
4	08:43			08:08		07:09		16:46 (4)	06:54			05:46		19:48 (2)	05:00			
	16:18			17:12	4 16:41 (4)	18:07	4	16:50 (4)	20:06			21:01	37	20:25 (2)	21:49			
5	08:43			08:07		07:07		17:40 (3)	06:51			05:44		19:48 (2)	04:59			
	16:19			17:14	8 16:43 (4)	18:09	2	17:42 (3)	20:07			21:03	36	20:24 (2)	21:50			
6	08:43			08:05		07:04		17:39 (3)	06:49			05:42		19:48 (2)	04:59			
	16:21			17:16	11 16:45 (4)	18:11	6	17:45 (3)	20:09			21:04	35	20:23 (2)	21:51			
7	08:42			08:03		07:02		17:37 (3)	06:47			05:40		19:49 (2)	04:58			
	16:22			17:18	14 16:47 (4)	18:13	9	17:46 (3)	20:11			21:06	35	20:24 (2)	21:52			
8	08:42			08:01		07:00		17:37 (3)	06:44			05:38		19:50 (2)	04:57			
	16:24			17:20	18 16:50 (4)	18:15	11	17:48 (3)	20:13			21:08	33	20:23 (2)	21:53			
9	08:41			07:59		06:57		17:35 (3)	06:42			05:36		19:50 (2)	04:57			
	16:25			17:22	21 16:52 (4)	18:17	15	17:50 (3)	20:15			21:10	32	20:22 (2)	21:54			
10	08:40			07:57		06:55		17:35 (3)	06:39			05:34		19:50 (2)	04:56			
	16:26			17:24	24 16:54 (4)	18:19	17	17:52 (3)	20:17			21:11	31	20:21 (2)	21:55			
11	08:40		15:49 (5)	07:55		06:52		17:35 (3)	06:37			05:33		19:52 (2)	04:56			
	16:28	3	15:52 (5)	17:26	26 16:56 (4)	18:21	20	17:55 (3)	20:19			21:13	29	20:21 (2)	21:55			
12	08:39		15:49 (5)	07:53		06:50		17:35 (3)	06:35			05:31		19:52 (2)	04:55			
	16:30	5	15:54 (5)	17:28	30 16:58 (4)	18:23	21	17:56 (3)	20:20			21:15	28	20:20 (2)	21:56			
13	08:38		15:49 (5)	07:51		06:48		17:35 (3)	06:32			05:29		19:53 (2)	04:55			
	16:31	6	15:55 (5)	17:30	32 17:00 (4)	18:25	23	17:58 (3)	20:22			21:17	25	20:18 (2)	21:57			
14	08:37		15:49 (5)	07:49		06:45		17:35 (3)	06:30			05:27		19:55 (2)	04:55			
	16:33	8	15:57 (5)	17:32	34 17:02 (4)	18:27	24	17:59 (3)	20:24			21:18	23	20:18 (2)	21:58			
15	08:36		15:49 (5)	07:47		06:43		17:36 (3)	06:28			05:26		19:56 (2)	04:55			
	16:34	10	15:59 (5)	17:34	38 17:05 (4)	18:28	22	17:58 (3)	20:26			21:20	20	20:16 (2)	21:58			
16	08:35		15:48 (5)	07:45		06:40		17:36 (3)	06:25			05:24		19:58 (2)	04:54			
	16:36	12	16:00 (5)	17:36	40 17:07 (4)	18:30	20	17:56 (3)	20:28			21:22	17	20:15 (2)	21:59			
17	08:34		15:49 (5)	07:43		06:38		17:38 (3)	06:23			05:22		19:59 (2)	04:54			
	16:38	14	16:03 (5)	17:38	41 17:09 (4)	18:32	17	17:55 (3)	20:30			21:23	13	20:12 (2)	21:59			
18	08:33		15:49 (5)	07:41		06:35		17:40 (3)	06:21			05:21		20:03 (2)	04:54			
	16:40	16	16:05 (5)	17:40	43 17:10 (4)	18:34	12	17:52 (3)	20:31			21:25	7	20:10 (2)	22:00			
19	08:32		15:49 (5)	07:39		06:33		17:45 (3)	06:18		20:02 (2)	05:19			04:54			
	16:41	18	16:07 (5)	17:42	43 17:10 (4)	18:36	2	17:47 (3)	20:33	3	20:05 (2)	21:27			22:00			
20	08:31		15:49 (5)	07:36		06:31			06:16		19:59 (2)	05:18			04:54			
	16:43	19	16:08 (5)	17:44	43 17:10 (4)	18:38			20:35	8	20:07 (2)	21:28			22:00			
21	08:30		15:50 (5)	07:34		06:28			06:14		19:56 (2)	05:16			04:54			
	16:45	21	16:11 (5)	17:46	42 17:10 (4)	18:40			20:37	12	20:08 (2)	21:30			22:01			
22	08:29		15:49 (5)	07:32		06:26			06:12		19:55 (2)	05:15			04:55			
	16:47	23	16:12 (5)	17:48	41 17:09 (4)	18:42			20:39	15	20:10 (2)	21:31			22:01			
23	08:27		15:50 (5)	07:30		06:23			06:09		19:54 (2)	05:13			04:55			
	16:49	25	16:15 (5)	17:50	41 17:09 (4)	18:43			20:41	18	20:12 (2)	21:33			22:01			
24	08:26		15:50 (5)	07:28		06:21			06:07		19:52 (2)	05:12			04:55			
	16:50	25	16:15 (5)	17:52	39 17:08 (4)	18:45			20:43	22	20:14 (2)	21:34			22:01			
25	08:24		15:52 (5)	07:25		06:18			06:05		19:52 (2)	05:11			04:55			
	16:52	24	16:16 (5)	17:54	38 17:07 (4)	18:47			20:44	23	20:15 (2)	21:36			22:01			
26	08:23		15:52 (5)	07:23		06:16			06:03		19:51 (2)	05:09			04:56			
	16:54	23	16:15 (5)	17:56	36 17:06 (4)	18:49			20:46	26	20:17 (2)	21:37			22:01			
27	08:22		15:52 (5)	07:21		06:13			06:01		19:50 (2)	05:08			04:56			
	16:56	23	16:15 (5)	17:58	33 17:05 (4)	18:51			20:48	29	20:19 (2)	21:39			22:01			
28	08:20		15:54 (5)	07:18		06:11			05:58		19:50 (2)	05:07			04:57			
	16:58	21	16:15 (5)	18:00	30 17:03 (4)	18:53			20:50	31	20:21 (2)	21:40			22:01			
29	08:18		15:55 (5)			07:08			05:56		19:49 (2)	05:06			04:57			
	17:00	19	16:14 (5)			19:54			20:52	33	20:22 (2)	21:41			22:01			
30	08:17		15:56 (5)			07:06			05:54		19:49 (2)	05:05			04:58			
	17:02	17	16:13 (5)			19:56			20:54	35	20:24 (2)	21:43			22:00			
31	08:15		15:57 (5)			07:04						05:04						
	17:04	14	16:11 (5)			19:58						21:44						
Potential sun hours	250			273		367		420			494				510			
Total, worst case		346		780		292		255		511								
Sun reduction		0.24		0.23		0.27		0.35		0.38								
Oper. time red.		1.00		1.00		1.00		1.00		1.00								
Wind dir. red.		0.66		0.66		0.67		0.65		0.65								
Total reduction		0.16		0.15		0.18		0.23		0.25								
Total, real		56		120		53		58		126								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DI - H113

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:02 (2) 20:30 (2)	06:33 20:18	07:26 19:05	18:14 (3) 16:54
2	04:59 22:00	05:40 21:23	20:02 (2) 20:32 (2)	06:35 20:16	18:13 (3) 19:02	16:23 (4) 16:21 (4)
3	05:00 21:59	05:42 21:21	20:00 (2) 20:32 (2)	06:36 20:13	18:13 (3) 19:00	16:01 (4) 16:19 (4)
4	05:01 21:59	05:44 21:19	20:00 (2) 20:33 (2)	06:38 20:11	18:31 (3) 18:29 (3)	16:50 16:17 (4)
5	05:02 21:58	05:45 21:17	19:59 (2) 20:33 (2)	06:40 20:09	18:13 (3) 18:55	16:04 (4) 16:46
6	05:03 21:58	05:47 21:15	19:59 (2) 20:33 (2)	06:42 20:06	18:14 (3) 18:52	16:05 (4) 16:12 (4)
7	05:04 21:57	05:49 21:13	19:59 (2) 20:34 (2)	06:43 20:04	18:24 (3) 18:50	16:44 16:43
8	05:05 21:56	05:51 21:12	19:58 (2) 20:34 (2)	06:45 20:01	18:13 (3) 18:48	16:38 16:41
9	05:06 21:55	05:52 21:10	19:58 (2) 20:34 (2)	06:47 19:59	18:18 (3) 18:45	16:40 16:39
10	05:07 21:55	05:54 21:07	19:57 (2) 20:33 (2)	06:49 19:56	17:16 (4) 18:43	15:31 (5) 15:41 (5)
11	05:08 21:54	05:56 21:05	19:57 (2) 20:34 (2)	06:50 19:54	17:12 (4) 18:40	15:29 (5) 15:43 (5)
12	05:09 21:53	05:57 21:03	19:57 (2) 20:34 (2)	06:52 19:51	17:09 (4) 18:38	15:27 (5) 15:45 (5)
13	05:10 21:52	05:59 21:01	19:56 (2) 20:31 (2)	06:54 19:49	17:07 (4) 18:36	15:26 (5) 16:32
14	05:12 21:51	06:01 20:59	19:57 (2) 20:29 (2)	06:56 19:47	17:05 (4) 18:33	15:26 (5) 16:31
15	05:13 21:50	06:03 20:57	19:57 (2) 20:28 (2)	06:58 19:44	17:04 (4) 18:31	15:25 (5) 16:29
16	05:14 21:49	06:04 20:55	19:57 (2) 20:25 (2)	06:59 19:42	17:02 (4) 18:29	15:25 (5) 16:27
17	05:16 21:47	06:06 20:53	19:58 (2) 20:23 (2)	07:01 19:39	17:01 (4) 18:26	15:24 (5) 16:26
18	05:17 21:46	06:08 20:51	19:58 (2) 20:22 (2)	07:03 19:37	17:00 (4) 18:24	15:24 (5) 16:24
19	05:18 21:45	06:10 20:48	19:58 (2) 20:19 (2)	07:05 19:34	16:59 (4) 18:22	15:24 (5) 16:23
20	05:20 21:44	06:12 20:46	19:59 (2) 20:17 (2)	07:06 19:32	16:59 (4) 18:20	15:24 (5) 16:22
21	05:21 21:42	06:13 20:44	20:01 (2) 20:15 (2)	07:08 19:29	17:41 (4) 18:17	15:47 (5) 16:20
22	05:23 21:41	06:15 20:42	20:01 (2) 20:12 (2)	07:10 19:27	16:58 (4) 18:15	15:25 (5) 16:19
23	05:24 21:39	06:17 20:39	20:03 (2) 20:10 (2)	07:12 19:24	16:57 (4) 18:13	15:25 (5) 16:18
24	05:26 21:38	06:19 20:37	20:06 (2) 20:09 (2)	07:13 19:22	16:57 (4) 18:11	15:26 (5) 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	18:23 (3) 17:09	15:57 (4) 16:38 (4)	15:27 (5) 16:16
26	05:29 21:35	20:12 (2) 20:22 (2)	06:22 20:32	18:20 (3) 18:36 (3)	15:57 (4) 16:36 (4)	15:27 (5) 16:14
27	05:30 21:33	20:09 (2) 20:24 (2)	06:24 20:30	17:19 19:14	15:57 (4) 16:34 (4)	15:28 (5) 16:13
28	05:32 21:32	20:07 (2) 20:26 (2)	06:26 20:28	17:21 19:12	15:57 (4) 18:39 (3)	15:29 (5) 16:12
29	05:34 21:30	20:05 (2) 20:27 (2)	06:27 20:25	17:22 19:09	15:57 (4) 18:39 (3)	15:29 (5) 16:12
30	05:35 21:28	20:04 (2) 20:29 (2)	06:29 20:23	17:24 19:07	15:58 (4) 18:38 (3)	15:30 (5) 16:11
31	05:37 21:26	20:04 (2) 20:30 (2)	06:31 20:21	17:22 16:56	15:58 (4) 16:25 (4)	15:35 (5) 16:11
Potential sun hours	512	460	382	328	259	233
Total, worst case	117	657	115	872	455	4
Sun reduction	0.32	0.34	0.32	0.29	0.27	0.21
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.65	0.65	0.68	0.66	0.66	0.66
Total reduction	0.21	0.22	0.22	0.19	0.18	0.14
Total, real	25	145	25	169	80	1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DJ - H114

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:03 (5)	07:16		16:40 (4)	07:01			05:52		19:50 (2)	05:03			
	16:15			17:06	18:21 (5)	18:02	34	17:14 (4)	20:00			20:55	35	20:25 (2)	21:45			
2	08:44			08:12	16:04 (5)	07:14		16:41 (4)	06:59			05:50		19:50 (2)	05:02			
	16:16			17:08	16:20 (5)	18:04	31	17:12 (4)	20:02			20:57	35	20:25 (2)	21:46			
3	08:44			08:10	16:06 (5)	07:12		16:43 (4)	06:56			05:48		19:50 (2)	05:01			
	16:17			17:10	16:18 (5)	18:06	27	17:10 (4)	20:04			20:59	34	20:24 (2)	21:48			
4	08:43			08:08	16:09 (5)	07:09		16:45 (4)	06:54			05:46		19:50 (2)	05:00			
	16:18			17:12	6	16:15 (5)	24	17:09 (4)	20:06			21:01	34	20:24 (2)	21:49			
5	08:43			08:07		07:07		16:47 (4)	06:51			05:44		19:50 (2)	04:59			
	16:19			17:14		18:09	18	17:05 (4)	20:07			21:03	33	20:23 (2)	21:50			
6	08:43			08:05		07:04		16:51 (4)	06:49			05:42		19:50 (2)	04:59			
	16:21			17:16		18:11	11	17:02 (4)	20:09			21:04	33	20:23 (2)	21:51			
7	08:42			08:03		07:02		17:42 (3)	06:47			05:40		19:51 (2)	04:58			
	16:22			17:18		18:13	4	17:46 (3)	20:11			21:06	32	20:23 (2)	21:52			
8	08:42			08:01		07:00		17:42 (3)	06:44			05:38		19:52 (2)	04:57			
	16:24			17:20	3	16:50 (4)	6	17:48 (3)	20:13			21:08	30	20:22 (2)	21:53			
9	08:41			07:59		06:57		17:40 (3)	06:42			05:36		19:52 (2)	04:57			
	16:25			17:22	6	16:52 (4)	10	17:50 (3)	20:15			21:10	29	20:21 (2)	21:54			
10	08:40			07:57		06:55		17:40 (3)	06:39			05:34		19:53 (2)	04:56			
	16:26			17:24	10	16:54 (4)	12	17:52 (3)	20:17			21:11	27	20:20 (2)	21:55			
11	08:40			07:55		06:52		17:39 (3)	06:37			05:33		19:54 (2)	04:56			
	16:28			17:26	13	16:56 (4)	16	17:55 (3)	20:19			21:13	25	20:19 (2)	21:55			
12	08:39			07:53		06:50		17:39 (3)	06:35			05:31		19:55 (2)	04:55			
	16:30			17:28	17	16:58 (4)	17	17:56 (3)	20:20			21:15	23	20:18 (2)	21:56			
13	08:38			07:51		06:48		17:39 (3)	06:32			05:29		19:56 (2)	04:55			
	16:31			17:30	20	17:00 (4)	19	17:58 (3)	20:22			21:17	20	20:16 (2)	21:57			
14	08:37			07:49		06:45		17:38 (3)	06:30			05:27		19:58 (2)	04:55			
	16:33			17:32	22	17:02 (4)	22	18:00 (3)	20:24			21:18	17	20:15 (2)	21:58			
15	08:36		15:58 (5)	07:47		06:43		17:39 (3)	06:28			05:26		20:00 (2)	04:55			
	16:34	1	15:59 (5)	17:34	26	17:05 (4)	23	18:02 (3)	20:26			21:20	13	20:13 (2)	21:58			
16	08:35		15:57 (5)	07:45		06:40		17:39 (3)	06:25			05:24		20:04 (2)	04:54			
	16:36	3	16:00 (5)	17:36	28	17:07 (4)	22	18:01 (3)	20:28			21:22	6	20:10 (2)	21:59			
17	08:34		15:57 (5)	07:43		06:38		17:40 (3)	06:23			05:22			04:54			
	16:38	6	16:03 (5)	17:38	31	17:09 (4)	20	18:00 (3)	20:30			21:23			21:59			
18	08:33		15:57 (5)	07:41		06:35		17:41 (3)	06:21			05:21			04:54			
	16:40	8	16:05 (5)	17:40	34	17:11 (4)	17	17:58 (3)	20:31			21:25			22:00			
19	08:32		15:57 (5)	07:39		06:33		17:43 (3)	06:18		20:02 (2)	05:19			04:54			
	16:41	10	16:07 (5)	17:42	36	17:13 (4)	13	17:56 (3)	20:33		3	20:05 (2)			22:00			
20	08:31		15:57 (5)	07:36		06:31		17:47 (3)	06:16			20:00 (2)			04:54			
	16:43	11	16:08 (5)	17:44	39	17:16 (4)	3	17:50 (3)	20:35		7	20:07 (2)			22:00			
21	08:30		15:57 (5)	07:34		06:28			06:14			19:57 (2)			04:54			
	16:45	14	16:11 (5)	17:46	41	17:18 (4)			20:37		11	20:08 (2)			22:01			
22	08:29		15:56 (5)	07:32		06:26			06:12			19:55 (2)			04:55			
	16:47	16	16:12 (5)	17:48	41	17:18 (4)			20:39		15	20:10 (2)			22:01			
23	08:27		15:57 (5)	07:30		06:23			06:09			19:54 (2)			04:55			
	16:49	18	16:15 (5)	17:50	41	17:18 (4)			20:41		18	20:12 (2)			22:01			
24	08:26		15:57 (5)	07:28		06:21			06:07			19:53 (2)			04:55			
	16:50	20	16:17 (5)	17:52	40	17:18 (4)			20:43		21	20:14 (2)			22:01			
25	08:24		15:58 (5)	07:25		06:18			06:05			19:52 (2)			04:55			
	16:52	21	16:19 (5)	17:54	40	17:17 (4)			20:44		23	20:15 (2)			22:01			
26	08:23		15:58 (5)	07:23		06:16			06:03			19:52 (2)			04:56			
	16:54	23	16:21 (5)	17:56	39	17:17 (4)			20:46		25	20:17 (2)			22:01			
27	08:22		15:58 (5)	07:21		06:13			06:01			19:51 (2)			04:56			
	16:56	24	16:22 (5)	17:58	37	17:16 (4)			20:48		28	20:19 (2)			22:01			
28	08:20		15:59 (5)	07:18		06:11			05:58			19:51 (2)			04:57			
	16:58	24	16:23 (5)	18:00	35	17:14 (4)			20:50		30	20:21 (2)			22:01			
29	08:18		15:59 (5)			07:08			05:56			19:50 (2)			04:57			
	17:00	23	16:22 (5)			19:54			20:52		32	20:22 (2)			22:01			
30	08:17		16:00 (5)			07:06			05:54			19:50 (2)			04:58			
	17:02	21	16:21 (5)			19:56			20:54		34	20:24 (2)			22:00			
31	08:15		16:01 (5)			07:04						05:04						
	17:04	20	16:21 (5)			19:58						21:44						
Potential sun hours	250			273		367		420				494			510			
Total, worst case	263			651		349		247				426						
Sun reduction	0.24			0.23		0.27		0.35				0.38						
Oper. time red.	1.00			1.00		1.00		1.00				1.00						
Wind dir. red.	0.66			0.67		0.67		0.65				0.65						
Total reduction	0.16			0.15		0.18		0.23				0.25						
Total, real	42			101		64		56				105						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DJ - H114

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	20:05 (2) 20:29 (2)	06:33 20:18	07:26 19:05	18:17 (3) 18:36 (3)	07:24 16:54	16:14 (4) 16:23 (4)	08:19 16:10
2	04:59 22:00	05:40 21:23	20:04 (2) 20:30 (2)	06:35 20:16	07:28 19:02	18:17 (3) 18:33 (3)	07:26 16:52	16:16 (4) 16:21 (4)	08:21 16:09
3	05:00 21:59	05:42 21:21	20:03 (2) 20:30 (2)	06:36 20:13	07:30 19:00	18:17 (3) 18:31 (3)	07:28 16:50	16:17 (4) 16:19 (4)	08:22 16:08
4	05:01 21:59	05:44 21:19	20:02 (2) 20:31 (2)	06:38 20:11	07:31 18:57	18:18 (3) 18:29 (3)	07:30 16:48		08:24 16:08
5	05:02 21:58	05:45 21:17	20:01 (2) 20:31 (2)	06:40 20:09	07:33 18:55	18:18 (3) 18:26 (3)	07:32 16:46		08:25 16:07
6	05:03 21:58	05:47 21:15	20:01 (2) 20:32 (2)	06:42 20:06	07:35 18:52	18:19 (3) 18:24 (3)	07:34 16:44		08:26 16:07
7	05:04 21:57	05:49 21:13	20:00 (2) 20:33 (2)	06:43 20:04	07:37 18:50	18:19 (3) 18:21 (3)	07:36 16:43	15:39 (5) 15:45 (5)	08:28 16:06
8	05:05 21:56	05:51 21:12	19:59 (2) 20:33 (2)	06:45 20:01	07:39 18:48	17:24 (4) 17:39 (4)	07:38 16:41	15:36 (5) 15:48 (5)	08:29 16:06
9	05:06 21:55	05:52 21:10	19:59 (2) 20:33 (2)	06:47 19:59	07:41 18:45	17:20 (4) 17:42 (4)	07:40 16:39	15:34 (5) 15:49 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	19:58 (2) 20:33 (2)	06:49 19:56	07:42 18:43	17:18 (4) 17:44 (4)	07:42 16:37	15:33 (5) 15:52 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	19:58 (2) 20:33 (2)	06:50 19:54	07:44 18:40	17:16 (4) 17:45 (4)	07:44 16:35	15:32 (5) 15:53 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	19:58 (2) 20:33 (2)	06:52 19:51	07:46 18:38	17:14 (4) 17:46 (4)	07:45 16:34	15:32 (5) 15:53 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01	19:58 (2) 20:31 (2)	06:54 19:49	07:48 18:36	17:13 (4) 17:47 (4)	07:47 16:32	15:31 (5) 15:54 (5)	08:35 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 20:29 (2)	06:56 19:47	07:50 18:33	17:12 (4) 17:48 (4)	07:49 16:31	15:31 (5) 15:54 (5)	08:36 16:04
15	05:13 21:50	06:03 20:57	19:58 (2) 20:28 (2)	06:58 19:44	07:52 18:31	17:11 (4) 17:48 (4)	07:51 16:29	15:31 (5) 15:55 (5)	08:37 16:05
16	05:14 21:49	06:04 20:55	19:58 (2) 20:25 (2)	06:59 19:42	07:54 18:29	17:10 (4) 17:49 (4)	07:53 16:27	15:31 (5) 15:54 (5)	08:38 16:05
17	05:16 21:47	06:06 20:53	19:58 (2) 20:23 (2)	07:01 19:39	07:55 18:26	17:09 (4) 17:49 (4)	07:55 16:26	15:31 (5) 15:52 (5)	08:38 16:05
18	05:17 21:46	06:08 20:51	19:59 (2) 20:22 (2)	07:03 19:37	07:57 18:24	17:09 (4) 17:49 (4)	07:57 16:24	15:31 (5) 15:51 (5)	08:39 16:05
19	05:18 21:45	06:10 20:48	19:59 (2) 20:19 (2)	07:05 19:34	07:59 18:22	17:08 (4) 17:49 (4)	07:59 16:23	15:31 (5) 15:49 (5)	08:40 16:05
20	05:20 21:44	06:12 20:46	20:00 (2) 20:17 (2)	07:06 19:32	08:01 18:20	17:08 (4) 17:49 (4)	08:00 16:22	15:31 (5) 15:47 (5)	08:41 16:06
21	05:21 21:42	06:13 20:44	20:01 (2) 20:15 (2)	07:08 19:29	08:03 18:17	17:08 (4) 17:48 (4)	08:02 16:20	15:32 (5) 15:46 (5)	08:41 16:06
22	05:23 21:41	06:15 20:42	20:02 (2) 20:12 (2)	07:10 19:27	08:05 18:15	17:08 (4) 17:45 (4)	08:04 16:19	15:33 (5) 15:44 (5)	08:42 16:06
23	05:24 21:39	06:17 20:39	20:04 (2) 20:10 (2)	07:12 19:24	08:07 18:13	17:08 (4) 17:43 (4)	08:06 16:18	15:33 (5) 15:43 (5)	08:42 16:07
24	05:26 21:38	06:19 20:37	20:06 (2) 20:09 (2)	07:13 19:22	18:28 (3) 18:38 (3)	08:09 18:11	17:08 (4) 17:41 (4)	08:08 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	 19:19	07:15 18:24 (3)	18:20 (3) 18:40 (3)	07:16 17:09	16:09 (4) 16:38 (4)	08:14 16:16	08:44 16:08
26	05:29 21:35	06:22 20:32	 19:17	07:17 18:22 (3)	18:22 (3) 18:41 (3)	07:13 17:06	16:08 (4) 16:36 (4)	08:11 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	 19:14	07:19 18:21 (3)	18:21 (3) 18:42 (3)	07:15 17:04	16:09 (4) 16:34 (4)	08:13 16:13	08:44 16:10
28	05:32 21:32	20:12 (2) 20:22 (2)	06:26 20:28	07:21 19:12	18:20 (3) 18:43 (3)	07:16 17:02	16:09 (4) 16:31 (4)	08:14 16:12	08:44 16:11
29	05:34 21:30	20:09 (2) 20:24 (2)	06:27 20:25	07:22 19:09	18:19 (3) 18:41 (3)	07:18 17:00	16:10 (4) 16:29 (4)	08:16 16:12	08:44 16:11
30	05:35 21:28	20:08 (2) 20:26 (2)	06:29 20:23	07:24 19:07	18:18 (3) 18:38 (3)	07:20 16:58	16:11 (4) 16:27 (4)	08:18 16:11	08:44 16:12
31	05:37 21:26	20:07 (2) 20:28 (2)	06:31 20:21	 	07:22 16:56	16:12 (4) 16:25 (4)	 	 	08:44 16:13
Potential sun hours	512	460	382	328	259	233			
Total, worst case	64	612	131	805	332				
Sun reduction	0.32	0.34	0.32	0.29	0.27				
Oper. time red.	1.00	1.00	1.00	1.00	1.00				
Wind dir. red.	0.65	0.65	0.67	0.67	0.66				
Total reduction	0.21	0.22	0.22	0.20	0.18				
Total, real	13	135	28	157	58				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DK - H115

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:23 (5)	08:14	15:56 (4)	07:16	17:32 (3)	07:01	19:32 (1)	05:52	19:51 (2)	05:03
2	08:44	15:23 (5)	08:12	15:56 (4)	07:14	17:29 (3)	06:59	19:30 (1)	05:50	19:50 (2)	05:02
3	08:44	15:23 (5)	08:10	15:55 (4)	07:12	17:28 (3)	06:56	19:30 (1)	05:48	19:49 (2)	05:01
4	08:43	15:24 (5)	08:08	15:55 (4)	07:09	17:28 (3)	06:54	19:30 (1)	05:46	19:49 (2)	05:00
5	08:43	15:23 (5)	08:07	15:55 (4)	07:07	17:26 (3)	06:51	19:29 (1)	05:44	19:48 (2)	04:59
6	08:43	15:24 (5)	08:05	15:55 (4)	07:04	17:26 (3)	06:49	19:29 (1)	05:42	19:48 (2)	04:59
7	08:42	15:24 (5)	08:03	15:55 (4)	07:02	17:25 (3)	06:47	19:28 (1)	05:40	19:49 (2)	04:58
8	08:42	15:24 (5)	08:01	15:55 (4)	07:00	17:25 (3)	06:44	19:29 (1)	05:38	19:48 (2)	04:57
9	08:41	15:26 (5)	07:59	15:55 (4)	06:57	17:24 (3)	06:42	19:31 (1)	05:36	19:48 (2)	04:57
10	08:40	15:26 (5)	07:57	15:55 (4)	06:55	17:25 (3)	06:39	19:31 (1)	05:34	19:48 (2)	04:56
11	08:40	15:26 (5)	07:55	15:55 (4)	06:53	17:26 (3)	06:37	19:36 (1)	05:33	19:49 (2)	04:56
12	08:39	15:26 (5)	07:53	15:56 (4)	06:50	17:26 (3)	06:35	19:37 (1)	05:31	19:48 (2)	04:55
13	08:38	15:27 (5)	07:51	15:55 (4)	06:48	17:27 (3)	06:32	19:37 (1)	05:29	19:48 (2)	04:55
14	08:37	15:27 (5)	07:49	15:56 (4)	06:45	17:27 (3)	06:30	19:37 (1)	05:27	19:49 (2)	04:55
15	08:36	15:28 (5)	07:47	15:57 (4)	06:43	17:29 (3)	06:28	19:37 (1)	05:26	19:49 (2)	04:55
16	08:35	15:28 (5)	07:45	15:57 (4)	06:40	17:30 (3)	06:25	19:37 (1)	05:24	19:50 (2)	04:54
17	08:34	15:29 (5)	07:43	15:58 (4)	06:38	17:35 (3)	06:23	19:37 (1)	05:22	19:50 (2)	04:54
18	08:33	15:30 (5)	07:41	15:59 (4)	06:35	17:40 (3)	06:21	19:37 (1)	05:21	19:51 (2)	04:54
19	08:32	15:31 (5)	07:39	16:00 (4)	06:33	17:41 (3)	06:18	19:37 (1)	05:19	19:52 (2)	04:54
20	08:31	15:31 (5)	07:36	16:01 (4)	06:31	17:42 (3)	06:16	19:37 (1)	05:18	19:52 (2)	04:54
21	08:30	15:33 (5)	07:34	16:03 (4)	06:28	17:43 (3)	06:14	19:37 (1)	05:16	19:53 (2)	04:54
22	08:29	15:33 (5)	07:32	16:04 (4)	06:26	17:44 (3)	06:12	19:37 (1)	05:15	19:54 (2)	04:55
23	08:27	15:35 (5)	07:30	16:06 (4)	06:23	17:45 (3)	06:09	19:37 (1)	05:13	19:54 (2)	04:55
24	08:26	15:36 (5)	07:28	16:09 (4)	06:21	17:46 (3)	06:07	19:37 (1)	05:12	19:55 (2)	04:55
25	08:24	15:39 (5)	07:25	16:11 (4)	06:18	17:47 (3)	06:05	19:37 (1)	05:11	19:56 (2)	04:55
26	08:23	15:43 (5)	07:23	16:18 (4)	06:16	17:48 (3)	06:03	19:37 (1)	05:09	19:57 (2)	04:56
27	08:22	15:57 (4)	07:21	16:23 (4)	06:13	17:49 (3)	06:01	19:37 (1)	05:08	19:59 (2)	04:56
28	08:20	16:23 (4)	07:18	16:51 (4)	06:11	17:50 (3)	05:58	19:37 (1)	05:07	20:00 (2)	04:57
29	08:18	16:26 (4)	07:16	16:54 (4)	06:09	17:51 (3)	05:56	19:37 (1)	05:06	20:01 (2)	04:57
30	08:17	16:28 (4)	07:14	16:56 (4)	06:07	17:52 (3)	05:54	19:37 (1)	05:05	20:02 (2)	04:58
31	08:15	16:32 (4)	07:12	16:58 (4)	06:05	17:53 (3)	05:52	19:37 (1)	05:04	20:03 (2)	04:58
Potential sun hours	250		273		367		420		494		510
Total, worst case	798		1080		301		291		1098		13
Sun reduction	0.24		0.23		0.27		0.35		0.38		0.32
Oper. time red.	1.00		1.00		1.00		1.00		1.00		1.00
Wind dir. red.	0.66		0.66		0.68		0.65		0.65		0.65
Total reduction	0.16		0.15		0.18		0.23		0.25		0.21
Total, real	128		166		55		67		270		3

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DK - H115

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59		05:39	19:59 (2)	06:33	19:34 (1)	07:26	18:05 (3)	07:24	15:25 (4)	08:19
	22:00		21:25	20:42 (2)	20:18	19:37 (1)	19:05	18:30 (3)	16:54	16:16 (4)	16:10
2	04:59		05:40	19:59 (2)	06:35	19:30 (1)	07:28	18:04 (3)	07:26	15:25 (4)	08:21
	22:00		21:23	20:42 (2)	20:16	19:41 (1)	19:02	18:31 (3)	16:52	16:16 (4)	16:09
3	05:00		05:42	19:58 (2)	06:36	19:29 (1)	07:30	18:03 (3)	07:28	15:24 (4)	08:22
	21:59		21:21	20:42 (2)	20:13	19:42 (1)	19:00	18:31 (3)	16:50	16:16 (4)	16:08
4	05:01		05:44	19:58 (2)	06:38	19:26 (1)	07:31	18:03 (3)	07:30	15:24 (4)	08:24
	21:59		21:19	20:42 (2)	20:11	19:42 (1)	18:57	18:29 (3)	16:48	16:16 (4)	16:08
5	05:02		05:45	19:58 (2)	06:40	19:26 (1)	07:33	18:02 (3)	07:32	15:24 (4)	08:25
	21:58		21:17	20:41 (2)	20:09	19:41 (1)	18:55	18:26 (3)	16:46	16:15 (4)	16:07
6	05:03		05:47	19:58 (2)	06:42	19:25 (1)	07:35	18:02 (3)	07:34	15:25 (4)	08:26
	21:58		21:15	20:42 (2)	20:06	19:39 (1)	18:52	18:24 (3)	16:44	16:12 (4)	16:07
7	05:04		05:49	19:58 (2)	06:43	19:24 (1)	07:37	18:01 (3)	07:36	15:25 (4)	08:28
	21:57		21:13	20:42 (2)	20:04	19:35 (1)	18:50	18:21 (3)	16:43	16:10 (4)	16:06
8	05:05		05:51	19:58 (2)	06:45	19:24 (1)	07:39	18:01 (3)	07:38	15:25 (4)	08:29
	21:56		21:12	20:41 (2)	20:01	19:33 (1)	18:48	18:18 (3)	16:41	16:08 (4)	16:06
9	05:06		05:52	19:58 (2)	06:47	19:24 (1)	07:41	18:02 (3)	07:40	15:25 (4)	08:30
	21:55		21:10	20:39 (2)	19:59	19:31 (1)	18:45	18:16 (3)	16:39	16:06 (4)	16:05
10	05:07		05:54	19:58 (2)	06:49	19:24 (1)	07:42	18:02 (3)	07:42	15:27 (4)	08:31
	21:55		21:08	20:37 (2)	19:56	19:28 (1)	18:43	18:14 (3)	16:37	16:05 (4)	16:05
11	05:08		05:56	19:59 (2)	06:50	19:24 (1)	07:44	18:03 (3)	07:44	15:27 (4)	08:33
	21:54	8	20:24 (2)	21:05	20:35 (2)	19:26 (1)	18:40	18:11 (3)	16:35	16:03 (4)	16:05
12	05:09		05:57	19:59 (2)	06:52		07:46	18:04 (3)	07:45	15:28 (4)	08:34
	21:53	13	20:26 (2)	21:03	20:34 (2)		18:38	18:09 (3)	16:34	16:01 (4)	16:05
13	05:10		05:59	19:59 (2)	06:54		07:48	18:05 (3)	07:47	15:29 (4)	08:35
	21:52	16	20:28 (2)	21:01	20:31 (2)		18:36	18:07 (3)	16:32	15:59 (4)	16:05
14	05:12		06:01	20:00 (2)	06:56		07:50		07:49	15:29 (4)	08:36
	21:51	19	20:29 (2)	20:59	20:29 (2)		18:33		16:31	15:58 (4)	16:05
15	05:13		06:03	20:01 (2)	06:58		07:52		07:51	15:30 (4)	08:37
	21:50	21	20:30 (2)	20:57	20:28 (2)		18:31		16:29	15:56 (4)	16:05
16	05:14		06:05	20:01 (2)	06:59		07:54	16:47 (4)	07:53	15:15 (5)	08:38
	21:49	23	20:31 (2)	20:55	20:25 (2)		18:29	12	16:59 (4)	16:27	15:54 (4)
17	05:16		06:06	20:02 (2)	07:01		07:55		07:55	15:12 (5)	08:38
	21:47	25	20:33 (2)	20:53	20:23 (2)		18:26	21	17:03 (4)	16:26	15:52 (4)
18	05:17		06:08	20:04 (2)	07:03		07:57		07:57	15:10 (5)	08:39
	21:46	28	20:34 (2)	20:51	20:22 (2)		18:24	26	17:05 (4)	16:24	15:51 (4)
19	05:18		06:10	20:05 (2)	07:05		07:59		07:59	15:09 (5)	08:40
	21:45	29	20:34 (2)	20:48	20:19 (2)		18:22	31	17:07 (4)	16:23	15:49 (4)
20	05:20		06:12	20:07 (2)	07:06		08:01		08:00	15:08 (5)	08:41
	21:44	31	20:36 (2)	20:46	20:17 (2)		18:20	35	17:09 (4)	16:22	15:47 (4)
21	05:21		06:13	20:10 (2)	07:08		08:03		08:02	15:08 (5)	08:41
	21:42	32	20:36 (2)	20:44	20:15 (2)		18:17	37	17:10 (4)	16:20	15:46 (4)
22	05:23		06:15		07:10		08:05		08:04	15:07 (5)	08:42
	21:41	34	20:37 (2)	20:42			18:15	40	17:11 (4)	16:19	15:44 (4)
23	05:24		06:17		07:12		08:07		08:06	15:07 (5)	08:42
	21:39	35	20:38 (2)	20:39			18:13	42	17:12 (4)	16:18	15:43 (4)
24	05:26		06:19		07:13		08:09		08:08	15:07 (5)	08:43
	21:38	36	20:38 (2)	20:37			18:11	44	17:13 (4)	16:17	15:42 (5)
25	05:27		06:20		07:15		07:11		08:09	15:07 (5)	08:43
	21:36	38	20:40 (2)	20:35			17:09	45	16:13 (4)	16:16	15:41 (4)
26	05:29		06:22		07:17		07:13		08:11	15:07 (5)	08:43
	21:35	39	20:40 (2)	20:32			17:06	47	16:14 (4)	16:14	15:40 (5)
27	05:30		06:24		07:19		07:15		08:13	15:07 (5)	08:44
	21:33	40	20:41 (2)	20:30			18:25 (3)	48	16:14 (4)	16:13	15:34 (5)
28	05:32		06:26		07:21		07:16		08:14	15:08 (5)	08:44
	21:32	41	20:41 (2)	20:28			18:28 (3)	49	16:14 (4)	16:12	15:34 (5)
29	05:34		06:28		07:22		07:18		08:16	15:07 (5)	08:44
	21:30	41	20:40 (2)	20:25			18:29 (3)	50	16:15 (4)	16:12	15:34 (5)
30	05:35		06:29		07:24		07:20		08:18	15:08 (5)	08:44
	21:28	42	20:41 (2)	20:23			16:58	51	16:15 (4)	16:11	15:35 (5)
31	05:37		06:31				07:22		08:19	15:09 (5)	08:44
	21:27	43	20:42 (2)	20:21			16:56	51	16:15 (4)	16:13	15:35 (5)
Potential sun hours	512		460		382		328		259		233
Total, worst case	634		679		179		859		1047		442
Sun reduction	0.32		0.34		0.32		0.29		0.27		0.21
Oper. time red.	1.00		1.00		1.00		1.00		1.00		1.00
Wind dir. red.	0.65		0.65		0.67		0.66		0.66		0.66
Total reduction	0.21		0.22		0.22		0.19		0.17		0.14
Total, real	132		150		39		167		183		60

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DL - H116

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44		15:02 (4)	08:14		07:16		17:18 (2)	07:01		05:52		05:03					
	16:15	29	15:31 (4)	17:06		18:02		16	17:34 (2)	20:00		20:55		21:45				
2	08:44		15:03 (4)	08:12		16:33 (3)	07:14		17:16 (2)	06:59		05:50		05:02				
	16:16	29	15:32 (4)	17:08	4	16:37 (3)	18:04	20	17:36 (2)	20:02		20:57		21:46				
3	08:44		15:03 (4)	08:10		16:33 (3)	07:12		17:15 (2)	06:56		05:48		05:01				
	16:17	28	15:31 (4)	17:10	6	16:39 (3)	18:06	23	17:38 (2)	20:04		20:59		21:48				
4	08:43		15:04 (4)	08:08		16:32 (3)	07:09		17:15 (2)	06:54		05:46		05:00				
	16:18	28	15:32 (4)	17:12	9	16:41 (3)	18:07	26	17:41 (2)	20:06		21:01		21:49				
5	08:43		15:04 (4)	08:07		16:32 (3)	07:07		17:13 (2)	06:51		05:44		04:59				
	16:19	28	15:32 (4)	17:14	11	16:43 (3)	18:09	29	17:42 (2)	20:07		21:03		21:50				
6	08:43		15:05 (4)	08:05		16:32 (3)	07:04		17:13 (2)	06:49		05:42		04:58				
	16:21	28	15:33 (4)	17:16	13	16:45 (3)	18:11	32	17:45 (2)	20:09		21:04		21:51				
7	08:42		15:06 (4)	08:03		16:32 (3)	07:02		17:12 (2)	06:47		05:40		04:58				
	16:22	27	15:33 (4)	17:18	15	16:47 (3)	18:13	33	17:45 (2)	20:11		21:06		21:52				
8	08:42		15:06 (4)	08:01		16:32 (3)	07:00		17:12 (2)	06:44		05:38		04:57				
	16:24	26	15:32 (4)	17:20	18	16:50 (3)	18:15	34	17:46 (2)	20:13		21:08		21:53				
9	08:41		15:08 (4)	07:59		16:33 (3)	06:57		17:11 (2)	06:42		05:36		04:57				
	16:25	25	15:33 (4)	17:22	19	16:52 (3)	18:17	34	17:45 (2)	20:15		21:10		21:54				
10	08:40		15:08 (4)	07:57		16:33 (3)	06:55		17:12 (2)	06:39		05:34		04:56				
	16:26	25	15:33 (4)	17:24	21	16:54 (3)	18:19	33	17:45 (2)	20:17		21:11		21:55				
11	08:40		15:09 (4)	07:55		16:34 (3)	06:52		17:12 (2)	06:37		05:33		04:56				
	16:28	24	15:33 (4)	17:26	19	16:53 (3)	18:21	33	17:45 (2)	20:19		21:13		21:55				
12	08:39		15:10 (4)	07:53		16:35 (3)	06:50		17:12 (2)	06:35		05:31		04:55				
	16:30	23	15:33 (4)	17:28	17	16:52 (3)	18:23	31	17:43 (2)	20:20		21:15		21:56				
13	08:38		15:11 (4)	07:51		16:36 (3)	06:48		17:13 (2)	06:32		05:29		04:55				
	16:31	22	15:33 (4)	17:30	14	16:50 (3)	18:25	30	17:43 (2)	20:22		21:17		21:57				
14	08:37		15:12 (4)	07:49		16:38 (3)	06:45		17:13 (2)	06:30		05:27		04:55				
	16:33	20	15:32 (4)	17:32	10	16:48 (3)	18:27	28	17:41 (2)	20:24		21:18		21:58				
15	08:36		15:14 (4)	07:47		06:43			17:15 (2)	06:28		05:26		04:54				
	16:34	18	15:32 (4)	17:34		18:28	25		17:40 (2)	20:26		21:20		21:58				
16	08:35		15:14 (4)	07:45		06:40			17:16 (2)	06:25		05:24		04:54				
	16:36	16	15:30 (4)	17:36		18:30	22		17:38 (2)	20:28		21:22		21:59				
17	08:34		15:17 (4)	07:43		06:38			17:18 (2)	06:23		05:22		04:54				
	16:38	12	15:29 (4)	17:38		18:32	18		17:36 (2)	20:30		21:23		21:59				
18	08:33		15:20 (4)	07:41		06:35			17:20 (2)	06:21		05:21		04:54				
	16:40	8	15:28 (4)	17:40		18:34	12		17:32 (2)	20:31		21:25		22:00				
19	08:32			07:39		06:33				06:18		05:19		04:54				
	16:41			17:42		18:36				20:33		21:27		22:00				
20	08:31			07:36		06:31				06:16		05:18		04:54				
	16:43			17:44		18:38				20:35		21:28		22:00				
21	08:30			07:34		06:28				06:14		05:16		04:54				
	16:45			17:46		18:40				20:37		21:30		22:01				
22	08:29			07:32		06:26				06:12		05:15		04:55				
	16:47			17:48		18:42				20:39		21:31		22:01				
23	08:27			07:30		06:23				06:09		05:13		04:55				
	16:49			17:50		18:43				20:41		21:33		22:01				
24	08:26			07:28		06:21				06:07		05:12		04:55				
	16:50			17:52		18:45				20:43		21:34		22:01				
25	08:24			07:25		06:18				06:05		05:11		04:55				
	16:52			17:54		18:47				20:44		21:36		22:01				
26	08:23			07:23		17:25 (2)	06:16			06:03		05:09		04:56				
	16:54			17:56	3	17:28 (2)	18:49			20:46		21:37		22:01				
27	08:22			07:21		17:22 (2)	06:13			06:00		05:08		04:56				
	16:56			17:58	9	17:31 (2)	18:51			20:48		21:39		22:01				
28	08:20			07:18		17:19 (2)	06:11			05:58		05:07		04:57				
	16:58			18:00	13	17:32 (2)	18:53			20:50		21:40		22:01				
29	08:19					07:08				05:56		05:06		04:57				
	17:00					19:54				20:52		21:41		22:01				
30	08:17					07:06				05:54		05:05		04:58				
	17:02					19:56				20:54		21:43		22:00				
31	08:15					07:04						05:04						
	17:04					19:58						21:44						
Potential sun hours	250		273		367		420		494		510							
Total, worst case	416		201		479													
Sun reduction	0.24		0.23		0.27													
Oper. time red.	1.00		1.00		1.00													
Wind dir. red.	0.65		0.66		0.68													
Total reduction	0.16		0.15		0.18													
Total, real	66		31		88													

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DL - H116

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:51 (2) 18:22 (2)	07:24 16:54	16:03 (3) 16:23 (3)	08:19 16:10	14:51 (4) 15:15 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:51 (2) 18:22 (2)	07:26 16:52	16:02 (3) 16:21 (3)	08:21 16:09	14:50 (4) 15:15 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:50 (2) 18:23 (2)	07:28 16:50	16:02 (3) 16:19 (3)	08:22 16:08	14:51 (4) 15:16 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:50 (2) 18:23 (2)	07:30 16:48	16:02 (3) 16:17 (3)	08:24 16:08	14:51 (4) 15:18 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:49 (2) 18:23 (2)	07:32 16:46	16:02 (3) 16:15 (3)	08:25 16:07	14:51 (4) 15:18 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:49 (2) 18:23 (2)	07:34 16:44	16:02 (3) 16:12 (3)	08:26 16:07	14:51 (4) 15:19 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:48 (2) 18:21 (2)	07:36 16:43	16:02 (3) 16:10 (3)	08:28 16:06	14:51 (4) 15:19 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:48 (2) 18:18 (2)	07:38 16:41	16:03 (3) 16:08 (3)	08:29 16:06	14:51 (4) 15:19 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:48 (2) 18:16 (2)	07:40 16:39	16:04 (3) 16:07 (3)	08:30 16:05	14:52 (4) 15:21 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:49 (2) 18:14 (2)	07:42 16:37	08:31 16:05	14:52 (4) 15:21 (4)	
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:50 (2) 18:11 (2)	07:44 16:35	08:33 16:05	14:52 (4) 15:21 (4)	
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:50 (2) 18:09 (2)	07:45 16:34	08:34 16:05	14:52 (4) 15:22 (4)	
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:52 (2) 18:07 (2)	07:47 16:32	08:35 16:05	14:53 (4) 15:22 (4)	
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:53 (2) 18:04 (2)	07:49 16:31	08:36 16:04	14:53 (4) 15:22 (4)	
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:55 (2) 18:02 (2)	07:51 16:29	08:37 16:04	14:53 (4) 15:23 (4)	
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05	14:54 (4) 15:24 (4)		
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05	14:54 (4) 15:24 (4)		
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05	14:55 (4) 15:25 (4)		
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05	14:56 (4) 15:26 (4)		
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06	14:56 (4) 15:26 (4)		
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06	14:57 (4) 15:27 (4)		
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06	14:57 (4) 15:27 (4)		
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07	14:58 (4) 15:28 (4)		
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	14:57 (4) 15:05 (4)	08:43 16:08	14:58 (4) 15:28 (4)	
25	05:27 21:36	06:20 20:35	07:15 19:19	18:05 (2) 18:13 (2)	07:11 17:09	08:09 16:16	14:55 (4) 15:07 (4)	08:43 16:08	14:58 (4) 15:28 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	18:01 (2) 18:17 (2)	07:13 17:06	08:11 16:14	14:54 (4) 15:09 (4)	08:43 16:09	14:58 (4) 15:28 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	17:58 (2) 18:19 (2)	07:15 17:04	16:11 (3) 16:15 (3)	08:13 16:13	08:44 15:11 (4)	15:00 (4) 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	17:56 (2) 18:20 (2)	07:16 17:02	16:07 (3) 16:18 (3)	08:14 16:12	08:44 15:12 (4)	15:00 (4) 16:10
29	05:34 21:30	06:27 20:25	07:22 19:09	17:55 (2) 18:21 (2)	07:18 17:00	16:05 (3) 16:20 (3)	08:16 16:12	14:51 (4) 15:13 (4)	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	17:52 (2) 18:21 (2)	07:20 16:58	16:04 (3) 16:21 (3)	08:18 16:11	14:51 (4) 15:14 (4)	08:44 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56	16:03 (3) 16:22 (3)	08:44 16:13	15:01 (4) 15:30 (4)		
Potential sun hours	512	460	382	328	259	233	894		
Total, worst case			124	451	228				
Sun reduction			0.32	0.29	0.27		0.21		
Oper. time red.			1.00	1.00	1.00		1.00		
Wind dir. red.			0.68	0.67	0.65		0.65		
Total reduction			0.22	0.20	0.17		0.13		
Total, real			27	89	39		120		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DM - H117
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		16:26 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		15:46 (2)	08:19		15:31 (3)				
	16:15		17:06	8	16:34 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	34	16:20 (2)	16:10	3	15:34 (3)				
2	08:44		08:12		16:24 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28		07:26		15:46 (2)	08:21		15:31 (3)				
	16:16		17:08	13	16:37 (2)	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02		16:52	34	16:20 (2)	16:09	1	15:32 (3)				
3	08:44		08:10		16:22 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		15:47 (2)	08:22						
	16:17		17:10	17	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00		16:50	32	16:19 (2)	16:08						
4	08:43		07:08		16:21 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31		07:30		15:48 (2)	08:24						
	16:18		17:12	20	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	29	16:17 (2)	16:08						
5	08:43		08:07		16:19 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33		07:32		15:48 (2)	08:25						
	16:19		17:14	24	16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55		16:46	26	16:14 (2)	16:07						
6	08:43		08:05		16:19 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35		07:34		15:49 (2)	08:26						
	16:21		17:16	26	16:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52		16:44	23	16:12 (2)	16:07						
7	08:42		08:03		16:18 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37		07:36		15:50 (2)	08:28						
	16:22		17:18	29	16:47 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	20	16:10 (2)	16:06						
8	08:42		08:01		16:17 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39		07:38		15:52 (2)	08:29						
	16:24		17:20	32	16:49 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	16	16:08 (2)	16:06						
9	08:41		07:59		16:17 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		15:55 (2)	08:30						
	16:25		17:22	33	16:50 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45		16:39	12	16:07 (2)	16:05						
10	08:40		07:57		16:16 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42		07:42		15:57 (2)	08:31						
	16:26	1	15:50 (3)	35	16:51 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43		16:37	8	16:05 (2)	16:05						
11	08:40		07:55		16:16 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44		07:44		15:58 (2)	08:33						
	16:28	3	15:52 (3)	35	16:51 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40		16:35		15:32 (3)	16:05						
12	08:39		07:53		16:16 (2)	06:50	06:35	05:30	04:55	05:09	05:57	06:52	07:46		07:45		15:38 (3)	16:05						
	16:30	5	15:54 (3)	36	16:52 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38		16:34	6	15:38 (3)	16:05						
13	08:38		07:51		16:15 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48		07:47		15:29 (3)	08:35						
	16:31	6	15:55 (3)	36	16:51 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32	12	15:41 (3)	16:05						
14	08:37		07:49		16:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49		15:28 (3)	08:36						
	16:33	8	15:57 (3)	36	16:51 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31	14	15:42 (3)	16:04						
15	08:36		07:47		16:15 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52		07:51		15:27 (3)	08:37						
	16:34	10	15:59 (3)	36	16:51 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	17	15:44 (3)	16:04						
16	08:35		07:45		16:16 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54		07:53	17:00 (2)	15:26 (3)	08:38						
	16:36	12	16:00 (3)	35	16:51 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	11	17:11 (2)	16:27	19	15:45 (3)	16:05					
17	08:34		07:43		16:16 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55		07:55	16:56 (2)	15:25 (3)	08:38						
	16:38	14	16:02 (3)	35	16:51 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	18	17:14 (2)	16:26	20	15:45 (3)	16:05					
18	08:33		07:41		16:16 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57	16:54 (2)	15:25 (3)	08:39						
	16:40	16	16:05 (3)	34	16:50 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	22	17:16 (2)	16:24	21	15:46 (3)	16:05					
19	08:32		07:39		16:17 (2)	06:33	06:12	05:13	04:53	05:16	06:07	07:02	07:56		07:56	16:52 (2)	15:24 (3)	08:40						
	16:41	17	16:07 (3)	33	16:50 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	25	17:17 (2)	16:23	21	15:46 (3)	16:05					
20	08:31		07:36		16:18 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		08:01	16:50 (2)	15:25 (3)	08:41						
	16:43	19	16:08 (3)	31	16:49 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	28	17:18 (2)	16:22	22	15:47 (3)	16:06					
21	08:30		07:34		16:19 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		08:03	16:49 (2)	15:25 (3)	08:41						
	16:45	21	16:11 (3)	29	16:48 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	30	17:19 (2)	16:20	21	15:46 (3)	16:06					
22	08:29		07:32		16:19 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:05	16:48 (2)	15:25 (3)	08:42						
	16:47	22	16:12 (3)	28	16:47 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	32	17:20 (2)	16:19	19	15:44 (3)	16:06					
23	08:27		07:30		16:21 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:07	16:47 (2)	15:26 (3)	08:42						
	16:49	21	16:12 (3)	24	16:45 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	33	17:20 (2)	16:18	17	15:43 (3)	16:07					
24	08:26		07:28		16:23 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09		08:09	16:46 (2)	15:26 (3)	08:43						
	16:50	21	16:12 (3)	21	16:44 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	35	17:21 (2)	16:17	16	15:42 (3)	16:08					
25	08:25		07:25		16:25 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11		08:11	15:46 (2)	15:27 (3)	08:43						
	16:52	20	16:12 (3)	16	16:41 (2)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	35	16:21 (2)	16:16	14	15:41 (3)	16:08					
26	08:23		07:23		16:30 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		08:13	15:45 (2)	15:27 (3)	08:43						
	16:54	19	16:12 (3)	6	16:36 (2)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	36	16:21 (2)	16:14	12	15:39 (3)	16:09					
27	08:22		07:21			06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15		08:15	15:45 (2)	15:28 (3)	08:44						
	16:56	17	16:11 (3)			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	36	16:21 (2)	16:13	10	15:38 (3)	16:10					
28	08:20		07:18			06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16		08:16	15:45 (2)	15:29 (3)	08:44						
	16:58	14	16:10 (3)			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	36	16:21 (2)	16:12	8	15:37 (3)	16:10					
29	08:19		07:33			07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18		08:18	15:45 (2)	15:29 (3)	08:44						
	17:00	12	16:09 (3)			19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	36	16:21 (2)	16:12	7	15:36 (3)	16:11					
30	08:17		07:30			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20		08:20	15:45 (2)	15:30 (3)	08:44						
	17:02	6	16:06 (3)			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	35	16:20 (2)	16:11	5	15:35 (3)	16:12					
31	08:15		07:20			07:04		05:04		05:37	06:31		07:22		07:22	15:45 (2)		08:44						
	17:04	1	16:30 (2)			19:58		21:44		21:27	20:21		16:56	35	16:20 (2)			16:13						
Potential sun hours	250			273			367		420															

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DN - H118

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	17:06	08:49 (2)	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54
3	08:44	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26
4	16:16	17:08	08:50 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
5	08:44	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
6	16:17	17:10	08:50 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50
7	08:43	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30
8	16:18	17:12	08:51 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48
9	08:43	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32
10	16:20	17:14	08:51 (2)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46
11	08:43	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34
12	16:21	17:16	08:51 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44
13	08:42	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36
14	16:22	17:18	08:51 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43
15	08:42	08:01	08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38
16	16:24	17:20	08:51 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41
17	08:41	07:59	08:28 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40
18	16:25	17:22	08:50 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39
19	08:41	07:57	08:29 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42
20	16:27	17:24	08:50 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37
21	08:40	07:55	08:30 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44
22	16:28	17:26	08:49 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36
23	08:39	07:53	08:31 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46
24	16:30	17:28	08:48 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34
25	08:38	07:51	08:33 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48
26	16:31	17:30	08:46 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32
27	08:37	07:49	08:35 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49
28	16:33	17:32	08:42 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31
29	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	06:37
30	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05
31	08:36	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	06:38
32	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16:05
33	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	06:39
34	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	16:05
35	08:33	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	06:39
36	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:05
37	08:32	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	06:40
38	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05
39	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	06:41
40	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:06
41	08:30	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	06:41
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:20	16:06
43	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	06:42
44	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:07
45	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	06:42
46	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	16:07
47	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	06:43
48	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	16:08
49	08:25	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:09	06:43
50	16:52	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	16:08
51	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	06:44
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	16:09
53	08:22	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13	06:44
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	16:14	16:10
55	08:20	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:15	06:44
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16:11
57	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16	06:44
58	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	16:11
59	08:17	08:45 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	06:44
60	17:02	2	08:47 (2)		19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58
61	08:15	08:44 (2)	07:04		19:58		21:43		21:28	20:23	19:07	16:58
62	17:04	5	08:49 (2)		19:58		21:44		21:27	20:21	16:56	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	7	223								62	170	
Sun reduction	0.24	0.23								0.29	0.27	
Oper. time red.	1.00	1.00								1.00	1.00	
Wind dir. red.	0.62	0.62								0.62	0.62	
Total reduction	0.15	0.14								0.18	0.16	
Total, real	1	32								11	28	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DO - H119
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:09 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:36 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:37	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:06	08:11 16:14	08:44 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:18 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21	07:22 16:56			08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DP - H120

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:11 (1)	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:56	4	06:22 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:40	06:11 (1)	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	7	06:23 (1)	21:47	22:00	21:23	24	06:35 (1)	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:57	05:48	06:14 (1)	05:01	05:01	05:42	06:12 (1)	06:37	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	10	06:24 (1)	21:48	21:59	21:21	22	06:34 (1)	20:14	19:00	16:50	16:09
4	08:43	08:09	07:09	06:54	05:46	06:12 (1)	05:00	05:01	05:44	06:14 (1)	06:38	07:32	07:30	08:24		
	16:18	17:12	18:08	20:06	21:01	12	06:24 (1)	21:49	21:59	21:19	21	06:35 (1)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	06:10 (1)	04:59	05:02	05:46	06:16 (1)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:10	20:08	21:03	14	06:24 (1)	21:50	21:58	21:18	19	06:35 (1)	20:09	18:55	16:46	16:07
6	08:43	08:05	07:05	06:49	05:42	06:09 (1)	04:59	05:03	05:47	06:17 (1)	06:42	07:35	07:34	08:27		
	16:21	17:16	18:12	20:09	21:05	16	06:25 (1)	21:51	21:58	21:16	17	06:34 (1)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	06:07 (1)	04:58	05:04	05:49	06:19 (1)	06:44	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	18	06:25 (1)	21:52	21:57	21:14	15	06:34 (1)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	06:05 (1)	04:57	05:05	05:51	06:20 (1)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	20	06:25 (1)	21:53	21:56	21:12	13	06:33 (1)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36	06:03 (1)	04:57	05:06	05:52	06:22 (1)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	21	06:24 (1)	21:54	21:56	21:10	11	06:33 (1)	19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35	06:02 (1)	04:56	05:07	05:54	06:24 (1)	06:49	07:43	07:42	08:32		
	16:27	17:24	18:19	20:17	21:12	23	06:25 (1)	21:55	21:55	21:08	9	06:33 (1)	19:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33	06:01 (1)	04:56	05:08	05:56	06:25 (1)	06:51	07:44	07:44	08:33		
	16:28	17:26	18:21	20:19	21:13	23	06:24 (1)	21:56	21:54	21:06	6	06:31 (1)	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	06:01 (1)	04:56	05:10	05:58	06:27 (1)	06:52	07:46	07:46	08:34		
	16:30	17:28	18:23	20:21	21:15	22	06:23 (1)	21:56	21:53	21:04	3	06:30 (1)	19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29	06:02 (1)	04:55	05:11	05:59	06:54	07:48	07:48	08:35			
	16:31	17:30	18:25	20:22	21:17	21	06:23 (1)	21:57	21:52	21:01	19:49	18:36	16:32	16:05		
14	08:37	07:49	06:45	06:30	05:27	06:02 (1)	04:55	05:12	06:01	06:56	07:50	07:49	08:36			
	16:33	17:32	18:27	20:24	21:19	20	06:22 (1)	21:58	21:51	20:59	19:47	18:34	16:31	16:05		
15	08:37	07:47	06:43	06:28	05:26	06:04 (1)	04:55	05:13	06:03	06:58	07:52	07:51	08:37			
	16:35	17:34	18:29	20:26	21:20	18	06:22 (1)	21:58	21:50	20:57	19:44	18:31	16:29	16:05		
16	08:36	07:45	06:41	06:25	05:24	06:04 (1)	04:55	05:15	06:05	07:00	07:54	07:53	08:38			
	16:36	17:36	18:31	20:28	21:22	17	06:21 (1)	21:59	21:49	20:55	19:42	18:29	16:28	16:05		
17	08:35	07:43	06:38	06:23	05:22	06:06 (1)	04:54	05:16	06:06	07:01	07:56	07:55	08:39			
	16:38	17:38	18:32	20:30	21:24	14	06:20 (1)	21:59	21:48	20:53	19:39	18:27	16:26	16:05		
18	08:33	07:41	06:36	06:21	05:21	06:07 (1)	04:54	05:17	06:08	07:03	07:58	07:57	08:39			
	16:40	17:40	18:34	20:32	21:25	11	06:18 (1)	22:00	21:46	20:51	19:37	18:24	16:25	16:05		
19	08:32	07:39	06:33	06:19	05:19	06:09 (1)	04:54	05:19	06:10	07:05	07:59	07:59	08:40			
	16:42	17:42	18:36	20:33	21:27	7	06:16 (1)	22:00	21:45	20:48	19:34	18:22	16:23	16:05		
20	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12	07:07	08:01	08:01	08:41			
	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46	19:32	18:20	16:22	16:06			
21	08:30	07:34	06:28	06:14	05:16		04:55	05:22	06:14	07:08	08:03	08:02	08:41			
	16:45	17:46	18:40	20:37	21:30		22:01	21:42	20:44	19:29	18:18	16:21	16:06			
22	08:29	07:32	06:26	06:12	05:15		04:55	05:23	06:15	07:10	08:05	08:04	08:42			
	16:47	17:48	18:42	20:39	21:31		22:01	21:41	20:42	19:27	18:15	16:19	16:07			
23	08:27	07:30	06:23	06:10	05:13		04:55	05:24	06:17	07:12	08:07	08:06	08:42			
	16:49	17:50	18:44	20:41	21:33		22:01	21:40	20:39	19:24	18:13	16:18	16:07			
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26		06:21 (1)	06:19	07:14	08:09	08:43		
	16:51	17:52	18:45	20:43	21:35		22:01	21:38	3	06:24 (1)	06:21	19:22	18:11	16:17	16:08	
25	08:25	07:26	06:19	06:05	05:11		04:56	05:28		06:18 (1)	06:21	07:15	07:11	08:09	08:43	
	16:53	17:54	18:47	20:45	21:36		22:01	21:37	10	06:28 (1)	06:25	19:20	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:10		04:56	05:29		06:16 (1)	06:22	07:17	07:13	08:11	08:44	
	16:55	17:56	18:49	20:46	21:37		22:01	21:35	13	06:29 (1)	06:20	19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08		04:57	05:31		06:15 (1)	06:24	07:19	07:15	08:13	08:44	
	16:56	17:58	18:51	20:48	21:39		22:01	21:33	16	06:31 (1)	06:20	19:15	17:05	16:14	16:10	
28	08:20	07:19	06:11	05:59	05:07		04:57	05:32		06:14 (1)	06:26	07:21	07:17	08:15	08:44	
	16:58	18:00	18:53	20:50	21:40		22:01	21:32	17	06:31 (1)	06:28	19:12	17:02	16:13	16:11	
29	08:19		07:09	05:56	05:06		04:58	05:34		06:14 (1)	06:28	07:23	07:19	08:16	08:44	
	17:00		19:55	20:52	21:42		22:01	21:30	19	06:33 (1)	06:26	19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05	06:20 (1)		04:58	05:36		06:12 (1)	06:29	07:24	07:21	08:18	08:44
	17:02		19:57	20:54	1	06:21 (1)		21:43	22:00	21	06:33 (1)	06:23	19:07	16:58	16:11	16:13
31	08:15		07:04		05:04			05:37		06:12 (1)	06:31		07:22			08:44
	17:04		19:58		21:44			21:27	22	06:34 (1)	06:21		16:56			16:14
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233		
Total, worst case				1	298			121	183							
Sun reduction				0.35	0.38			0.32	0.34							
Oper. time red.				1.00	1.00			1.00	1.00							
Wind dir. red.				0.67	0.67			0.67	0.67							
Total reduction				0.24	0.26			0.22	0.23							
Total, real				0	76			26	42							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DQ - H121

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	05:03	05:34 (1)	04:59	05:32 (1)	05:39	06:33	07:26	07:24	08:19	
2	16:15	17:06	18:02	20:00	20:56	21:45	05:45 (1)	22:00	18	05:50 (1)	21:25	20:18	19:05	16:54	16:10
	08:44	08:12	07:14	06:59	05:50	05:02	05:33 (1)	05:00		05:33 (1)	05:41	06:35	07:28	07:26	08:21
3	16:16	17:08	18:04	20:02	20:57	21:47	05:45 (1)	22:00	17	05:50 (1)	21:23	20:16	19:02	16:52	16:09
	08:44	08:10	07:12	06:57	05:48	05:01	05:32 (1)	05:01		05:34 (1)	05:42	06:37	07:30	07:28	08:22
4	16:17	17:10	18:06	20:04	20:59	21:48	05:44 (1)	21:59	17	05:51 (1)	21:21	20:14	19:00	16:50	16:09
	08:43	08:09	07:09	06:54	05:46	05:00	05:31 (1)	05:01		05:34 (1)	05:44	06:38	07:32	07:30	08:24
5	16:18	17:12	18:08	20:06	21:01	21:49	05:44 (1)	21:59	16	05:50 (1)	21:19	20:11	18:57	16:48	16:08
	08:43	08:07	07:07	06:52	05:44	04:59	05:31 (1)	05:02		05:35 (1)	05:46	06:40	07:33	07:32	08:25
6	16:20	17:14	18:10	20:08	21:03	21:50	05:45 (1)	21:58	16	05:51 (1)	21:18	20:09	18:55	16:47	16:07
	08:43	08:05	07:05	06:49	05:42	04:59	05:30 (1)	05:03		05:36 (1)	05:47	06:42	07:35	07:34	08:27
7	16:21	17:16	18:12	20:09	21:05	21:51	05:45 (1)	21:58	15	05:51 (1)	21:16	20:06	18:53	16:45	16:07
	08:42	08:03	07:02	06:47	05:40	04:58	05:30 (1)	05:04		05:37 (1)	05:49	06:44	07:37	07:36	08:28
8	16:22	17:18	18:13	20:11	21:06	21:52	05:45 (1)	21:57	14	05:51 (1)	21:14	20:04	18:50	16:43	16:06
	08:42	08:01	07:00	06:44	05:38	04:57	05:29 (1)	05:05		05:38 (1)	05:51	06:45	07:39	07:38	08:29
9	16:24	17:20	18:15	20:13	21:08	21:53	05:45 (1)	21:56	14	05:52 (1)	21:12	20:01	18:48	16:41	16:06
	08:41	07:59	06:58	06:42	05:36	04:57	05:29 (1)	05:06		05:39 (1)	05:52	06:47	07:41	07:40	08:30
10	16:25	17:22	18:17	20:15	21:10	21:54	05:46 (1)	21:56	13	05:52 (1)	21:10	19:59	18:45	16:39	16:06
	08:41	07:57	06:55	06:40	05:35	04:56	05:28 (1)	05:07		05:40 (1)	05:54	06:49	07:43	07:42	08:32
11	16:27	17:24	18:19	20:17	21:12	21:55	05:45 (1)	21:55	12	05:52 (1)	21:08	19:57	18:43	16:37	16:05
	08:40	07:55	06:53	06:37	05:33	04:56	05:28 (1)	05:08		05:41 (1)	05:56	06:51	07:44	07:44	08:33
12	16:28	17:26	18:21	20:19	21:13	21:56	05:45 (1)	21:54	11	05:52 (1)	21:06	19:54	18:41	16:36	16:05
	08:39	07:53	06:50	06:35	05:31	04:56	05:28 (1)	05:10		05:42 (1)	05:58	06:52	07:46	07:46	08:34
13	16:30	17:28	18:23	20:21	21:15	21:56	05:46 (1)	21:53	10	05:52 (1)	21:04	19:52	18:38	16:34	16:05
	08:38	07:51	06:48	06:33	05:29	04:55	05:27 (1)	05:11		05:43 (1)	05:59	06:54	07:48	07:48	08:35
14	16:31	17:30	18:25	20:22	21:17	21:57	05:45 (1)	21:52	9	05:52 (1)	21:01	19:49	18:36	16:32	16:05
	08:37	07:49	06:45	06:30	05:27	04:55	05:27 (1)	05:12		05:44 (1)	06:01	06:56	07:50	07:49	08:36
15	16:33	17:32	18:27	20:24	21:19	21:58	05:46 (1)	21:51	8	05:52 (1)	20:59	19:47	18:34	16:31	16:05
	08:36	07:47	06:43	06:28	05:26	04:55	05:27 (1)	05:13		05:45 (1)	06:03	06:58	07:52	07:51	08:37
16	16:35	17:34	18:29	20:26	21:20	21:58	05:46 (1)	21:50	7	05:52 (1)	20:57	19:44	18:31	16:29	16:05
	08:36	07:45	06:41	06:25	05:24	04:55	05:27 (1)	05:15		05:47 (1)	06:05	07:00	07:54	07:53	08:38
17	16:36	17:36	18:31	20:28	21:22	21:59	05:46 (1)	21:49	5	05:52 (1)	20:55	19:42	18:29	16:28	16:05
	08:35	07:43	06:38	06:23	05:22	04:54	05:27 (1)	05:16		05:48 (1)	06:06	07:01	07:56	07:55	08:39
18	16:38	17:38	18:32	20:30	21:24	21:59	05:46 (1)	21:48	4	05:52 (1)	20:53	19:39	18:27	16:26	16:05
	08:33	07:41	06:36	06:21	05:21	04:54	05:27 (1)	05:17		05:49 (1)	06:08	07:03	07:58	07:57	08:39
19	16:40	17:40	18:34	20:32	21:25	22:00	05:46 (1)	21:46	2	05:51 (1)	20:51	19:37	18:24	16:25	16:05
	08:32	07:39	06:33	06:19	05:19	04:54	05:27 (1)	05:19			06:10	07:05	07:59	07:59	08:40
20	16:42	17:42	18:36	20:33	21:27	22:00	05:46 (1)	21:45			20:48	19:34	18:22	16:23	16:05
	08:31	07:37	06:31	06:16	05:18	04:55	05:27 (1)	05:20			06:12	07:07	08:01	08:01	08:41
21	16:43	17:44	18:38	20:35	21:28	22:00	05:46 (1)	21:44			20:46	19:32	18:20	16:22	16:06
	08:30	07:34	06:28	06:14	05:16	04:55	05:28 (1)	05:22			06:14	07:08	08:03	08:02	08:41
22	16:45	17:46	18:40	20:37	21:30	22:01	05:47 (1)	21:42			20:44	19:29	18:18	16:21	16:06
	08:29	07:32	06:26	06:12	05:15	04:55	05:28 (1)	05:23			06:15	07:10	08:05	08:04	08:42
23	16:47	17:48	18:42	20:39	21:31	22:01	05:47 (1)	21:41			20:42	19:27	18:15	16:19	16:07
	08:27	07:30	06:23	06:10	05:13	04:55	05:28 (1)	05:24			06:17	07:12	08:07	08:06	08:42
24	16:49	17:50	18:44	20:41	21:33	22:01	05:47 (1)	21:40	19		20:39	19:24	18:13	16:18	16:07
	08:26	07:28	06:21	06:07	05:12	04:55	05:28 (1)	05:26			06:19	07:14	08:09	08:08	08:43
25	16:51	17:52	18:45	20:43	21:34	22:01	05:47 (1)	21:38	19		20:37	19:22	18:11	16:17	16:08
	08:25	07:26	06:19	06:05	05:11	04:56	05:29 (1)	05:28			06:21	07:15	08:11	08:09	08:43
26	16:53	17:54	18:47	20:45	21:36	1	05:41 (1)	22:01	19		20:35	19:20	17:09	16:16	16:08
	08:23	07:23	06:16	06:03	05:10	05:39 (1)	04:56	05:29 (1)	05:29		06:22	07:17	08:13	08:11	08:44
27	16:55	17:56	18:49	20:46	21:37	3	05:42 (1)	22:01	19		20:33	19:17	17:07	16:15	16:09
	08:22	07:21	06:14	06:01	05:08	05:38 (1)	04:57	05:30 (1)	05:31		06:24	07:19	08:15	08:13	08:44
28	16:56	17:58	18:51	20:48	21:39	4	05:42 (1)	22:01	19		20:30	19:15	17:05	16:14	16:10
	08:20	07:19	06:11	05:59	05:07	05:37 (1)	04:57	05:30 (1)	05:32		06:26	07:21	08:17	08:14	08:44
29	16:58	18:00	18:53	20:50	21:40	6	05:43 (1)	22:01	19		20:28	19:12	17:02	16:13	16:11
	08:19		07:09	05:56	05:06	05:36 (1)	04:58	05:31 (1)	05:34		06:28	07:23	07:19	08:16	08:44
30	17:00		19:55	20:52	21:42	7	05:43 (1)	22:01	18		20:26	19:10	17:00	16:12	16:12
	08:17		07:06	05:54	05:05	05:35 (1)	04:58	05:31 (1)	05:36		06:29	07:24	07:21	08:18	08:44
31	17:02		19:57	20:54	21:43	8	05:43 (1)	22:00	18		20:23	19:07	16:58	16:11	16:13
	08:15		07:04		05:04	05:34 (1)		05:37			06:31		07:22		08:44
	17:04		19:58		21:44	10	05:44 (1)				20:21		16:56		16:14
Potential sun hours	250	273	367	420	494	510	512	512	460	382	328	259	233		
Total, worst case					39		516		208						
Sun reduction					0.38		0.32		0.32						
Oper. time red.					1.00		1.00		1.00						
Wind dir. red.					0.66		0.66		0.66						
Total reduction					0.25		0.21		0.21						
Total, real					10		109		44						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DR - H122

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DS - H123

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:03 05:34 (3)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 05:33 (3)
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 05:32 (3)
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 05:31 (3)
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 21:03	04:59 05:31 (3)
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 21:04	04:59 05:30 (3)
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:11 (5) 21:06	04:58 05:30 (3)
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:08 (5) 21:08	04:57 05:29 (3)
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:06 (5) 21:10	04:57 05:44 (3)
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:04 (5) 21:12	04:56 05:43 (3)
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:05 (5) 21:13	04:56 05:28 (3)
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	07:07 (5) 21:15	04:56 05:44 (3)
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	07:10 (5) 21:17	04:55 05:27 (3)
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	07:16 (5) 21:18	04:55 05:43 (3)
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 05:27 (3)
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 05:44 (3)
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 05:27 (3)
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 05:43 (3)
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 05:27 (3)
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 05:44 (3)
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 05:28 (3)
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 05:45 (3)
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 05:28 (3)
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 05:45 (3)
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 05:29 (3)
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 05:46 (3)
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 05:30 (3)
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 05:47 (3)
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 05:31 (3)
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 05:47 (3)
31	08:15 17:04		07:04 19:58		05:04 21:44	05:34 (3) 05:42 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case				154	30	460
Sun reduction				0.35	0.38	0.32
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.66	0.66
Total reduction				0.24	0.25	0.21
Total, real				37	8	97

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DS - H123

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 16	05:32 (3) 05:48 (3) 21:25	05:39 20:18 16	07:04 (5) 07:20 (5) 19:05	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 15	05:33 (3) 05:48 (3) 21:23	05:40 20:16 19	07:03 (5) 07:22 (5) 19:02	07:28 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 15	05:33 (3) 05:48 (3) 21:21	05:42 20:14 19	07:04 (5) 07:23 (5) 19:00	07:30 16:50 16:09	08:22 16:09 16:09
4	05:01 21:59 14	05:34 (3) 05:48 (3) 21:19	05:44 20:11 17	07:05 (5) 07:22 (5) 18:57	07:30 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 14	05:35 (3) 05:49 (3) 21:17	05:46 20:09 16	07:07 (5) 07:23 (5) 18:55	07:32 16:46 16:07	08:25 16:07 16:07
6	05:03 21:58 13	05:36 (3) 05:49 (3) 21:16	05:47 20:06 14	07:09 (5) 07:23 (5) 18:53	07:34 16:45 16:07	08:26 16:07 16:07
7	05:04 21:57 13	05:37 (3) 05:50 (3) 21:14	05:49 20:04 12	07:10 (5) 07:22 (5) 18:50	07:36 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 12	05:38 (3) 05:50 (3) 21:12	05:51 20:01 10	07:12 (5) 07:22 (5) 18:48	07:38 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 11	05:39 (3) 05:50 (3) 21:10	05:52 19:59 7	07:14 (5) 07:21 (5) 18:45	07:40 16:39 16:06	08:30 16:06 16:06
10	05:07 21:55 10	05:40 (3) 05:50 (3) 21:08	05:54 19:57 5	07:16 (5) 07:21 (5) 18:43	07:42 16:37 16:05	08:32 16:05 16:05
11	05:08 21:54 9	05:41 (3) 05:50 (3) 21:06	05:56 19:54 2	07:17 (5) 07:19 (5) 18:41	07:44 16:36 16:05	08:33 16:05 16:05
12	05:10 21:53 8	05:42 (3) 05:50 (3) 21:04	05:58 19:52 1	07:19 (5) 07:21 (5) 18:38	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 7	05:43 (3) 05:50 (3) 21:01	06:00 19:49 1	07:22 (5) 07:23 (5) 18:36	07:47 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 6	05:44 (3) 05:50 (3) 20:59	06:01 19:47 1	07:24 (5) 07:25 (5) 18:34	07:49 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 5	05:45 (3) 05:50 (3) 20:57	06:03 19:44 1	07:26 (5) 07:27 (5) 18:31	07:51 16:29 16:05	08:37 16:05 16:05
16	05:15 21:49 4	05:47 (3) 05:51 (3) 20:55	06:05 19:42 1	07:28 (5) 07:29 (5) 18:29	07:53 16:28 16:05	08:38 16:05 16:05
17	05:16 21:47 2	05:48 (3) 05:50 (3) 20:53	06:06 19:39 1	07:30 (5) 07:31 (5) 18:27	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 1	05:49 (3) 05:50 (3) 20:51	06:08 19:37 1	07:32 (5) 07:33 (5) 18:24	07:57 16:25 16:05	08:39 16:05 16:05
19	05:19 21:45 1	06:10 20:48 1	07:05 19:34 1	07:59 18:22 16:23	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44 1	06:12 20:46 1	07:07 19:32 1	08:01 18:20 16:22	08:01 16:22 16:06	08:41 16:06 16:06
21	05:21 21:42 1	06:14 20:44 1	07:08 19:29 1	08:03 18:18 16:21	08:02 16:21 16:06	08:41 16:06 16:06
22	05:23 21:41 1	06:15 20:42 1	07:10 19:27 1	08:05 18:15 16:19	08:04 16:19 16:07	08:42 16:07 16:07
23	05:24 21:39 1	06:17 20:39 1	07:12 19:24 1	08:07 18:13 16:18	08:06 16:18 16:07	08:42 16:07 16:07
24	05:26 21:38 1	06:19 20:37 1	07:14 19:22 1	08:09 18:11 16:17	08:08 16:17 16:08	08:43 16:08 16:08
25	05:28 21:36 1	06:21 20:35 1	07:15 19:19 1	08:11 17:09 16:16	08:09 16:16 16:08	08:43 16:08 16:08
26	05:29 21:35 1	06:22 20:33 1	07:17 19:17 1	08:13 17:07 16:15	08:11 16:15 16:09	08:43 16:09 16:09
27	05:31 21:33 1	06:24 20:30 1	07:19 19:15 1	08:15 17:05 16:14	08:13 16:14 16:10	08:44 16:10 16:10
28	05:32 21:32 1	06:26 20:28 1	07:21 19:12 1	08:17 17:02 16:13	08:14 16:13 16:11	08:44 16:11 16:11
29	05:34 21:30 1	06:28 20:25 1	07:23 19:10 1	08:19 17:00 16:12	08:16 16:12 16:12	08:44 16:12 16:12
30	05:35 21:28 1	06:29 20:23 6	07:10 (5) 07:16 (5) 19:07	08:21 16:58 16:11	08:18 16:11 16:13	08:44 16:13 16:13
31	05:37 21:27 1	06:31 20:21 13	07:07 (5) 07:20 (5) 19:07	08:23 16:56 16:14	08:19 16:14 16:14	08:44 16:14 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	175	19	137			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.67	0.67			
Total reduction	0.21	0.23	0.22			
Total, real	37	4	30			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DT - H124

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DU - H125

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:40 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DV - H126

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	09:05 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
	16:15	17:06	3 09:08 (2)	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54
2	08:44	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26
	16:16	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
3	08:44	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
	16:17	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50
4	08:43	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30
	16:18	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48
5	08:43	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32
	16:20	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46
6	08:43	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34
	16:21	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44
7	08:42	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36
	16:22	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43
8	08:42	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38
	16:24	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41
9	08:41	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40
	16:25	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39
10	08:41	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42
	16:27	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37
11	08:40	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44
	16:28	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36
12	08:39	07:53		06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46
	16:30	17:28		18:23	20:21	21:15	21:58	21:53	21:04	19:52	18:38	16:34
13	08:38	07:51		06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48
	16:31	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32
14	08:37	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49
	16:33	09:09 (2)		18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31
15	08:37	07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51
	16:34	09:12 (2)		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29
16	08:36	07:45		06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53
	16:36	09:13 (2)		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28
17	08:35	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55
	16:38	09:13 (2)		18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26
18	08:33	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57
	16:40	09:13 (2)		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25
19	08:32	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59
	16:41	09:14 (2)		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23
20	08:31	07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01
	16:43	09:14 (2)		18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22
21	08:30	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02
	16:45	09:15 (2)		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:20
22	08:29	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04
	16:47	09:16 (2)		18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19
23	08:27	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06
	16:49	09:16 (2)		18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18
24	08:26	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08
	16:51	09:15 (2)		18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17
25	08:25	07:25		06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09
	16:52	09:16 (2)		18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:09	16:16
26	08:23	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11
	16:54	09:15 (2)		18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:15
27	08:22	07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13
	16:56	09:16 (2)		18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	16:14
28	08:20	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:15
	16:58	09:15 (2)		18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:13
29	08:19	07:18		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16
	17:00	09:14 (2)		19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:12
30	08:17	07:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18
	17:02	09:13 (2)		19:56	20:54	21:43	22:01	21:28	20:23	19:07	18:58	16:11
31	08:15	07:16		07:04	05:54	05:04	05:57	06:31	07:25	08:20	09:16	09:14
	17:04	09:12 (2)		19:58	21:44	21:44	21:27	20:21	19:16	18:01	16:56	16:13
Potential sun hours	250	273		367	420	494	510	512	460	382	328	259
Total, worst case	245	3										252
Sun reduction	0.24	0.23										0.27
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.61	0.61										0.61
Total reduction	0.15	0.14										0.16
Total, real	36	0										41

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DW - H127

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May		June
1	08:44		15:23 (5)	08:14		15:49 (4)	07:16		17:09 (3)	07:01		19:16 (2)	05:52		05:03
	16:15	14	15:37 (5)	17:06	38	16:27 (4)	18:02	23	17:32 (3)	20:00	17	19:33 (2)	20:55		21:45
2	08:44		15:23 (5)	08:12		15:50 (4)	07:14		17:09 (3)	06:59		19:13 (2)	05:50		05:02
	16:16	16	15:39 (5)	17:08	37	16:27 (4)	18:04	22	17:31 (3)	20:02	22	19:35 (2)	20:57		21:46
3	08:44		15:23 (5)	08:10		15:50 (4)	07:12		17:10 (3)	06:56		19:12 (2)	05:48		05:01
	16:17	16	15:39 (5)	17:10	37	16:27 (4)	18:06	20	17:30 (3)	20:04	25	19:37 (2)	20:59		21:48
4	08:43		15:24 (5)	08:08		15:50 (4)	07:09		17:12 (3)	06:54		19:11 (2)	05:46		05:00
	16:18	17	15:41 (5)	17:12	36	16:26 (4)	18:07	17	17:29 (3)	20:06	28	19:39 (2)	21:01		21:49
5	08:43		15:24 (5)	08:07		15:51 (4)	07:07		17:13 (3)	06:51		19:10 (2)	05:44		04:59
	16:19	18	15:42 (5)	17:14	35	16:26 (4)	18:09	13	17:26 (3)	20:07	30	19:40 (2)	21:03		21:50
6	08:43		15:25 (5)	08:05		15:52 (4)	07:04		17:17 (3)	06:49		19:09 (2)	05:42		04:59
	16:21	19	15:44 (5)	17:16	34	16:26 (4)	18:11	6	17:23 (3)	20:09	33	19:42 (2)	21:04		21:51
7	08:42		15:25 (5)	08:03		15:52 (4)	07:02			06:47		19:08 (2)	05:40		04:58
	16:22	20	15:45 (5)	17:18	33	16:25 (4)	18:13			20:11	35	19:43 (2)	21:06		21:52
8	08:42		15:25 (5)	08:01		15:53 (4)	07:00			06:44		19:07 (2)	05:38		04:57
	16:24	21	15:46 (5)	17:20	31	16:24 (4)	18:15			20:13	37	19:44 (2)	21:08		21:53
9	08:41		15:26 (5)	07:59		15:55 (4)	06:57			06:42		19:07 (2)	05:36		04:57
	16:25	23	15:49 (5)	17:22	28	16:23 (4)	18:17			20:15	37	19:44 (2)	21:10		21:54
10	08:40		15:26 (5)	07:57		15:56 (4)	06:55			06:39		19:06 (2)	05:34		04:56
	16:26	23	15:49 (5)	17:24	26	16:22 (4)	18:19			20:17	37	19:43 (2)	21:11		21:55
11	08:40		15:27 (5)	07:55		15:58 (4)	06:52			06:37		19:07 (2)	05:33		04:56
	16:28	22	15:49 (5)	17:26	23	16:21 (4)	18:21			20:19	36	19:43 (2)	21:13		21:55
12	08:39		15:27 (5)	07:53		15:59 (4)	06:50			06:35		19:07 (2)	05:31		04:55
	16:30	23	15:50 (5)	17:28	19	16:18 (4)	18:23			20:20	36	19:43 (2)	21:15		21:56
13	08:38		15:28 (5)	07:51		16:02 (4)	06:48			06:32		19:06 (2)	05:29		04:55
	16:31	24	15:55 (4)	17:30	13	16:15 (4)	18:25			20:22	36	19:42 (2)	21:17		21:57
14	08:37		15:29 (5)	07:49			06:45			06:30		19:07 (2)	05:27		04:55
	16:33	26	15:57 (4)	17:32			18:27			20:24	34	19:41 (2)	21:18		21:58
15	08:36		15:29 (5)	07:47			06:43			06:28		19:07 (2)	05:26		04:54
	16:34	28	15:59 (4)	17:34			18:28			20:26	34	19:41 (2)	21:20		21:58
16	08:35		15:29 (5)	07:45			06:40			06:25		19:08 (2)	05:24		04:54
	16:36	30	16:00 (4)	17:36			18:30			20:28	32	19:40 (2)	21:22		21:59
17	08:34		15:31 (5)	07:43			06:38			06:23		19:08 (2)	05:22		04:54
	16:38	30	16:02 (4)	17:38			18:32			20:30	30	19:38 (2)	21:23		21:59
18	08:33		15:32 (5)	07:41			06:35			06:21		19:09 (2)	05:21		04:54
	16:40	32	16:05 (4)	17:40			18:34			20:31	28	19:37 (2)	21:25		22:00
19	08:32		15:33 (5)	07:39			06:33			06:18		19:10 (2)	05:19		04:54
	16:41	33	16:07 (4)	17:42			18:36			20:33	26	19:36 (2)	21:27		22:00
20	08:31		15:34 (5)	07:36		17:14 (3)	06:31			06:16		19:12 (2)	05:18		04:54
	16:43	32	16:08 (4)	17:44	2	17:16 (3)	18:38			20:35	22	19:34 (2)	21:28		22:00
21	08:30		15:37 (5)	07:34		17:12 (3)	06:28			06:14		19:13 (2)	05:16		04:54
	16:45	32	16:11 (4)	17:46	6	17:18 (3)	18:40			20:37	18	19:31 (2)	21:30		22:01
22	08:29		15:40 (5)	07:32		17:11 (3)	06:26			06:12		19:16 (2)	05:15		04:55
	16:47	27	16:12 (4)	17:48	8	17:19 (3)	18:42			20:39	12	19:28 (2)	21:31		22:01
23	08:27		15:49 (4)	07:30		17:10 (3)	06:23			06:09			05:13		04:55
	16:49	26	16:15 (4)	17:50	12	17:22 (3)	18:43			20:41			21:33		22:01
24	08:26		15:48 (4)	07:28		17:10 (3)	06:21			06:07			05:12		04:55
	16:50	29	16:17 (4)	17:52	14	17:24 (3)	18:45			20:43			21:34		22:01
25	08:24		15:49 (4)	07:25		17:09 (3)	06:18			06:05			05:11		04:55
	16:52	30	16:19 (4)	17:54	17	17:26 (3)	18:47			20:44			21:36		22:01
26	08:23		15:48 (4)	07:23		17:09 (3)	06:16			06:03			05:09		04:56
	16:54	33	16:21 (4)	17:56	19	17:28 (3)	18:49			20:46			21:37		22:01
27	08:22		15:48 (4)	07:21		17:09 (3)	06:13			06:01			05:08		04:56
	16:56	35	16:23 (4)	17:58	22	17:31 (3)	18:51			20:48			21:39		22:01
28	08:20		15:49 (4)	07:18		17:08 (3)	06:11			05:58			05:07		04:57
	16:58	37	16:26 (4)	18:00	24	17:32 (3)	18:53			20:50			21:40		22:01
29	08:18		15:48 (4)				07:08			05:56			05:06		04:57
	17:00	38	16:26 (4)				19:54			20:52			21:41		22:01
30	08:17		15:48 (4)				07:06		19:22 (2)	05:54			05:05		04:58
	17:02	38	16:26 (4)				19:56	8	19:30 (2)	20:54			21:43		22:00
31	08:15		15:48 (4)				07:04			19:18 (2)			05:04		
	17:04	38	16:26 (4)				19:58	13	19:31 (2)				21:44		
Potential sun hours	250			273			367			420			494		510
Total, worst case		830			514			122			645				
Sun reduction		0.24			0.23			0.27			0.35				
Oper. time red.		1.00			1.00			1.00			1.00				
Wind dir. red.		0.66			0.67			0.67			0.67				
Total reduction		0.16			0.15			0.18			0.24				
Total, real		133			80			22			152				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DW - H127

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:05 (2) 19:42 (2)	07:26 16:54	15:25 (4) 15:52 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	19:05 (2) 19:42 (2)	07:28 16:52	15:24 (4) 15:53 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	19:04 (2) 19:41 (2)	07:30 16:50	15:23 (4) 15:54 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	19:05 (2) 19:41 (2)	07:31 16:48	15:22 (4) 15:55 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	19:05 (2) 19:40 (2)	07:33 16:46	15:21 (4) 15:55 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	19:05 (2) 19:39 (2)	07:35 16:44	15:21 (4) 15:56 (4)
7	05:04 21:57	05:49 21:13	06:43 20:04	19:05 (2) 19:35 (2)	07:37 16:43	15:20 (4) 15:56 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	19:05 (2) 19:33 (2)	07:38 16:41	15:20 (4) 15:57 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	19:06 (2) 19:31 (2)	07:40 16:39	15:19 (4) 15:57 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	19:07 (2) 19:28 (2)	07:42 16:37	15:20 (4) 15:58 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	19:08 (2) 19:26 (2)	07:44 16:35	15:20 (4) 15:58 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	19:10 (2) 19:24 (2)	07:45 16:34	15:20 (4) 15:58 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	19:12 (2) 19:22 (2)	07:47 16:32	15:20 (4) 15:58 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	19:16 (2) 19:18 (2)	07:49 16:31	15:20 (4) 15:57 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	19:18 (2) 19:26 (2)	16:31 16:29	15:21 (4) 15:56 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	19:26 (2) 19:29	16:27 16:23	15:21 (4) 15:54 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	19:29 19:33	16:23 16:20	15:22 (4) 15:52 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	19:33 19:37	16:19 16:16	15:22 (4) 15:51 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	19:39 19:42	16:14 16:12	15:23 (4) 15:49 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	19:42 19:45	16:08 16:06	15:15 (5) 15:47 (4)
21	05:21 21:42	06:13 20:44	19:21 (2) 19:35 (2)	07:08 19:29	16:02 16:00	15:12 (5) 15:46 (4)
22	05:23 21:41	06:15 20:42	19:17 (2) 19:36 (2)	07:10 19:27	16:04 16:02	15:10 (5) 15:44 (4)
23	05:24 21:39	06:17 20:39	19:15 (2) 19:38 (2)	07:12 19:24	16:06 16:04	15:10 (5) 15:43 (4)
24	05:26 21:38	06:19 20:37	19:14 (2) 19:40 (2)	07:13 19:22	16:08 16:06	15:09 (5) 15:42 (4)
25	05:27 21:36	06:20 20:35	19:12 (2) 19:40 (2)	07:15 19:19	16:09 16:07	15:09 (5) 15:41 (4)
26	05:29 21:35	06:22 20:32	19:11 (2) 19:41 (2)	07:17 19:17	16:11 16:09	15:09 (5) 15:39 (4)
27	05:30 21:33	06:24 20:30	19:10 (2) 19:42 (2)	07:19 19:14	16:13 16:10	15:09 (5) 15:38 (4)
28	05:32 21:32	06:26 20:28	19:08 (2) 19:42 (2)	07:21 19:12	16:14 16:12	15:09 (5) 15:41 (4)
29	05:34 21:30	06:27 20:25	19:07 (2) 19:42 (2)	07:22 19:09	16:16 16:14	15:08 (5) 15:36 (4)
30	05:35 21:28	06:29 20:23	19:07 (2) 19:43 (2)	07:24 19:07	16:18 16:16	15:08 (5) 15:34 (4)
31	05:37 21:27	06:31 20:21	19:06 (2) 19:42 (2)	07:25 16:56	16:11 15:50	15:31 (5) 15:26 (4)
Potential sun hours	512	460	382	328	259	233
Total, worst case		313		364	288	435
Sun reduction		0.34		0.32	0.29	0.21
Oper. time red.		1.00		1.00	1.00	1.00
Wind dir. red.		0.67		0.67	0.66	0.66
Total reduction		0.23		0.21	0.18	0.14
Total, real		72		78	57	59

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DX - H128

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:02 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:50 (2)										
	16:15	15:25 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	15:10 (2)	20									
2	08:44	15:02 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	14:50 (2)										
	16:16	15:26 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	15:10 (2)	20									
3	08:44	15:02 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	14:50 (2)										
	16:17	15:26 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	15:11 (2)	21									
4	08:43	15:03 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	14:50 (2)										
	16:18	15:27 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	15:12 (2)	22									
5	08:43	15:03 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	14:50 (2)										
	16:19	15:26 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	15:12 (2)	22									
6	08:43	15:05 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	14:51 (2)										
	16:21	15:27 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:07	15:13 (2)	22									
7	08:42	15:05 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	14:51 (2)										
	16:22	15:27 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	15:14 (2)	23									
8	08:42	15:05 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	14:50 (2)										
	16:23	15:27 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	15:14 (2)	24									
9	08:41	15:07 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	14:51 (2)										
	16:25	15:28 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	15:15 (2)	24									
10	08:40	15:08 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	14:51 (2)										
	16:26	15:28 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	15:15 (2)	24									
11	08:40	15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33	14:52 (2)										
	16:28	15:28 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05	15:16 (2)	24									
12	08:39	15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	14:52 (2)										
	16:29	15:27 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	15:16 (2)	24									
13	08:38	15:10 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	14:52 (2)										
	16:31	15:27 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04	15:16 (2)	24									
14	08:37	15:12 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	14:54 (2)										
	16:33	15:27 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04	15:18 (2)	24									
15	08:36	15:13 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37	14:53 (2)										
	16:34	15:26 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	15:17 (2)	24									
16	08:35	15:14 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	14:54 (2)										
	16:36	15:24 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	15:18 (2)	24									
17	08:34	15:18 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39	14:54 (2)										
	16:38	15:22 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05	15:19 (2)	25									
18	08:33	15:19 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	14:55 (2)										
	16:39	15:23 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05	15:19 (2)	24									
19	08:32	15:19 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	14:56 (2)										
	16:41	15:24 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	15:20 (2)	24									
20	08:31	15:19 (2)	07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00	08:41	14:55 (2)										
	16:43	15:24 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05	15:20 (2)	25									
21	08:30	15:19 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	14:56 (2)										
	16:45	15:24 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	15:21 (2)	25									
22	08:29	15:19 (2)	07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42	14:56 (2)										
	16:47	15:24 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06	15:21 (2)	25									
23	08:27	15:19 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	14:57 (2)										
	16:49	15:24 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07	15:22 (2)	25									
24	08:26	15:19 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43	14:58 (2)										
	16:50	15:24 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07	15:22 (2)	24									
25	08:25	15:19 (2)	07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	08:11	08:09	14:56 (2)	08:43										
	16:52	15:24 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:15	4	15:00 (2)	16:08	24								
26	08:23	15:19 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	14:54 (2)	08:43										
	16:54	15:24 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	9	15:03 (2)	16:09	24								
27	08:22	15:19 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13	14:52 (2)	08:44										
	16:56	15:24 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	13	15:05 (2)	16:10	25								
28	08:20	15:19 (2)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	14:52 (2)	08:44										
	16:58	15:24 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	15	15:07 (2)	16:10	24								
29	08:19	15:19 (2)	07:17	06:08	05:56	05:06	04:57	05:34	06:27	07:22	08:17	08:16	14:50 (2)	08:44										
	17:00	15:24 (2)	18:02	18:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	17	15:07 (2)	16:11	25								
30	08:17	15:19 (2)	07:15	06:06	05:54	05:05	04:58	05:35	06:29	07:24	08:19	08:18	14:50 (2)	08:44										
	17:02	15:24 (2)	18:04	18:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	18	15:08 (2)	16:12	24								
31	08:15	15:19 (2)	07:13	06:04	05:52	05:03	04:57	05:37	06:31	07:26	08:21	08:20	14:50 (2)	08:44										
	17:04	15:24 (2)	18:06	18:58	20:56	21:45	22:01	21:27	20:21	19:05	18:00	16:13	16:13	15:25 (2)	24									
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	733											
Total, worst case</																								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DY - H129
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DZ - H130

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EA - H131

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EB - H132

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EC - H133

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: ED - H134

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
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Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EE - H135

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EF - H136

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EG - H137

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EH - H138
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	08:14	07:16	07:01	05:52	06:20 (5)	05:03	05:34 (4)	04:59	05:39	06:33	07:26	07:24
16:15	17:06	18:02	20:00	20:55	31 06:51 (5)	21:45	05:46 (4)	22:00	21:25	20:18	19:05	16:10
2 08:44	08:12	07:14	06:59	05:50	06:20 (5)	05:02	05:33 (4)	05:00	05:40	06:35	07:28	07:26
16:16	17:08	18:04	20:02	20:57	30 06:50 (5)	21:47	05:46 (4)	22:00	21:23	20:16	19:02	16:52
3 08:44	08:10	07:12	06:56	05:48	06:21 (5)	05:01	05:32 (4)	05:00	05:39 (4)	06:37	07:30	07:28
16:17	17:10	18:06	20:04	20:59	28 06:49 (5)	21:48	05:45 (4)	21:59	7 05:46 (4)	21:21	19:00	16:50
4 08:43	08:08	07:09	06:54	05:46	06:22 (5)	05:00	05:31 (4)	05:01	05:39 (4)	06:38 (5)	07:32	07:30
16:18	17:12	18:08	20:06	21:01	26 06:48 (5)	21:49	05:44 (4)	21:59	8 05:47 (4)	21:19	18:57	16:48
5 08:43	08:07	07:07	06:52	05:44	06:22 (5)	04:59	05:31 (4)	05:02	05:38 (4)	06:40	07:33	07:32
16:20	17:14	18:10	20:08	21:03	25 06:47 (5)	21:50	05:45 (4)	21:58	11 05:49 (4)	21:17	18:55	16:46
6 08:43	08:05	07:05	06:49	05:42	06:24 (5)	04:59	05:31 (4)	05:03	05:38 (4)	06:42	07:35	07:34
16:21	17:16	18:11	20:09	21:04	22 06:46 (5)	21:51	05:44 (4)	21:58	12 05:50 (4)	21:16	18:53	16:45
7 08:42	08:03	07:02	06:47	05:40	06:25 (5)	04:58	05:33 (4)	05:04	05:37 (4)	06:44	07:37	07:36
16:22	17:18	18:13	20:11	21:06	19 06:44 (5)	21:52	05:44 (4)	21:57	14 05:51 (4)	21:14	18:50	16:43
8 08:42	08:01	07:00	06:44	05:38	06:27 (5)	04:57	05:33 (4)	05:05	05:38 (4)	06:51	07:39	07:38
16:24	17:20	18:15	20:13	21:08	15 06:42 (5)	21:53	05:43 (4)	21:56	13 05:51 (4)	21:12	18:48	16:41
9 08:41	07:59	06:57	06:42	05:36	06:29 (5)	04:57	05:34 (4)	05:06	05:39 (4)	06:52	07:41	07:40
16:25	17:22	18:17	20:15	21:10	10 06:39 (5)	21:54	05:42 (4)	21:55	13 05:52 (4)	21:10	18:45	16:39
10 08:40	07:57	06:55	06:40	05:35	06:30 (5)	04:56	05:35 (4)	05:07	05:40 (4)	06:54	07:43	07:42
16:27	17:24	18:19	20:17	21:12	21:55	04:56	05:41 (4)	21:55	13 05:53 (4)	21:08	18:43	16:37
11 08:40	07:55	06:53	06:37	05:33	06:31 (5)	04:55	05:37 (4)	05:08	05:41 (4)	06:56	07:44	07:44
16:28	17:26	18:21	20:19	21:13	21:55	04:54	05:40 (4)	21:54	12 05:53 (4)	21:06	18:41	16:36
12 08:39	07:53	06:50	06:35	05:31	06:30 (5)	04:56	05:09	05:09	05:42 (4)	06:58	07:46	07:46
16:30	17:28	18:23	20:20	21:15	21:56	04:55	05:54 (4)	21:03	31 06:59 (5)	19:52	18:38	16:34
13 08:38	07:51	06:48	06:32	05:29	06:45 (5)	04:55	05:11	05:43 (4)	06:59	06:29 (5)	07:48	07:47
16:31	17:30	18:25	20:22	21:17	21:57	04:55	05:54 (4)	21:01	31 07:00 (5)	19:49	18:36	16:32
14 08:37	07:49	06:45	06:30	05:27	06:46 (5)	04:55	05:12	05:44 (4)	06:01	06:30 (5)	07:50	07:49
16:33	17:32	18:27	20:24	21:18	21:58	04:55	05:55 (4)	21:01	30 07:00 (5)	19:47	18:34	16:31
15 08:36	07:47	06:43	06:28	05:26	06:47 (5)	04:55	05:13	05:45 (4)	06:03	06:32 (5)	07:52	07:51
16:35	17:34	18:29	20:26	21:20	21:58	04:55	05:55 (4)	21:05	28 07:00 (5)	19:44	18:31	16:29
16 08:35	07:45	06:40	06:25	05:24	06:48 (5)	04:55	05:15	05:47 (4)	06:05	06:33 (5)	07:54	07:53
16:36	17:36	18:30	20:28	21:22	21:59	04:54	05:16	05:48 (4)	06:06	06:35 (5)	07:56	07:55
17 08:34	07:43	06:38	06:23	05:22	06:49 (5)	04:54	05:17	05:49 (4)	06:06	06:36 (5)	07:57	07:56
16:38	17:38	18:32	20:30	1 06:48 (5)	21:23	21:59	05:16	05:56 (4)	21:03	06:37 (5)	07:57	07:57
18 08:33	07:41	06:36	06:21	05:21	06:45 (5)	04:54	05:17	05:49 (4)	06:08	06:37 (5)	07:57	07:57
16:40	17:40	18:34	20:32	5 06:50 (5)	21:25	22:00	05:19	05:56 (4)	21:05	06:38 (5)	07:58	07:58
19 08:32	07:39	06:33	06:18	05:19	06:43 (5)	04:54	05:19	05:50 (4)	06:10	06:38 (5)	07:59	07:59
16:42	17:42	18:36	20:33	8 06:51 (5)	21:27	22:00	05:20	05:56 (4)	21:04	06:39 (5)	07:59	07:59
20 08:31	07:37	06:31	06:16	05:18	06:44 (5)	04:54	05:20	05:52 (4)	06:12	06:40 (5)	07:59	07:59
16:43	17:44	18:38	20:35	11 06:52 (5)	21:28	22:00	05:21	05:57 (4)	21:04	06:41 (5)	07:59	07:59
21 08:30	07:34	06:28	06:14	05:16	06:39 (5)	04:55	05:21	05:53 (4)	06:13	06:42 (5)	07:59	07:59
16:45	17:46	18:40	20:37	14 06:53 (5)	21:30	2 05:47 (4)	21:42	05:57 (4)	21:04	06:43 (5)	07:59	07:59
22 08:29	07:32	06:26	06:12	05:15	06:36 (5)	04:55	05:23	05:55 (4)	06:15	06:43 (5)	07:59	07:59
16:47	17:48	18:42	20:39	16 06:52 (5)	21:31	3 05:47 (4)	21:41	05:57 (4)	21:04	06:44 (5)	07:59	07:59
23 08:27	07:30	06:23	06:09	05:13	06:34 (5)	04:55	05:24	05:56 (4)	06:17	06:45 (5)	07:59	07:59
16:49	17:50	18:43	20:41	19 06:53 (5)	21:33	4 05:47 (4)	21:39	05:57 (4)	21:04	06:46 (5)	07:59	07:59
24 08:26	07:28	06:21	06:07	05:12	06:32 (5)	04:55	05:26	05:56 (4)	06:19	06:47 (5)	07:59	07:59
16:51	17:52	18:45	20:43	21 06:53 (5)	21:34	6 05:47 (4)	21:38	05:57 (4)	21:04	06:48 (5)	07:59	07:59
25 08:25	07:25	06:18	06:05	05:11	06:30 (5)	04:56	05:27	05:58 (4)	06:21	06:49 (5)	07:59	07:59
16:53	17:54	18:47	20:44	23 06:53 (5)	21:36	7 05:47 (4)	21:36	05:59 (4)	21:04	06:50 (5)	07:59	07:59
26 08:23	07:23	06:16	06:03	05:09	06:28 (5)	04:56	05:29	05:59 (4)	06:22	06:50 (5)	07:59	07:59
16:54	17:56	18:49	20:46	25 06:53 (5)	21:37	8 05:47 (4)	21:35	05:59 (4)	21:04	06:51 (5)	07:59	07:59
27 08:22	07:21	06:14	06:01	05:08	06:26 (5)	04:57	05:31	05:59 (4)	06:24	06:51 (5)	07:59	07:59
16:56	17:58	18:51	20:48	27 06:53 (5)	21:39	9 05:47 (4)	21:33	05:59 (4)	21:04	06:52 (5)	07:59	07:59
28 08:20	07:19	06:11	05:59	05:07	06:24 (5)	04:57	05:32	05:59 (4)	06:26	06:52 (5)	07:59	07:59
16:58	18:00	18:53	20:50	28 06:52 (5)	21:40	10 05:47 (4)	21:32	05:59 (4)	21:04	06:53 (5)	07:59	07:59
29 08:19	07:09	05:56	05:56	05:06	06:22 (5)	04:58	05:34	05:59 (4)	06:28	06:53 (5)	07:59	07:59
17:00	19:55	20:52	20:52	30 06:52 (5)	21:41	10 05:46 (4)	21:30	05:59 (4)	21:04	06:54 (5)	07:59	07:59
30 08:17	07:06	05:54	05:54	05:05	06:20 (5)	04:58	05:35	05:59 (4)	06:29	06:54 (5)	07:59	07:59
17:02	19:56	20:54	20:54	31 06:51 (5)	21:43	11 05:46 (4)	21:28	05:59 (4)	21:04	06:55 (5)	07:59	07:59
31 08:15	07:04	05:54	05:54	05:04	06:19 (5)	04:58	05:37	05:59 (4)	06:31	06:55 (5)	07:59	07:59
17:04	19:58	20:56	20:56	21:44	06:20 (5)	04:59	21:27	05:59 (4)	21:04	06:56 (5)	07:59	07:59
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				259	288	116	194	472				
Sun reduction				0.35	0.38	0.32	0.32	0.34				
Oper. time red.				1.00	1.00	1.00	1.00	1.00				
Wind dir. red.				0.68	0.67	0.66	0.66	0.68				
Total reduction				0.24	0.26	0.21	0.21	0.23				
Total, real				62	74	24	41	109				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EI - H139
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EJ - H140

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EK - H141

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EL - H142

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:25 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					43							
Sun reduction					0.38							
Oper. time red.					1.00							
Wind dir. red.					0.66							
Total reduction					0.25							
Total, real					11							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EM - H143

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:52 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:50 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:48 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:19 (5) 21:01	05:46 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:19 (5) 21:03	05:44 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:20 (5) 21:04	05:42 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:21 (5) 21:06	05:40 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:22 (5) 21:08	05:38 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:26 (5) 21:10	05:36 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:33 (5) 21:12	05:35 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	05:33 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	05:31 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	05:29 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	05:27 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	05:26 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	05:24 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	05:22 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	05:21 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	05:19 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:18 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:16 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	05:15 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	05:13 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	05:12 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	05:11 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	05:09 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	06:26 (4) 21:39	05:08 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	06:24 (4) 21:40	05:07 22:01
29	08:19 17:00	07:19 19:55	07:09 19:55	05:56 20:52	06:22 (4) 21:41	05:06 22:01
30	08:17 17:02	07:19 19:56	07:06 19:56	05:54 20:54	06:20 (4) 21:43	05:05 22:01
31	08:15 17:04	07:19 19:58	07:04 19:58	05:54 20:54	06:20 (4) 21:44	05:05 22:01
Potential sun hours	250	273	367	420	494	510
Total, worst case			81	195	64	380
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.67	0.66
Total reduction			0.18	0.24	0.26	0.21
Total, real			15	46	16	80

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EM - H143

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 13	05:32 (3) 05:45 (3) 21:25	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54
2	05:00 22:00 13	05:33 (3) 05:46 (3) 21:23	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52
3	05:00 21:59 12	05:33 (3) 05:45 (3) 21:21	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50
4	05:01 21:59 11	05:34 (3) 05:45 (3) 21:19	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48
5	05:02 21:58 11	05:35 (3) 05:46 (3) 21:17	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46
6	05:03 21:58 10	05:36 (3) 05:46 (3) 21:16	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45
7	05:04 21:57 9	05:37 (3) 05:46 (3) 21:14	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43
8	05:05 21:56 8	05:38 (3) 05:46 (3) 21:12	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41
9	05:06 21:55 7	05:39 (3) 05:46 (3) 21:10	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39
10	05:07 21:55 6	05:40 (3) 05:46 (3) 21:08	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37
11	05:08 21:54 5	05:41 (3) 05:46 (3) 21:06	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36
12	05:09 21:53 3	05:42 (3) 05:45 (3) 21:03	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34
13	05:11 21:52 2	05:43 (3) 05:45 (3) 21:01	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32
14	05:12 21:51 1	05:44 (3) 05:45 (3) 20:59	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31
15	05:13 21:50 1	06:03 20:57	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29
16	05:14 21:49 1	06:05 20:55	06:33 (4) 19:42	06:59 19:42	07:54 18:29	07:53 16:28
17	05:16 21:47 1	06:06 20:53	07:01 19:39	07:28 (5) 18:27	07:56 18:27	07:55 16:26
18	05:17 21:46 1	06:08 20:51	07:03 19:37	07:29 (5) 18:24	07:57 18:24	07:57 16:25
19	05:19 21:45 1	06:10 20:48	07:05 19:34	07:59 18:22	07:59 18:22	08:00 16:23
20	05:20 21:44 1	06:12 20:46	07:07 19:32	08:01 18:20	08:01 18:20	08:01 16:22
21	05:21 21:42 1	06:13 20:44	07:08 19:29	08:03 18:18	08:03 18:18	08:02 16:21
22	05:23 21:41 1	06:15 20:42	07:10 19:27	08:05 18:15	08:05 18:15	08:04 16:19
23	05:24 21:39 1	06:17 20:39	07:12 19:24	08:07 18:13	08:07 18:13	08:06 16:18
24	05:26 21:38 1	06:19 20:37	07:14 19:22	08:09 18:11	08:09 18:11	08:08 16:17
25	05:27 21:36 1	06:21 20:35	07:15 19:19	07:11 17:09	08:09 17:09	08:09 16:16
26	05:29 21:35 1	06:22 20:32	07:17 19:17	07:13 17:07	08:11 17:07	08:11 16:15
27	05:31 21:33 1	06:24 20:30	07:19 19:15	07:15 17:05	08:13 17:05	08:13 16:14
28	05:32 21:32 1	06:26 20:28	07:21 19:12	07:17 17:02	08:14 17:02	08:14 16:13
29	05:34 21:30 1	06:28 20:25	07:23 19:10	07:19 17:00	08:16 17:00	08:16 16:12
30	05:35 21:28 1	06:29 20:23	07:24 19:07	07:20 16:58	08:18 17:00	08:18 16:11
31	05:37 21:27 1	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	111	77	266			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.67	0.68			
Total reduction	0.21	0.23	0.22			
Total, real	24	18	58			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EN - H144

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:06 (5)	08:14	15:25 (4)	07:16	17:05 (3)	07:01	19:16 (1)	05:52	19:18 (2)	05:03
2	08:44	15:07 (5)	08:12	15:26 (4)	07:14	17:04 (3)	06:59	19:16 (1)	05:50	19:18 (2)	05:02
3	08:44	15:07 (5)	08:10	15:27 (4)	07:12	17:06 (3)	06:56	19:18 (1)	05:48	19:19 (2)	05:01
4	08:43	15:08 (5)	08:08	15:28 (4)	07:09	17:07 (3)	06:54	19:21 (1)	05:46	19:21 (2)	05:00
5	08:43	15:08 (5)	08:07	15:29 (4)	07:07	17:08 (3)	06:51	19:26 (1)	05:44	19:22 (2)	04:59
6	08:43	15:09 (5)	08:05	15:30 (4)	07:04	17:10 (3)	06:49	19:33 (2)	05:42	19:24 (2)	04:59
7	08:42	15:10 (5)	08:03	15:32 (4)	07:02	17:14 (3)	06:47	19:39 (2)	05:40	19:27 (2)	04:58
8	08:42	15:10 (5)	08:01	15:34 (4)	07:00	17:19 (3)	06:44	19:43 (2)	05:38	19:30 (2)	04:57
9	08:41	15:12 (5)	07:59	15:37 (4)	06:57	17:24 (3)	06:42	19:46 (2)	05:36	19:40 (2)	04:57
10	08:40	15:12 (5)	07:57	15:40 (4)	06:55	17:26 (3)	06:40	19:48 (2)	05:34	19:42 (2)	04:56
11	08:40	15:13 (5)	07:55	15:42 (4)	06:53	17:28 (3)	06:37	19:51 (2)	05:33	19:44 (2)	04:55
12	08:39	15:14 (5)	07:53	15:44 (4)	06:50	17:30 (3)	06:35	19:52 (2)	05:31	19:45 (2)	04:55
13	08:38	15:16 (5)	07:51	15:46 (4)	06:48	17:32 (3)	06:32	19:54 (2)	05:29	19:46 (2)	04:55
14	08:37	15:17 (5)	07:49	15:48 (4)	06:45	17:34 (3)	06:30	19:56 (2)	05:27	19:47 (2)	04:55
15	08:36	15:19 (5)	07:47	15:50 (4)	06:43	17:36 (3)	06:28	19:58 (2)	05:25	19:48 (2)	04:55
16	08:35	15:21 (4)	07:45	15:52 (4)	06:40	17:38 (3)	06:26	20:00 (2)	05:24	19:49 (2)	04:54
17	08:34	15:23 (4)	07:43	15:54 (4)	06:38	17:40 (3)	06:23	20:02 (2)	05:22	19:50 (2)	04:54
18	08:33	15:25 (4)	07:41	15:56 (4)	06:35	17:42 (3)	06:21	20:04 (2)	05:20	19:51 (2)	04:54
19	08:32	15:27 (4)	07:39	15:58 (4)	06:33	17:44 (3)	06:18	20:06 (2)	05:18	19:52 (2)	04:54
20	08:31	15:29 (4)	07:37	16:00 (4)	06:30	17:46 (3)	06:16	20:08 (2)	05:16	19:53 (2)	04:54
21	08:30	15:31 (4)	07:35	16:02 (4)	06:28	17:48 (3)	06:14	20:10 (2)	05:14	19:54 (2)	04:54
22	08:29	15:33 (4)	07:33	16:04 (4)	06:26	17:50 (3)	06:12	20:12 (2)	05:12	19:55 (2)	04:54
23	08:27	15:35 (4)	07:31	16:06 (4)	06:23	17:52 (3)	06:09	20:14 (2)	05:10	19:56 (2)	04:54
24	08:26	15:37 (4)	07:29	16:08 (4)	06:21	17:54 (3)	06:07	20:16 (2)	05:08	19:57 (2)	04:54
25	08:24	15:39 (4)	07:27	16:10 (4)	06:18	17:56 (3)	06:05	20:18 (2)	05:06	19:58 (2)	04:54
26	08:23	15:41 (4)	07:25	16:12 (4)	06:16	17:58 (3)	06:03	20:20 (2)	05:04	19:59 (2)	04:54
27	08:22	15:43 (4)	07:23	16:14 (4)	06:13	18:00 (3)	06:01	20:22 (2)	05:02	20:00 (2)	04:54
28	08:20	15:45 (4)	07:21	16:16 (4)	06:11	18:02 (3)	05:58	20:24 (2)	05:00	20:02 (2)	04:54
29	08:19	15:47 (4)	07:19	16:18 (4)	06:09	18:04 (3)	05:56	20:26 (2)	04:58	20:04 (2)	04:54
30	08:17	15:49 (4)	07:17	16:20 (4)	06:06	18:06 (3)	05:54	20:28 (2)	04:56	20:06 (2)	04:54
31	08:15	15:51 (4)	07:15	16:22 (4)	06:04	18:08 (3)	05:52	20:30 (2)	04:54	20:08 (2)	04:54
Potential sun hours	250		273		367		420		494		510
Total, worst case	1266		490		200		962		202		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.66		0.67		0.66		0.66		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	202		76		37		224		51		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EN - H144

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December					
1	04:59 22:00	05:39 21:25	06:33 20:18	19:20 (2) 19:50 (2)	07:26 16:54	15:09 (4) 15:25 (4)	08:19 16:10	14:55 (5) 15:34 (4)			
2	04:59 22:00	05:40 21:23	06:35 20:16	19:22 (2) 19:48 (2)	07:28 16:52	15:06 (4) 15:28 (4)	08:21 16:09	14:55 (5) 15:33 (4)			
3	05:00 21:59	05:42 21:21	06:36 20:13	19:23 (2) 19:46 (2)	07:30 16:50	15:03 (4) 15:30 (4)	08:22 16:08	14:55 (5) 15:32 (4)			
4	05:01 21:59	05:44 21:19	06:38 20:11	19:24 (2) 19:43 (2)	07:31 16:48	15:02 (4) 15:31 (4)	08:24 16:08	14:55 (5) 15:32 (4)			
5	05:02 21:58	05:45 21:17	19:38 (2) 19:51 (2)	06:40 20:09	19:26 (2) 19:41 (2)	07:33 18:55	15:00 (4) 16:07	08:25 15:30 (4)			
6	05:03 21:58	05:47 21:15	19:35 (2) 19:54 (2)	06:42 20:06	19:29 (2) 19:39 (2)	07:35 18:52	14:59 (4) 15:34 (4)	08:26 16:07	14:55 (5) 15:30 (4)		
7	05:04 21:57	05:49 21:14	19:34 (2) 19:56 (2)	06:43 20:04	07:37 18:50	17:47 (3) 17:58 (3)	07:36 16:43	14:58 (4) 15:35 (4)	08:28 16:06	14:55 (5) 15:29 (4)	
8	05:05 21:56	05:51 21:12	19:31 (2) 19:57 (2)	06:45 20:01	19:16 (1) 19:19 (1)	07:39 18:48	17:44 (3) 18:00 (3)	07:38 16:41	14:57 (4) 15:35 (4)	08:29 16:06	14:55 (5) 15:28 (4)
9	05:06 21:55	05:52 21:10	19:30 (2) 19:59 (2)	06:47 19:59	19:12 (1) 19:23 (1)	07:41 18:45	17:42 (3) 18:02 (3)	07:40 16:39	14:56 (4) 15:36 (4)	08:30 16:05	14:56 (5) 15:28 (4)
10	05:07 21:55	05:54 21:08	19:28 (2) 20:00 (2)	06:49 19:56	19:09 (1) 19:24 (1)	07:42 18:43	17:40 (3) 18:03 (3)	07:42 16:37	14:56 (4) 15:38 (4)	08:31 16:05	14:56 (5) 15:28 (4)
11	05:08 21:54	05:56 21:05	19:27 (2) 20:01 (2)	06:50 19:54	19:08 (1) 19:25 (1)	07:44 18:40	17:39 (3) 18:04 (3)	07:44 16:35	14:56 (4) 15:38 (4)	08:33 16:05	14:56 (5) 15:27 (4)
12	05:09 21:53	05:57 21:03	19:26 (2) 20:02 (2)	06:52 19:51	19:07 (1) 19:24 (1)	07:46 18:38	17:38 (3) 18:04 (3)	07:45 16:34	14:55 (4) 15:39 (4)	08:34 16:05	14:56 (5) 15:27 (4)
13	05:10 21:52	05:59 21:01	19:24 (2) 20:02 (2)	06:54 19:49	19:07 (1) 19:22 (1)	07:48 18:36	17:37 (3) 18:05 (3)	07:47 16:32	14:55 (4) 15:39 (4)	08:35 16:05	14:56 (5) 15:27 (4)
14	05:12 21:51	06:01 20:59	19:23 (2) 20:03 (2)	06:56 19:47	19:06 (1) 19:18 (1)	07:50 18:33	17:37 (3) 18:04 (3)	07:49 16:31	14:54 (4) 15:40 (4)	08:36 16:04	14:57 (5) 15:26 (4)
15	05:13 21:50	06:03 20:57	19:23 (2) 20:04 (2)	06:58 19:44	19:06 (1) 19:16 (1)	07:52 18:31	17:36 (3) 18:02 (3)	07:51 16:29	14:54 (4) 15:40 (4)	08:37 16:05	14:57 (5) 15:26 (4)
16	05:14 21:49	06:04 20:55	19:21 (2) 20:04 (2)	06:59 19:42	19:06 (1) 19:14 (1)	07:54 18:29	17:36 (3) 17:59 (3)	07:53 16:27	14:54 (4) 15:40 (4)	08:38 16:05	14:58 (5) 15:26 (4)
17	05:16 21:47	06:06 20:53	19:21 (2) 20:04 (2)	07:01 19:39	19:05 (1) 19:11 (1)	07:55 18:26	17:36 (3) 17:57 (3)	07:55 16:26	14:54 (4) 15:41 (4)	08:38 16:05	14:58 (5) 15:27 (4)
18	05:17 21:46	06:08 20:51	19:21 (2) 20:05 (2)	07:03 19:37	19:06 (1) 19:08 (1)	07:57 18:24	17:36 (3) 17:55 (3)	07:57 16:24	14:54 (4) 15:41 (4)	08:39 16:05	14:59 (5) 15:27 (4)
19	05:18 21:45	06:10 20:48	19:20 (2) 20:04 (2)	07:05 19:34	07:59 18:22	07:59 18:22	17:37 (3) 17:52 (3)	07:59 16:23	14:54 (4) 15:41 (4)	08:40 16:05	15:00 (5) 15:28 (4)
20	05:20 21:44	06:12 20:46	19:19 (2) 20:04 (2)	07:06 19:32	08:01 18:20	08:01 17:50 (3)	17:37 (3) 17:50 (3)	08:00 16:22	14:55 (4) 15:41 (4)	08:41 16:06	15:00 (5) 15:27 (4)
21	05:21 21:42	06:13 20:44	19:19 (2) 20:05 (2)	07:08 19:29	08:03 18:17	08:03 17:48 (3)	17:38 (3) 18:20	08:02 16:20	14:55 (4) 15:42 (4)	08:41 16:06	15:01 (5) 15:28 (4)
22	05:23 21:41	06:15 20:42	19:18 (2) 20:04 (2)	07:10 19:27	08:05 18:15	08:05 17:45 (3)	17:39 (3) 17:45 (3)	08:04 16:19	14:55 (4) 15:42 (4)	08:42 16:06	15:01 (5) 15:28 (4)
23	05:24 21:39	06:17 20:39	19:18 (2) 20:04 (2)	07:12 19:24	08:07 18:13	08:07 17:40 (3)	17:40 (3) 16:18	08:06 16:18	14:56 (4) 15:42 (4)	08:42 16:07	15:02 (5) 15:29 (4)
24	05:26 21:38	06:19 20:37	19:19 (2) 20:04 (2)	07:13 19:22	08:09 18:11	08:09 16:17	16:16 15:42 (4)	08:08 16:08	14:56 (4) 15:42 (4)	08:43 16:08	15:02 (5) 15:30 (4)
25	05:27 21:36	06:20 20:35	19:18 (2) 20:03 (2)	07:15 19:19	07:11 17:09	08:09 16:16	16:16 15:41 (4)	08:09 16:08	14:57 (4) 15:41 (4)	08:43 16:08	15:02 (5) 15:30 (4)
26	05:29 21:35	06:22 20:32	19:18 (2) 20:02 (2)	07:17 19:17	07:13 17:06	08:11 16:14	16:16 15:39 (4)	08:11 16:09	14:57 (4) 15:39 (4)	08:43 16:09	15:02 (5) 15:30 (4)
27	05:30 21:33	06:24 20:30	19:18 (2) 20:02 (2)	07:19 19:14	07:15 17:04	08:13 16:13	16:13 15:38 (4)	08:13 16:10	14:58 (5) 15:38 (4)	08:44 16:10	15:04 (5) 15:32 (4)
28	05:32 21:32	06:26 20:28	19:18 (2) 19:59 (2)	07:21 19:12	07:16 17:02	08:14 16:12	16:14 15:37 (4)	08:14 16:11	14:57 (5) 15:37 (4)	08:44 16:11	15:04 (5) 15:33 (4)
29	05:34 21:30	06:28 20:25	19:19 (2) 19:57 (2)	07:22 19:09	07:18 17:00	08:16 16:12	16:16 15:36 (4)	08:16 16:11	14:56 (5) 15:36 (4)	08:44 16:11	15:05 (5) 15:34 (4)
30	05:35 21:28	06:29 20:23	19:19 (2) 19:55 (2)	07:24 19:07	07:20 16:58	08:18 16:11	16:18 15:35 (4)	08:18 16:12	14:55 (5) 15:35 (4)	08:44 16:12	15:04 (5) 15:34 (4)
31	05:37 21:27	06:31 20:21	19:19 (2) 19:52 (2)	07:25 16:56	07:22 16:56	15:14 (4) 15:18 (4)	16:11 16:11	08:44 16:13	15:35 (4) 16:13	08:44 16:13	15:05 (5) 15:35 (4)
Potential sun hours	512	460	382	328	259	233					
Total, worst case		1013	239	316	1206	954					
Sun reduction		0.34	0.32	0.29	0.27	0.21					
Oper. time red.		1.00	1.00	1.00	1.00	1.00					
Wind dir. red.		0.66	0.67	0.67	0.66	0.65					
Total reduction		0.23	0.21	0.20	0.17	0.14					
Total, real		228	51	62	211	129					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EO - H145

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March	April	May	June	July	August	September	October	November	December									
1	08:44	15:15 (3)	08:14	15:32 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:10 (2)	08:19	15:03 (3)						
	16:15	22	15:37 (3)	17:06	36	16:08 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	21	15:31 (2)	16:10	31	15:34 (2)		
2	08:44	15:16 (3)	08:12	15:32 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	15:08 (2)	08:21	15:02 (3)						
	16:16	23	15:39 (3)	17:08	36	16:08 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	25	15:33 (2)	16:09	30	15:32 (2)		
3	08:44	15:16 (3)	08:10	15:32 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	15:07 (2)	08:22	15:03 (3)						
	16:17	22	15:38 (3)	17:10	35	16:07 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	27	15:34 (2)	16:08	29	15:32 (2)		
4	08:43	15:17 (3)	08:08	15:33 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	15:05 (2)	08:24	15:03 (3)						
	16:18	22	15:39 (3)	17:12	34	16:07 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	30	15:35 (2)	16:08	28	15:31 (2)		
5	08:43	15:17 (3)	08:07	15:34 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	15:04 (2)	08:25	15:03 (3)						
	16:19	22	15:39 (3)	17:14	32	16:06 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	32	15:36 (2)	16:07	22	15:25 (3)		
6	08:43	15:18 (3)	08:05	15:35 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	15:03 (2)	08:26	15:04 (3)						
	16:21	22	15:40 (3)	17:16	31	16:06 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	33	15:36 (2)	16:07	22	15:26 (3)		
7	08:42	15:18 (3)	08:03	15:36 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	15:03 (2)	08:28	15:04 (3)						
	16:22	22	15:40 (3)	17:18	29	16:05 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	34	15:37 (2)	16:06	22	15:26 (3)		
8	08:42	15:18 (3)	08:01	15:37 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	15:02 (2)	08:29	15:04 (3)						
	16:24	28	15:46 (2)	17:20	27	16:04 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	35	15:37 (2)	16:06	22	15:26 (3)		
9	08:41	15:20 (3)	07:59	15:39 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	15:03 (2)	08:30	15:05 (3)						
	16:25	29	15:49 (2)	17:22	24	16:03 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	36	15:39 (2)	16:05	23	15:28 (3)		
10	08:40	15:20 (3)	07:57	15:41 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	15:03 (2)	08:32	15:05 (3)						
	16:26	30	15:50 (2)	17:24	20	16:01 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	36	15:39 (2)	16:05	23	15:28 (3)		
11	08:40	15:21 (3)	07:55	15:43 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44	15:02 (2)	08:33	15:05 (3)						
	16:28	31	15:52 (2)	17:26	16	15:59 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	37	15:39 (2)	16:05	22	15:27 (3)		
12	08:39	15:22 (3)	07:53	15:47 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	15:02 (2)	08:34	15:06 (3)						
	16:30	32	15:54 (2)	17:28	8	15:55 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	37	15:39 (2)	16:05	21	15:27 (3)		
13	08:38	15:23 (3)	07:51	15:48 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	15:02 (2)	08:35	15:06 (3)						
	16:31	33	15:55 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	17	15:39 (2)	16:05	20	15:26 (3)			
14	08:37	15:23 (3)	07:49	16:05	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	15:02 (2)	08:36	15:06 (3)							
	16:33	34	15:57 (2)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	37	15:39 (2)	16:04	20	15:26 (3)			
15	08:36	15:25 (3)	07:47	16:03	06:28	05:26	04:54	05:13	06:03	06:58	07:52		17:39 (1)	07:51	15:02 (2)	08:37				15:07 (3)		
	16:34	33	15:58 (2)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	7	17:46 (1)	16:29	37	15:39 (2)	16:04	19	15:26 (3)	
16	08:35	15:25 (3)	07:45		17:05 (1)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54		17:36 (1)	07:53					15:08 (3)	
	16:36	33	15:58 (2)	17:36	2	17:07 (1)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	12	17:48 (1)	16:27	36	15:39 (2)	16:05	18	15:26 (3)
17	08:34	15:27 (3)	07:43		17:04 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55		17:35 (1)	07:55					15:08 (3)	
	16:38	33	16:00 (2)	17:38	5	17:09 (1)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	14	17:49 (1)	16:26	36	15:39 (2)	16:05	19	15:27 (3)
18	08:33	15:29 (3)	07:41		17:02 (1)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57		17:33 (1)	07:57					15:09 (3)	
	16:40	32	16:01 (2)	17:40	9	17:11 (1)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	17	17:50 (1)	16:24	36	15:39 (2)	16:05	18	15:27 (3)
19	08:32	15:31 (2)	07:39		17:02 (1)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		17:33 (1)	07:59					15:10 (3)	
	16:41	31	16:02 (2)	17:42	11	17:13 (1)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	17	17:50 (1)	16:23	35	15:39 (2)	16:05	18	15:28 (3)
20	08:31	15:30 (2)	07:36		17:02 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		17:32 (1)	08:00					15:10 (3)	
	16:43	33	16:03 (2)	17:44	14	17:16 (1)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	18	17:50 (1)	16:22	34	15:39 (2)	16:06	17	15:27 (3)
21	08:30	15:30 (2)	07:34		17:02 (1)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		17:32 (1)	08:02					15:10 (3)	
	16:45	34	16:04 (2)	17:46	16	17:18 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16	17:48 (1)	16:20	34	15:39 (2)	16:06	18	15:28 (3)
22	08:29	15:30 (2)	07:32		17:01 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		17:32 (1)	08:04					15:10 (3)	
	16:47	34	16:04 (2)	17:48	18	17:19 (1)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	13	17:45 (1)	16:19	33	15:39 (2)	16:06	18	15:28 (3)
23	08:27	15:30 (2)	07:30		17:02 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		17:32 (1)	08:06					15:12 (3)	
	16:49	35	16:05 (2)	17:50	17	17:19 (1)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	11	17:43 (1)	16:18	31	15:38 (2)	16:07	17	15:29 (3)
24	08:26	15:30 (2)	07:28		17:03 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09		17:33 (1)	08:08					15:12 (3)	
	16:50	35	16:05 (2)	17:52	15	17:18 (1)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	8	17:41 (1)	16:17	32	15:38 (2)	16:08	17	15:29 (3)
25	08:25	15:30 (2)	07:25		17:03 (1)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11		16:34 (1)	08:09					15:12 (3)	
	16:52	36	16:06 (2)	17:54	14	17:17 (1)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	4	16:38 (1)	16:16	33	15:38 (2)	16:08	18	15:30 (3)
26	08:23	15:30 (2)	07:23		17:05 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13		16:35 (1)	08:11					15:12 (3)	
	16:54	36	16:06 (2)	17:56	10	17:15 (1)	18:54	20:46	21:38	22:01	21:38	20:32	19:17	17:06	1	16:36 (1)	16:14	34	15:38 (2)	16:09	18	15:30 (3)
27	08:22	15:30 (2)	07:21		17:08 (1)	06:13	06:00	05:06	04:56	05:30	06:24	07:19	07:15		16:33	08:13					15:13 (3)	
	16:56	36	16:06 (2)	17:58	4	17:12 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	15:04 (3)	08:44				15:13 (3)	
28	08:20	15:30 (2)	07:19		17:06	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16		16:34	08:14					15:14 (3)	
	16:58	37	16:07 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02		16:12	15:37 (2)	16:11	32	15:35 (2)	16:12	20	15:35 (3)
29	08:19	15:30 (2)				07:09	05:56	05:06	04:57	05:34	06:27	07:22	07:18		16:16	15:03 (3)	08:44				15:14 (3)	
	17:00	37	16:07 (2)			19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00		16:12	15:36 (2)	16:11	20	15:34 (3)			15:14 (3)
30	08:17	15:30 (2)				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20		15:15 (2)	08:18					15:15 (3)	
	17:02	37	16:07 (2)			19:56																

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EP - H146

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44		15:17 (3)	08:14		15:34 (2)	07:16		17:10 (1)	07:01		05:52		05:03				
	16:15	20	15:37 (3)	17:06	42	16:16 (2)	18:02	13	17:23 (1)	20:00		20:55		21:45				
2	08:44		15:17 (3)	08:12		15:34 (2)	07:14		17:11 (1)	06:59		05:50		05:02				
	16:16	22	15:39 (3)	17:08	42	16:16 (2)	18:04	9	17:20 (1)	20:02		20:57		21:47				
3	08:44		15:17 (3)	08:10		15:34 (2)	07:12			06:56		05:48		05:01				
	16:17	22	15:39 (3)	17:10	42	16:16 (2)	18:06			20:04		20:59		21:48				
4	08:43		15:18 (3)	08:08		15:34 (2)	07:09			06:54		05:46		05:00				
	16:18	23	15:41 (3)	17:12	42	16:16 (2)	18:07			20:06		21:01		21:49				
5	08:43		15:18 (3)	08:07		15:35 (2)	07:07			06:51		05:44		04:59				
	16:19	24	15:42 (3)	17:14	41	16:16 (2)	18:09			20:07		21:03		21:50				
6	08:43		15:19 (3)	08:05		15:35 (2)	07:04			06:49		05:42		04:58				
	16:21	24	15:43 (3)	17:16	41	16:16 (2)	18:11			20:09		21:04		21:51				
7	08:42		15:19 (3)	08:03		15:35 (2)	07:02			06:47		05:40		04:58				
	16:22	24	15:43 (3)	17:18	41	16:16 (2)	18:13			20:11		21:06		21:52				
8	08:42		15:19 (3)	08:01		15:36 (2)	07:00			06:44		05:38		04:57				
	16:24	25	15:44 (3)	17:20	40	16:16 (2)	18:15			20:13		21:08		21:53				
9	08:41		15:21 (3)	07:59		15:37 (2)	06:57			06:42		05:36		04:57				
	16:25	24	15:45 (3)	17:22	38	16:15 (2)	18:17			20:15		21:10		21:54				
10	08:40		15:21 (3)	07:57		15:37 (2)	06:55			06:39		05:34		04:56				
	16:26	24	15:45 (3)	17:24	38	16:15 (2)	18:19			20:17		21:11		21:55				
11	08:40		15:21 (3)	07:55		15:38 (2)	06:53			06:37		05:33		04:56				
	16:28	24	15:45 (3)	17:26	36	16:14 (2)	18:21			20:19		21:13		21:55				
12	08:39		15:22 (3)	07:53		15:39 (2)	06:50			06:35		05:31		04:55				
	16:30	23	15:45 (3)	17:28	35	16:14 (2)	18:23			20:20		21:15		21:56				
13	08:38		15:23 (3)	07:51		15:40 (2)	06:48			06:32		05:29		04:55				
	16:31	23	15:50 (2)	17:30	32	16:12 (2)	18:25			20:22		21:17		21:57				
14	08:37		15:23 (3)	07:49		15:41 (2)	06:45			06:30		05:27		04:55				
	16:33	32	15:55 (2)	17:32	30	16:11 (2)	18:27			20:24		21:18		21:58				
15	08:36		15:24 (3)	07:47		15:43 (2)	06:43			06:28		05:26		04:54				
	16:34	34	15:58 (2)	17:34	26	16:09 (2)	18:28			20:26		21:20		21:58				
16	08:35		15:24 (3)	07:45		15:45 (2)	06:40			06:25		05:24		04:54				
	16:36	35	15:59 (2)	17:36	23	16:08 (2)	18:30			20:28		21:22		21:59				
17	08:34		15:26 (3)	07:43		15:48 (2)	06:38			06:23		05:22		04:54				
	16:38	36	16:02 (2)	17:38	17	16:05 (2)	18:32			20:30		21:23		21:59				
18	08:33		15:27 (3)	07:41		15:52 (2)	06:36			06:21		05:21		04:54				
	16:40	36	16:03 (2)	17:40	8	16:00 (2)	18:34			20:31		21:25		22:00				
19	08:32		15:29 (3)	07:39		17:12 (1)	06:33			06:18		05:19		04:54				
	16:41	36	16:05 (2)	17:42	1	17:13 (1)	18:36			20:33		21:27		22:00				
20	08:31		15:30 (3)	07:36		17:11 (1)	06:31			06:16		05:18		04:54				
	16:43	36	16:06 (2)	17:44	5	17:16 (1)	18:38			20:35		21:28		22:00				
21	08:30		15:32 (3)	07:34		17:10 (1)	06:28			06:14		05:16		04:54				
	16:45	36	16:08 (2)	17:46	8	17:18 (1)	18:40			20:37		21:30		22:01				
22	08:29		15:36 (2)	07:32		17:08 (1)	06:26			06:12		05:15		04:55				
	16:47	32	16:08 (2)	17:48	11	17:19 (1)	18:42			20:39		21:31		22:01				
23	08:27		15:36 (2)	07:30		17:08 (1)	06:23			06:09		05:13		04:55				
	16:49	34	16:10 (2)	17:50	14	17:22 (1)	18:43			20:41		21:33		22:01				
24	08:26		15:35 (2)	07:28		17:08 (1)	06:21			06:07		05:12		04:55				
	16:50	35	16:10 (2)	17:52	16	17:24 (1)	18:45			20:43		21:34		22:01				
25	08:25		15:35 (2)	07:25		17:07 (1)	06:18			06:05		05:11		04:55				
	16:52	37	16:12 (2)	17:54	19	17:26 (1)	18:47			20:44		21:36		22:01				
26	08:23		15:35 (2)	07:23		17:08 (1)	06:16			06:03		05:09		04:56				
	16:54	37	16:12 (2)	17:56	18	17:26 (1)	18:49			20:46		21:37		22:01				
27	08:22		15:34 (2)	07:21		17:08 (1)	06:13			06:01		05:08		04:56				
	16:56	39	16:13 (2)	17:58	18	17:26 (1)	18:51			20:48		21:39		22:01				
28	08:20		15:35 (2)	07:19		17:08 (1)	06:11			05:58		05:07		04:57				
	16:58	39	16:14 (2)	18:00	16	17:24 (1)	18:53			20:50		21:40		22:01				
29	08:19		15:34 (2)				07:09			05:56		05:06		04:57				
	17:00	40	16:14 (2)				19:55			20:52		21:41		22:01				
30	08:17		15:34 (2)				07:06			05:54		05:05		04:58				
	17:02	41	16:15 (2)				19:56			20:54		21:43		22:00				
31	08:15		15:34 (2)				07:04					05:04						
	17:04	41	16:15 (2)				19:58					21:44						
Potential sun hours		250			273		367				420		494		510			
Total, worst case		958			740		22											
Sun reduction		0.24			0.23		0.27											
Oper. time red.		1.00			1.00		1.00											
Wind dir. red.		0.66			0.66		0.67											
Total reduction		0.16			0.15		0.18											
Total, real		153			114		4											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EP - H146

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	15:07 (2) 15:44 (2)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	15:06 (2) 15:45 (2)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	15:06 (2) 15:45 (2)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	15:05 (2) 15:46 (2)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	15:05 (2) 15:46 (2)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	15:04 (2) 15:46 (2)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	15:04 (2) 15:46 (2)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	15:04 (2) 15:46 (2)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	15:05 (2) 15:47 (2)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	15:05 (2) 15:47 (2)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:48 (1) 17:52 (1)	08:33 16:35
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:44 (1) 17:55 (1)	08:34 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:42 (1) 17:57 (1)	08:35 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:41 (1) 17:58 (1)	08:36 16:31
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:40 (1) 17:58 (1)	08:37 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:40 (1) 17:58 (1)	08:38 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:39 (1) 17:57 (1)	08:38 16:26
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:39 (1) 17:55 (1)	08:39 16:24
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:39 (1) 17:52 (1)	08:40 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:40 (1) 17:50 (1)	08:41 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:40 (1) 17:48 (1)	08:41 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:41 (1) 17:45 (1)	08:42 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:41 (1) 17:45 (1)	08:42 16:19
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	16:21 (2) 16:32 (2)	08:43 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	08:11 18:09	15:17 (2) 15:35 (2)	08:43 16:16
26	05:29 21:35	06:22 20:32	07:17 19:17	08:13 18:07	15:14 (2) 15:38 (2)	08:43 16:14
27	05:30 21:33	06:24 20:30	07:19 19:14	08:15 18:04	15:12 (2) 15:39 (2)	08:44 16:13
28	05:32 21:32	06:26 20:28	07:21 19:12	08:16 18:02	15:10 (2) 15:40 (2)	08:44 16:12
29	05:34 21:30	06:27 20:25	07:22 19:09	08:18 18:00	15:09 (2) 15:41 (2)	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	08:20 17:58	15:08 (2) 15:42 (2)	08:44 16:11
31	05:37 21:27	06:31 20:21		08:22 16:56	15:08 (2) 15:44 (2)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case				364	1114	598
Sun reduction				0.29	0.27	0.21
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.66	0.66
Total reduction				0.20	0.18	0.14
Total, real				71	195	81

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EQ - H147

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: ER - H148

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: ES - H149

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: ET - H150

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		15:27 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24				06:33	07:26	07:24				08:19	15:11 (1)	
	16:15	10	15:37 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54				06:35	07:28	07:26				16:10	22	15:33 (1)
2	08:44		15:27 (1)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26				06:35	07:28	07:26				08:21		15:12 (1)
	16:16	11	15:38 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				06:36	07:30	07:28				16:09	21	15:33 (1)
3	08:44		15:27 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28				06:36	07:30	07:28				08:22		15:12 (1)
	16:17	12	15:39 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50				06:38	07:32	07:30				16:08	20	15:32 (1)
4	08:43		15:27 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30				06:38	07:32	07:30				08:24		15:13 (1)
	16:18	14	15:41 (1)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48				06:40	07:33	07:32				16:08	19	15:32 (1)
5	08:43		15:27 (1)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32				06:40	07:33	07:32				08:25		15:13 (1)
	16:19	15	15:42 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46				06:42	07:35	07:34				16:07	17	15:30 (1)
6	08:43		15:28 (1)	08:05	07:05	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34				06:42	07:35	07:34				08:27		15:14 (1)
	16:21	16	15:44 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44				06:43	07:37	07:36				16:07	16	15:30 (1)
7	08:42		15:28 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				06:43	07:37	07:36				08:28		15:14 (1)
	16:22	17	15:45 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				06:45	07:39	07:38				16:06	15	15:29 (1)
8	08:42		15:28 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38				06:45	07:39	07:38				08:29		15:16 (1)
	16:24	18	15:46 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41				06:47	07:41	07:40				16:06	13	15:29 (1)
9	08:41		15:29 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				06:47	07:41	07:40				08:30		15:16 (1)
	16:25	20	15:49 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39				06:49	07:42	07:42				16:05	12	15:28 (1)
10	08:40		15:29 (1)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42				06:49	07:42	07:42				08:32		15:16 (1)
	16:26	21	15:50 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37				06:51	07:44	07:44				16:05	12	15:28 (1)
11	08:40		15:29 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44				06:51	07:44	07:44				08:33		15:17 (1)
	16:28	22	15:51 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:35				06:52	07:46	07:46				16:05	10	15:27 (1)
12	08:39		15:30 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46				06:52	07:46	07:46				08:34		15:17 (1)
	16:30	21	15:51 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34				06:52	07:46	07:46				16:05	10	15:27 (1)
13	08:38		15:30 (1)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47				06:54	07:48	07:47				08:35		15:19 (1)
	16:31	22	15:52 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32				06:54	07:48	07:47				16:05	8	15:27 (1)
14	08:37		15:30 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				06:56	07:50	07:49				08:36		15:19 (1)
	16:33	22	15:52 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31				06:56	07:50	07:49				16:04	8	15:27 (1)
15	08:36		15:31 (1)	07:47	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51				06:58	07:52	07:51				08:37		15:20 (1)
	16:34	22	15:53 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				06:58	07:52	07:51				16:04	7	15:27 (1)
16	08:35		15:32 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53				06:59	07:54	07:53				08:38		15:20 (1)
	16:36	21	15:53 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27				06:59	07:54	07:53				16:05	6	15:26 (1)
17	08:34		15:32 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55				07:01	07:56	07:55				08:39		15:21 (1)
	16:38	20	15:52 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:26	16:26				07:03	07:57	07:57				16:05	6	15:27 (1)
18	08:33		15:33 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				07:03	07:57	07:57			15:14 (1)	08:39		15:22 (1)
	16:40	19	15:52 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:24				07:05	07:59	07:59			15:22 (1)	16:05	5	15:27 (1)
19	08:32		15:34 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				07:05	07:59	07:59			15:12 (1)	08:40		15:22 (1)
	16:41	19	15:53 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23				07:06	08:01	08:01			15:24 (1)	16:05	6	15:28 (1)
20	08:31		15:34 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01				07:06	08:01	08:01			15:11 (1)	08:41		15:22 (1)
	16:43	18	15:52 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22				07:08	08:03	08:02			15:26 (1)	16:06	5	15:27 (1)
21	08:30		15:35 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				07:08	08:03	08:02			15:10 (1)	08:41		15:23 (1)
	16:45	17	15:52 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20				07:08	08:03	08:02			15:27 (1)	16:06	5	15:28 (1)
22	08:29		15:36 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04				07:10	08:05	08:04			15:10 (1)	08:42		15:23 (1)
	16:47	15	15:51 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19				07:12	08:07	08:06			15:28 (1)	16:06	5	15:28 (1)
23	08:27		15:38 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				07:12	08:07	08:06			15:10 (1)	08:42		15:24 (1)
	16:49	12	15:50 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18				07:14	08:09	08:08			15:29 (1)	16:07	5	15:29 (1)
24	08:26		15:40 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08				07:14	08:09	08:08			15:10 (1)	08:43		15:24 (1)
	16:50	8	15:48 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17				07:14	08:09	08:08			15:30 (1)	16:08	5	15:29 (1)
25	08:25			07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09				07:15	07:11	08:09			15:10 (1)	08:43		15:24 (1)
	16:52			17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16				07:17	07:13	08:11			15:31 (1)	16:08	6	15:30 (1)
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11				07:17	07:13	08:11			15:10 (1)	08:43		15:26 (1)
	16:54			17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14				07:17	07:13	08:11			15:31 (1)	16:09	5	15:31 (1)
27	08:22			07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13				07:19	07:15	08:13			15:10 (1)	08:44		15:26 (1)
	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13				07:19	07:15	08:13			15:32 (1)	16:10	6	15:32 (1)
28	08:20			07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14				07:19	07:15	08:13			15:11 (1)	08:44		15:26 (1)
	16:58				18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02				07:21	07:17	08:14			15:32 (			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EU - H151

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44		14:46 (4)	08:14		16:22 (3)	07:16		17:04 (2)	07:01		05:52	05:03					
	16:15	25	15:11 (4)	17:06	12	16:34 (3)	18:02	30	17:34 (2)	20:00		20:55	21:45					
2	08:44		14:47 (4)	08:12		16:22 (3)	07:14		17:03 (2)	06:59		05:50	05:02					
	16:16	25	15:12 (4)	17:08	15	16:37 (3)	18:04	33	17:36 (2)	20:02		20:57	21:46					
3	08:44		14:48 (4)	08:10		16:22 (3)	07:12		17:02 (2)	06:56		05:48	05:01					
	16:17	23	15:11 (4)	17:10	17	16:39 (3)	18:06	36	17:38 (2)	20:04		20:59	21:48					
4	08:43		14:49 (4)	08:08		16:22 (3)	07:09		17:02 (2)	06:54		05:46	05:00					
	16:18	23	15:12 (4)	17:12	19	16:41 (3)	18:07	37	17:39 (2)	20:06		21:01	21:49					
5	08:43		14:49 (4)	08:07		16:22 (3)	07:07		17:01 (2)	06:51		05:44	04:59					
	16:19	22	15:11 (4)	17:14	21	16:43 (3)	18:09	37	17:38 (2)	20:07		21:03	21:50					
6	08:43		14:51 (4)	08:05		16:23 (3)	07:04		17:01 (2)	06:49		05:42	04:58					
	16:21	21	15:12 (4)	17:16	22	16:45 (3)	18:11	37	17:38 (2)	20:09		21:04	21:51					
7	08:42		14:52 (4)	08:03		16:23 (3)	07:02		17:01 (2)	06:47		05:40	04:58					
	16:22	19	15:11 (4)	17:18	22	16:45 (3)	18:13	37	17:38 (2)	20:11		21:06	21:52					
8	08:42		14:53 (4)	08:01		16:24 (3)	07:00		17:01 (2)	06:44		05:38	04:57					
	16:24	17	15:10 (4)	17:20	20	16:44 (3)	18:15	37	17:38 (2)	20:13		21:08	21:53					
9	08:41		14:55 (4)	07:59		16:25 (3)	06:57		17:01 (2)	06:42		05:36	04:57					
	16:25	16	15:11 (4)	17:22	18	16:43 (3)	18:17	35	17:36 (2)	20:15		21:10	21:54					
10	08:40		14:56 (4)	07:57		16:26 (3)	06:55		17:01 (2)	06:39		05:34	04:56					
	16:26	14	15:10 (4)	17:24	16	16:42 (3)	18:19	35	17:36 (2)	20:17		21:11	21:55					
11	08:40		14:59 (4)	07:55		16:28 (3)	06:53		17:02 (2)	06:37		05:33	04:56					
	16:28	9	15:08 (4)	17:26	13	16:41 (3)	18:21	34	17:36 (2)	20:19		21:13	21:55					
12	08:39		15:02 (4)	07:53		16:32 (3)	06:50		17:02 (2)	06:35		05:31	04:55					
	16:30	4	15:06 (4)	17:28	6	16:38 (3)	18:23	32	17:34 (2)	20:20		21:15	21:56					
13	08:38			07:51			06:48		17:04 (2)	06:32		05:29	04:55					
	16:31			17:30			18:25	29	17:33 (2)	20:22		21:17	21:57					
14	08:37			07:49			06:45		17:04 (2)	06:30		05:27	04:55					
	16:33			17:32			18:27	27	17:31 (2)	20:24		21:18	21:58					
15	08:36			07:47			06:43		17:06 (2)	06:28		05:26	04:54					
	16:34			17:34			18:28	24	17:30 (2)	20:26		21:20	21:58					
16	08:35			07:45			06:40		17:07 (2)	06:25		05:24	04:54					
	16:36			17:36			18:30	20	17:27 (2)	20:28		21:22	21:59					
17	08:34			07:43			06:38		17:11 (2)	06:23		05:22	04:54					
	16:38			17:38			18:32	13	17:24 (2)	20:30		21:23	21:59					
18	08:33			07:41			06:35			06:21		05:21	04:54					
	16:40			17:40			18:34			20:31		21:25	22:00					
19	08:32			07:39			06:33			06:18		05:19	04:54					
	16:41			17:42			18:36			20:33		21:27	22:00					
20	08:31			07:36			06:31			06:16		05:18	04:54					
	16:43			17:44			18:38			20:35		21:28	22:00					
21	08:30			07:34			06:28			06:14		05:16	04:54					
	16:45			17:46			18:40			20:37		21:30	22:01					
22	08:29			07:32			06:26			06:12		05:15	04:55					
	16:47			17:48			18:42			20:39		21:31	22:01					
23	08:27			07:30			06:23			06:09		05:13	04:55					
	16:49			17:50	8	17:22 (2)	18:43			20:41		21:33	22:01					
24	08:26			07:28			17:12 (2)	06:21		06:07		05:12	04:55					
	16:50			17:52	12	17:24 (2)	18:45			20:43		21:34	22:01					
25	08:24			07:25			17:09 (2)	06:18		06:05		05:11	04:55					
	16:52			17:54	17	17:26 (2)	18:47			20:44		21:36	22:01					
26	08:23			07:23			17:08 (2)	06:16		06:03		05:09	04:56					
	16:54			17:56	20	17:28 (2)	18:49			20:46		21:37	22:01					
27	08:22			07:21			17:07 (2)	06:13		06:00		05:08	04:56					
	16:56			17:58	24	17:31 (2)	18:51			20:48		21:39	22:01					
28	08:20		16:24 (3)	07:18			17:05 (2)	06:11		05:58		05:07	04:57					
	16:58	2	16:26 (3)	18:00	27	17:32 (2)	18:53			20:50		21:40	22:01					
29	08:19		16:23 (3)				07:08			05:56		05:06	04:57					
	17:00	5	16:28 (3)				19:54			20:52		21:41	22:01					
30	08:17		16:22 (3)				07:06			05:54		05:05	04:58					
	17:02	7	16:29 (3)				19:56			20:54		21:43	22:00					
31	08:15		16:22 (3)				07:04					05:04						
	17:04	9	16:31 (3)				19:58					21:44						
Potential sun hours	250			273			367			420		494	510					
Total, worst case		241			309			533										
Sun reduction		0.24			0.23			0.27										
Oper. time red.		1.00			1.00			1.00										
Wind dir. red.		0.65			0.66			0.68										
Total reduction		0.16			0.15			0.18										
Total, real		38			48			98										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EU - H151

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December				
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:42 (2) 18:13 (2)	07:24 16:12 (3)	15:56 (3) 16:10	08:19 16:10	14:41 (4) 14:50 (4)	
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:40 (2) 18:13 (2)	07:26 16:52	15:54 (3) 16:13 (3)	08:21 16:09	14:39 (4) 14:52 (4)	
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:40 (2) 18:14 (2)	07:28 16:50	15:53 (3) 16:14 (3)	08:22 16:08	14:38 (4) 14:54 (4)	
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:39 (2) 18:14 (2)	07:30 16:48	15:53 (3) 16:14 (3)	08:24 16:08	14:38 (4) 14:55 (4)	
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:38 (2) 18:14 (2)	07:32 16:46	15:52 (3) 16:15 (3)	08:25 16:07	14:37 (4) 14:56 (4)	
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:38 (2) 18:15 (2)	07:34 16:44	15:52 (3) 16:12 (3)	08:26 16:07	14:37 (4) 14:58 (4)	
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:37 (2) 18:13 (2)	07:36 16:43	15:52 (3) 16:10 (3)	08:28 16:06	14:37 (4) 14:58 (4)	
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:36 (2) 18:13 (2)	07:38 16:41	15:52 (3) 16:08 (3)	08:29 16:06	14:36 (4) 14:59 (4)	
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:36 (2) 18:13 (2)	07:40 16:39	15:53 (3) 16:07 (3)	08:30 16:05	14:37 (4) 15:00 (4)	
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:36 (2) 18:12 (2)	07:42 16:37	15:53 (3) 16:05 (3)	08:31 16:05	14:37 (4) 15:01 (4)	
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:37 (2) 18:11 (2)	07:44 16:35	15:53 (3) 16:03 (3)	08:33 16:05	14:36 (4) 15:01 (4)	
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:37 (2) 18:09 (2)	07:45 16:34	15:54 (3) 16:01 (3)	08:34 16:05	14:36 (4) 15:02 (4)	
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:38 (2) 18:07 (2)	07:47 16:32	15:55 (3) 15:59 (3)	08:35 16:05	14:37 (4) 15:02 (4)	
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:38 (2) 18:04 (2)	07:49 16:31	15:56 (3) 15:57 (3)	08:36 16:04	14:37 (4) 15:03 (4)	
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:39 (2) 18:02 (2)	07:51 16:29		08:37 16:04	14:37 (4) 15:04 (4)	
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:40 (2) 17:59 (2)	07:53 16:27		08:38 16:05	14:38 (4) 15:04 (4)	
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:42 (2) 17:57 (2)	07:55 16:26		08:38 16:05	14:38 (4) 15:05 (4)	
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:44 (2) 17:55 (2)	07:57 16:24		08:39 16:05	14:39 (4) 15:06 (4)	
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:47 (2) 17:52 (2)	07:59 16:23		08:40 16:05	14:39 (4) 15:07 (4)	
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20		08:00 16:22		08:41 16:06	14:39 (4) 15:07 (4)	
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17		08:02 16:20		08:41 16:06	14:40 (4) 15:08 (4)	
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:04 16:19		08:42 16:06	14:40 (4) 15:08 (4)	
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13		08:06 16:18		08:42 16:07	14:41 (4) 15:09 (4)	
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11		08:08 16:17		08:43 16:08	14:41 (4) 15:09 (4)	
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09		08:09 16:16		08:43 16:08	14:42 (4) 15:09 (4)	
26	05:29 21:35	06:22 20:32	07:17 19:17	17:54 (2) 18:04 (2)	07:13 17:06	08:11 16:14		08:43 16:09	14:42 (4) 15:09 (4)	
27	05:30 21:33	06:24 20:30	07:19 19:14	17:50 (2) 18:08 (2)	07:15 17:04	08:13 16:13		08:44 16:10	14:43 (4) 15:10 (4)	
28	05:32 21:32	06:26 20:28	07:21 19:12	17:48 (2) 18:10 (2)	07:16 17:02	08:14 16:12		08:44 16:10	14:44 (4) 15:11 (4)	
29	05:34 21:30	06:27 20:25	07:22 19:09	17:46 (2) 18:12 (2)	07:18 17:00	08:16 16:12		08:44 16:11	14:45 (4) 15:11 (4)	
30	05:35 21:28	06:29 20:23	07:24 19:07	17:43 (2) 18:12 (2)	07:20 16:58	15:59 (3) 16:07 (3)	08:18 16:11	14:44 (4) 14:46 (4)	08:44 16:12	14:44 (4) 15:10 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	15:57 (3) 16:10 (3)		2 16:11	08:44 16:13	14:45 (4) 15:11 (4)	
Potential sun hours	512	460	382	328		259		233		
Total, worst case			105	567		204			749	
Sun reduction			0.32	0.29		0.27			0.21	
Oper. time red.			1.00	1.00		1.00			1.00	
Wind dir. red.			0.68	0.68		0.66			0.65	
Total reduction			0.22	0.20		0.17			0.13	
Total, real			23	112		36			100	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EV - H152

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	15:09 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	08:44	15:34 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54
3	08:44	15:09 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26
4	08:43	15:35 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
5	08:44	15:09 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
6	08:43	15:10 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34
7	08:42	15:10 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36
8	08:42	15:12 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38
9	08:41	15:11 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40
10	08:40	15:12 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42
11	08:40	15:12 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44
12	08:39	15:12 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46
13	08:38	15:13 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47
14	08:37	15:13 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49
15	08:36	15:14 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51
16	08:35	15:13 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53
17	08:34	15:14 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55
18	08:33	15:15 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57
19	08:32	15:16 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59
20	08:31	15:16 (2)	07:36	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00
21	08:30	15:17 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02
22	08:29	15:18 (2)	07:32	06:26	06:11	05:15	04:55	05:23	06:15	07:10	08:05	08:04
23	08:27	15:20 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06
24	08:26	15:21 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08
25	08:25	15:23 (2)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:10
26	08:23	15:26 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11
27	08:22	15:35 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13
28	08:20	15:38 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14
29	08:19	15:40 (2)	07:17	06:08	05:56	05:06	04:57	05:34	06:27	07:22	08:17	08:16
30	08:17	15:41 (2)	07:15	06:06	05:54	05:05	04:58	05:35	06:29	07:24	08:18	08:17
31	08:15	15:42 (2)	07:13	06:04	05:52	05:04	04:59	05:37	06:31	07:27	08:19	08:18
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	640										344	774
Sun reduction	0.24										0.27	0.21
Oper. time red.	1.00										1.00	1.00
Wind dir. red.	0.65										0.65	0.65
Total reduction	0.16										0.17	0.14
Total, real	102										60	105

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EW - H153

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EX - H154

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	08:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EY - H155

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 18:02	07:01 18:02	05:52 18:02	05:03 18:02	04:59 18:02	05:39 18:02	06:33 18:02	07:26 18:02	08:19 18:02
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 18:04	06:59 18:04	05:50 18:04	05:02 18:04	05:00 18:04	05:40 18:04	06:35 18:04	07:28 18:04	08:21 18:04
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 18:06	06:57 18:06	05:48 18:06	05:01 18:06	05:00 18:06	05:42 18:06	06:37 18:06	07:30 18:06	08:22 18:06
4	08:44 16:18	08:09 17:12	07:09 18:08	07:34 (1) 18:08	06:54 18:08	05:46 18:08	05:00 18:08	05:01 18:08	05:44 18:08	06:38 18:08	07:32 18:08	08:24 18:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:31 (1) 18:10	06:52 18:10	05:44 18:10	05:02 18:10	05:00 18:10	05:46 18:10	06:40 18:10	07:34 18:10	08:25 18:10
6	08:43 16:21	08:05 17:16	07:05 18:12	07:29 (1) 18:12	06:49 18:12	05:42 18:12	05:03 18:12	05:03 18:12	05:47 18:12	06:42 18:12	07:35 18:12	08:27 18:12
7	08:42 16:22	08:03 17:18	07:02 18:13	07:47 (1) 18:13	06:47 18:13	05:40 18:13	05:04 18:13	05:04 18:13	05:49 18:13	06:44 18:13	07:37 18:13	08:28 18:13
8	08:42 16:24	08:01 17:20	07:00 18:15	07:30 (1) 18:15	06:44 18:15	05:38 18:15	05:05 18:15	05:05 18:15	05:51 18:15	06:45 18:15	07:39 18:15	08:29 18:15
9	08:41 16:25	07:59 17:22	06:58 18:17	07:32 (1) 18:17	06:42 18:17	05:36 18:17	05:06 18:17	05:06 18:17	05:52 18:17	06:47 18:17	07:41 18:17	08:31 18:17
10	08:41 16:27	07:57 17:24	06:55 18:19	07:43 (1) 18:19	06:40 18:19	05:35 18:19	05:07 18:19	05:07 18:19	05:54 18:19	06:49 18:19	07:43 18:19	08:32 18:19
11	08:40 16:28	07:55 17:26	06:53 18:21	07:39 (1) 18:21	06:37 18:21	05:33 18:21	05:08 18:21	05:08 18:21	05:56 18:21	06:51 18:21	07:45 18:21	08:33 18:21
12	08:39 16:30	07:53 17:28	06:50 18:23	07:35 (1) 18:23	06:35 18:23	05:31 18:23	05:09 18:23	05:09 18:23	05:58 18:23	06:52 18:23	07:46 18:23	08:34 18:23
13	08:38 16:31	07:51 17:30	06:48 18:25	07:33 18:25	06:33 18:25	05:29 18:25	05:11 18:25	05:11 18:25	05:59 18:25	06:54 18:25	07:48 18:25	08:35 18:25
14	08:38 16:33	07:49 17:32	06:45 18:27	07:30 18:27	06:30 18:27	05:27 18:27	05:12 18:27	05:12 18:27	06:01 18:27	06:56 18:27	07:50 18:27	08:36 18:27
15	08:37 16:35	07:47 17:34	06:43 18:29	07:28 18:29	06:28 18:29	05:26 18:29	05:13 18:29	05:13 18:29	06:03 18:29	06:58 18:29	07:52 18:29	08:37 18:29
16	08:36 16:36	07:45 17:36	06:41 18:31	07:26 18:31	06:25 18:31	05:24 18:31	05:15 18:31	05:15 18:31	06:05 18:31	07:00 18:31	07:54 18:31	08:38 18:31
17	08:35 16:38	07:43 17:38	06:38 18:32	07:24 18:32	06:23 18:32	05:22 18:32	05:16 18:32	05:16 18:32	06:06 18:32	07:01 18:32	07:56 18:32	08:39 18:32
18	08:34 16:40	07:41 17:40	06:36 18:34	07:22 18:34	06:21 18:34	05:21 18:34	05:17 18:34	05:17 18:34	06:08 18:34	07:03 18:34	07:58 18:34	08:40 18:34
19	08:32 16:42	07:39 17:42	06:33 18:36	07:20 18:36	06:19 18:36	05:19 18:36	05:19 18:36	05:19 18:36	06:10 18:36	07:05 18:36	07:59 18:36	08:40 18:36
20	08:31 16:43	07:37 17:44	06:31 18:38	07:18 18:38	06:16 18:38	05:18 18:38	05:18 18:38	05:18 18:38	06:12 18:38	07:07 18:38	08:01 18:38	08:41 18:38
21	08:30 16:45	07:34 17:46	06:28 18:40	07:16 18:40	06:14 18:40	05:16 18:40	05:16 18:40	05:16 18:40	06:14 18:40	07:08 18:40	08:03 18:40	08:41 18:40
22	08:29 16:47	07:32 17:48	06:26 18:42	07:14 18:42	06:12 18:42	05:15 18:42	05:15 18:42	05:15 18:42	06:15 18:42	07:10 18:42	08:05 18:42	08:42 18:42
23	08:27 16:49	07:30 17:50	06:23 18:44	07:12 18:44	06:10 18:44	05:13 18:44	05:13 18:44	05:13 18:44	06:17 18:44	07:12 18:44	08:07 18:44	08:43 18:44
24	08:26 16:51	07:28 17:52	06:21 18:45	07:10 18:45	06:07 18:45	05:12 18:45	05:12 18:45	05:12 18:45	06:19 18:45	07:14 18:45	08:09 18:45	08:43 18:45
25	08:25 16:53	07:26 17:54	06:19 18:47	07:08 18:47	06:05 18:47	05:11 18:47	05:11 18:47	05:11 18:47	06:21 18:47	07:15 18:47	08:11 18:47	08:43 18:47
26	08:23 16:54	07:23 17:56	06:16 18:49	07:06 18:49	06:03 18:49	05:10 18:49	05:10 18:49	05:10 18:49	06:22 18:49	07:17 18:49	08:11 18:49	08:44 18:49
27	08:22 16:56	07:21 17:58	06:14 18:51	07:04 18:51	06:01 18:51	05:08 18:51	05:08 18:51	05:08 18:51	06:24 18:51	07:19 18:51	08:13 18:51	08:44 18:51
28	08:20 16:58	07:19 18:00	06:11 18:53	07:02 18:53	05:59 18:53	05:07 18:53	05:07 18:53	05:07 18:53	06:26 18:53	07:21 18:53	08:15 18:53	08:44 18:53
29	08:19 17:00		07:09 19:00	07:00 19:00	05:56 19:00	05:06 19:00	05:06 19:00	05:06 19:00	06:28 19:00	07:23 19:00	08:16 19:00	08:44 19:00
30	08:17 17:02		07:06 19:02	07:00 19:02	05:54 19:02	05:05 19:02	05:05 19:02	05:05 19:02	06:29 19:02	07:24 19:02	08:17 19:02	08:44 19:02
31	08:16 17:04		07:04 19:04	07:00 19:04	05:54 19:04	05:05 19:04	05:05 19:04	05:05 19:04	06:31 19:04	07:26 19:04	08:19 19:04	08:44 19:04
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		3	121							124		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		0	21							24		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EZ - H156
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:18 (4)	08:14		08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		08:01 (2)	08:19		09:02 (4)			
	16:15	13	09:31 (4)	17:06	15	08:57 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	27	08:28 (2)	16:10	11	09:13 (4)			
2	08:44		09:18 (4)	08:12		08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		08:01 (2)	08:21		09:02 (4)			
	16:16	13	09:31 (4)	17:08	17	08:57 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	27	08:28 (2)	16:09	13	09:15 (4)			
3	08:44		09:31 (4)	08:10		08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		08:00 (2)	08:22		09:01 (4)			
	16:17	14	09:31 (4)	17:10	20	08:58 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	29	08:29 (2)	16:08	14	09:15 (4)			
4	08:43		09:17 (4)	08:09		08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		08:00 (2)	08:24		09:01 (4)			
	16:18	15	09:32 (4)	17:12	22	08:58 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	29	08:29 (2)	16:08	16	09:17 (4)			
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6	08:43		09:16 (4)	08:05		08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34		08:04 (2)	08:27		09:02 (4)			
	16:21	16	09:32 (4)	17:16	27	08:59 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:44	24	08:28 (2)	16:07	16	09:18 (4)			
7	08:42		09:15 (4)	08:03		08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36		08:06 (2)	08:28		09:03 (4)			
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	16:25	14	09:32 (4)	17:22	28	08:59 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	17	08:28 (2)	16:05	14	09:20 (4)			
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23	08:27			07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:06			16:02		09:18 (4)			
	16:49			17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13		16:18			16:07	26	12:39 (1)			
24	08:26			07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:08			16:03		09:18 (4)			
	16:51			17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11		16:17			16:08	26	12:39 (1)			
25	08:25			07:25			06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11		08:13 (2)			16:09		09:18 (4)			
	16:52			17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	3	08:16 (2)			16:08	25	12:39 (1)			
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	16:58	3	08:52 (2)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	20	08:24 (2)			16:11	23	12:40 (1)			
29	08:19																							

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FA - H157
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:18 (4)	08:14		08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	05:39	06:33	07:26			07:24		08:06 (2)	08:19			09:06 (4)
	16:15	14	09:32 (4)	17:06	19	09:01 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	20:18	19:05			16:54	24	08:30 (2)	16:10	6		09:12 (4)
2	08:44		09:18 (4)	08:12		08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26			07:26		08:05 (2)	08:21			09:06 (4)
	16:16	15	09:33 (4)	17:08	21	09:01 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	26		08:31 (2)	16:09		9			09:15 (4)
3	08:44		09:17 (4)	08:10		08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			07:28		08:04 (2)	08:22			09:04 (4)
	16:17	15	09:32 (4)	17:10	24	09:02 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	27		08:31 (2)	16:08		11			09:15 (4)
4	08:43		09:17 (4)	08:09		08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30			07:30		08:04 (2)	08:24			09:04 (4)
	16:18	16	09:33 (4)	17:12	26	09:02 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	27		08:31 (2)	16:08		13			09:17 (4)
5	08:43		09:16 (4)	08:07		08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32			07:32		08:03 (2)	08:25			09:04 (4)
	16:20	16	09:32 (4)	17:14	28	09:02 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	28		08:31 (2)	16:07		14			09:18 (4)
6	08:43		09:18 (4)	08:05		08:34 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34			07:34		08:04 (2)	08:27			09:04 (4)
	16:21	15	09:33 (4)	17:16	28	09:02 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	27		08:31 (2)	16:07		15			09:19 (4)
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18	08:33			07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57			07:57		08:30				09:15 (4)
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19	08:32			07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59			07:59		08:30				09:16 (4)
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24	08:26			07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08			08:08		08:31 (2)	08:35			09:26 (4)
	16:51			17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17			16:17		08:31 (2)	08:35			09:27 (4)
25	08:25			07:25			06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09			08:09		08:31 (2)	08:35			09:28 (4)
	16:52			17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09	16:16			16:16		08:31 (2)	08:35			09:29 (4)
26	08:23		08:52 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11			08:11		08:31 (2)	08:35			09:30 (4)
	16:54	3	08:55 (2)	17:56			18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:15			16:15		08:31 (2)	08:35			09:31 (4)
27	08:22		08:51 (2)	07:21			06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13			08:13		08:31 (2)	08:35			09:32 (4)
	16:56	6	08:57 (2)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:14			16:14		08:31 (2)	08:35			09:33 (4)
28	08:20		08:49 (2)	07:19																				

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FB - H158
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44		09:46 (3)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		07:54 (2)	08:19		08:54 (4)		07:54 (2)	08:19		08:54 (4)	
	16:15	56	12:05 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	1	07:55 (2)	16:10	31	11:45 (1)		16:54	1	07:55 (2)	16:10	
2	08:44		09:48 (3)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26			08:21		11:15 (1)		07:26		08:21	11:15 (1)	
	16:16	53	12:05 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52			16:09	32	11:47 (1)		16:52		16:09	32	
3	08:44		09:48 (3)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28			08:22		11:14 (1)		07:28		08:22	11:14 (1)	
	16:17	51	12:05 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50			16:08	33	11:47 (1)		16:50		16:08	33	
4	08:43		09:51 (3)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30			08:24		11:14 (1)		07:30		08:24	11:14 (1)	
	16:18	47	12:05 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48			16:08	35	11:49 (1)		16:48		16:08	35	
5	08:43		09:53 (3)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32			08:25		11:13 (1)		07:32		08:25	11:13 (1)	
	16:20	42	12:05 (1)	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46			16:07	37	11:50 (1)		16:46		16:07	37	
6	08:43		11:27 (1)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34			08:27		11:13 (1)		07:34		08:27	11:13 (1)	
	16:21	38	12:05 (1)	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:45			16:07	38	11:51 (1)		16:45		16:07	38	
7	08:42		11:28 (1)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36			08:28		09:41 (3)		07:36		08:28	09:41 (3)	
	16:22	37	12:05 (1)	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43			16:06	40	11:52 (1)		16:43		16:06	40	
8	08:42		11:29 (1)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38			08:29		09:39 (3)		07:38		08:29	09:39 (3)	
	16:24	35	12:04 (1)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41			16:06	47	11:53 (1)		16:41		16:06	47	
9	08:41		11:31 (1)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40			08:30		09:38 (3)		07:40		08:30	09:38 (3)	
	16:25	33	12:04 (1)	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39			16:05	50	11:54 (1)		16:39		16:05	50	
10	08:41		11:32 (1)	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42			08:32		09:37 (3)		07:42		08:32	09:37 (3)	
	16:27	32	12:04 (1)	17:24	1	08:25 (2)	18:19	20:17	21:12	21:55	21:08	19:57	18:43		16:37			16:05	53	11:54 (1)		16:37		16:05	53	
11	08:40		09:12 (4)	07:55		06:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51		07:44			08:33		09:36 (3)		07:44		08:33	09:36 (3)	
	16:28	31	12:03 (1)	17:26	5	08:27 (2)	18:21	20:19	21:13	21:56	21:06	19:54	18:41		16:36			16:05	56	11:55 (1)		16:36		16:05	56	
12	08:39		09:11 (4)	07:53		06:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52		07:46			08:34		09:37 (3)		07:46		08:34	09:37 (3)	
	16:30	31	12:02 (1)	17:28	8	08:28 (2)	18:23	20:21	21:15	21:56	21:04	19:52	18:38		16:34			16:05	56	11:56 (1)		16:34		16:05	56	
13	08:38		09:10 (4)	07:51		06:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54		07:48			08:35		09:37 (3)		07:48		08:35	09:37 (3)	
	16:31	29	12:01 (1)	17:30	11	08:29 (2)	18:25	20:22	21:17	21:57	21:01	19:49	18:36		16:32			16:05	58	11:57 (1)		16:32		16:05	58	
14	08:37		09:09 (4)	07:49		06:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56		07:50			08:36		09:37 (3)		07:50		08:36	09:37 (3)	
	16:33	28	12:00 (1)	17:32	14	08:29 (2)	18:27	20:24	21:19	21:58	21:01	19:47	18:34		16:31			16:05	60	11:58 (1)		16:31		16:05	60	
15	08:36		09:08 (4)	07:47		06:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58		07:52		08:47 (2)	07:51		09:37 (3)		07:52		08:37	09:37 (3)	
	16:35	24	11:58 (1)	17:34	17	08:30 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	3	08:50 (2)	16:29		16:05	61	11:58 (1)		08:50 (2)	16:29	16:05	61	
16	08:36		09:07 (4)	07:45		06:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59		07:54		08:42 (2)	07:53		09:36 (3)		08:42 (2)	07:53	08:38	09:36 (3)	
	16:36	19	11:55 (1)	17:36	19	08:30 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	13	08:55 (2)	16:28		16:05	62	11:58 (1)		08:55 (2)	16:28	16:05	62	
17	08:35		09:05 (4)	07:43		06:09 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01		07:56		08:40 (2)	07:55		09:37 (3)		08:40 (2)	07:55	08:39	09:37 (3)	
	16:38	10	09:15 (4)	17:38	22	08:31 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	17	08:57 (2)	16:26		16:05	63	11:59 (1)		08:57 (2)	16:26	16:05	63	
18	08:33		09:04 (4)	07:41		06:07 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03		07:57		08:38 (2)	07:57		09:37 (3)		07:57		08:39	09:37 (3)	
	16:40	11	09:15 (4)	17:40	24	08:31 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	20	08:58 (2)	16:25	9	08:46 (4)	16:05	63	12:00 (1)		08:46 (4)	16:05	63	
19	08:32		09:03 (4)	07:39		06:04 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05		07:59		08:37 (2)	07:59		09:38 (3)		08:37 (2)	07:59	08:36 (4)	08:40	09:38 (3)
	16:41	13	09:16 (4)	17:42	26	08:30 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	22	08:59 (2)	16:23	12	08:48 (4)	16:05	62	12:00 (1)		08:59 (2)	16:23	16:05	62
20	08:31		09:01 (4)	07:37		06:04 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06		08:01		08:36 (2)	08:01		09:38 (3)		08:36 (2)	08:01	08:35 (4)	08:41	09:38 (3)
	16:43	14	09:15 (4)	17:44	26	08:30 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	24	09:00 (2)	16:22	14	08:49 (4)	16:06	63	12:00 (1)		09:00 (2)	16:22	16:06	63
21	08:30		09:00 (4)	07:34		06:05 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08		08:03		08:35 (2)	08:02		09:39 (3)		08:35 (2)	08:02	08:35 (4)	08:41	09:39 (3)
	16:45	15	09:15 (4)	17:46	25	08:30 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	25	09:00 (2)	16:20	15	08:50 (4)	16:06	63	12:01 (1)		09:00 (2)	16:20	16:06	63
22	08:29		09:00 (4)	07:32		06:05 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10		08:05		08:34 (2)	08:04		09:39 (3)		08:34 (2)	08:04	08:37 (4)	08:42	09:39 (3)
	16:47	14	09:14 (4)	17:48	23	08:28 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	26	09:00 (2)	16:19	14	08:51 (4)	16:07	63	12:01 (1)		09:00 (2)	16:19	16:07	63
23	08:27		09:02 (4)	07:30		06:06 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12		08:07		08:35 (2)	08:06		09:40 (3)		08:35 (2)	08:06	08:39 (4)	08:42	09:40 (3)
	16:49	12	09:14 (4)	17:50	21	08:27 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	26	09:01 (2)	16:18	13	08:52 (4)	16:07	63	12:02 (1)		09:01 (2)	16:18	16:07	63
24	08:26		09:03 (4)	07:28		06:07 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14		08:09		08:37 (2)	08:08		09:40 (3)		08:37 (2)	08:08	08:41 (4)	08:43	09:40 (3)
	16:51	9	09:12 (4)	17:52	19	08:26 (2)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	23	09:00 (2)	16:17	11	08:52 (4)	16:08	63	12:02 (1)		09:00 (2)	16:17	16:08	63
25	08:25			07:25		06:08 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15		07:11		07:39 (2)	08:09		09:40 (3)		07:39 (2)	08:09	08:43 (4)	08:43	09:4

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FC - H159

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FD - H160

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FE - H161

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FF - H162

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FG - H163

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		11:47 (1)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		07:54 (2)	08:19		08:54 (4)				
	16:15	25	12:12 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	17	08:11 (2)	16:10	10	09:04 (4)				
2	08:44		11:49 (1)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		07:56 (2)	08:21		08:56 (4)				
	16:16	23	12:12 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	15	08:11 (2)	16:09	9	09:05 (4)				
3	08:44		09:17 (4)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		07:58 (2)	08:22		08:57 (4)				
	16:17	23	12:11 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	12	08:10 (2)	16:08	7	09:04 (4)				
4	08:43		09:17 (4)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		08:00 (2)	08:24		08:59 (4)				
	16:18	22	12:11 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	9	08:09 (2)	16:08	6	09:05 (4)				
5	08:43		09:16 (4)	08:07		06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32		07:32		08:02 (2)	08:25		09:00 (4)				
	16:20	21	12:10 (1)	17:14	3	08:37 (2)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	6	08:08 (2)	16:07	13	11:51				
6	08:43		09:16 (4)	08:05		06:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:04 (2)	08:27		09:02 (4)				
	16:21	18	12:09 (1)	17:16	6	08:38 (2)	18:11	20:08	21:05	21:51	21:58	21:16	20:06	18:53	16:44	3	08:07 (2)	16:07	18	11:55 (1)				
7	08:42		09:15 (4)	08:03		06:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36		08:07 (2)	08:28		09:03 (4)				
	16:22	13	12:06 (1)	17:18	9	08:39 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43			16:06	20	11:57 (1)				
8	08:42		09:14 (4)	08:01		06:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38			08:29		09:05 (4)				
	16:24	6	09:20 (4)	17:20	12	08:40 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41			16:06	22	11:59 (1)				
9	08:41		09:14 (4)	07:59		06:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			08:30		09:06 (4)				
	16:25	7	09:21 (4)	17:22	15	08:41 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39			16:05	23	12:00 (1)				
10	08:41		09:13 (4)	07:57		06:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42			08:32		11:38 (1)				
	16:27	8	09:21 (4)	17:24	18	08:42 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37			16:05	23	12:01 (1)				
11	08:40		09:12 (4)	07:55		06:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44			11:37 (1)		12:02 (1)				
	16:28	10	09:22 (4)	17:26	20	08:42 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36			16:05	25	12:02 (1)				
12	08:39		09:11 (4)	07:53		06:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46			11:38 (1)		12:04 (1)				
	16:30	11	09:22 (4)	17:28	22	08:42 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34			16:05	26	12:04 (1)				
13	08:38		09:10 (4)	07:51		06:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48			11:38 (1)		12:05 (1)				
	16:31	12	09:22 (4)	17:30	25	08:43 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32			16:05	27	12:05 (1)				
14	08:37		09:09 (4)	07:49		06:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49			11:38 (1)		12:06 (1)				
	16:33	13	09:22 (4)	17:32	27	08:42 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31			16:05	28	12:06 (1)				
15	08:36		09:08 (4)	07:47		06:16 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51			11:38 (1)		12:07 (1)				
	16:35	14	09:22 (4)	17:34	26	08:42 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29			16:05	29	12:07 (1)				
16	08:36		09:07 (4)	07:45		06:16 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53			11:37 (1)		12:07 (1)				
	16:36	15	09:22 (4)	17:36	25	08:41 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28			16:05	30	12:07 (1)				
17	08:35		09:07 (4)	07:43		06:17 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55			11:37 (1)		12:07 (1)				
	16:38	14	09:21 (4)	17:38	24	08:41 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26			16:05	30	12:07 (1)				
18	08:33		09:08 (4)	07:41		06:18 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57			11:38 (1)		12:08 (1)				
	16:40	13	09:21 (4)	17:40	22	08:40 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25			16:05	30	12:08 (1)				
19	08:32		09:10 (4)	07:39		06:18 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59			11:39 (1)		12:09 (1)				
	16:41	10	09:20 (4)	17:42	20	08:38 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23			16:05	30	12:09 (1)				
20	08:31		09:12 (4)	07:37		06:20 (2)	06:31	06:16	05:18	04:54	05:21	06:12	07:06	08:01	08:01		08:56 (2)	08:41		12:10 (1)				
	16:43	5	09:17 (4)	17:44	17	08:37 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	6	09:02 (2)	08:41		12:10 (1)				
21	08:30			07:34		06:23 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:03		09:02 (2)	08:02		11:39 (1)				
	16:45		17:46		11	08:34 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:20	14	09:06 (2)	08:02		12:10 (1)				
22	08:29			07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:50 (2)		08:48 (4)	08:42		11:39 (1)				
	16:47		17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	18	09:08 (2)		08:53 (4)	16:07	31	12:10 (1)				
23	08:27			07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:48 (2)		08:46 (4)	08:42		11:40 (1)				
	16:49		17:50			18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	21	09:09 (2)		08:56 (4)	16:07	31	12:11 (1)				
24	08:26			07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:47 (2)		08:45 (4)	08:43		11:40 (1)				
	16:51		17:52			18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	23	09:10 (2)		08:58 (4)	16:08	31	12:11 (1)				
25	08:25			07:25		06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11		07:46 (2)		08:45 (4)	08:43		11:41 (1)				
	16:52		17:54			18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	24	08:10 (2)		08:59 (4)	16:08	30	12:11 (1)				
26	08:23			07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13		07:46 (2)		08:11	16:08		11:42 (1)				
	16:54		17:56			18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	25	08:11 (2)		08:15	15	09:00 (4)	16:09	30	12:12 (1)		
27	08:22			07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:13		07:45 (2)		08:13	14	09:01 (4)	16:10	30	12:13 (1)		
	16:56		17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	26	08:11 (2)		08:14	14	09:01 (4)	16:10	30	12:13 (1)		
28	08:20			07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17		07:45 (2)		08:14		08:49 (4)	08:44				
	16:58		18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	26	08:11 (2)		08:13	13	09:02 (4)	16:11	30	12:13 (1)		
29	08:19					07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19		07:47 (2)		08:16		08:50 (4)	08:44				
	17:00					19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	24	08:11 (2)		08:12	12	09:02 (4)	16:11	29	12:13 (1)		
30	08:17					07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20		07:50 (2)		08:18		08:52 (4)	08:44				
	17:02					19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	22	08:12 (2)		08:12	11	09:03 (4)	16:12				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FH - H164

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FI - H165

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FJ - H166

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:19 (5)	08:14	15:45 (4)	07:16	17:10 (3)	07:01	05:52	05:03		
	16:15	18	15:37 (5)	17:06	41	16:26 (4)	18:02	24	17:34 (3)	20:00	20:55
2	08:44	15:20 (5)	08:12	15:46 (4)	07:14	17:09 (3)	06:59		05:50	05:02	
	16:16	19	15:39 (5)	17:08	40	16:26 (4)	18:04	25	17:34 (3)	20:02	20:57
3	08:44	15:20 (5)	08:10	15:46 (4)	07:12	17:10 (3)	06:56		19:29 (2)	05:48	05:01
	16:17	19	15:39 (5)	17:10	40	16:26 (4)	18:06	24	17:34 (3)	20:04	20:59
4	08:43	15:21 (5)	08:08	15:46 (4)	07:09	17:11 (3)	06:54		19:26 (2)	05:46	05:00
	16:18	20	15:41 (5)	17:12	40	16:26 (4)	18:07	22	17:33 (3)	20:06	21:01
5	08:43	15:21 (5)	08:07	15:47 (4)	07:07	17:12 (3)	06:51	13	19:39 (2)	21:01	21:49
	16:19	21	15:42 (5)	17:14	38	16:25 (4)	18:09	18	19:40 (2)	21:03	21:50
6	08:43	15:22 (5)	08:05	15:47 (4)	07:04	17:14 (3)	06:49		19:21 (2)	05:42	04:59
	16:21	22	15:44 (5)	17:16	38	16:25 (4)	18:11	21	19:42 (2)	21:04	21:51
7	08:42	15:22 (5)	08:03	15:48 (4)	07:02	17:15 (3)	06:47		19:19 (2)	05:40	04:58
	16:22	23	15:45 (5)	17:18	36	16:24 (4)	18:13	24	19:43 (2)	21:06	21:52
8	08:42	15:22 (5)	08:01	15:49 (4)	07:00		06:44		19:18 (2)	05:38	04:57
	16:24	24	15:46 (5)	17:20	35	16:24 (4)	18:15	28	19:46 (2)	21:08	21:53
9	08:41	15:23 (5)	07:59	15:50 (4)	06:57		06:42		19:17 (2)	05:36	04:57
	16:25	24	15:47 (5)	17:22	33	16:23 (4)	18:17	31	19:48 (2)	21:10	21:54
10	08:40	15:23 (5)	07:57	15:51 (4)	06:55		06:39		19:15 (2)	05:34	04:56
	16:26	24	15:47 (5)	17:24	31	16:22 (4)	18:19	34	19:49 (2)	21:11	21:55
11	08:40	15:24 (5)	07:55	15:53 (4)	06:52		06:37		19:15 (2)	05:33	04:56
	16:28	25	15:52 (4)	17:26	28	16:21 (4)	18:21	36	19:51 (2)	21:13	21:55
12	08:39	15:24 (5)	07:53	15:55 (4)	06:50		06:35		19:14 (2)	05:31	04:55
	16:30	28	15:54 (4)	17:28	25	16:20 (4)	18:23	38	19:52 (2)	21:15	21:56
13	08:38	15:25 (5)	07:51	15:56 (4)	06:48		06:32		19:13 (2)	05:29	04:55
	16:31	29	15:55 (4)	17:30	21	16:17 (4)	18:25	39	19:52 (2)	21:17	21:57
14	08:37	15:26 (5)	07:49	15:59 (4)	06:45		06:30		19:13 (2)	05:27	04:55
	16:33	31	15:57 (4)	17:32	15	16:14 (4)	18:27	39	19:52 (2)	21:18	21:58
15	08:36	15:27 (5)	07:47		06:43		06:28		19:13 (2)	05:26	04:54
	16:34	32	15:59 (4)	17:34		18:28	20:26	39	19:52 (2)	21:20	21:58
16	08:35	15:27 (5)	07:45		06:40		06:25		19:13 (2)	05:24	04:54
	16:36	33	16:00 (4)	17:36		18:30	20:28	39	19:52 (2)	21:22	21:59
17	08:34	15:28 (5)	07:43		06:38		06:23		19:12 (2)	05:22	04:54
	16:38	34	16:02 (4)	17:38		18:32	20:30	39	19:51 (2)	21:23	21:59
18	08:33	15:29 (5)	07:41		06:35		06:21		19:12 (2)	05:21	04:54
	16:40	36	16:05 (4)	17:40		18:34	20:31	38	19:50 (2)	21:25	22:00
19	08:32	15:31 (5)	07:39		06:33		06:18		19:13 (2)	05:19	04:54
	16:41	36	16:07 (4)	17:42		18:36	20:33	37	19:50 (2)	21:27	22:00
20	08:31	15:32 (5)	07:36		06:31		06:16		19:13 (2)	05:18	04:54
	16:43	36	16:08 (4)	17:44		18:38	20:35	37	19:50 (2)	21:28	22:00
21	08:30	15:35 (5)	07:34	17:16 (3)	06:28		06:14		19:13 (2)	05:16	04:54
	16:45	35	16:11 (4)	17:46	2	17:18 (3)	18:40	35	19:48 (2)	21:30	22:01
22	08:29	15:44 (4)	07:32	17:13 (3)	06:26		06:12		19:13 (2)	05:15	04:55
	16:47	28	16:12 (4)	17:48	6	17:19 (3)	18:42	34	19:47 (2)	21:31	22:01
23	08:27	15:45 (4)	07:30	17:12 (3)	06:23		06:09		19:14 (2)	05:13	04:55
	16:49	30	16:15 (4)	17:50	10	17:22 (3)	18:43	32	19:46 (2)	21:33	22:01
24	08:26	15:44 (4)	07:28	17:12 (3)	06:21		06:07		19:15 (2)	05:12	04:55
	16:50	33	16:17 (4)	17:52	12	17:24 (3)	18:45	30	19:45 (2)	21:34	22:01
25	08:24	15:45 (4)	07:25	17:10 (3)	06:18		06:05		19:16 (2)	05:11	04:55
	16:52	34	16:19 (4)	17:54	16	17:26 (3)	18:47	28	19:44 (2)	21:36	22:01
26	08:23	15:44 (4)	07:23	17:10 (3)	06:16		06:03		19:18 (2)	05:09	04:56
	16:54	37	16:21 (4)	17:56	18	17:28 (3)	18:49	24	19:42 (2)	21:37	22:01
27	08:22	15:44 (4)	07:21	17:10 (3)	06:13		06:01		19:20 (2)	05:08	04:56
	16:56	39	16:23 (4)	17:58	21	17:31 (3)	18:51	20	19:40 (2)	21:39	22:01
28	08:20	15:45 (4)	07:18	17:09 (3)	06:11		05:58		19:22 (2)	05:07	04:57
	16:58	40	16:25 (4)	18:00	23	17:32 (3)	18:53	16	19:38 (2)	21:40	22:01
29	08:18	15:44 (4)			07:08		05:56		19:25 (2)	05:06	04:57
	17:00	41	16:25 (4)		19:54		20:52	9	19:34 (2)	21:41	22:01
30	08:17	15:44 (4)			07:06		05:54			05:05	04:58
	17:02	41	16:25 (4)		19:56		20:54			21:43	22:00
31	08:15	15:44 (4)			07:04					05:04	
	17:04	41	16:25 (4)		19:58					21:44	
Potential sun hours	250		273		367		420		494	510	
Total, worst case	933		569		142		786				
Sun reduction	0.24		0.23		0.27		0.35				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.66		0.66		0.68		0.66				
Total reduction	0.16		0.15		0.18		0.23				
Total, real	150		88		26		184				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FJ - H166

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:14 (2) 19:50 (2)	07:26 16:54	15:21 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	19:14 (2) 19:48 (2)	07:28 16:52	15:20 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	19:14 (2) 19:45 (2)	07:30 16:50	15:19 (4) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	19:15 (2) 19:43 (2)	07:31 16:48	15:18 (4) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	19:16 (2) 19:41 (2)	07:33 16:46	15:17 (4) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	19:17 (2) 19:39 (2)	07:35 16:44	15:17 (4) 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	19:17 (2) 19:35 (2)	07:36 16:43	15:16 (4) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	19:19 (2) 19:33 (2)	07:38 16:41	15:16 (4) 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	19:22 (2) 19:31 (2)	07:40 16:39	15:15 (4) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	19:31 (2) 18:43	07:42 16:37	15:16 (4) 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:40 17:44	07:44 16:35	15:16 (4) 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:36 17:38	07:45 16:34	15:16 (4) 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:36 17:36	07:47 16:32	15:16 (4) 16:05
14	05:12 21:51	06:01 20:59	19:32 (2) 19:43 (2)	07:50 18:33	16:29 16:31	15:17 (4) 16:04
15	05:13 21:50	06:03 20:57	19:29 (2) 19:46 (2)	07:52 18:31	16:29 16:29	15:17 (4) 16:05
16	05:14 21:49	06:04 20:55	19:26 (2) 19:42	07:54 18:29	16:27 16:27	15:17 (4) 16:05
17	05:16 21:47	06:06 20:53	19:24 (2) 19:49	07:55 18:26	16:26 16:26	15:18 (4) 16:05
18	05:17 21:46	06:08 20:51	19:23 (2) 19:51	07:57 18:24	16:25 16:24	15:18 (4) 16:05
19	05:18 21:45	06:10 20:48	19:21 (2) 19:51	07:59 18:22	16:23 16:23	15:19 (4) 16:05
20	05:20 21:44	06:12 20:46	19:20 (2) 19:52	08:01 18:20	16:22 16:22	15:19 (4) 16:06
21	05:21 21:42	06:13 20:44	19:19 (2) 19:53	08:03 18:17	16:22 16:20	15:10 (5) 16:06
22	05:23 21:41	06:15 20:42	19:17 (2) 19:53	08:05 18:15	16:20 16:19	15:08 (5) 16:06
23	05:24 21:39	06:17 20:39	19:17 (2) 19:53	08:07 18:13	16:19 16:18	15:07 (5) 16:07
24	05:26 21:38	06:19 20:37	19:16 (2) 19:54	08:09 18:11	16:17 16:17	15:06 (5) 16:08
25	05:27 21:36	06:20 20:35	19:15 (2) 19:53	08:09 17:09	16:16 16:16	15:06 (5) 16:08
26	05:29 21:35	06:22 20:32	19:15 (2) 19:53	07:13 17:06	16:11 16:14	15:06 (5) 16:09
27	05:30 21:33	06:24 20:30	19:15 (2) 19:54	07:15 17:04	16:13 16:13	15:06 (5) 16:10
28	05:32 21:32	06:26 20:28	19:14 (2) 19:53	07:16 17:02	16:14 16:12	15:06 (5) 16:11
29	05:34 21:30	06:27 20:25	19:14 (2) 19:53	07:18 17:00	16:16 16:12	15:05 (5) 16:11
30	05:35 21:28	06:29 20:23	19:14 (2) 19:52	07:20 16:58	16:18 16:11	15:06 (5) 16:12
31	05:37 21:27	06:31 20:21	19:13 (2) 19:51	07:22 16:56	16:11 16:11	15:06 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		577	217	354	1067	528
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.66	0.67	0.66	0.66
Total reduction		0.23	0.21	0.20	0.18	0.14
Total, real		131	46	70	187	72

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FK - H167

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44		14:39 (4)	08:14		16:16 (3)	07:16		16:55 (2)	07:01		05:52			05:03		
	16:15	20	14:59 (4)	17:06	18	16:34 (3)	18:02	37	17:32 (2)	20:00		20:55			21:45		
2	08:44		14:40 (4)	08:12		16:16 (3)	07:14		16:54 (2)	06:59		05:50			05:02		
	16:16	20	15:00 (4)	17:08	21	16:37 (3)	18:04	38	17:32 (2)	20:02		20:57			21:46		
3	08:44		14:41 (4)	08:10		16:16 (3)	07:12		16:54 (2)	06:56		05:48			05:01		
	16:17	18	14:59 (4)	17:10	23	16:39 (3)	18:06	38	17:32 (2)	20:04		20:59			21:48		
4	08:43		14:43 (4)	08:08		16:17 (3)	07:09		16:54 (2)	06:54		05:46			05:00		
	16:18	16	14:59 (4)	17:12	23	16:40 (3)	18:07	39	17:33 (2)	20:06		21:01			21:49		
5	08:43		14:43 (4)	08:07		16:17 (3)	07:07		16:53 (2)	06:51		05:44			04:59		
	16:19	15	14:58 (4)	17:14	22	16:39 (3)	18:09	39	17:32 (2)	20:07		21:03			21:50		
6	08:43		14:46 (4)	08:05		16:18 (3)	07:04		16:54 (2)	06:49		05:42			04:58		
	16:21	12	14:58 (4)	17:16	21	16:39 (3)	18:11	38	17:32 (2)	20:09		21:04			21:51		
7	08:42		14:47 (4)	08:03		16:19 (3)	07:02		16:53 (2)	06:47		05:40			04:58		
	16:22	10	14:57 (4)	17:18	19	16:38 (3)	18:13	38	17:31 (2)	20:11		21:06			21:52		
8	08:42		14:50 (4)	08:01		16:20 (3)	07:00		16:54 (2)	06:44		05:38			04:57		
	16:24	5	14:55 (4)	17:20	17	16:37 (3)	18:15	37	17:31 (2)	20:13		21:08			21:53		
9	08:41			07:59		16:21 (3)	06:57		16:54 (2)	06:42		05:36			04:57		
	16:25			17:22	15	16:36 (3)	18:17	36	17:30 (2)	20:15		21:10			21:54		
10	08:40			07:57		16:24 (3)	06:55		16:55 (2)	06:39		05:34			04:56		
	16:26			17:24	10	16:34 (3)	18:19	34	17:29 (2)	20:17		21:11			21:55		
11	08:40			07:55			06:53		16:56 (2)	06:37		05:33			04:56		
	16:28			17:26			18:21	32	17:28 (2)	20:19		21:13			21:55		
12	08:39			07:53			06:50		16:56 (2)	06:35		05:31			04:55		
	16:30			17:28			18:23	30	17:26 (2)	20:20		21:15			21:56		
13	08:38			07:51			06:48		16:58 (2)	06:32		05:29			04:55		
	16:31			17:30			18:25	27	17:25 (2)	20:22		21:17			21:57		
14	08:37			07:49			06:45		16:59 (2)	06:30		05:27			04:55		
	16:33			17:32			18:27	24	17:23 (2)	20:24		21:18			21:58		
15	08:36			07:47			06:43		17:01 (2)	06:28		05:26			04:54		
	16:34			17:34			18:28	20	17:21 (2)	20:26		21:20			21:58		
16	08:35			07:45			06:40		17:04 (2)	06:25		05:24			04:54		
	16:36			17:36			18:30	13	17:17 (2)	20:28		21:22			21:59		
17	08:34			07:43			06:38			06:23		05:22			04:54		
	16:38			17:38			18:32			20:30		21:23			21:59		
18	08:33			07:41			06:35			06:21		05:21			04:54		
	16:40			17:40			18:34			20:31		21:25			22:00		
19	08:32			07:39			06:33			06:18		05:19			04:54		
	16:41			17:42			18:36			20:33		21:27			22:00		
20	08:31			07:36		17:12 (2)	06:31			06:16		05:18			04:54		
	16:43			17:44	4	17:16 (2)	18:38			20:35		21:28			22:00		
21	08:30			07:34		17:07 (2)	06:28			06:14		05:16			04:54		
	16:45			17:46	11	17:18 (2)	18:40			20:37		21:30			22:01		
22	08:29			07:32		17:04 (2)	06:26			06:12		05:15			04:55		
	16:47			17:48	15	17:19 (2)	18:42			20:39		21:31			22:01		
23	08:27			07:30		17:02 (2)	06:23			06:09		05:13			04:55		
	16:49			17:50	20	17:22 (2)	18:43			20:41		21:33			22:01		
24	08:26			07:28		17:01 (2)	06:21			06:07		05:12			04:55		
	16:50			17:52	23	17:24 (2)	18:45			20:43		21:34			22:01		
25	08:24		16:18 (3)	07:25		16:59 (2)	06:18			06:05		05:11			04:55		
	16:52	1	16:19 (3)	17:54	27	17:26 (2)	18:47			20:44		21:36			22:01		
26	08:23		16:17 (3)	07:23		16:58 (2)	06:16			06:03		05:09			04:56		
	16:54	4	16:21 (3)	17:56	30	17:28 (2)	18:49			20:46		21:37			22:01		
27	08:22		16:16 (3)	07:21		16:57 (2)	06:13			06:01		05:08			04:56		
	16:56	7	16:23 (3)	17:58	34	17:31 (2)	18:51			20:48		21:39			22:01		
28	08:20		16:16 (3)	07:18		16:56 (2)	06:11			05:58		05:07			04:57		
	16:58	10	16:26 (3)	18:00	36	17:32 (2)	18:53			20:50		21:40			22:01		
29	08:19		16:16 (3)				07:08			05:56		05:06			04:57		
	17:00	12	16:28 (3)				19:54			20:52		21:41			22:01		
30	08:17		16:15 (3)				07:06			05:54		05:05			04:58		
	17:02	14	16:29 (3)				19:56			20:54		21:43			22:00		
31	08:15		16:15 (3)				07:04					05:04					
	17:04	16	16:31 (3)				19:58					21:44					
Potential sun hours		250			273		367			420		494			510		
Total, worst case		180			389		520										
Sun reduction		0.24			0.23		0.27										
Oper. time red.		1.00			1.00		1.00										
Wind dir. red.		0.65			0.67		0.68										
Total reduction		0.16			0.16		0.18										
Total, real		29			60		95										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FK - H167

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:35 (2) 18:05 (2)	07:24 16:54	15:53 (3) 16:04 (3)	08:19 16:10	
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:34 (2) 18:06 (2)	07:26 16:52	15:51 (3) 16:06 (3)	08:21 16:09	
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:33 (2) 18:07 (2)	07:28 16:50	15:49 (3) 16:07 (3)	08:22 16:08	
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:32 (2) 18:07 (2)	07:30 16:48	15:48 (3) 16:08 (3)	08:24 16:08	14:35 (4) 14:39 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:31 (2) 18:08 (2)	07:32 16:46	15:47 (3) 16:09 (3)	08:25 16:07	14:32 (4) 14:42 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:30 (2) 18:08 (2)	07:34 16:44	15:47 (3) 16:09 (3)	08:26 16:07	14:32 (4) 14:44 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:29 (2) 18:07 (2)	07:36 16:43	15:46 (3) 16:09 (3)	08:28 16:06	14:31 (4) 14:45 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:29 (2) 18:07 (2)	07:38 16:41	15:46 (3) 16:08 (3)	08:29 16:06	14:30 (4) 14:46 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:28 (2) 18:07 (2)	07:40 16:39	15:47 (3) 16:07 (3)	08:30 16:05	14:30 (4) 14:48 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:28 (2) 18:07 (2)	07:42 16:37	15:47 (3) 16:05 (3)	08:31 16:05	14:30 (4) 14:49 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:28 (2) 18:06 (2)	07:44 16:35	15:47 (3) 16:03 (3)	08:33 16:05	14:29 (4) 14:49 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:28 (2) 18:06 (2)	07:45 16:34	15:47 (3) 16:01 (3)	08:34 16:05	14:29 (4) 14:50 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:29 (2) 18:05 (2)	07:47 16:32	15:48 (3) 15:59 (3)	08:35 16:05	14:29 (4) 14:51 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:29 (2) 18:04 (2)	07:49 16:31	15:48 (3) 15:57 (3)	08:36 16:04	14:29 (4) 14:52 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:30 (2) 18:02 (2)	07:51 16:29	15:49 (3) 15:56 (3)	08:37 16:04	14:29 (4) 14:52 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:30 (2) 17:59 (2)	07:53 16:27	15:50 (3) 15:54 (3)	08:38 16:05	14:30 (4) 14:53 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:31 (2) 17:57 (2)	07:55 16:26	15:51 (3) 15:52 (3)	08:38 16:05	14:30 (4) 14:54 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:32 (2) 17:55 (2)	07:57 16:24	15:52 (3) 16:05	08:39 16:05	14:31 (4) 14:55 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:34 (2) 17:52 (2)	07:59 16:23	16:05	08:40 16:05	14:32 (4) 14:56 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:36 (2) 17:50 (2)	08:00 16:22	08:41 16:06	14:31 (4) 14:55 (4)	
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:38 (2) 17:48 (2)	08:02 16:20	08:41 16:06	14:32 (4) 14:56 (4)	
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05	08:04 16:19	08:42 16:06	14:32 (4) 14:56 (4)	
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:07	08:06 16:18	08:42 16:07	14:33 (4) 14:57 (4)	
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:09	08:08 16:17	08:43 16:08	14:33 (4) 14:57 (4)	
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09	08:09 16:16	08:43 16:08	14:34 (4) 14:58 (4)	
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11	08:11 16:14	08:43 16:09	14:34 (4) 14:58 (4)	
27	05:30 21:33	06:24 20:30	07:19 19:14	17:47 (2) 17:57 (2)	07:15 17:04	08:13 16:13	08:44 16:10	14:36 (4) 14:59 (4)	
28	05:32 21:32	06:26 20:28	07:21 19:12	17:43 (2) 18:01 (2)	07:16 17:02	08:14 16:12	08:44 16:11	14:36 (4) 14:59 (4)	
29	05:34 21:30	06:27 20:25	07:22 19:09	17:40 (2) 18:03 (2)	07:18 17:00	08:16 16:12	08:44 16:11	14:37 (4) 14:59 (4)	
30	05:35 21:28	06:29 20:23	07:24 19:07	17:37 (2) 18:04 (2)	07:20 16:58	08:18 16:11	08:44 16:12	14:37 (4) 14:59 (4)	
31	05:37 21:27	06:31 20:21		07:22 16:56	15:57 (3) 15:58 (3)		08:44 16:13	14:38 (4) 14:59 (4)	
Potential sun hours	512	460	382	328	259	233			
Total, worst case			78	660	253	576			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.68	0.68	0.66	0.65			
Total reduction			0.22	0.20	0.18	0.13			
Total, real			17	130	44	77			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FL - H168

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

		January	February	March	April	May	June	July	August	September	October	November	December						
1	08:44	15:22 (3)	08:14	15:43 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:10 (3)				
	16:15	15	15:37 (3)	17:06	16:08 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	24	15:34 (2)		
2	08:44	15:23 (3)	08:12	15:44 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	15:09 (3)				
	16:16	15	15:38 (3)	17:08	16:07 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	23	15:32 (2)		
3	08:44	15:23 (3)	08:10	15:45 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	15:10 (3)				
	16:17	16	15:39 (3)	17:10	16:06 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	22	15:32 (2)		
4	08:43	15:24 (3)	08:08	15:46 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	15:10 (3)				
	16:18	17	15:41 (3)	17:12	16:05 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	22	15:32 (2)		
5	08:43	15:24 (3)	08:07	15:48 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	15:10 (3)				
	16:19	18	15:42 (3)	17:14	16:03 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	11	15:31 (2)	16:07	19	15:29 (3)
6	08:43	15:25 (3)	08:05	15:51 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	15:11 (3)				
	16:21	19	15:44 (3)	17:16	16:01 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	15	15:33 (2)	16:07	19	15:30 (3)
7	08:42	15:25 (3)	08:03	15:49 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	15:11 (3)				
	16:22	19	15:44 (3)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	19	15:35 (2)	16:06	18	15:29 (3)	
8	08:42	15:25 (3)	08:01	15:49 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	15:11 (3)				
	16:23	21	15:46 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	22	15:36 (2)	16:06	17	15:28 (3)	
9	08:41	15:27 (3)	07:59	15:47 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	15:12 (3)				
	16:25	22	15:49 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	24	15:38 (2)	16:05	16	15:28 (3)	
10	08:40	15:27 (3)	07:57	15:48 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	15:12 (3)				
	16:26	23	15:50 (2)	17:24	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	25	15:39 (2)	16:05	16	15:28 (3)	
11	08:40	15:28 (3)	07:55	15:49 (2)	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33	15:12 (3)				
	16:28	24	15:52 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	26	15:39 (2)	16:05	15	15:27 (3)	
12	08:39	15:29 (3)	07:53	15:50 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	15:13 (3)				
	16:29	25	15:54 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	28	15:40 (2)	16:05	14	15:27 (3)	
13	08:38	15:29 (3)	07:51	15:51 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	15:13 (3)				
	16:31	26	15:55 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	28	15:40 (2)	16:04	13	15:26 (3)	
14	08:37	15:31 (3)	07:49	15:53 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	15:13 (3)				
	16:33	26	15:57 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	29	15:41 (2)	16:04	13	15:26 (3)	
15	08:36	15:32 (3)	07:47	15:54 (2)	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37	15:14 (3)				
	16:34	27	15:59 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	29	15:41 (2)	16:04	12	15:26 (3)	
16	08:35	15:33 (3)	07:45	15:55 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	15:15 (3)				
	16:36	27	16:00 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	29	15:41 (2)	16:05	11	15:26 (3)	
17	08:34	15:35 (3)	07:43	15:56 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:38	15:15 (3)				
	16:38	27	16:02 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	29	15:41 (2)	16:05	12	15:27 (3)	
18	08:33	15:39 (2)	07:41	15:57 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	15:16 (3)				
	16:40	25	16:04 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	29	15:41 (2)	16:05	11	15:27 (3)	
19	08:32	15:39 (2)	07:39	15:58 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	15:17 (3)				
	16:41	26	16:05 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	29	15:42 (2)	16:05	11	15:28 (3)	
20	08:31	15:38 (2)	07:36	15:59 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	08:41	15:17 (3)				
	16:43	28	16:06 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	29	15:42 (2)	16:06	10	15:27 (3)	
21	08:30	15:38 (2)	07:34	15:59 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	15:18 (3)				
	16:45	29	16:07 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	29	15:42 (2)	16:06	10	15:28 (3)	
22	08:29	15:38 (2)	07:32	15:59 (2)	06:26	06:11	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42	15:18 (3)				
	16:47	29	16:07 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	28	15:42 (2)	16:06	10	15:28 (3)	
23	08:27	15:39 (2)	07:30	15:59 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	15:19 (3)				
	16:49	29	16:08 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	27	15:42 (2)	16:07	10	15:29 (3)	
24	08:26	15:38 (2)	07:28	15:59 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43	15:19 (3)				
	16:50	29	16:07 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	25	15:41 (2)	16:08	10	15:29 (3)	
25	08:25	15:39 (2)	07:25	15:59 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09	08:43	15:19 (3)				
	16:52	29	16:08 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	28	15:41 (2)	16:08	11	15:30 (3)	
26	08:23	15:39 (2)	07:23	15:59 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43	15:19 (3)				
	16:54	29	16:08 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	27	15:39 (2)	16:09	11	15:30 (3)	
27	08:22	15:39 (2)	07:21	15:59 (2)	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:44	15:20 (3)				
	16:56	29	16:08 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	27	15:38 (2)	16:10	12	15:32 (3)	
28	08:20	15:40 (2)	07:18	15:59 (2)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	08:44	15:21 (3)				
	16:58	29	16:09 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	26	15:37 (2)	16:10	12	15:33 (3)	
29	08:19	15:40 (2)		15:59 (2)	07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	08:44	15:21 (3)				
	17:00	28	16:08 (2)		19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	25	15:35 (2)	16:11	13	15:34 (3)	
30	08:17	15:41 (2)		15:59 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44	15:22 (3)				
	17:02	27	16:08 (2)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	25	15:35 (2)	16:12	13	15:35 (3)	
31	08:15	15:41 (2)		15:59 (2)	07:04		05:04		05:37	06:31		07:22		08:44	15:21 (3)				
	17:04	26	16:07 (2)		19:58		21:44		21:27	20:21		16:56		16:13	15:35 (3)				
Potential sun hours	250	273		367	420	494	510	512	460	382		259		233					
Total, worst case	759	113										668		444					
Sun reduction	0.24	0.23										0.27		0.21					
Oper. time red.	1.00	1.00										1.00		1.00					
Wind dir. red.	0.66	0.66										0.66		0.66					
Total reduction	0.16	0.15										0.18		0.14					
Total, real	122	17										117		60					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FM - H169

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44		10:02 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24									08:19		09:51 (2)		
2	16:15	75	15:21 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54									16:10	70	15:07 (1)		
	08:44		10:03 (2)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26									08:21		09:51 (2)		
3	16:16	75	15:22 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52									16:09	71	15:08 (1)		
	08:44		10:03 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28									08:22		09:51 (2)		
4	16:17	74	15:21 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50									16:08	71	15:08 (1)		
	08:43		10:04 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30									08:24		09:51 (2)		
5	16:18	74	15:22 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48									16:08	73	15:09 (1)		
	08:43		10:04 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32									08:25		09:51 (2)		
6	16:20	74	15:22 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46									16:07	73	15:09 (1)		
	08:43		10:05 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34									08:27		09:51 (2)		
7	16:21	73	15:23 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44									16:07	74	15:09 (1)		
	08:42		10:06 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36									08:28		09:51 (2)		
8	16:22	72	15:23 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43									16:06	74	15:09 (1)		
	08:42		10:06 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38									08:29		09:52 (2)		
9	16:24	73	15:24 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41									16:06	74	15:10 (1)		
	08:41		10:07 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40									08:30		09:52 (2)		
10	16:25	72	15:25 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39									16:05	75	15:11 (1)		
	08:40		10:08 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42									08:32		09:52 (2)		
11	16:27	71	15:25 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37									16:05	75	15:11 (1)		
	08:40		10:09 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44									08:33		09:52 (2)		
12	16:28	70	15:25 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36									16:05	75	15:11 (1)		
	08:39		10:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46									08:34		09:52 (2)		
13	16:30	69	15:25 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34									16:05	75	15:11 (1)		
	08:38		10:10 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47									08:35		09:54 (2)		
14	16:31	68	15:25 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32									16:05	75	15:12 (1)		
	08:37		10:11 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49									08:36		09:54 (2)		
15	16:33	66	15:26 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31									16:05	75	15:13 (1)		
	08:36		10:13 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51									08:37		09:54 (2)		
16	16:34	63	15:26 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29									16:05	76	15:13 (1)		
	08:35		10:14 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53									14:42 (1)	08:38	09:54 (2)		
17	16:36	61	15:26 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27									8	14:50 (1)	16:05	75	15:13 (1)
	08:34		10:14 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55									14:39 (1)	08:39		09:55 (2)	
18	16:38	59	15:25 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26									14	14:53 (1)	16:05	74	15:13 (1)
	08:33		10:16 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57									14:37 (1)	08:39		09:55 (2)	
19	16:40	55	15:25 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25									18	14:55 (1)	16:05	76	15:14 (1)
	08:32		10:18 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59									14:36 (1)	08:40		09:56 (2)	
20	16:41	52	15:25 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23									21	14:57 (1)	16:05	75	15:15 (1)
	08:31		10:19 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01									09:59 (2)	08:41		09:56 (2)	
21	16:43	47	15:24 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22									34	14:58 (1)	16:06	75	15:15 (1)
	08:30		10:21 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02									09:56 (2)	08:41		09:57 (2)	
22	16:45	42	15:24 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20									42	14:59 (1)	16:06	75	15:16 (1)
	08:29		10:24 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04									09:55 (2)	08:42		09:57 (2)	
23	16:47	34	15:23 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19									47	15:00 (1)	16:06	75	15:16 (1)
	08:27		15:02 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06									09:54 (2)	08:42		09:58 (2)	
24	16:49	21	15:23 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18									52	15:01 (1)	16:07	75	15:17 (1)
	08:26		15:03 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08									09:53 (2)	08:43		09:58 (2)	
25	16:51	18	15:21 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17									55	15:02 (1)	16:08	75	15:17 (1)
	08:25		15:06 (1)	07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09									09:52 (2)	08:43		09:58 (2)	
26	16:52	14	15:20 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16									59	15:03 (1)	16:08	76	15:17 (1)
	08:23		15:09 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11									09:52 (2)	08:43		09:59 (2)	
27	16:54	8	15:17 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15									61	15:04 (1)	16:09	75	15:18 (1)
	08:22		07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13										09:52 (2)	08:44		10:00 (2)	
28	16:56		07:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	63	15:05 (1)	16:10	75	15:19 (1)									
	08:20		07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14										09:52 (2)	08:44		10:00 (2)	
29	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	65	15:06 (1)	16:11	76	15:19 (1)									
	08:19			07:09	05:56	05:06	04:57	05:34	06:28	07:22	07:18	08:16										09:51 (2)	08:44		10:01 (2)	
30	17:00			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	66	15:05 (1)	16:11	75	15:20 (1)									
	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18										09:51 (2)	08:44		10:01 (2)	
31	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	68	15:06 (1)	16:12	75	15:20 (1)									
	08:15			07:04		05:04		05:37	06:31		07:22											08:44			10:01 (2)	
	17:																									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FN - H170

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:11 (3)	08:14	15:27 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:01 (3)								
2	08:44	15:12 (3)	08:12	15:28 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	15:00 (3)								
3	08:44	15:12 (3)	08:10	15:30 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	15:00 (3)								
4	08:43	15:13 (3)	08:08	15:31 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	15:01 (3)								
5	08:43	15:13 (3)	08:07	15:34 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	15:00 (3)								
6	08:43	15:15 (3)	08:05	15:37 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	15:01 (3)								
7	08:42	15:15 (3)	08:03	15:47 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	15:00 (3)								
8	08:42	15:15 (3)	08:01	15:48 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	15:00 (3)								
9	08:41	15:17 (3)	07:59	15:48 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	15:01 (3)								
10	08:40	15:18 (3)	07:57	15:48 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	15:01 (3)								
11	08:40	15:19 (3)	07:55	15:49 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44	08:33	15:01 (3)								
12	08:39	15:20 (2)	07:53	15:50 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	15:01 (3)								
13	08:38	15:20 (2)	07:51	15:51 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	15:02 (3)								
14	08:37	15:20 (2)	07:49	15:52 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	15:03 (3)								
15	08:36	15:21 (2)	07:47	15:53 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	08:37	15:03 (3)								
16	08:34	15:22 (2)	07:45	15:54 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	15:03 (3)								
17	08:33	15:23 (2)	07:43	15:55 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39	15:04 (3)								
18	08:33	15:23 (2)	07:41	15:56 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	15:04 (3)								
19	08:32	15:24 (2)	07:39	15:57 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	15:05 (3)								
20	08:31	15:25 (2)	07:36	15:58 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	08:41	15:05 (3)								
21	08:30	15:26 (2)	07:34	15:59 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:42	15:06 (3)								
22	08:29	15:27 (2)	07:32	16:00 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:43	15:06 (3)								
23	08:27	15:28 (2)	07:30	16:01 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:44	15:07 (3)								
24	08:26	15:29 (2)	07:28	16:02 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:45	15:07 (3)								
25	08:25	15:30 (2)	07:25	16:03 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09	08:46	15:08 (3)								
26	08:23	15:31 (2)	07:23	16:04 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:47	15:08 (3)								
27	08:22	15:32 (2)	07:21	16:05 (2)	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13	08:48	15:09 (3)								
28	08:20	15:33 (2)	07:19	16:06 (2)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	08:49	15:09 (3)								
29	08:19	15:34 (2)	07:17	16:07 (2)	06:09	05:56	05:06	04:57	05:34	06:27	07:22	08:17	08:15	08:50	15:10 (3)								
30	08:17	15:35 (2)	07:15	16:08 (2)	06:07	05:54	05:05	04:58	05:35	06:29	07:24	08:18	08:16	08:51	15:10 (3)								
31	08:15	15:36 (2)	07:13	16:09 (2)	06:05	05:52	05:04	04:59	05:37	06:31	07:27	08:20	08:18	08:52	15:11 (3)								
Potential sun hours	250		273		367	420	494	510	512	460	382	328	259	782	233								
Total, worst case	974		124																				
Sun reduction	0.24		0.23																				
Oper. time red.	1.00		1.00																				
Wind dir. red.	0.66		0.66																				
Total reduction	0.16		0.15																				
Total, real	156		19																				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FO - H171

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

		January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	14:59 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17	15:16 (2)	17:06	18:02	20:00	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	15:00 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21
	16:16	17	15:17 (2)	17:08	18:04	20:02	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	15:00 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	16	15:16 (2)	17:10	18:05	20:04	21:48	21:59	21:21	20:13	19:00	16:50	16:08
4	08:43	15:02 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24
	16:18	15	15:17 (2)	17:12	18:07	20:06	21:01	21:49	21:19	20:11	18:57	16:48	16:08
5	08:43	15:02 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25
	16:19	14	15:16 (2)	17:14	18:09	20:07	21:03	21:50	21:17	20:09	18:55	16:46	16:07
6	08:43	15:04 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26
	16:21	13	15:17 (2)	17:16	18:11	20:09	21:04	21:51	21:18	20:06	18:52	16:44	16:06
7	08:42	15:05 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28
	16:22	11	15:16 (2)	17:18	18:13	20:11	21:06	21:52	21:14	20:04	18:50	16:42	16:06
8	08:42	15:06 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29
	16:23	9	15:15 (2)	17:20	18:15	20:13	21:08	21:56	21:12	20:01	18:48	16:41	16:06
9	08:41	15:09 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
	16:25	6	15:15 (2)	17:22	18:17	20:15	21:10	21:54	21:10	19:59	18:45	16:39	16:05
10	08:40		07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32
	16:26		17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05
11	08:40		07:55	06:52	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33
	16:28		17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05
12	08:39		07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34
	16:29		17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05
13	08:38		07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35
	16:31		17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04
14	08:37		07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36
	16:33		17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04
15	08:36		07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:57	07:52	07:51	08:37
	16:34		17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04
16	08:35		07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38
	16:36		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05
17	08:34		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39
	16:38		17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05
18	08:33		07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39
	16:39		17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05
19	08:32		07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40
	16:41		17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05
20	08:31		07:36	06:31	06:16	05:17	04:54	05:20	06:11	07:06	08:01	08:00	08:41
	16:43		17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05
21	08:30		07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41
	16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06
22	08:29		07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42
	16:47		17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06
23	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42
	16:49		17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07
24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43
	16:50		17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07
25	08:25		07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	07:11	08:09	08:43
	16:52		17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:15	16:08
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43
	16:54		17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	16:09
27	08:22		07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:44
	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:10
28	08:20		07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	08:44
	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16:10
29	08:19			07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	08:44
	17:00			19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	16:11
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44
	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:12
31	08:15			07:04		05:04		05:37	06:31		07:22		08:44
	17:04			19:58		21:44		21:27	20:21		16:56		16:13
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	233
Total, worst case		118											492
Sun reduction		0.24											0.21
Oper. time red.		1.00											1.00
Wind dir. red.		0.64											0.64
Total reduction		0.16											0.13
Total, real		18											66

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FP - H172

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

		January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	14:56 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	15:10 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	14:57 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21
	16:16	15:10 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	14:58 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	15:09 (2)	17:10	18:05	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08
4	08:43	14:59 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24
	16:18	15:09 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	15:01 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25
	16:19	15:08 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07
6	08:43	15:03 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26
	16:21	15:08 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:06
7	08:42		08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28
	16:22		17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:42	16:06
8	08:42		08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29
	16:23		17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06
9	08:41		07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
	16:25		17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05
10	08:40		07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32
	16:26		17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05
11	08:40		07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33
	16:28		17:26	18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	16:05
12	08:39		07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34
	16:29		17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05
13	08:38		07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35
	16:31		17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04
14	08:37		07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36
	16:33		17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04
15	08:36		07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37
	16:34		17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04
16	08:35		07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38
	16:36		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05
17	08:34		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39
	16:38		17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05
18	08:33		07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39
	16:39		17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05
19	08:32		07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40
	16:41		17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05
20	08:31		07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00	08:41
	16:43		17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05
21	08:30		07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41
	16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06
22	08:29		07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42
	16:47		17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06
23	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42
	16:49		17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07
24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43
	16:50		17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07
25	08:25		07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	07:11	08:09	08:43
	16:52		17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:15	16:08
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43
	16:54		17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	16:09
27	08:22		07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:44
	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:10
28	08:20		07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	08:44
	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16:10
29	08:19			07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	08:44
	17:00			19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	16:11
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44
	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:12
31	08:15			07:04		05:04		05:37	06:31		07:22		08:44
	17:04			19:58		21:44		21:27	20:21		16:56		16:13
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	233
Total, worst case	60												383
Sun reduction	0.24												0.21
Oper. time red.	1.00												1.00
Wind dir. red.	0.65												0.65
Total reduction	0.16												0.13
Total, real	9												51

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FQ - H173

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15 10	14:56 (2) 15:06 (2)	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16 8	14:58 (2) 15:06 (2)	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17 5	14:59 (2) 15:04 (2)	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	05:44 20:11	06:38 18:57	07:31 16:48	07:30 16:08	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	07:32 16:07	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	07:34 16:06	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	07:36 16:06	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	07:38 16:06	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	07:40 16:05	08:30 14:48 (2) 14:53 (2)
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:08	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	07:42 16:05	08:32 14:55 (2) 14:59 (2)
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	07:44 16:05	08:33 14:47 (2) 14:56 (2)
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	07:46 16:05	08:34 14:46 (2) 14:57 (2)
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	07:47 16:04	08:35 12 14:47 (2) 14:59 (2)
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	07:49 16:06	08:36 12 14:47 (2) 14:59 (2)
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	07:51 16:04	08:37 13 14:46 (2) 14:59 (2)
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	07:53 16:05	08:38 14 14:46 (2) 15:00 (2)
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	07:55 16:05	08:39 14 14:47 (2) 15:01 (2)
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	07:57 16:05	08:39 15 14:47 (2) 15:02 (2)
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	07:59 16:05	08:40 15 14:48 (2) 15:03 (2)
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:11 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:01 16:05	08:41 15 14:48 (2) 15:03 (2)
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:02 16:06	08:41 15 14:49 (2) 15:04 (2)
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:04 16:06	08:42 14 14:49 (2) 15:03 (2)
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:06 16:07	08:42 15 14:50 (2) 15:05 (2)
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:08 16:07	08:43 15 14:50 (2) 15:05 (2)
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	07:11 16:15	07:11 16:08	08:43 15 14:51 (2) 15:05 (2)
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	07:13 16:14	07:13 16:09	08:43 14 14:52 (2) 15:06 (2)
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	07:15 16:13	07:15 16:10	08:44 14 14:53 (2) 15:06 (2)
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	07:16 16:12	07:16 16:10	08:44 13 14:54 (2) 15:06 (2)
29	08:19 17:00	07:08 19:54	05:56 20:52	05:06 21:41	05:06 22:01	04:57 21:30	05:34 20:25	06:27 19:09	07:22 17:00	07:18 16:11	07:18 16:11	07:18 16:11	08:44 12 14:55 (2) 15:06 (2)
30	08:17 17:02	07:06 19:56	05:54 20:54	05:05 21:43	05:05 22:00	04:58 21:30	05:35 20:23	06:29 19:07	07:24 16:58	07:20 16:11	07:20 16:11	07:20 16:12	08:44 12 14:55 (2) 15:07 (2)
31	08:15 17:04	07:04 19:58	05:04 21:44	05:04 21:44	05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	07:22 16:56	07:22 16:56	07:22 16:56	07:22 16:56	08:44 11 14:55 (2) 15:06 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	293
Total, worst case	23												0.21
Sun reduction	0.24												1.00
Oper. time red.	1.00												0.65
Wind dir. red.	0.65												0.13
Total reduction	0.16												39
Total, real	4												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FR - H174

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10	
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08	
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08	
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07	
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06	
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06	
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05	
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05	
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05	
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05	
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04	
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04	14:47 (2)
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04	3 14:50 (2)
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05	5 14:51 (2)
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05	7 14:52 (2)
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05	7 14:53 (2)
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05	8 14:54 (2)
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05	9 14:55 (2)
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06	9 14:56 (2)
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06	9 14:57 (2)
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07	9 14:58 (2)
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07	9 14:59 (2)
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08	8 14:50 (2)
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09	8 14:51 (2)
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10	7 14:52 (2)
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10	6 14:53 (2)
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11	4 14:54 (2)
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12	
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	117
Total, worst case													0.21
Sun reduction													1.00
Oper. time red.													0.65
Wind dir. red.													0.13
Total reduction													16
Total, real													

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FS - H175

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:23 (5)	07:16	17:02 (4)	07:01		05:52	05:03		
	16:15	17:06	11 16:34 (5)	18:02	19 17:21 (4)	20:00		20:55	21:45		
2	08:44	08:12	16:24 (5)	07:14	17:03 (4)	06:59		05:50	05:02		
	16:16	17:08	13 16:37 (5)	18:04	15 17:18 (4)	20:02		20:57	21:46		
3	08:43	08:10	16:24 (5)	07:11	17:06 (4)	06:56	19:33 (2)	05:48	05:01		
	16:17	17:10	15 16:39 (5)	18:05	10 17:16 (4)	20:04	4 19:37 (2)	20:59	21:48		
4	08:43	08:08	16:24 (5)	07:09		06:54	19:31 (2)	05:46	05:00		
	16:18	17:12	17 16:41 (5)	18:07		20:06	8 19:39 (2)	21:01	21:49		
5	08:43	08:07	16:25 (5)	07:07	17:41 (3)	06:51	19:29 (2)	05:44	04:59		
	16:19	17:14	17 16:42 (5)	18:09	1 17:42 (3)	20:07	11 19:40 (2)	21:03	21:50		
6	08:42	08:05	16:25 (5)	07:04	17:40 (3)	06:49	19:28 (2)	05:42	04:58		
	16:21	17:16	17 16:42 (5)	18:11	5 17:45 (3)	20:09	14 19:42 (2)	21:04	21:51		
7	08:42	08:03	16:26 (5)	07:02	17:39 (3)	06:47	19:27 (2)	05:40	04:58		
	16:22	17:18	15 16:41 (5)	18:13	7 17:46 (3)	20:11	16 19:43 (2)	21:06	21:52		
8	08:42	08:01	16:28 (5)	07:00	17:39 (3)	06:44	19:27 (2)	05:38	04:57		
	16:24	17:20	12 16:40 (5)	18:15	9 17:48 (3)	20:13	19 19:46 (2)	21:08	21:53		
9	08:41	07:59	16:30 (5)	06:57	17:38 (3)	06:42	19:26 (2)	05:36	04:57		
	16:25	17:22	8 16:38 (5)	18:17	12 17:50 (3)	20:15	22 19:48 (2)	21:10	21:54		
10	08:40	07:57		06:55	17:38 (3)	06:39	19:25 (2)	05:34	04:56		
	16:26	17:24		18:19	14 17:52 (3)	20:17	24 19:49 (2)	21:11	21:55		
11	08:40	07:55		06:52	17:39 (3)	06:37	19:26 (2)	05:32	04:56		
	16:28	17:26		18:21	16 17:55 (3)	20:18	24 19:50 (2)	21:13	21:55		
12	08:39	07:53		06:50	17:39 (3)	06:35	19:26 (2)	05:31	04:55		
	16:30	17:28		18:23	16 17:55 (3)	20:20	23 19:49 (2)	21:15	21:56		
13	08:38	07:51		06:48	17:41 (3)	06:32	19:26 (2)	05:29	04:55		
	16:31	17:30		18:25	12 17:53 (3)	20:22	22 19:48 (2)	21:17	21:57		
14	08:37	07:49		06:45	17:42 (3)	06:30	19:27 (2)	05:27	04:55		
	16:33	17:32		18:27	8 17:50 (3)	20:24	20 19:47 (2)	21:18	21:57		
15	08:36	07:47		06:43		06:28	19:28 (2)	05:25	04:54		
	16:34	17:34		18:28		20:26	18 19:46 (2)	21:20	21:58		
16	08:35	07:45	17:04 (4)	06:40		06:25	19:28 (2)	05:24	04:54		
	16:36	17:36	3 17:07 (4)	18:30		20:28	15 19:43 (2)	21:22	21:59		
17	08:34	07:43	17:03 (4)	06:38		06:23	19:31 (2)	05:22	04:54		
	16:38	17:38	6 17:09 (4)	18:32		20:30	10 19:41 (2)	21:23	21:59		
18	08:33	07:41	17:01 (4)	06:35		06:21		05:21	04:54		
	16:40	17:40	10 17:11 (4)	18:34		20:31		21:25	22:00		
19	08:32	07:39	17:00 (4)	06:33		06:18		05:19	04:54		
	16:41	17:42	13 17:13 (4)	18:36		20:33		21:27	22:00		
20	08:31	07:36	17:00 (4)	06:31		06:16		05:18	04:54		
	16:43	17:44	16 17:16 (4)	18:38		20:35		21:28	22:00		
21	08:30	07:34	17:00 (4)	06:28		06:14		05:16	04:54		
	16:45	17:46	18 17:18 (4)	18:40		20:37		21:30	22:01		
22	08:28	07:32	16:59 (4)	06:26		06:11		05:15	04:55		
	16:47	17:48	20 17:19 (4)	18:41		20:39		21:31	22:01		
23	08:27	07:30	16:59 (4)	06:23		06:09		05:13	04:55		
	16:49	17:50	23 17:22 (4)	18:43		20:41		21:33	22:01		
24	08:26	07:28	16:59 (4)	06:21		06:07		05:12	04:55		
	16:50	17:52	25 17:24 (4)	18:45		20:42		21:34	22:01		
25	08:24	07:25	16:59 (4)	06:18		06:05		05:11	04:55		
	16:52	17:54	25 17:24 (4)	18:47		20:44		21:36	22:01		
26	08:23	07:23	16:59 (4)	06:16		06:03		05:09	04:56		
	16:54	17:56	25 17:24 (4)	18:49		20:46		21:37	22:01		
27	08:22	07:21	17:00 (4)	06:13		06:00		05:08	04:56		
	16:56	17:58	24 17:24 (4)	18:51		20:48		21:39	22:01		
28	08:20	16:25 (5)	07:18	06:11		05:58		05:07	04:57		
	16:58	1 16:26 (5)	18:00	17:22 (4)		20:50		21:40	22:01		
29	08:18	16:24 (5)		07:08		05:56		05:06	04:57		
	17:00	4 16:28 (5)		19:54		20:52		21:41	22:01		
30	08:17	16:24 (5)		07:06		05:54		05:05	04:58		
	17:02	6 16:30 (5)		19:56		20:53		21:43	22:00		
31	08:15	16:23 (5)		07:04				05:04			
	17:04	8 16:31 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494	510		
Total, worst case	19		355	144		250					
Sun reduction	0.24		0.23	0.27		0.35					
Oper. time red.	1.00		1.00	1.00		1.00					
Wind dir. red.	0.66		0.67	0.67		0.67					
Total reduction	0.16		0.16	0.18		0.23					
Total, real	3		55	26		59					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FS - H175

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	19:25 (2) 19:49 (2)	07:26 19:05	18:18 (3) 18:33 (3)	07:24 16:54	08:19 16:10	
2	04:59 22:00	05:40 21:23	06:35 20:16	19:24 (2) 19:48 (2)	07:28 19:02	18:17 (3) 18:33 (3)	07:26 16:52	15:59 (5) 16:08 (5)	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	19:23 (2) 19:45 (2)	07:30 19:00	18:16 (3) 18:31 (3)	07:28 16:50	15:57 (5) 16:10 (5)	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	19:24 (2) 19:43 (2)	07:31 18:57	18:16 (3) 18:29 (3)	07:30 16:48	15:56 (5) 16:11 (5)	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	19:24 (2) 19:41 (2)	07:33 18:55	18:16 (3) 18:26 (3)	07:32 16:46	15:55 (5) 16:11 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	19:24 (2) 19:39 (2)	07:35 18:52	18:16 (3) 18:24 (3)	07:34 16:44	15:54 (5) 16:12 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	19:24 (2) 19:35 (2)	07:37 18:50	18:15 (3) 18:21 (3)	07:36 16:43	15:54 (5) 16:10 (5)	08:28 16:06
8	05:05 21:56	05:50 21:11	06:45 20:01	19:25 (2) 19:33 (2)	07:39 18:48	18:16 (3) 18:18 (3)	07:38 16:41	15:54 (5) 16:08 (5)	08:29 16:06
9	05:06 21:55	05:52 21:09	06:47 19:59	19:27 (2) 19:31 (2)	07:41 18:45	18:18 (3)	07:40 16:39	15:54 (5) 16:06 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	06:49 19:56		07:42 18:43	17:43 (4) 17:47 (4)	07:42 16:37	15:55 (5) 16:05 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54		07:44 18:40	17:39 (4) 17:51 (4)	07:44 16:35	15:55 (5) 16:03 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51		07:46 18:38	17:36 (4) 17:53 (4)	07:45 16:34	15:56 (5) 16:01 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49		07:48 18:36	17:34 (4) 17:55 (4)	07:47 16:32	15:56 (5) 15:59 (5)	08:35 16:04
14	05:12 21:51	06:01 20:59	06:56 19:47		07:50 18:33	17:33 (4) 17:55 (4)	07:49 16:31	15:57 (5) 15:58 (5)	08:36 16:04
15	05:13 21:50	06:03 20:57	06:57 19:44		07:52 18:31	17:32 (4) 17:56 (4)	07:51 16:29		08:37 16:04
16	05:14 21:49	06:04 20:55	06:59 19:42		07:54 18:29	17:31 (4) 17:57 (4)	07:53 16:27		08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39		07:55 18:26	17:31 (4) 17:57 (4)	07:55 16:26		08:38 16:05
18	05:17 21:46	06:08 20:50	07:03 19:37		07:57 18:24	17:30 (4) 17:55 (4)	07:57 16:24		08:39 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34		07:59 18:22	17:30 (4) 17:52 (4)	07:59 16:23		08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32		08:01 18:20	17:30 (4) 17:50 (4)	08:00 16:22		08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29		08:03 18:17	17:30 (4) 17:48 (4)	08:02 16:20		08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27		08:05 18:15	17:30 (4) 17:45 (4)	08:04 16:19		08:42 16:06
23	05:24 21:39	06:17 20:39	07:12 19:24		08:07 18:13	17:31 (4) 17:43 (4)	08:06 16:18		08:42 16:07
24	05:26 21:38	06:19 20:37	07:13 19:22		08:09 18:11	17:32 (4) 17:41 (4)	08:08 16:17		08:43 16:08
25	05:27 21:36	06:20 20:35	07:15 19:19		07:11 17:09	16:32 (4) 16:38 (4)	08:09 16:16		08:43 16:08
26	05:29 21:35	06:22 20:32	19:33 (2) 19:17		07:13 17:06	16:34 (4) 16:36 (4)	08:11 16:14		08:43 16:09
27	05:30 21:33	06:24 20:30	19:31 (2) 19:14		07:19 17:04		08:13 16:13		08:44 16:10
28	05:32 21:32	06:26 20:28	19:29 (2) 19:12		07:21 17:02		08:14 16:12		08:44 16:10
29	05:34 21:30	06:27 20:25	19:27 (2) 19:09	18:25 (3)	07:18 17:00		08:16 16:11		08:44 16:11
30	05:35 21:28	06:29 20:23	19:27 (2) 19:07	18:20 (3)	07:20 16:58		08:18 16:11		08:44 16:12
31	05:37 21:26	06:31 20:21	19:25 (2) 19:48 (2)	18:32 (3)	07:22 16:56				08:44 16:13
Potential sun hours	512	460	382	328	259				233
Total, worst case		110	161	366	140				
Sun reduction		0.34	0.32	0.29	0.27				
Oper. time red.		1.00	1.00	1.00	1.00				
Wind dir. red.		0.67	0.67	0.67	0.66				
Total reduction		0.23	0.21	0.20	0.17				
Total, real		25	34	72	24				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FT - H176

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May		June
1	08:44		15:15 (5)	08:14		15:39 (4)	07:16		17:05 (3)	07:01		19:04 (2)	05:52		05:03
	16:15	22	15:37 (5)	17:06	35	16:14 (4)	18:02	18	17:23 (3)	20:00	29	19:33 (2)	20:55		21:45
2	08:44		15:16 (5)	08:12		15:40 (4)	07:14		17:06 (3)	06:59		19:02 (2)	05:50		05:02
	16:16	23	15:39 (5)	17:08	33	16:13 (4)	18:04	15	17:21 (3)	20:02	33	19:35 (2)	20:57		21:46
3	08:44		15:16 (5)	08:10		15:41 (4)	07:12		17:09 (3)	06:56		19:01 (2)	05:48		05:01
	16:17	23	15:39 (5)	17:10	31	16:12 (4)	18:06	9	17:18 (3)	20:04	36	19:37 (2)	20:59		21:48
4	08:43		15:17 (5)	08:08		15:42 (4)	07:09			06:54		19:01 (2)	05:46		05:00
	16:18	24	15:41 (4)	17:12	30	16:12 (4)	18:07			20:06	37	19:38 (2)	21:01		21:49
5	08:43		15:17 (5)	08:07		15:43 (4)	07:07			06:51		19:00 (2)	05:44		04:59
	16:19	25	15:42 (4)	17:14	27	16:10 (4)	18:09			20:07	38	19:38 (2)	21:03		21:50
6	08:43		15:18 (5)	08:05		15:45 (4)	07:04			06:49		19:00 (2)	05:42		04:59
	16:21	26	15:44 (4)	17:16	24	16:09 (4)	18:11			20:09	38	19:38 (2)	21:04		21:51
7	08:42		15:18 (5)	08:03		15:47 (4)	07:02			06:47		18:59 (2)	05:40		04:58
	16:22	27	15:45 (4)	17:18	21	16:08 (4)	18:13			20:11	38	19:37 (2)	21:06		21:52
8	08:42		15:18 (5)	08:01		15:49 (4)	07:00			06:44		18:59 (2)	05:38		04:57
	16:24	28	15:46 (4)	17:20	16	16:05 (4)	18:15			20:13	38	19:37 (2)	21:08		21:53
9	08:41		15:20 (5)	07:59		15:54 (4)	06:57			06:42		18:59 (2)	05:36		04:57
	16:25	29	15:49 (4)	17:22	8	16:02 (4)	18:17			20:15	38	19:37 (2)	21:10		21:54
10	08:40		15:20 (5)	07:57			06:55			06:39		18:59 (2)	05:34		04:56
	16:26	30	15:50 (4)	17:24			18:19			20:17	37	19:36 (2)	21:11		21:55
11	08:40		15:21 (5)	07:55			06:52			06:37		18:59 (2)	05:33		04:56
	16:28	31	15:52 (4)	17:26			18:21			20:19	36	19:35 (2)	21:13		21:55
12	08:39		15:22 (5)	07:53			06:50			06:35		19:00 (2)	05:31		04:55
	16:30	32	15:54 (4)	17:28			18:23			20:20	35	19:35 (2)	21:15		21:56
13	08:38		15:23 (5)	07:51			06:48			06:32		19:00 (2)	05:29		04:55
	16:31	32	15:55 (4)	17:30			18:25			20:22	33	19:33 (2)	21:17		21:57
14	08:37		15:24 (5)	07:49			06:45			06:30		19:01 (2)	05:27		04:55
	16:33	33	15:57 (4)	17:32			18:27			20:24	31	19:32 (2)	21:18		21:58
15	08:36		15:25 (5)	07:47			06:43			06:28		19:02 (2)	05:26		04:54
	16:34	34	15:59 (4)	17:34			18:28			20:26	29	19:31 (2)	21:20		21:58
16	08:35		15:26 (5)	07:45			06:40			06:25		19:03 (2)	05:24		04:54
	16:36	34	16:00 (4)	17:36			18:30			20:28	27	19:30 (2)	21:22		21:59
17	08:34		15:28 (5)	07:43		17:07 (3)	06:38			06:23		19:04 (2)	05:22		04:54
	16:38	34	16:02 (4)	17:38	2	17:09 (3)	18:32			20:30	23	19:27 (2)	21:23		21:59
18	08:33		15:31 (5)	07:41		17:05 (3)	06:35			06:21		19:06 (2)	05:21		04:54
	16:40	34	16:05 (4)	17:40	6	17:11 (3)	18:34			20:31	19	19:25 (2)	21:25		22:00
19	08:32		15:35 (4)	07:39		17:04 (3)	06:33			06:18		19:09 (2)	05:19		04:54
	16:41	32	16:07 (4)	17:42	9	17:13 (3)	18:36			20:33	14	19:23 (2)	21:27		22:00
20	08:31		15:34 (4)	07:36		17:03 (3)	06:31			06:16			05:18		04:54
	16:43	34	16:08 (4)	17:44	13	17:16 (3)	18:38			20:35			21:28		22:00
21	08:30		15:35 (4)	07:34		17:03 (3)	06:28			06:14			05:16		04:54
	16:45	36	16:11 (4)	17:46	15	17:18 (3)	18:40			20:37			21:30		22:01
22	08:29		15:34 (4)	07:32		17:02 (3)	06:26			06:12			05:15		04:55
	16:47	38	16:12 (4)	17:48	17	17:19 (3)	18:42			20:39			21:31		22:01
23	08:27		15:35 (4)	07:30		17:02 (3)	06:23			06:09			05:13		04:55
	16:49	38	16:13 (4)	17:50	20	17:22 (3)	18:43			20:41			21:33		22:01
24	08:26		15:35 (4)	07:28		17:02 (3)	06:21			06:07			05:12		04:55
	16:50	38	16:13 (4)	17:52	22	17:24 (3)	18:45			20:43			21:34		22:01
25	08:24		15:36 (4)	07:25		17:02 (3)	06:18			06:05			05:11		04:55
	16:52	38	16:14 (4)	17:54	24	17:26 (3)	18:47			20:44			21:36		22:01
26	08:23		15:36 (4)	07:23		17:02 (3)	06:16		18:18 (2)	06:03			05:09		04:56
	16:54	38	16:14 (4)	17:56	24	17:26 (3)	18:49	5	18:23 (2)	20:46			21:37		22:01
27	08:22		15:36 (4)	07:21		17:03 (3)	06:13		18:13 (2)	06:01			05:08		04:56
	16:56	38	16:14 (4)	17:58	23	17:26 (3)	18:51	11	18:24 (2)	20:48			21:39		22:01
28	08:20		15:37 (4)	07:18		17:03 (3)	06:11		18:11 (2)	05:58			05:07		04:57
	16:58	37	16:14 (4)	18:00	21	17:24 (3)	18:53	15	18:26 (2)	20:50			21:40		22:01
29	08:18		15:37 (4)				07:08		19:08 (2)	05:56			05:06		04:57
	17:00	37	16:14 (4)				19:54	20	19:28 (2)	20:52			21:41		22:01
30	08:17		15:37 (4)				07:06		19:07 (2)	05:54			05:05		04:58
	17:02	37	16:14 (4)				19:56	23	19:30 (2)	20:54			21:43		22:00
31	08:15		15:38 (4)				07:04		19:04 (2)				05:04		
	17:04	35	16:13 (4)				19:58	27	19:31 (2)				21:44		
Potential sun hours	250			273			367			420			494		510
Total, worst case		997			421			143			609				
Sun reduction		0.24			0.23			0.27			0.35				
Oper. time red.		1.00			1.00			1.00			1.00				
Wind dir. red.		0.66			0.67			0.67			0.67				
Total reduction		0.16			0.16			0.18			0.24				
Total, real		160			65			26			145				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FT - H176

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:58 (2) 19:34 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:58 (2) 19:35 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:56 (2) 19:34 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:56 (2) 19:34 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:56 (2) 19:34 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:56 (2) 19:34 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:55 (2) 19:33 (2)	07:37 16:43	08:28 16:06
8	05:05 21:56	05:50 21:12	06:45 20:01	18:55 (2) 19:32 (2)	07:39 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	18:56 (2) 19:31 (2)	07:41 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:55 (2) 19:28 (2)	07:42 17:49 (3)	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:56 (2) 19:26 (2)	07:44 17:53 (3)	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:57 (2) 19:24 (2)	07:46 17:55 (3)	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:58 (2) 19:22 (2)	07:48 17:57 (3)	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:58 (2) 19:18 (2)	07:50 17:57 (3)	08:36 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	19:00 (2) 19:16 (2)	07:52 17:58 (3)	08:37 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	19:02 (2) 19:14 (2)	07:54 17:58 (3)	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	19:04 (2) 19:11 (2)	07:55 17:57 (3)	08:38 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	18:26 18:24	16:26 17:55 (3)	16:05 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	18:22 18:22	16:23 17:52 (3)	16:05 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	18:20 18:20	16:22 17:50 (3)	16:06 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	18:03 18:17	16:20 17:48 (3)	16:06 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	18:05 18:15	16:19 17:45 (3)	16:06 16:06
23	05:24 21:39	06:17 20:39	19:17 (2) 19:22 (2)	18:07 18:13	16:18 17:43 (3)	16:07 16:07
24	05:26 21:38	06:19 20:37	19:12 (2) 19:27 (2)	18:09 18:11	16:17 17:41 (3)	16:08 16:08
25	05:27 21:36	06:20 20:35	19:08 (2) 19:28 (2)	17:15 17:13	16:16 16:38 (3)	16:09 16:16
26	05:29 21:35	06:22 20:32	19:06 (2) 19:30 (2)	17:17 17:06	16:14 16:14	16:09 16:09
27	05:30 21:33	06:24 20:30	19:05 (2) 19:32 (2)	17:19 17:04	16:13 16:13	16:10 16:10
28	05:32 21:32	06:26 20:28	19:02 (2) 19:32 (2)	17:21 17:02	16:12 16:12	16:11 16:11
29	05:34 21:30	06:27 20:25	19:01 (2) 19:33 (2)	17:22 17:00	16:12 16:12	16:11 16:11
30	05:35 21:28	06:29 20:23	19:00 (2) 19:34 (2)	17:24 16:58	16:11 16:11	16:11 16:11
31	05:37 21:27	06:31 20:21	18:59 (2) 19:34 (2)	17:22 16:56	16:11 16:11	16:11 16:11
Potential sun hours	512	460	382	328	259	233
Total, worst case		222		504	238	676
Sun reduction		0.34		0.32	0.27	0.21
Oper. time red.		1.00		1.00	1.00	1.00
Wind dir. red.		0.67		0.67	0.66	0.66
Total reduction		0.23		0.22	0.18	0.14
Total, real		51		109	165	92

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FU - H177

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:09 (5)	08:14	15:33 (4)	07:16	17:04 (3)	07:01	18:59 (2)	05:52	05:03	
2	08:44	15:10 (5)	08:12	15:34 (4)	07:14	17:08 (3)	06:59	18:57 (2)	05:50	05:02	
3	08:44	15:11 (5)	08:10	15:35 (4)	07:12	17:09 (3)	06:56	18:57 (2)	05:48	05:01	
4	08:43	15:11 (5)	08:08	15:37 (4)	07:09		06:54	18:57 (2)	05:46	05:00	
5	08:43	15:11 (5)	08:07	15:40 (4)	07:07		06:51	18:56 (2)	05:44	04:59	
6	08:43	15:13 (5)	08:05	15:45 (4)	07:04		06:49	18:56 (2)	05:42	04:59	
7	08:42	15:13 (5)	08:03	15:51 (4)	07:02		06:47	18:55 (2)	05:40	04:58	
8	08:42	15:14 (5)	08:01		07:00		06:44	18:55 (2)	05:38	04:57	
9	08:41	15:15 (5)	07:59		06:57		06:42	18:55 (2)	05:36	04:57	
10	08:40	15:16 (5)	07:57		06:55		06:39	18:55 (2)	05:34	04:56	
11	08:40	15:17 (5)	07:55		06:53		06:37	18:55 (2)	05:33	04:56	
12	08:39	15:18 (5)	07:53		06:50		06:35	18:56 (2)	05:31	04:55	
13	08:38	15:20 (5)	07:51		06:48		06:32	18:56 (2)	05:29	04:55	
14	08:37	15:22 (5)	07:49		06:45		06:30	18:57 (2)	05:27	04:55	
15	08:36	15:23 (4)	07:47	17:02 (3)	06:43		06:28	18:58 (2)	05:26	04:54	
16	08:35	15:22 (4)	07:45	17:01 (3)	06:40		06:25	19:00 (2)	05:24	04:54	
17	08:34	15:23 (4)	07:43	17:00 (3)	06:38		06:23	19:01 (2)	05:22	04:54	
18	08:33	15:23 (4)	07:41	16:58 (3)	06:35		06:21	19:03 (2)	05:21	04:54	
19	08:32	15:24 (4)	07:39	17:11 (3)	06:33		06:18	19:06 (2)	05:19	04:54	
20	08:31	15:24 (4)	07:36	17:13 (3)	06:31		06:16	19:19 (2)	05:18	04:54	
21	08:30	15:24 (4)	07:34	17:16 (3)	06:28	18:10 (1)	06:14		05:16	04:54	
22	08:29	15:24 (4)	07:32	17:18 (3)	06:26	18:13 (1)	06:12		05:15	04:55	
23	08:27	15:25 (4)	07:30	17:19 (3)	06:23	18:15 (1)	06:09		05:13	04:55	
24	08:26	15:25 (4)	07:28	17:22 (3)	06:21	18:17 (1)	06:07		05:12	04:55	
25	08:24	15:26 (4)	07:25	17:23 (3)	06:18	18:18 (1)	06:05		05:11	04:55	
26	08:23	15:27 (4)	07:23	17:21 (3)	06:16	18:21 (2)	06:03		05:10	04:56	
27	08:22	15:27 (4)	07:21	17:21 (3)	06:13	18:23 (2)	06:01		05:08	04:56	
28	08:20	15:28 (4)	07:18	17:20 (3)	06:11	18:24 (2)	05:58		05:07	04:57	
29	08:19	15:29 (4)	07:16	17:18 (3)	06:09	18:26 (2)	05:56		05:06	04:57	
30	08:17	15:30 (4)	07:14		06:06	19:02 (2)	05:54		05:05	04:58	
31	08:15	15:31 (4)	07:12		06:04	19:01 (2)	05:52		05:04	04:58	
Potential sun hours	250		273		367		420		494	510	
Total, worst case	1085		358		199		639				
Sun reduction	0.24		0.23		0.27		0.35				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.66		0.67		0.67		0.67				
Total reduction	0.16		0.16		0.18		0.24				
Total, real	173		56		36		152				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FU - H177

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December		
1	04:59 22:00	05:39 21:25	06:33 20:18	18:54 (2) 19:32 (2)	07:26 16:54	08:19 16:10	14:59 (5) 15:34 (4)	
2	04:59 22:00	05:40 21:23	06:35 20:16	18:54 (2) 19:32 (2)	07:28 16:52	08:21 16:09	14:58 (5) 15:33 (4)	
3	05:00 21:59	05:42 21:21	06:36 20:13	18:52 (2) 19:31 (2)	07:30 16:50	08:22 16:08	14:58 (5) 15:32 (4)	
4	05:01 21:59	05:44 21:19	06:38 20:11	18:52 (2) 19:32 (2)	07:31 16:48	08:24 16:08	14:59 (5) 15:32 (4)	
5	05:02 21:58	05:45 21:17	06:40 20:09	18:52 (2) 19:32 (2)	07:33 16:46	15:14 (4) 15:21 (4)	08:25 16:07	14:58 (5) 15:30 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	18:52 (2) 19:32 (2)	07:35 16:44	15:10 (4) 15:25 (4)	08:26 16:07	14:59 (5) 15:30 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	18:51 (2) 19:31 (2)	07:37 16:43	15:07 (4) 15:27 (4)	08:28 16:06	14:59 (5) 15:29 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	18:51 (2) 19:30 (2)	07:39 16:41	15:05 (4) 15:29 (4)	08:29 16:06	14:58 (5) 15:28 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	18:51 (2) 19:30 (2)	07:41 16:39	15:04 (4) 15:30 (4)	08:30 16:05	14:59 (5) 15:28 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	18:50 (2) 19:28 (2)	07:42 16:37	15:03 (4) 15:33 (4)	08:31 16:05	14:59 (5) 15:28 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	18:51 (2) 19:26 (2)	07:44 16:35	15:02 (4) 15:34 (4)	08:33 16:05	14:59 (5) 15:27 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	18:52 (2) 19:24 (2)	07:46 17:39 (3)	15:01 (4) 15:34 (4)	08:34 16:05	15:00 (5) 15:27 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	18:52 (2) 19:22 (2)	07:48 17:36 (3)	15:01 (4) 15:35 (4)	08:35 16:05	15:00 (5) 15:27 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	18:52 (2) 19:18 (2)	07:50 17:33 (3)	15:00 (4) 15:36 (4)	08:36 16:04	15:00 (5) 15:26 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	18:54 (2) 19:16 (2)	07:52 17:32 (3)	15:00 (4) 15:36 (4)	08:37 16:05	15:01 (5) 15:26 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	18:55 (2) 19:14 (2)	07:54 17:31 (3)	15:00 (4) 15:37 (4)	08:38 16:05	15:01 (5) 15:26 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	18:55 (1) 19:11 (2)	07:55 17:30 (3)	14:59 (4) 15:37 (4)	08:38 16:05	15:02 (5) 15:27 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	18:55 (1) 19:08 (2)	07:57 17:29 (3)	14:59 (4) 15:38 (4)	08:39 16:05	15:02 (5) 15:27 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	18:54 (1) 19:06 (1)	07:59 17:29 (3)	14:59 (4) 15:38 (4)	08:40 16:05	15:03 (5) 15:28 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	18:54 (1) 19:04 (1)	08:00 17:28 (3)	14:59 (4) 15:39 (4)	08:41 16:06	15:03 (5) 15:27 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	18:53 (1) 19:01 (1)	08:02 17:28 (3)	14:59 (4) 15:39 (4)	08:41 16:06	15:04 (5) 15:28 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	18:54 (1) 18:58 (1)	08:05 17:28 (3)	15:00 (4) 15:39 (4)	08:42 16:06	15:04 (5) 15:28 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	18:55 (1) 18:56 (1)	08:07 17:29 (3)	15:00 (4) 15:40 (4)	08:42 16:07	15:05 (5) 15:29 (4)
24	05:26 21:38	06:19 20:37	19:09 (2) 19:23 (2)	07:13 18:11	08:09 17:29 (3)	15:00 (4) 15:40 (4)	08:43 16:08	15:05 (5) 15:30 (4)
25	05:27 21:36	06:20 20:35	19:05 (2) 19:25 (2)	07:15 19:19	08:09 17:48 (3)	15:01 (4) 15:40 (4)	08:43 16:08	15:05 (5) 15:30 (4)
26	05:29 21:35	06:22 20:32	19:03 (2) 19:27 (2)	07:17 19:17	08:11 16:30 (3)	15:01 (4) 15:39 (4)	08:43 16:09	15:06 (5) 15:30 (4)
27	05:30 21:33	06:24 20:30	19:01 (2) 19:29 (2)	07:19 17:04	08:13 16:32 (3)	15:02 (4) 15:38 (4)	08:44 16:10	15:07 (5) 15:32 (4)
28	05:32 21:32	06:26 20:28	18:59 (2) 19:29 (2)	07:21 17:02	08:14 16:12	15:02 (5) 15:37 (4)	08:44 16:11	15:07 (5) 15:33 (4)
29	05:34 21:30	06:27 20:25	18:58 (2) 19:30 (2)	07:22 17:00	08:16 16:12	15:00 (5) 15:36 (4)	08:44 16:11	15:08 (5) 15:34 (4)
30	05:35 21:28	06:29 20:23	18:57 (2) 19:31 (2)	07:24 19:07	08:18 16:58	14:59 (5) 16:11	08:44 16:12	15:08 (5) 15:34 (4)
31	05:37 21:27	06:31 20:21	18:55 (2) 19:31 (2)	07:22 16:56	08:22 16:13	08:44 16:13	15:08 (5) 15:35 (4)	
Potential sun hours	512	460	382	328	259	233		
Total, worst case		218	619	256	865	851		
Sun reduction		0.34	0.32	0.29	0.27	0.21		
Oper. time red.		1.00	1.00	1.00	1.00	1.00		
Wind dir. red.		0.67	0.67	0.67	0.66	0.65		
Total reduction		0.23	0.22	0.20	0.17	0.14		
Total, real		50	134	50	151	115		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FV - H178

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44	15:06 (5)	08:14	15:30 (4)	07:16				07:01	18:54 (2)	05:52	05:03					
	16:15	31	15:37 (4)	17:06	23	15:53 (4)	18:02		20:00	39	19:33 (2)	20:55	21:45				
2	08:44		15:07 (5)	08:12		15:32 (4)	07:14		06:59		18:53 (2)	05:50	05:02				
	16:16	32	15:39 (4)	17:08	19	15:51 (4)	18:04		20:02	40	19:33 (2)	20:57	21:46				
3	08:44		15:07 (5)	08:10		15:34 (4)	07:12		06:56		18:53 (2)	05:48	05:01				
	16:17	32	15:39 (4)	17:10	14	15:48 (4)	18:06		20:04	40	19:33 (2)	20:59	21:48				
4	08:43		15:08 (5)	08:08		15:40 (4)	07:09		06:54		18:52 (2)	05:46	05:00				
	16:18	33	15:41 (4)	17:12	3	15:43 (4)	18:07		20:06	41	19:33 (2)	21:01	21:49				
5	08:43		15:09 (5)	08:07			07:07		06:51		18:52 (2)	05:44	04:59				
	16:19	33	15:42 (4)	17:14			18:09		20:07	41	19:33 (2)	21:03	21:50				
6	08:43		15:10 (5)	08:05			07:04		06:49		18:52 (2)	05:42	04:59				
	16:21	34	15:44 (4)	17:16			18:11		20:09	41	19:33 (2)	21:04	21:51				
7	08:42		15:11 (5)	08:03			07:02		06:47		18:51 (2)	05:40	04:58				
	16:22	34	15:45 (4)	17:18			18:13		20:11	41	19:32 (2)	21:06	21:52				
8	08:42		15:11 (5)	08:01			07:00		06:44		18:51 (2)	05:38	04:57				
	16:24	35	15:46 (4)	17:20			18:15		20:13	40	19:31 (2)	21:08	21:53				
9	08:41		15:13 (5)	07:59			06:57		06:42		18:52 (2)	05:36	04:57				
	16:25	36	15:49 (4)	17:22			18:17		20:15	39	19:31 (2)	21:10	21:54				
10	08:40		15:14 (5)	07:57			06:55		06:39		18:52 (2)	05:34	04:56				
	16:26	36	15:50 (4)	17:24			18:19		20:17	38	19:30 (2)	21:11	21:55				
11	08:40		15:15 (4)	07:55			06:53		06:37		18:52 (2)	05:33	04:56				
	16:28	37	15:52 (4)	17:26			18:21		20:19	37	19:29 (2)	21:13	21:55				
12	08:39		15:15 (4)	07:53			06:50		06:35		18:53 (2)	05:31	04:55				
	16:30	39	15:54 (4)	17:28			18:23		20:20	35	19:28 (2)	21:15	21:56				
13	08:38		15:16 (4)	07:51		16:59 (3)	06:48		06:32		18:53 (2)	05:29	04:55				
	16:31	39	15:55 (4)	17:30	1	17:00 (3)	18:25		20:22	33	19:26 (2)	21:17	21:57				
14	08:37		15:16 (4)	07:49		16:58 (3)	06:45		06:30		18:55 (2)	05:27	04:55				
	16:33	40	15:56 (4)	17:32	4	17:02 (3)	18:27		20:24	30	19:25 (2)	21:18	21:58				
15	08:36		15:16 (4)	07:47		16:57 (3)	06:43		06:28		18:56 (2)	05:26	04:54				
	16:34	40	15:56 (4)	17:34	8	17:05 (3)	18:28		20:26	28	19:24 (2)	21:20	21:58				
16	08:35		15:16 (4)	07:45		16:56 (3)	06:40		06:25		18:58 (2)	05:24	04:54				
	16:36	40	15:56 (4)	17:36	11	17:07 (3)	18:30		20:28	24	19:22 (2)	21:22	21:59				
17	08:34		15:17 (4)	07:43		16:56 (3)	06:38		06:23		18:59 (2)	05:22	04:54				
	16:38	39	15:56 (4)	17:38	13	17:09 (3)	18:32		20:30	20	19:19 (2)	21:23	21:59				
18	08:33		15:17 (4)	07:41		16:54 (3)	06:35		06:21		19:02 (2)	05:21	04:54				
	16:40	40	15:57 (4)	17:40	17	17:11 (3)	18:34		20:31	14	19:16 (2)	21:25	22:00				
19	08:32		15:18 (4)	07:39		16:54 (3)	06:33		06:18			05:19	04:54				
	16:41	39	15:57 (4)	17:42	19	17:13 (3)	18:36		20:33			21:27	22:00				
20	08:31		15:18 (4)	07:36		16:54 (3)	06:31		18:08 (1)	06:16		05:18	04:54				
	16:43	39	15:57 (4)	17:44	22	17:16 (3)	18:38	3	18:11 (1)	20:35		21:28	22:00				
21	08:30		15:19 (4)	07:34		16:55 (3)	06:28		18:07 (1)	06:14		05:16	04:54				
	16:45	39	15:58 (4)	17:46	23	17:18 (3)	18:40	6	18:13 (1)	20:37		21:30	22:01				
22	08:29		15:19 (4)	07:32		16:54 (3)	06:26		18:06 (1)	06:12		05:15	04:55				
	16:47	38	15:57 (4)	17:48	25	17:19 (3)	18:42	9	18:15 (1)	20:39		21:31	22:01				
23	08:27		15:20 (4)	07:30		16:55 (3)	06:23		18:06 (1)	06:09		05:13	04:55				
	16:49	38	15:58 (4)	17:50	24	17:19 (3)	18:43	11	18:17 (2)	20:41		21:33	22:01				
24	08:26		15:20 (4)	07:28		16:56 (3)	06:21		18:05 (1)	06:07		05:12	04:55				
	16:50	37	15:57 (4)	17:52	23	17:19 (3)	18:45	13	18:18 (2)	20:43		21:34	22:01				
25	08:24		15:21 (4)	07:25		16:56 (3)	06:18		18:04 (2)	06:05		05:11	04:55				
	16:52	36	15:57 (4)	17:54	21	17:17 (3)	18:47	17	18:21 (2)	20:44		21:36	22:01				
26	08:23		15:22 (4)	07:23		16:57 (3)	06:16		18:02 (2)	06:03		05:09	04:56				
	16:54	35	15:57 (4)	17:56	19	17:16 (3)	18:49	21	18:23 (2)	20:46		21:37	22:01				
27	08:22		15:22 (4)	07:21		16:59 (3)	06:13		18:00 (2)	06:01		05:08	04:56				
	16:56	34	15:56 (4)	17:58	16	17:15 (3)	18:51	24	18:24 (2)	20:48		21:39	22:01				
28	08:20		15:24 (4)	07:18		17:01 (3)	06:11		17:59 (2)	05:58		05:07	04:57				
	16:58	32	15:56 (4)	18:00	11	17:12 (3)	18:53	27	18:26 (2)	20:50		21:40	22:01				
29	08:19		15:25 (4)				07:09		18:57 (2)	05:56		05:06	04:57				
	17:00	30	15:55 (4)				19:54	31	19:28 (2)	20:52		21:41	22:01				
30	08:17		15:26 (4)				07:06		18:56 (2)	05:54		05:05	04:58				
	17:02	28	15:54 (4)				19:56	34	19:30 (2)	20:54		21:43	22:00				
31	08:15		15:27 (4)				07:04		18:54 (2)			05:04					
	17:04	26	15:53 (4)				19:58	37	19:31 (2)			21:44					
Potential sun hours	250			273			367			420		494		510			
Total, worst case	1101			316			233			621							
Sun reduction	0.24			0.23			0.27			0.35							
Oper. time red.	1.00			1.00			1.00			1.00							
Wind dir. red.	0.66			0.67			0.67			0.67							
Total reduction	0.16			0.16			0.18			0.24							
Total, real	176			49			43			148							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FV - H178

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:51 (2) 19:28 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:50 (2) 19:29 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:49 (2) 19:28 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:48 (2) 19:28 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:48 (2) 19:29 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:48 (2) 19:29 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:47 (2) 19:28 (2)	07:37 16:43	08:28 16:06
8	05:05 21:56	05:50 21:12	06:45 20:01	18:47 (2) 19:28 (2)	07:39 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	18:47 (2) 19:27 (2)	07:41 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:46 (2) 19:26 (2)	07:42 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:46 (2) 19:26 (2)	07:44 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:47 (2) 19:24 (2)	07:46 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:47 (2) 19:22 (2)	07:48 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:47 (2) 19:18 (2)	07:49 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	18:48 (2) 19:16 (2)	07:51 16:29	08:37 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	18:49 (2) 19:14 (2)	07:53 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	18:50 (2) 19:11 (2)	07:55 16:26	08:38 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	18:51 (2) 19:08 (2)	07:57 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	18:53 (1) 19:06 (2)	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	18:52 (1) 19:04 (2)	08:00 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	18:52 (1) 19:01 (1)	08:02 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	18:52 (1) 18:58 (1)	08:04 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	07:12 19:24	18:53 (1) 18:56 (1)	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:13 19:22	18:56 (1) 18:11	08:08 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	07:15 19:19	16:25 (3) 16:38 (3)	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	17:03 16:36 (3)	08:11 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	16:26 (3) 16:34 (3)	08:13 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	17:04 16:27 (3)	08:14 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	17:02 17:00	08:16 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	18:54 (2) 16:58	07:20 16:11	08:44 16:12
31	05:37 21:27	06:31 20:21	18:52 (2) 19:27 (2)	07:22 16:56	07:22 16:13	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		189	676	266	792	944
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.65
Total reduction		0.23	0.22	0.20	0.17	0.14
Total, real		44	146	52	138	128

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FW - H179

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44		14:41 (4)	08:14			07:16			07:01		18:32 (2)	05:52			05:03		
	16:15	40	15:21 (4)	17:06			18:02			20:00	45	19:17 (2)	20:55			21:45		
2	08:44		14:42 (4)	08:12			07:14			06:59		18:31 (2)	05:50			05:02		
	16:16	39	15:21 (4)	17:08			18:04			20:02	44	19:15 (2)	20:57			21:46		
3	08:44		14:41 (4)	08:10			07:12			06:56		18:32 (2)	05:48			05:01		
	16:17	40	15:21 (4)	17:10			18:06			20:04	43	19:15 (2)	20:59			21:48		
4	08:43		14:43 (4)	08:08			07:09			06:54		18:33 (2)	05:46			05:00		
	16:18	39	15:22 (4)	17:12			18:07			20:06	41	19:14 (2)	21:01			21:49		
5	08:43		14:43 (4)	08:07		16:42 (3)	07:07			06:51		18:33 (2)	05:44			04:59		
	16:19	39	15:22 (4)	17:14	1	16:43 (3)	18:09			20:07	40	19:13 (2)	21:03			21:50		
6	08:43		14:44 (4)	08:05			07:04			06:49		18:34 (2)	05:42			04:59		
	16:21	38	15:22 (4)	17:16	4	16:45 (3)	18:11			20:09	38	19:12 (2)	21:04			21:51		
7	08:42		14:44 (4)	08:03			07:02			06:47		18:34 (2)	05:40			04:58		
	16:22	38	15:22 (4)	17:18	7	16:47 (3)	18:13			20:11	36	19:10 (2)	21:06			21:52		
8	08:42		14:44 (4)	08:01			07:00			06:44		18:35 (2)	05:38			04:57		
	16:24	38	15:23 (4)	17:20	11	16:50 (3)	18:15			20:13	34	19:09 (2)	21:08			21:53		
9	08:41		14:46 (4)	07:59			06:57			06:42		18:37 (2)	05:36			04:57		
	16:25	37	15:23 (4)	17:22	14	16:52 (3)	18:17			20:15	30	19:07 (2)	21:10			21:54		
10	08:40		14:46 (4)	07:57			06:55			06:39		18:38 (2)	05:34			04:56		
	16:26	37	15:23 (4)	17:24	16	16:54 (3)	18:19			20:17	27	19:05 (2)	21:11			21:55		
11	08:40		14:47 (4)	07:55			06:53			06:37		18:40 (2)	05:33			04:56		
	16:28	36	15:23 (4)	17:26	18	16:56 (3)	18:21			20:19	23	19:03 (2)	21:13			21:55		
12	08:39		14:48 (4)	07:53			06:50			06:35		18:44 (2)	05:31			04:55		
	16:30	35	15:23 (4)	17:28	21	16:59 (3)	18:23			20:20	16	19:00 (2)	21:15			21:56		
13	08:38		14:49 (4)	07:51			06:48			06:32			05:29			04:55		
	16:31	34	15:23 (4)	17:30	23	17:00 (3)	18:25			20:22			21:17			21:57		
14	08:37		14:50 (4)	07:49			06:45			06:30			05:27			04:55		
	16:33	33	15:23 (4)	17:32	25	17:02 (3)	18:27			20:24			21:18			21:58		
15	08:36		14:51 (4)	07:47			06:43		17:53 (2)	06:28			05:26			04:54		
	16:34	32	15:23 (4)	17:34	26	17:04 (3)	18:28	9	18:02 (2)	20:26			21:20			21:58		
16	08:35		14:51 (4)	07:45			06:40		17:48 (2)	06:25			05:24			04:54		
	16:36	31	15:22 (4)	17:36	26	17:04 (3)	18:30	16	18:04 (2)	20:28			21:22			21:59		
17	08:34		14:52 (4)	07:43			06:38		17:46 (2)	06:23			05:22			04:54		
	16:38	30	15:22 (4)	17:38	25	17:04 (3)	18:32	20	18:06 (2)	20:30			21:23			21:59		
18	08:33		14:54 (4)	07:41			06:35		17:43 (2)	06:21			05:21			04:54		
	16:40	27	15:21 (4)	17:40	23	17:02 (3)	18:34	24	18:07 (2)	20:31			21:25			22:00		
19	08:32		14:56 (4)	07:39			06:33		17:41 (2)	06:18			05:19			04:54		
	16:41	25	15:21 (4)	17:42	21	17:01 (3)	18:36	29	18:10 (2)	20:33			21:27			22:00		
20	08:31		14:57 (4)	07:36			06:31		17:39 (2)	06:16			05:18			04:54		
	16:43	22	15:19 (4)	17:44	18	17:00 (3)	18:38	32	18:11 (2)	20:35			21:28			22:00		
21	08:30		14:59 (4)	07:34			06:28		17:38 (2)	06:14			05:16			04:54		
	16:45	20	15:19 (4)	17:46	15	16:59 (3)	18:40	35	18:13 (2)	20:37			21:30			22:01		
22	08:29		15:01 (4)	07:32			06:26		17:36 (2)	06:12			05:15			04:55		
	16:47	15	15:16 (4)	17:48	9	16:55 (3)	18:42	39	18:15 (2)	20:39			21:31			22:01		
23	08:27		15:05 (4)	07:30			06:23		17:36 (2)	06:09			05:13			04:55		
	16:49	9	15:14 (4)	17:50			18:43	41	18:17 (2)	20:41			21:33			22:01		
24	08:26			07:28			06:21		17:34 (2)	06:07			05:12			04:55		
	16:50			17:52			18:45	44	18:18 (2)	20:43			21:34			22:01		
25	08:24			07:25			06:18		17:34 (2)	06:05			05:11			04:55		
	16:52			17:54			18:47	44	18:18 (2)	20:44			21:36			22:01		
26	08:23			07:23			06:16		17:34 (2)	06:03			05:09			04:56		
	16:54			17:56			18:49	45	18:19 (2)	20:46			21:37			22:01		
27	08:22			07:21			06:13		17:33 (2)	06:01			05:08			04:56		
	16:56			17:58			18:51	45	18:18 (2)	20:48			21:39			22:01		
28	08:20			07:18			06:11		17:33 (2)	05:58			05:07			04:57		
	16:58			18:00			18:53	46	18:19 (2)	20:50			21:40			22:01		
29	08:19						07:09		18:32 (2)	05:56			05:06			04:57		
	17:00						19:55	46	19:18 (2)	20:52			21:41			22:01		
30	08:17						07:06		18:32 (2)	05:54			05:05			04:58		
	17:02						19:56	46	19:18 (2)	20:54			21:43			22:00		
31	08:15						07:04		18:31 (2)				05:04					
	17:04						19:58	46	19:17 (2)				21:44					
Potential sun hours	250			273			367			420			494			510		
Total, worst case	734			303			607			417								
Sun reduction	0.24			0.23			0.27			0.35								
Oper. time red.	1.00			1.00			1.00			1.00								
Wind dir. red.	0.65			0.66			0.68			0.68								
Total reduction	0.16			0.15			0.18			0.24								
Total, real	115			46			111			99								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FW - H179

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:39 (2) 19:02 (2)	07:26 16:54	16:08 (3) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:37 (2) 19:04 (2)	07:28 16:52	16:08 (3) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:35 (2) 19:05 (2)	07:30 16:50	16:09 (3) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:32 (2) 19:06 (2)	07:31 16:48	16:09 (3) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:31 (2) 19:07 (2)	07:33 16:46	16:10 (3) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:30 (2) 19:08 (2)	07:35 16:44	16:15 (3) 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:28 (2) 19:08 (2)	07:37 16:43	16:08 (3) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	18:27 (2) 19:09 (2)	07:39 16:41	16:07 (3) 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	18:26 (2) 19:09 (2)	07:41 16:39	16:07 (3) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:25 (2) 19:09 (2)	07:42 16:37	16:05 (3) 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:24 (2) 19:09 (2)	07:44 16:35	16:05 (3) 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:24 (2) 19:09 (2)	07:46 16:34	16:05 (3) 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:23 (2) 19:09 (2)	07:48 16:32	16:05 (3) 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:22 (2) 19:08 (2)	07:50 16:31	16:05 (3) 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	18:22 (2) 19:08 (2)	07:52 16:29	16:05 (3) 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	18:22 (2) 19:08 (2)	07:54 16:27	16:05 (3) 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	18:21 (2) 19:06 (2)	07:55 16:26	16:05 (3) 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	18:21 (2) 19:06 (2)	07:57 16:24	16:05 (3) 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	18:22 (2) 19:05 (2)	07:59 16:23	16:05 (3) 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	18:22 (2) 19:04 (2)	08:00 16:22	16:05 (3) 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	18:22 (2) 19:01 (2)	08:02 16:20	16:05 (3) 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	18:23 (2) 18:58 (2)	08:05 16:19	16:05 (3) 16:06
23	05:24 21:39	06:17 20:39	07:12 19:24	18:24 (2) 18:56 (2)	08:07 16:18	16:05 (3) 16:07
24	05:26 21:38	06:19 20:37	07:13 19:22	18:25 (2) 18:54 (2)	08:09 16:17	16:05 (3) 16:08
25	05:27 21:36	06:20 20:35	07:15 19:19	18:25 (2) 18:51 (2)	08:09 16:16	16:05 (3) 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	18:27 (2) 18:48 (2)	08:11 16:14	16:05 (3) 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	18:29 (2) 18:46 (2)	08:13 16:13	16:05 (3) 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	18:32 (2) 18:44 (2)	08:14 16:12	16:05 (3) 16:11
29	05:34 21:30	06:28 20:25	07:22 19:09	18:38 (2) 18:41 (2)	08:16 16:12	16:05 (3) 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	17:00 16:58	16:12 16:11	16:05 (3) 16:12
31	05:37 21:27	06:31 20:21	18:50 (2) 18:53 (2) 18:42 (2) 18:59 (2)	07:24 19:07 16:58 16:56	16:12 16:27 (3) 16:06 (3) 16:25 (3)	16:05 (3) 16:11 16:08 (3) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		20	1020	259	364	1225
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.68	0.68	0.66	0.65	0.65
Total reduction		0.23	0.22	0.19	0.17	0.13
Total, real		5	221	50	63	164

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FX - H180

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44		14:40 (4)	08:14		16:13 (3)	07:16		16:48 (2)	07:01		05:52			05:03		
	16:15	13	14:53 (4)	17:06	21	16:34 (3)	18:02	38	17:26 (2)	20:00		20:55			21:45		
2	08:44		14:42 (4)	08:12		16:13 (3)	07:14		16:47 (2)	06:59		05:50			05:02		
	16:16	10	14:52 (4)	17:08	23	16:36 (3)	18:04	38	17:25 (2)	20:02		20:57			21:46		
3	08:44		14:43 (4)	08:10		16:13 (3)	07:12		16:48 (2)	06:56		05:48			05:01		
	16:17	8	14:51 (4)	17:10	22	16:35 (3)	18:06	37	17:25 (2)	20:04		20:59			21:48		
4	08:43		14:48 (4)	08:08		16:14 (3)	07:09		16:48 (2)	06:54		05:46			05:00		
	16:18	1	14:49 (4)	17:12	21	16:35 (3)	18:07	37	17:25 (2)	20:06		21:01			21:49		
5	08:43			08:07		16:15 (3)	07:07		16:48 (2)	06:51		05:44			04:59		
	16:19			17:14	19	16:34 (3)	18:09	36	17:24 (2)	20:07		21:03			21:50		
6	08:43			08:05		16:16 (3)	07:04		16:49 (2)	06:49		05:42			04:58		
	16:21			17:16	17	16:33 (3)	18:11	34	17:23 (2)	20:09		21:04			21:51		
7	08:42			08:03		16:18 (3)	07:02		16:49 (2)	06:47		05:40			04:58		
	16:22			17:18	14	16:32 (3)	18:13	33	17:22 (2)	20:11		21:06			21:52		
8	08:42			08:01		16:20 (3)	07:00		16:50 (2)	06:44		05:38			04:57		
	16:24			17:20	10	16:30 (3)	18:15	31	17:21 (2)	20:13		21:08			21:53		
9	08:41			07:59			06:57		16:51 (2)	06:42		05:36			04:57		
	16:25			17:22			18:17	28	17:19 (2)	20:15		21:10			21:54		
10	08:40			07:57			06:55		16:53 (2)	06:39		05:34			04:56		
	16:26			17:24			18:19	25	17:18 (2)	20:17		21:11			21:55		
11	08:40			07:55			06:53		16:55 (2)	06:37		05:33			04:56		
	16:28			17:26			18:21	21	17:16 (2)	20:19		21:13			21:55		
12	08:39			07:53			06:50		16:57 (2)	06:35		05:31			04:55		
	16:30			17:28			18:23	16	17:13 (2)	20:20		21:15			21:56		
13	08:38			07:51			06:48		17:02 (2)	06:32		05:29			04:55		
	16:31			17:30			18:25	6	17:08 (2)	20:22		21:17			21:57		
14	08:37			07:49			06:45		06:30	05:27		04:55					
	16:33			17:32			18:27		20:24	21:18		21:58					
15	08:36			07:47			06:43		06:28	05:26		04:54					
	16:34			17:34			18:28		20:26	21:20		21:58					
16	08:35			07:45			06:40		06:25	05:24		04:54					
	16:36			17:36			18:30		20:28	21:22		21:59					
17	08:34			07:43		17:02 (2)	06:38		06:23	05:22		04:54					
	16:38			17:38	7	17:09 (2)	18:32		20:30	21:23		21:59					
18	08:33			07:41		16:58 (2)	06:35		06:21	05:21		04:54					
	16:40			17:40	13	17:11 (2)	18:34		20:31	21:25		22:00					
19	08:32			07:39		16:56 (2)	06:33		06:18	05:19		04:54					
	16:41			17:42	17	17:13 (2)	18:36		20:33	21:27		22:00					
20	08:31			07:36		16:55 (2)	06:31		06:16	05:18		04:54					
	16:43			17:44	21	17:16 (2)	18:38		20:35	21:28		22:00					
21	08:30			07:34		16:54 (2)	06:28		06:14	05:16		04:54					
	16:45			17:46	24	17:18 (2)	18:40		20:37	21:30		22:01					
22	08:29			07:32		16:52 (2)	06:26		06:12	05:15		04:55					
	16:47			17:48	27	17:19 (2)	18:42		20:39	21:31		22:01					
23	08:27		16:13 (3)	07:30		16:51 (2)	06:23		06:09	05:13		04:55					
	16:49	2	16:15 (3)	17:50	31	17:22 (2)	18:43		20:41	21:33		22:01					
24	08:26		16:12 (3)	07:28		16:51 (2)	06:21		06:07	05:12		04:55					
	16:50	5	16:17 (3)	17:52	33	17:24 (2)	18:45		20:43	21:34		22:01					
25	08:24		16:13 (3)	07:25		16:49 (2)	06:18		06:05	05:11		04:55					
	16:52	6	16:19 (3)	17:54	36	17:25 (2)	18:47		20:44	21:36		22:01					
26	08:23		16:12 (3)	07:23		16:49 (2)	06:16		06:03	05:09		04:56					
	16:54	9	16:21 (3)	17:56	37	17:26 (2)	18:49		20:46	21:37		22:01					
27	08:22		16:11 (3)	07:21		16:49 (2)	06:13		06:00	05:08		04:56					
	16:56	12	16:23 (3)	17:58	37	17:26 (2)	18:51		20:48	21:39		22:01					
28	08:20		16:12 (3)	07:18		16:48 (2)	06:11		05:58	05:07		04:57					
	16:58	14	16:26 (3)	18:00	38	17:26 (2)	18:53		20:50	21:40		22:01					
29	08:19		16:12 (3)				07:08		05:56	05:06		04:57					
	17:00	16	16:28 (3)				19:54		20:52	21:41		22:01					
30	08:17		16:12 (3)				07:06		05:54	05:05		04:58					
	17:02	17	16:29 (3)				19:56		20:54	21:43		22:00					
31	08:15		16:12 (3)				07:04			05:04							
	17:04	19	16:31 (3)				19:58			21:44							
Potential sun hours	250			273			367		420	494		510					
Total, worst case	132			468			380										
Sun reduction	0.24			0.23			0.27										
Oper. time red.	1.00			1.00			1.00										
Wind dir. red.	0.66			0.67			0.67										
Total reduction	0.16			0.16			0.18										
Total, real	21			73			69										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FX - H180

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:37 (2) 17:50 (2)	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:34 (2) 17:53 (2)	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:31 (2) 17:55 (2)	07:28 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:29 (2) 17:56 (2)	07:30 16:48
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:28 (2) 17:58 (2)	07:32 16:46
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:27 (2) 17:58 (2)	07:34 16:44
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:24 (2) 17:58 (2)	07:36 16:43
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:24 (2) 17:59 (2)	07:38 16:41
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:23 (2) 17:59 (2)	07:40 16:39
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:22 (2) 17:59 (2)	07:42 16:37
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:22 (2) 17:59 (2)	07:44 16:35
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:21 (2) 17:59 (2)	07:45 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:21 (2) 17:59 (2)	07:47 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:21 (2) 17:59 (2)	07:49 16:31
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:21 (2) 17:58 (2)	07:51 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:21 (2) 17:58 (2)	07:53 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:22 (2) 17:57 (2)	07:55 16:26
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:22 (2) 17:55 (2)	07:57 16:24
19	05:18 21:45	06:10 20:48	07:05 19:35	07:59 18:22	17:23 (2) 17:52 (2)	07:59 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:24 (2) 17:50 (2)	08:00 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:25 (2) 17:48 (2)	08:02 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:26 (2) 17:45 (2)	08:04 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:27 (2) 17:43 (2)	08:06 16:18
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:29 (2) 17:41 (2)	08:08 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	16:33 (2) 16:38 (2)	08:09 16:16
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	16:11
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	16:08
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	16:12
31	05:37 21:27	06:31 20:21	07:22 16:56	07:22 16:56	16:11 16:13	16:12 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case				709	248	374
Sun reduction				0.29	0.27	0.21
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.66	0.65
Total reduction				0.20	0.18	0.13
Total, real				140	43	50

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FY - H181

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44		08:14	16:04 (3) 07:16	16:33 (2) 07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:58 (2) 08:19
16:15		17:06	16:14 (3) 18:02	16:51 (2) 20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:23 (2) 16:10
2 08:44		08:12	07:14	16:36 (2) 06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	15:59 (2) 08:21
16:16		17:08	18:04	16:47 (2) 20:02	20:57	21:46	22:00	21:23	20:16	19:02	16:52	16:21 (2) 16:09
3 08:44		08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	16:00 (2) 08:22
16:17		17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:19 (2) 16:08
4 08:43		08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	16:02 (2) 08:24
16:18		17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	15:17 (2) 16:08
5 08:43		08:07	16:38 (2) 07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	16:04 (2) 08:25
16:19		17:14	16:43 (2) 18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	15:15 (2) 16:07
6 08:43		08:05	16:34 (2) 07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	16:08 (2) 08:26
16:21		17:16	16:45 (2) 18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:12 (2) 16:07
7 08:42		08:03	16:32 (2) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	16:08 (2) 08:28
16:22		17:18	16:47 (2) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06 (2) 08:29
8 08:42		08:01	16:31 (2) 07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	16:06 (2) 08:29
16:24		17:20	16:50 (2) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06 (2) 08:30
9 08:41		07:59	16:29 (2) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	15:39 (3) 08:30
16:25		17:22	16:52 (2) 18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	15:42 (3) 16:05
10 08:40		07:57	16:28 (2) 06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	15:35 (3) 08:31
16:26		17:24	16:54 (2) 18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	15:45 (3) 16:05
11 08:40		07:55	16:27 (2) 06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	17:15 (2) 07:44	15:33 (3) 08:33
16:28		17:26	16:56 (2) 18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	17:16 (2) 16:35	15:47 (3) 16:05
12 08:39		07:53	16:27 (2) 06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	17:08 (2) 07:45	15:32 (3) 08:34
16:30		17:28	16:59 (2) 18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	17:22 (2) 16:34	15:48 (3) 16:05
13 08:38		07:51	16:25 (2) 06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	17:05 (2) 07:47	15:31 (3) 08:35
16:31		17:30	16:59 (2) 18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	17:25 (2) 16:32	15:49 (3) 16:05
14 08:37		15:55 (3) 07:49	16:25 (2) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	17:03 (2) 07:49	15:30 (3) 08:36
16:33	2	15:57 (3) 17:32	17:00 (2) 18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	17:27 (2) 16:31	15:50 (3) 16:04
15 08:36		15:55 (3) 07:47	16:25 (2) 06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	17:01 (2) 07:51	15:30 (3) 08:37
16:34	4	15:59 (3) 17:34	17:01 (2) 18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	17:28 (2) 16:29	15:51 (3) 16:04
16 08:35		15:54 (3) 07:45	16:25 (2) 06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	16:59 (2) 07:53	15:29 (3) 08:38
16:36	6	16:00 (3) 17:36	17:01 (2) 18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	17:29 (2) 16:27	15:51 (3) 16:05
17 08:34		15:54 (3) 07:43	16:25 (2) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	16:58 (2) 07:55	15:29 (3) 08:38
16:38	8	16:02 (3) 17:38	17:02 (2) 18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	17:30 (2) 16:26	15:52 (3) 16:05
18 08:33		15:55 (3) 07:41	16:24 (2) 06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	16:57 (2) 07:57	15:29 (3) 08:39
16:40	10	16:05 (3) 17:40	17:01 (2) 18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	17:30 (2) 16:24	15:50 (3) 16:05
19 08:32		15:55 (3) 07:39	16:24 (2) 06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	16:56 (2) 07:59	15:29 (3) 08:40
16:41	12	16:07 (3) 17:42	17:01 (2) 18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	17:31 (2) 16:23	15:49 (3) 16:05
20 08:31		15:54 (3) 07:36	16:24 (2) 06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	16:56 (2) 08:00	15:30 (3) 08:41
16:43	14	16:08 (3) 17:44	17:01 (2) 18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	17:31 (2) 16:22	15:47 (3) 16:06
21 08:30		15:55 (3) 07:34	16:25 (2) 06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	16:55 (2) 08:02	15:30 (3) 08:41
16:45	16	16:11 (3) 17:46	17:01 (2) 18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	17:31 (2) 16:20	15:46 (3) 16:06
22 08:29		15:55 (3) 07:32	16:24 (2) 06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	16:55 (2) 08:04	15:30 (3) 08:42
16:47	17	16:12 (3) 17:48	17:00 (2) 18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	17:31 (2) 16:19	15:44 (3) 16:06
23 08:27		15:55 (3) 07:30	16:25 (2) 06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	16:54 (2) 08:06	15:31 (3) 08:42
16:49	20	16:15 (3) 17:50	16:59 (2) 18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	17:31 (2) 16:18	15:43 (3) 16:07
24 08:26		15:55 (3) 07:28	16:26 (2) 06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	16:54 (2) 08:08	15:32 (3) 08:43
16:50	22	16:17 (3) 17:52	16:59 (2) 18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	17:31 (2) 16:17	15:42 (3) 16:08
25 08:25		15:56 (3) 07:25	16:26 (2) 06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:10	16:54 (2) 08:09	15:32 (3) 08:43
16:52	23	16:19 (3) 17:54	16:57 (2) 18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:31 (2) 16:16	15:41 (3) 16:08
26 08:23		15:56 (3) 07:23	16:28 (2) 06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	16:54 (2) 08:11	15:33 (3) 08:43
16:54	22	16:18 (3) 17:56	16:56 (2) 18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:31 (2) 16:14	15:39 (3) 16:09
27 08:22		15:57 (3) 07:21	16:29 (2) 06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	16:54 (2) 08:13	15:34 (3) 08:44
16:56	21	16:18 (3) 17:58	16:55 (2) 18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:30 (2) 16:13	15:38 (3) 16:10
28 08:20		15:58 (3) 07:18	16:30 (2) 06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	16:55 (2) 08:14	15:35 (3) 08:44
16:58	20	16:18 (3) 18:00	16:53 (2) 18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:29 (2) 16:12	15:37 (3) 16:10
29 08:19		15:59 (3)	07:09	05:56	05:06	04:57	05:34	06:27	07:22	08:18	16:55 (2) 08:16	15:36 (3) 08:44
17:00	18	16:17 (3)	19:54	20:52	21:41	22:01	21:30	20:25	19:09	18:00	16:29 (2) 16:12	15:36 (3) 16:11
30 08:17		16:00 (3)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	16:56 (2) 08:18	15:37 (3) 08:44
17:02	17	16:17 (3)	19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:27 (2) 16:11	15:37 (3) 08:44
31 08:15		16:01 (3)	07:04	05:54	05:04	04:57	05:37	06:31	07:26	08:22	16:56 (2) 08:19	15:38 (3) 08:44
17:04	14	16:15 (3)	19:58	20:54	21:44	22:01	21:27	20:21	19:15	18:10	16:25 (2)	15:38 (3) 08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	266	706	29							635	374	
Sun reduction	0.24	0.23	0.27							0.29	0.27	
Oper. time red.	1.00	1.00	1.00							1.00	1.00	
Wind dir. red.	0.66	0.66	0.66							0.66	0.66	
Total reduction	0.16	0.15	0.18							0.19	0.18	
Total, real	43	108	5							122	66	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FZ - H182
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:10 (3)	08:14	15:24 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:03 (2)	08:19	14:59 (3)								
	16:15	27	17:06	34	15:58 (2)	18:02	20:55	21:45	22:00	21:25	20:18	19:05	16:54	15:16 (2)	16:10	32	15:31 (2)							
2	08:44	15:11 (3)	08:12	15:25 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	15:07 (2)	08:21	14:58 (3)								
	16:16	28	17:08	32	15:57 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	9	15:16 (2)	16:09	32	15:30 (2)					
3	08:44	15:11 (3)	08:10	15:26 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	15:04 (2)	08:22	14:59 (3)								
	16:17	28	17:10	31	15:57 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16	15:20 (2)	16:08	32	15:31 (2)					
4	08:43	15:12 (3)	08:08	15:27 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	15:01 (2)	08:24	14:59 (3)								
	16:18	29	17:12	29	15:56 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	21	15:22 (2)	16:08	32	15:31 (2)					
5	08:43	15:12 (3)	08:07	15:28 (2)	07:07	06:51	05:44	05:02	04:59	05:02	06:45	07:33	07:32	14:59 (2)	08:25	14:59 (3)								
	16:19	30	17:14	27	15:55 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	24	15:23 (2)	16:07	31	15:30 (2)					
6	08:43	15:13 (3)	08:05	15:30 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	14:58 (2)	08:26	14:59 (3)								
	16:21	31	17:16	23	15:53 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	27	15:25 (2)	16:07	31	15:30 (2)					
7	08:42	15:14 (3)	08:03	15:32 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	14:57 (2)	08:28	14:59 (3)								
	16:22	31	17:18	20	15:52 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	29	15:26 (2)	16:06	30	15:29 (2)					
8	08:42	15:14 (3)	08:01	15:34 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	14:56 (2)	08:29	14:59 (3)								
	16:24	32	17:20	16	15:50 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	30	15:26 (2)	16:06	29	15:28 (2)					
9	08:41	15:16 (3)	07:59	15:39 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	14:56 (2)	08:30	15:00 (3)								
	16:25	31	17:22	7	15:46 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	32	15:28 (2)	16:05	28	15:28 (2)					
10	08:40	15:16 (3)	07:57	15:40 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	14:55 (2)	08:32	15:00 (3)								
	16:26	32	17:24	18	15:48 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	34	15:29 (2)	16:05	28	15:28 (2)					
11	08:40	15:17 (3)	07:55	15:49 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44	14:55 (2)	08:33	15:00 (3)								
	16:28	32	17:26	18	15:49 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	34	15:29 (2)	16:05	27	15:27 (2)					
12	08:39	15:18 (3)	07:54	15:50 (2)	06:50	06:34	05:30	04:53	05:04	05:51	06:46	07:40	07:46	14:54 (2)	08:35	15:00 (3)								
	16:30	32	17:28	18	15:50 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	36	15:30 (2)	16:05	27	15:27 (2)					
13	08:38	15:19 (3)	07:51	15:51 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	14:54 (2)	08:35	15:01 (3)								
	16:31	32	17:30	18	15:52 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	36	15:30 (2)	16:05	25	15:26 (2)					
14	08:37	15:20 (2)	07:49	15:52 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	14:54 (2)	08:36	15:02 (3)								
	16:33	32	17:32	18	15:52 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	36	15:30 (2)	16:04	25	15:27 (2)					
15	08:36	15:20 (2)	07:47	15:53 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	14:54 (2)	08:37	15:01 (3)								
	16:34	33	17:34	5	17:00 (1)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	37	15:31 (2)	16:04	25	15:26 (2)					
16	08:35	15:19 (2)	07:45	15:54 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:54	14:54 (2)	08:38	15:02 (3)								
	16:36	34	17:36	8	17:07 (1)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	1	17:38 (1)	07:53	15:31 (2)	16:05	23	15:25 (2)				
17	08:34	15:19 (2)	07:43	15:55 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	17:33 (1)	07:55	14:54 (2)	08:39	15:03 (3)						
	16:38	35	17:38	10	17:09 (1)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	10	17:43 (1)	07:56	15:31 (2)	16:05	22	15:25 (2)				
18	08:33	15:20 (2)	07:41	15:56 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	17:31 (1)	07:57	14:54 (2)	08:39	15:03 (3)						
	16:40	35	17:40	14	17:11 (1)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	14	17:45 (1)	07:58	15:31 (2)	16:05	23	15:26 (3)				
19	08:32	15:21 (2)	07:53	15:57 (2)	06:35	06:20	05:19	04:53	05:16	06:07	07:02	07:56	07:56	17:30 (1)	07:59	14:54 (2)	08:40	15:04 (3)						
	16:41	36	17:42	16	17:13 (1)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16	17:46 (1)	07:59	15:31 (2)	16:05	23	15:27 (3)				
20	08:31	15:19 (2)	07:36	15:58 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	17:29 (1)	08:00	14:55 (2)	08:41	15:04 (3)						
	16:43	37	17:44	18	17:16 (1)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	17	17:46 (1)	07:58	15:31 (2)	16:06	23	15:27 (3)				
21	08:30	15:20 (2)	07:34	15:59 (1)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:03	17:28 (1)	08:02	14:55 (2)	08:41	15:05 (3)						
	16:45	36	17:46	18	17:16 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	18	17:46 (1)	07:58	15:31 (2)	16:06	23	15:28 (3)				
22	08:29	15:20 (2)	07:32	15:59 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:05	17:28 (1)	08:04	14:55 (2)	08:42	15:05 (3)						
	16:47	36	17:48	17	17:15 (1)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	17	17:45 (1)	07:58	15:31 (2)	16:06	23	15:28 (3)				
23	08:27	15:20 (2)	07:30	15:59 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:07	17:28 (1)	08:06	14:56 (2)	08:42	15:06 (3)						
	16:49	37	17:50	15	17:14 (1)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	15	17:43 (1)	07:58	15:31 (2)	16:07	23	15:29 (3)				
24	08:26	15:20 (2)	07:28	15:59 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:09	17:28 (1)	08:08	14:57 (2)	08:43	15:06 (3)						
	16:50	37	17:52	13	17:13 (1)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	13	17:41 (1)	07:58	15:31 (2)	16:08	23	15:29 (3)				
25	08:25	15:21 (2)	07:25	15:59 (1)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:11	17:28 (1)	08:09	14:57 (2)	08:43	15:06 (3)						
	16:52	37	17:54	8	17:10 (1)	18:47	20:44	21:36	22:01	21:46	20:35	19:19	17:09	10	16:38 (1)	07:58	15:31 (2)	16:08	23	15:29 (3)				
26	08:23	15:21 (2)	07:21	15:59 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:13	17:29 (1)	08:11	14:58 (2)	08:43	15:07 (3)						
	16:54	38	17:56	18	17:12 (1)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	7	16:36 (1)	07:58	15:31 (2)	16:09	22	15:29 (3)				
27	08:22	15:21 (2)	07:21	15:59 (1)	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:15	17:30 (1)	08:13	14:59 (2)	08:44	15:08 (3)						
	16:56	37	17:58	18	17:13 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	4	16:34 (1)	07:58	15:31 (2)	16:10	23	15:31 (2)				
28	08:20	15:22 (2)	07:19	15:59 (1)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:16	17:31 (1)	08:14	15:00 (2)	08:44	15:08 (3)						
	16:58	36	18:00	18	17:14 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	32	15:32 (2)	16:10	24	15:32 (2)					
29	08:19	15:22 (2)		15:59 (1)	06:09	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:18	17:32 (1)	08:14	15:01 (2)	08:44	15:09 (3)						
	17:00	36		15:58 (2)	06:05	17:00	19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:12	32	15:31 (2)	16:11	25	15:34 (2)				
30	08:17	15:22 (2)		15:58 (2)	06:06	17:01	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	32	15:31 (2)	16:12	26	15:35 (2)				
31	08:15	15:23 (2)		15:57 (2)	06:04	17:04	19:58	21:04	21:44	22:00	21:27	20:21	19:07	16:56	16:11	32	15:31 (2)	16:12	26	15:35 (2)				
Potential sun hours	250			273	367	420	494	510	512	460	382	328	259	233										
Total, worst case	1036			361									142	928										
Sun reduction	0.24			0.23									0.29	0.27										
Oper. time red.	1.00			1.00									1.00	1.00										
Wind dir. red.	0.66			0.66									0.67	0.67										
Total reduction	0.16			0.15									0.20	0.17										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GA - H183
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:07 (3)	08:14	15:20 (2)	07:16	15:53 (2)	07:01	15:52	05:52	05:03	04:59	05:39	06:33	07:26			07:24			08:19	14:56 (2)			
	16:15	30	15:37 (2)	17:06	33	15:53 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05			16:54			16:10	32	15:28 (2)		
2	08:44	15:08 (3)	08:12	15:20 (2)	07:14	15:52 (2)	06:59	15:50	05:50	05:02	04:59	05:40	06:35	07:28			07:26			08:21	14:56 (2)			
	16:16	30	15:38 (2)	17:08	32	15:52 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02			16:52			16:09	31	15:27 (2)		
3	08:44	15:08 (3)	08:10	15:21 (2)	07:12	15:51 (2)	06:56	15:48	05:48	05:01	05:00	05:42	06:36	07:30			07:28			15:01 (2)	08:22	14:56 (3)		
	16:17	30	15:38 (2)	17:10	30	15:51 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00			16:50	12		15:13 (2)	16:08	32	15:28 (2)	
4	08:43	15:09 (3)	08:08	15:23 (2)	07:09	15:53 (2)	06:54	15:46	05:46	05:00	05:01	05:44	06:38	07:31			07:30			14:58 (2)	08:24	14:57 (3)		
	16:18	31	15:40 (2)	17:12	27	15:50 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57			16:48	18		15:16 (2)	16:08	31	15:28 (2)	
5	08:43	15:09 (3)	08:07	15:24 (2)	07:07	15:54 (2)	06:51	15:44	05:44	05:00	05:02	05:45	06:40	07:33			07:32			14:55 (2)	08:25	14:56 (3)		
	16:19	31	15:40 (2)	17:14	25	15:49 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55			16:46	23		15:18 (2)	16:07	31	15:27 (3)	
6	08:43	15:10 (3)	08:05	15:26 (2)	07:04	15:56 (2)	06:49	15:42	05:42	04:58	05:03	05:47	06:42	07:35			07:34			14:54 (2)	08:26	14:57 (3)		
	16:21	32	15:42 (2)	17:16	22	15:48 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52			16:44	25		15:19 (2)	16:07	31	15:28 (2)	
7	08:42	15:11 (3)	08:03	15:28 (2)	07:02	15:58 (2)	06:47	15:40	05:40	04:58	05:04	05:49	06:43	07:37			07:36			14:52 (2)	08:28	14:56 (3)		
	16:22	31	15:42 (2)	17:18	18	15:46 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50			16:43	28	15:20 (2)	16:06	31	15:27 (2)		
8	08:42	15:11 (3)	08:01	15:32 (2)	07:00	15:56 (2)	06:44	15:38	04:57	05:05	05:05	05:50	06:45	07:39			07:38			14:51 (2)	08:29	14:56 (3)		
	16:24	32	15:43 (2)	17:20	11	15:43 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48			16:41	30	15:21 (2)	16:06	31	15:27 (2)		
9	08:41	15:13 (3)	07:59	15:35 (2)	06:57	15:57 (2)	06:42	15:36	04:57	05:06	05:06	05:52	06:47	07:41			07:40			14:51 (2)	08:30	14:57 (3)		
	16:25	32	15:45 (2)	17:22		18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45			16:39	32	15:23 (2)	16:05	30	15:27 (2)			
10	08:40	15:14 (2)	07:57	15:36 (2)	06:55	15:58 (2)	06:39	15:34	04:56	05:07	05:07	05:54	06:49	07:42			07:42			14:50 (2)	08:32	14:57 (3)		
	16:26	31	15:45 (2)	17:24		18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43			16:37	34	15:24 (2)	16:05	30	15:27 (2)			
11	08:40	15:14 (2)	07:55	15:37 (2)	06:53	15:59 (2)	06:37	15:33	04:56	05:08	05:08	05:56	06:50	07:44			07:44			14:50 (2)	08:33	14:57 (3)		
	16:28	32	15:46 (2)	17:26		18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40			16:35	34	15:24 (2)	16:05	30	15:27 (2)			
12	08:39	15:15 (2)	07:53	15:38 (2)	06:50	16:00 (2)	06:35	15:30	04:55	05:06	05:06	05:53	06:48	07:42			07:46			14:49 (2)	08:34	14:57 (3)		
	16:30	33	15:47 (2)	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38			16:34	36	15:25 (2)	16:05	29	15:26 (2)			
13	08:38	15:14 (2)	07:51	15:40 (2)	06:48	16:02 (2)	06:32	15:29	04:55	05:10	05:09	05:54	06:48	07:42			07:47			14:49 (2)	08:35	14:58 (3)		
	16:31	34	15:48 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36			16:32	36	15:25 (2)	16:05	28	15:26 (2)			
14	08:37	15:14 (2)	07:49	15:41 (2)	06:45	16:03 (2)	06:30	15:27	04:55	05:12	05:12	06:01	06:56	07:50			07:49			14:49 (2)	08:36	14:59 (3)		
	16:33	34	15:48 (2)	17:32	2	17:02 (1)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33			16:31	37	15:26 (2)	16:04	28	15:27 (2)		
15	08:36	15:14 (2)	07:47	15:42 (2)	06:43	16:05 (1)	06:43	15:28	05:26	04:54	05:13	06:03	06:58	07:52			07:51			14:49 (2)	08:37	14:58 (3)		
	16:34	35	15:49 (2)	17:34	6	17:05 (1)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31			16:29	37	15:26 (2)	16:04	28	15:26 (2)		
16	08:35	15:13 (2)	07:45	15:43 (2)	06:40	16:58 (1)	06:40	15:25	05:24	04:54	05:14	06:04	06:59	07:54			07:53			14:48 (2)	08:38	14:59 (3)		
	16:36	36	15:49 (2)	17:36	9	17:07 (1)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29			16:27	38	15:26 (2)	16:05	27	15:26 (2)		
17	08:34	15:13 (2)	07:43	15:43 (2)	06:38	16:57 (1)	06:38	15:23	05:22	04:54	05:16	06:06	07:01	07:55			17:32 (1)	07:55		14:48 (2)	08:39	15:00 (3)		
	16:38	37	15:50 (2)	17:38	12	17:09 (1)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	10		17:42 (1)	16:26	39	15:27 (2)	16:05	27	15:27 (2)	
18	08:33	15:14 (2)	07:41	15:44 (2)	06:36	16:56 (1)	06:36	15:21	05:21	04:54	05:17	06:08	07:03	07:57			17:30 (1)	07:57		14:49 (2)	08:39	15:00 (3)		
	16:40	37	15:51 (2)	17:40	15	17:11 (1)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	14		17:44 (1)	16:24	38	15:27 (2)	16:05	27	15:27 (2)	
19	08:32	15:14 (2)	07:39	15:45 (2)	06:34	16:56 (1)	06:34	15:19	05:19	04:54	05:19	06:10	07:05	07:59			17:29 (1)	07:59		14:49 (2)	08:40	15:00 (3)		
	16:41	38	15:52 (2)	17:42	17	17:13 (1)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16		17:45 (1)	16:23	38	15:27 (2)	16:05	27	15:28 (2)	
20	08:31	15:14 (2)	07:36	15:46 (2)	06:31	16:57 (1)	06:31	15:16	05:18	04:54	05:20	06:12	07:06	08:01			17:28 (1)	08:00		14:49 (2)	08:41	15:01 (3)		
	16:43	38	15:52 (2)	17:44	18	17:15 (1)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	17		17:45 (1)	16:22	38	15:27 (2)	16:06	26	15:27 (2)	
21	08:30	15:14 (2)	07:34	15:47 (2)	06:28	16:57 (1)	06:28	15:14	05:16	04:54	05:21	06:13	07:08	08:03			17:27 (1)	08:02		14:49 (2)	08:41	15:02 (3)		
	16:45	39	15:53 (2)	17:46	18	17:15 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	19		17:46 (1)	16:20	39	15:28 (2)	16:06	26	15:28 (2)	
22	08:29	15:14 (2)	07:32	15:48 (2)	06:26	16:57 (1)	06:26	15:12	05:15	04:55	05:23	06:15	07:10	08:05			17:27 (1)	08:04		14:50 (2)	08:42	15:02 (3)		
	16:47	38	15:52 (2)	17:48	17	17:14 (1)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	18		17:45 (1)	16:19	38	15:28 (2)	16:06	26	15:28 (2)	
23	08:27	15:15 (2)	07:30	15:49 (2)	06:23	16:58 (1)	06:23	15:09	05:13	04:55	05:24	06:17	07:12	08:07			17:27 (1)	08:06		14:50 (2)	08:42	15:03 (3)		
	16:49	38	15:53 (2)	17:50	15	17:13 (1)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16		17:43 (1)	16:18	38	15:28 (2)	16:07	26	15:29 (2)	
24	08:26	15:15 (2)	07:28	15:50 (2)	06:21	17:00 (1)	06:21	15:07	05:12	04:55	05:26	06:19	07:13	08:09			17:27 (1)	08:08		14:51 (2)	08:43	15:03 (3)		
	16:50	38	15:53 (2)	17:52	12	17:12 (1)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	14		17:41 (1)	16:17	37	15:28 (2)	16:08	26	15:29 (2)	
25	08:25	15:15 (2)	07:25	15:51 (2)	06:18	17:01 (1)	06:18	15:05	05:11	04:55	05:27	06:20	07:15	07:11			16:27 (1)	08:09		14:52 (2)	08:43	15:03 (3)		
	16:52	39	15:54 (2)	17:54	8	17:09 (1)	18:47	20:44	21:36	22:01	21:45	20:35	19:19	17:08	11		16:38 (1)	16:16	36	15:28 (2)	16:08	27	15:30 (2)	
26	08:23	15:15 (2)	07:23	15:52 (2)	06:16	17:05 (1)	06:16	15:03	05:09	04:56	05:29	06:22	07:17	07:13			16:28 (1)	08:11		14:52 (2)	08:43	15:03 (3)		
	16:54	39	15:54 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	8	16:36 (1)	16:14	36	15:28 (2)	16:09	27	15:30 (2)			
27	08:22	15:16 (2)	07:21	15:53 (2)	06:13	17:06 (1)	06:13	15:01	05:08	04:56	05:30	06:24	07:19	07:15			16:28 (1)	08:13		14:53 (2)	08:44	15:05 (3)		
	16:56	37	15:53 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	6	16:34 (1)	16:13	35	15:28 (2)	16:10	27	15:32 (2)			
28	08:20	15:17 (2)	07:19	15:54 (2)	06:11	17:07 (1)	06:11	15:58	05:07	04:57	05:32	06:26	07:21	07:16			16:30 (1)	08:14		14:54 (2)	08:44	15:05 (3)		
	16:58	37	15:54 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	1	16:31 (1)	16:12	35	15:29 (2)	16:10	28	15:33 (2)			
29	08:19	15:17 (2)		15:55 (2)	06:07	17:09 (1)	06:07	15:56	05:06	04:57	05:34	06:27	07:22	07:18										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GB - H184
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:06 (3)	08:14	15:18 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:02 (2)	08:19	14:53 (2)								
2	08:44	15:36 (2)	17:06	15:36 (2)	17:06	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	34	15:27 (2)								
3	08:44	15:07 (3)	08:12	15:19 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	14:54 (2)									
4	08:44	15:37 (2)	17:08	15:50 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	32	15:26 (2)								
5	08:44	15:07 (3)	08:10	15:20 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	14:55 (2)									
6	08:44	15:37 (2)	17:10	15:49 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:10	31	15:26 (2)								
7	08:43	15:08 (3)	08:08	15:21 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	14:56 (2)									
8	08:43	15:39 (2)	17:12	15:48 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:13	31	15:27 (2)								
9	08:43	15:08 (3)	08:07	15:23 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	14:55 (3)									
10	08:43	15:39 (2)	17:14	15:49 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:11	31	15:26 (2)								
11	08:43	15:09 (3)	08:05	15:25 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	14:56 (3)									
12	08:42	15:41 (2)	17:16	15:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:12	31	15:27 (2)								
13	08:42	15:10 (3)	08:03	15:27 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	14:55 (3)									
14	08:42	15:41 (2)	17:18	15:43 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:13	31	15:26 (2)								
15	08:42	15:10 (3)	08:01	15:31 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	14:55 (3)									
16	08:42	15:42 (2)	17:20	15:39 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:14	31	15:26 (2)								
17	08:41	15:12 (2)	07:59	16:57	06:42	05:36	04:57	05:06	05:06	05:52	06:47	07:41	07:40	08:30	14:56 (3)									
18	08:41	15:43 (2)	17:22	16:17	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:15	30	15:26 (2)								
19	08:40	15:11 (2)	07:57	16:55	06:39	05:34	04:56	05:07	05:07	05:54	06:49	07:42	07:42	08:32	14:56 (3)									
20	08:40	15:44 (2)	17:24	16:19	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:16	30	15:26 (2)								
21	08:40	15:11 (2)	07:55	16:53	06:37	05:33	04:56	05:08	05:08	05:56	06:50	07:44	07:44	08:33	14:56 (3)									
22	08:39	15:45 (2)	17:26	16:21	18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	16:15	30	15:26 (2)								
23	08:39	15:11 (2)	07:53	16:50	06:35	05:31	04:55	05:09	05:09	05:57	06:52	07:46	07:46	08:34	14:56 (3)									
24	08:39	15:45 (2)	17:28	16:23	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:15	30	15:26 (2)								
25	08:38	15:11 (2)	07:51	16:48	06:32	05:29	04:55	05:10	05:10	05:59	06:54	07:48	07:47	08:35	14:56 (3)									
26	08:38	15:46 (2)	17:30	16:25	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:16	30	15:26 (2)								
27	08:37	15:11 (2)	07:49	16:59 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	14:58 (3)									
28	08:37	15:47 (2)	17:32	17:02 (1)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:17	29	15:27 (2)								
29	08:36	15:12 (2)	07:47	16:58 (1)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	08:37	14:57 (3)									
30	08:36	15:48 (2)	17:34	17:05 (1)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:18	29	15:26 (2)								
31	08:35	15:11 (2)	07:45	16:57 (1)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	14:58 (3)									
32	08:36	15:48 (2)	17:36	17:07 (1)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:19	28	15:26 (2)								
33	08:34	15:11 (2)	07:43	16:57 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	17:32 (1) 07:55	14:46 (2) 08:39	14:58 (3)									
34	08:38	15:48 (2)	17:38	17:09 (1)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	9 17:41 (1) 16:26	14:47 (2) 08:41	15:01 (3)									
35	08:38	15:12 (2)	07:41	16:56 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	17:30 (1) 07:57	14:46 (2) 08:39	14:59 (3)									
36	08:40	15:49 (2)	17:40	17:11 (1)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	13 17:43 (1) 16:24	14:46 (2) 08:39	15:27 (2)									
37	08:32	15:12 (2)	07:39	16:56 (1)	06:33	06:18	05:19	04:53	05:18	06:10	07:05	07:59	17:29 (1) 07:59	14:47 (2) 08:40	15:00 (3)									
38	08:31	15:50 (2)	17:42	17:13 (1)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	15 17:44 (1) 16:23	14:46 (2) 08:39	15:27 (2)									
39	08:31	15:12 (2)	07:36	16:56 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	17:28 (1) 08:00	14:47 (2) 08:41	15:00 (3)									
40	08:33	15:50 (2)	17:44	17:15 (1)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	17 17:45 (1) 16:22	14:46 (2) 08:39	15:27 (2)									
41	08:30	15:12 (2)	07:34	16:57 (1)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	17:27 (1) 08:02	14:47 (2) 08:41	15:01 (3)									
42	08:39	15:51 (2)	17:46	17:15 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	18 17:45 (1) 16:20	14:46 (2) 08:39	15:27 (2)									
43	08:29	15:12 (2)	07:32	16:56 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	17:26 (1) 08:04	14:48 (2) 08:42	15:00 (3)									
44	08:39	15:51 (2)	17:48	17:13 (1)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	19 17:45 (1) 16:19	14:46 (2) 08:39	15:27 (2)									
45	08:27	15:13 (2)	07:30	16:58 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	17:26 (1) 08:06	14:48 (2) 08:42	15:02 (3)									
46	08:39	15:51 (2)	17:50	17:13 (1)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	17 17:43 (1) 16:18	14:46 (2) 08:39	15:27 (2)									
47	08:26	15:12 (2)	07:28	16:59 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	17:26 (1) 08:08	14:49 (2) 08:43	15:02 (3)									
48	08:30	15:51 (2)	17:52	17:11 (1)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	15 17:41 (1) 16:17	14:46 (2) 08:39	15:27 (2)									
49	08:25	15:13 (2)	07:25	17:01 (1)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	16:26 (1) 08:09	14:49 (2) 08:43	15:02 (3)									
50	08:32	15:52 (2)	17:54	17:12 (1)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	12 16:38 (1) 16:16	14:46 (2) 08:39	15:27 (2)									
51	08:23	15:13 (2)	07:23	16:57 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	16:27 (1) 08:11	14:50 (2) 08:43	15:02 (3)									
52	08:23	15:52 (2)	17:56	17:12 (1)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	9 16:36 (1) 16:14	14:47 (2) 08:40	15:00 (3)									
53	08:22	15:14 (2)	07:21	16:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	09:10	16:28 (1) 08:13	14:51 (2) 08:44	15:04 (3)									
54	08:26	15:51 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	6 16:34 (1) 16:13	16:29 (1) 08:14	14:46 (2) 08:39	15:27 (2)									
55	08:20	15:15 (2)	07:19	16:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	9:00	16:29 (1) 08:14	14:52 (2) 08:44	15:04 (3)									
56	08:38	15:52 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	2 16:31 (1) 16:12	16:29 (1) 08:14	14:46 (2) 08:39	15:27 (2)									
57	08:19	15:15 (2)	07:10	16:09	05:56	05:06	04:57	05:34	06:27	07:22	08:18	9:00	16:12	14:51 (2) 08:44	15:05 (3)									
58	08:37	15:52 (2)	18:00	19:55	20:52	21:41	22:01	21:30	20:25	19:09	18:00	16:12	16:12	14:46 (2) 08:39	15:27 (2)									
59	08:17	15:16 (2)	07:10	16:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	9:00	16:18	14:52 (2) 08:44	15:05 (3)									
60	08:37	15:51 (2)	18:00	19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	16:11	14:46 (2) 08:39	15:27 (2)									
61	08:15	15:16 (2)	07:10	16:07	05:54	05:05	04:58	05:35	06:29	07:24	08:20	9:00	16:18	14:52 (2) 08:44	15:05 (3)									
62	08:37	15:51 (2)	18:00	19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	16:11	14:46 (2) 08:39	15:27 (2)									
63	08:15	15:16 (2)	07:10	16:07	05:54	05:05	04:58	05:35	06:29	07:24														

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GC - H185

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	16:04 (1) 18:02	07:16 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10	
2	08:44 16:16	08:12 17:08	16:06 (1) 18:04	07:14 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	
3	08:44 16:17	08:10 17:10	16:08 (1) 18:06	07:12 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08	
4	08:43 16:18	08:08 17:12	16:16 (1) 18:07	07:09 20:06	05:54 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08	
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07	
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06	
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	15:38 (1) 15:46 (1)	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	15:37 (1) 15:49 (1)	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	15:35 (1) 15:50 (1)	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	15:51 (1) 15:51 (1)	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 19:52	06:52 18:38	07:46 17:34	07:46 16:34	15:54 (1) 15:52 (1)	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	15:53 (1) 15:53 (1)	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	15:33 (1) 15:53 (1)	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	15:33 (1) 15:53 (1)	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	15:33 (1) 15:54 (1)	08:38 16:05
17	08:34 16:38	16:01 (1) 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:25	15:33 (1) 15:52 (1)	08:39 16:05
18	08:33 16:40	16:01 (1) 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	15:33 (1) 15:50 (1)	08:39 16:05
19	08:32 16:41	16:01 (1) 17:39	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	15:34 (1) 15:49 (1)	08:40 16:05
20	08:31 16:43	16:00 (1) 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	15:34 (1) 15:47 (1)	08:41 16:06
21	08:30 16:45	16:00 (1) 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	15:35 (1) 15:46 (1)	08:41 16:06
22	08:29 16:47	15:59 (1) 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	15:36 (1) 15:44 (1)	08:42 16:06
23	08:27 16:49	16:00 (1) 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	15:37 (1) 15:43 (1)	08:42 16:07
24	08:26 16:50	15:59 (1) 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	15:38 (1) 15:42 (1)	08:43 16:08
25	08:25 16:52	16:00 (1) 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	08:09 17:09	08:09 16:16	15:39 (1) 15:40 (1)	08:43 16:08
26	08:23 16:54	16:00 (1) 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:11 17:06	08:11 16:14	15:40 (1) 16:01 (1)	08:43 16:09
27	08:22 16:56	16:01 (1) 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	08:13 17:04	08:13 16:13	15:41 (1) 16:02 (1)	08:44 16:10
28	08:20 16:58	16:01 (1) 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:14 17:02	08:14 16:12	15:42 (1) 16:03 (1)	08:44 16:11
29	08:19 17:00	16:01 (1) 18:01	07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:09	08:16 17:00	08:16 16:12	15:43 (1) 16:04 (1)	08:44 16:11
30	08:17 17:02	16:02 (1) 18:02	07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:18 16:58	08:18 16:11	15:44 (1) 16:05 (1)	08:44 16:12
31	08:15 17:04	16:02 (1) 18:01	07:04 19:58	05:54 21:44	05:04 21:44	05:37 21:27	06:31 20:21	06:31 19:21	07:22 16:56	08:19 16:11	08:19 16:11	15:45 (1) 16:06 (1)	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case	210	36									245		
Sun reduction	0.24	0.23									0.27		
Oper. time red.	1.00	1.00									1.00		
Wind dir. red.	0.66	0.66									0.66		
Total reduction	0.16	0.15									0.18		
Total, real	34	6									43		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GD - H186

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	10:59 (2)	08:14	15:41 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24			08:19		10:51 (2)					
2	08:44	11:01 (2)	08:12	15:42 (1)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26			08:21		10:51 (2)					
3	08:44	11:01 (2)	08:10	15:43 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			08:22		10:50 (2)					
4	08:43	11:02 (2)	08:09	15:44 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30			15:20 (1)	08:24	10:50 (2)					
5	08:43	11:02 (2)	08:07	15:46 (1)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32			15:17 (1)	08:25	10:49 (2)					
6	08:43	11:04 (2)	08:05	15:48 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:37	07:36			15:15 (1)	08:26	10:50 (2)					
7	08:42	11:04 (2)	08:03	15:51 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36			15:14 (1)	08:28	10:49 (2)					
8	08:42	11:05 (2)	08:01	15:59 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38			15:13 (1)	08:29	10:50 (2)					
9	08:41	11:07 (2)	07:59			06:57	05:36	04:57	05:06	05:52	06:47	07:41	07:40			15:13 (1)	08:30	10:50 (2)					
10	08:40	11:07 (2)	07:57			06:55	05:39	05:34	04:56	05:07	05:54	06:49	07:43			15:12 (1)	08:32	10:50 (2)					
11	08:40	11:08 (2)	07:55			06:53	05:37	05:33	04:56	05:08	05:56	06:51	07:44			15:11 (1)	08:33	10:50 (2)					
12	08:39	11:10 (2)	07:53			06:50	05:35	05:31	04:55	05:09	05:58	06:52	07:46			15:11 (1)	08:34	10:50 (2)					
13	08:38	11:11 (2)	07:51			06:48	05:32	05:29	04:55	05:11	05:59	06:54	07:48			15:11 (1)	08:35	10:51 (2)					
14	08:37	11:13 (2)	07:49			06:45	05:30	05:27	04:55	05:12	06:01	06:56	07:50			15:11 (1)	08:36	10:51 (2)					
15	08:36	11:15 (2)	07:47			06:43	05:28	05:26	04:55	05:13	06:03	06:58	07:52			15:10 (1)	08:37	10:51 (2)					
16	08:34	11:17 (2)	07:45			06:40	05:25	05:20	04:54	05:14	06:05	06:59	07:54			15:11 (1)	08:38	10:51 (2)					
17	08:34	11:19 (2)	07:43			06:38	05:23	05:22	04:54	05:16	06:06	07:01	07:56			15:11 (1)	08:39	10:51 (2)					
18	08:33	11:23 (2)	07:41			06:36	05:21	05:21	04:54	05:17	06:08	07:03	07:57			15:11 (1)	08:39	10:52 (2)					
19	08:32	11:27 (2)	07:39			06:33	05:18	05:19	04:54	05:18	06:10	07:05	07:59			15:11 (1)	08:40	10:53 (2)					
20	08:31	11:31 (2)	07:37			06:31	05:16	05:18	04:54	05:20	06:12	07:06	08:01			15:12 (1)	08:41	10:53 (2)					
21	08:30	11:35 (2)	07:34			06:28	05:14	05:16	04:54	05:21	06:13	07:08	08:03			15:12 (1)	08:41	10:53 (2)					
22	08:29	11:37 (2)	07:32			06:26	05:12	05:15	04:55	05:23	06:15	07:10	08:05			15:13 (1)	08:42	10:53 (2)					
23	08:27	11:41 (2)	07:30			06:23	05:09	05:13	04:55	05:24	06:17	07:12	08:07			15:14 (1)	08:42	10:55 (2)					
24	08:26	11:45 (2)	07:28			06:21	05:07	05:12	04:55	05:26	06:19	07:14	08:09			15:14 (1)	08:43	10:55 (2)					
25	08:25	11:49 (2)	07:26			06:18	05:05	05:11	04:55	05:27	06:20	07:15	07:11			15:15 (1)	08:43	10:55 (2)					
26	08:23	11:53 (2)	07:24			06:16	05:03	05:09	04:56	05:29	06:22	07:17	07:13			15:16 (1)	08:44	10:56 (2)					
27	08:22	11:57 (2)	07:22			06:13	05:01	05:08	04:56	05:30	06:24	07:19	07:17			15:17 (1)	08:44	10:57 (2)					
28	08:20	12:01 (2)	07:20			06:11	05:00	05:07	04:57	05:32	06:26	07:21	07:17			15:18 (1)	08:44	10:57 (2)					
29	08:19	12:05 (2)	07:18			06:09	05:00	05:06	04:57	05:34	06:28	07:22	07:18			15:19 (1)	08:44	10:58 (2)					
30	08:17	12:09 (2)	07:16			06:07	05:00	05:05	04:58	05:36	06:29	07:24	07:20			15:20 (1)	08:44	10:59 (2)					
31	08:15	12:13 (2)	07:14			06:05	05:00	05:05	04:58	05:38	06:30	07:25	07:21			15:21 (1)	08:44	10:59 (2)					
Potential sun hours	250	273	367	420	494	510	512	460	382	259	816	1323	0.21			0.27	1.00	0.60	0.12				
Total, worst case	1124	136																					
Sun reduction	0.24	0.23																					
Oper. time red.	1.00	1.00																					
Wind dir. red.	0.63	0.66																					
Total reduction	0.15	0.15																					
Total, real	172	21																					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GE - H187

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	09:24 (2) 08:14	09:41 (2) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	09:09 (2)
2	16:15	15:17 (1) 17:06	10:08 (2) 18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	15:04 (1)
3	08:44	09:25 (2) 08:12	09:43 (2) 07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	09:10 (2)
4	16:16	15:18 (1) 17:08	10:06 (2) 18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	15:04 (1)
5	08:44	09:25 (2) 08:10	09:45 (2) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	09:10 (2)
6	16:17	15:18 (1) 17:10	10:04 (2) 18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08	15:04 (1)
7	08:43	09:25 (2) 08:09	09:48 (2) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	09:11 (2)
8	16:18	15:19 (1) 17:12	10:01 (2) 18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	15:05 (1)
9	08:43	09:25 (2) 08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	09:11 (2)
10	16:20	15:19 (1) 17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	15:05 (1)
11	08:43	09:26 (2) 08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	09:12 (2)
12	16:21	15:20 (1) 17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	16:07	15:06 (1)
13	08:42	09:26 (2) 08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	09:12 (2)
14	16:22	15:20 (1) 17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	15:06 (1)
15	08:42	09:26 (2) 08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	09:13 (2)
16	16:24	15:20 (1) 17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	15:07 (1)
17	08:41	09:27 (2) 07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	09:14 (2)
18	16:25	15:21 (1) 17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	15:07 (1)
19	08:40	09:27 (2) 07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32	09:14 (2)
20	16:27	15:21 (1) 17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	15:07 (1)
21	08:40	09:27 (2) 07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	09:14 (2)
22	16:28	15:22 (1) 17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05	15:07 (1)
23	08:39	09:27 (2) 07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	09:15 (2)
24	16:30	15:22 (1) 17:28	18:23	20:20	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05	15:07 (1)
25	08:38	09:28 (2) 07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47	08:35	09:16 (2)
26	16:31	15:22 (1) 17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05	15:09 (1)
27	08:37	09:28 (2) 07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	09:17 (2)
28	16:33	15:22 (1) 17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:05	15:09 (1)
29	08:36	09:29 (2) 07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37	09:17 (2)
30	16:34	15:23 (1) 17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05	15:10 (1)
31	08:35	09:29 (2) 07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38	09:17 (2)
32	16:36	15:23 (1) 17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	15:09 (1)
33	08:34	09:29 (2) 07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39	09:18 (2)
34	16:38	15:22 (1) 17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	16:05	15:10 (1)
35	08:33	09:29 (2) 07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	09:19 (2)
36	16:40	15:22 (1) 17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:05	15:10 (1)
37	08:32	09:30 (2) 07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	09:19 (2)
38	16:41	15:23 (1) 17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	15:11 (1)
39	08:31	09:30 (2) 07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:41	09:19 (2)
40	16:43	15:22 (1) 17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:06	15:11 (1)
41	08:30	09:31 (2) 07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	09:20 (2)
42	16:45	15:22 (1) 17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	15:12 (1)
43	08:29	09:31 (2) 07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42	09:20 (2)
44	16:47	15:21 (1) 17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06	15:12 (1)
45	08:27	09:32 (2) 07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	09:21 (2)
46	16:49	15:21 (1) 17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	16:07	15:13 (1)
47	08:26	09:32 (2) 07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43	09:21 (2)
48	16:51	15:20 (1) 17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:08	15:13 (1)
49	08:25	09:34 (2) 07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09	08:43	09:22 (2)
50	16:52	15:20 (1) 17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	16:08	15:13 (1)
51	08:23	09:34 (2) 07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43	09:23 (2)
52	16:54	15:19 (1) 17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15	16:09	15:15 (1)
53	08:22	09:35 (2) 07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:44	09:23 (2)
54	16:56	15:18 (1) 17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:10	15:15 (1)
55	08:20	09:36 (2) 07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14	08:44	09:23 (2)
56	16:58	15:16 (1) 18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16:11	15:15 (1)
57	08:19	09:37 (2)	07:09	05:56	05:06	04:57	05:34	06:28	07:23	07:18	08:16	08:44	09:24 (2)
58	17:00	15:13 (1)	19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	16:11	15:16 (1)
59	08:17	09:38 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44	09:24 (2)
60	17:02	15:13 (1)	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:12	15:16 (1)
61	08:15	09:39 (2)	07:04	05:54	05:04	04:57	05:37	06:31	07:22	07:17	08:14	08:44	09:24 (2)
62	17:04	15:13 (1)	19:58	20:54	21:44	22:01	21:27	20:21	19:05	16:56	16:11	16:13	15:16 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case	2234	82									1435	2427	
Sun reduction	0.24	0.23									0.27	0.21	
Oper. time red.	1.00	1.00									1.00	1.00	
Wind dir. red.	0.62	0.59									0.61	0.62	
Total reduction	0.15	0.14									0.16	0.13	
Total, real	335	11									234	312	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GF - H188

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	10:59 (2) 15:37 (1)	08:14 17:06	15:37 (1) 18:02	07:16 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:24 19:05	08:19 16:54
2	08:44 16:16	11:01 (2) 15:38 (1)	08:12 17:08	15:47 (1) 18:04	07:14 20:02	05:59 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:21 16:52
3	08:44 16:17	11:01 (2) 15:39 (1)	08:10 17:10		07:12 20:04	05:56 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	08:22 16:50
4	08:43 16:18	11:02 (2) 15:41 (1)	08:09 17:12		07:09 20:06	05:54 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:24 16:48
5	08:43 16:20	11:03 (2) 15:42 (1)	08:07 17:14		07:07 20:08	05:51 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	08:25 16:46
6	08:43 16:21	11:05 (2) 15:44 (1)	08:05 17:16		07:05 20:09	05:49 21:04	05:03 21:51	05:47 21:58	05:52 21:16	06:42 20:06	07:35 18:52	08:27 16:44
7	08:42 16:22	11:06 (2) 15:45 (1)	08:03 17:18		07:02 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	08:28 16:43
8	08:42 16:24	11:07 (2) 15:46 (1)	08:01 17:20		07:00 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	08:29 16:41
9	08:41 16:25	11:09 (2) 15:48 (1)	07:59 17:22		06:57 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:30 16:39
10	08:40 16:26	11:11 (2) 15:49 (1)	07:57 17:24		06:55 20:17	05:39 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	08:32 16:37
11	08:40 16:28	11:13 (2) 15:49 (1)	07:55 17:26		06:53 20:19	05:37 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	08:33 16:36
12	08:39 16:30	11:17 (2) 15:50 (1)	07:53 17:28		06:50 20:20	05:35 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	08:34 16:34
13	08:38 16:31	15:22 (1) 15:51 (1)	07:51 17:30		06:48 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	08:35 16:32
14	08:37 16:33	15:22 (1) 15:51 (1)	07:49 17:32		06:45 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	08:36 16:31
15	08:36 16:34	15:22 (1) 15:52 (1)	07:47 17:34		06:43 20:26	05:26 21:20	04:55 21:50	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:37 16:29
16	08:35 16:36	15:23 (1) 15:52 (1)	07:45 17:36		06:40 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	08:38 16:27
17	08:34 16:38	15:22 (1) 15:52 (1)	07:43 17:38		06:38 20:30	05:22 21:23	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:26	08:39 16:26
18	08:33 16:40	15:23 (1) 15:53 (1)	07:41 17:40		06:36 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	08:39 16:25
19	08:32 16:41	15:23 (1) 15:53 (1)	07:39 17:42		06:33 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	08:39 16:23
20	08:31 16:43	15:23 (1) 15:53 (1)	07:37 17:44		06:31 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22
21	08:30 16:45	15:24 (1) 15:54 (1)	07:34 17:46		06:28 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20
22	08:29 16:47	15:24 (1) 15:53 (1)	07:32 17:48		06:26 20:42	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19
23	08:27 16:49	15:25 (1) 15:54 (1)	07:30 17:50		06:23 20:43	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18
24	08:26 16:51	15:25 (1) 15:53 (1)	07:28 17:52		06:21 20:45	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17
25	08:25 16:52	15:26 (1) 15:54 (1)	07:25 17:54		06:18 20:44	05:11 21:36	04:55 22:01	05:27 21:37	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16
26	08:23 16:54	15:27 (1) 15:53 (1)	07:23 17:56		06:16 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15
27	08:22 16:56	15:27 (1) 15:52 (1)	07:21 17:58		06:13 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13
28	08:20 16:58	15:29 (1) 15:52 (1)	07:19 18:00		06:11 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12
29	08:19 17:00	15:30 (1) 15:51 (1)			07:09 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12
30	08:17 17:02	15:32 (1) 15:50 (1)			07:06 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11
31	08:15 17:04	15:33 (1) 15:48 (1)			07:04 19:58	05:04 21:44	05:37 21:47	06:31 20:21	06:31 20:21	07:22 16:56	07:22 16:56	08:44 16:13
Potential sun hours	250	273		367	420	494	510	512	460	382	328	259
Total, worst case	1055	10										554
Sun reduction	0.24	0.23										0.27
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.64	0.66										0.66
Total reduction	0.16	0.15										0.17
Total, real	165	2										97

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GG - H189
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April	May	June	July	August	September	October	November	December	
1	08:44		11:35 (2)	08:14	15:48 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:33 (1)
2	16:15	31	12:06 (2)	17:06	16:13 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	15:34 (1)
3	08:44		11:37 (2)	08:12	15:49 (1)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	11:33 (2)
4	16:16	29	12:06 (2)	17:08	16:13 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	11:43 (2)
5	08:44		11:37 (2)	08:10	15:49 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	11:30 (2)
6	16:17	28	12:05 (2)	17:10	16:12 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08	15:45 (2)
7	08:43		11:39 (2)	08:09	15:51 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	11:29 (2)
8	16:18	27	12:06 (2)	17:12	16:11 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	15:35 (1)	15:48 (2)
9	08:43		11:39 (2)	08:07	15:52 (1)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	11:28 (2)
10	16:19	26	12:05 (2)	17:14	16:10 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	15:38 (1)	15:49 (2)
11	08:43		11:41 (2)	08:05	15:54 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:26	11:27 (2)
12	16:21	24	12:04 (2)	17:16	16:08 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	15:39 (1)	15:47 (2)
13	08:42		11:42 (2)	08:03	15:58 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	11:26 (2)
14	16:22	22	12:04 (2)	17:18	16:05 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	15:41 (1)	15:46 (2)
15	08:42		11:44 (2)	08:01	16:05 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	11:27 (2)
16	16:24	19	12:03 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	21:22	20:01	18:48	16:41	15:42 (1)	15:46 (2)
17	08:41		11:47 (2)	07:59	16:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	07:40	08:30	11:26 (2)
18	16:25	15	12:02 (2)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	21:20	19:59	18:45	16:39	15:43 (1)	15:45 (2)
19	08:40		11:49 (2)	07:57	16:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	07:42	08:32	11:26 (2)
20	16:26	11	12:00 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	21:18	19:56	18:43	16:37	15:44 (1)	15:45 (2)
21	08:40		15:51 (1)	07:55	16:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	07:44	08:33	11:25 (2)
22	16:28	1	15:52 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	21:16	19:54	18:40	16:36	15:45 (1)	15:45 (2)
23	08:39		15:49 (1)	07:53	16:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	07:46	08:34	11:25 (2)
24	16:30	5	15:54 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	21:13	19:52	18:38	16:34	15:45 (1)	15:45 (2)
25	08:38		15:48 (1)	07:51	16:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	07:47	08:35	11:26 (2)
26	16:31	7	15:55 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	21:11	19:49	18:36	16:32	15:45 (1)	15:45 (2)
27	08:37		15:48 (1)	07:49	16:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	07:49	08:36	11:26 (2)
28	16:33	9	15:57 (1)	17:32	18:27	20:24	21:18	21:58	21:51	21:09	21:19	19:47	18:33	16:31	15:46 (1)	15:45 (2)
29	08:36		15:47 (1)	07:47	16:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	07:51	08:37	11:27 (2)
30	16:34	12	15:59 (1)	17:34	18:28	20:26	21:20	21:58	21:50	21:07	21:17	19:44	18:31	16:29	15:46 (1)	15:45 (2)
31	08:35		15:47 (1)	07:45	16:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	07:53	08:38	11:26 (2)
32	16:36	14	16:01 (1)	17:36	18:30	20:28	21:22	21:59	21:49	21:05	21:15	19:42	18:29	16:27	15:46 (1)	15:45 (2)
33	08:34		15:45 (1)	07:43	16:38	06:23	05:22	04:54	05:16	06:06	06:56	07:51	07:50	07:50	08:39	11:26 (2)
34	16:38	17	16:02 (1)	17:38	18:32	20:30	21:23	21:59	21:47	21:03	21:13	19:39	18:26	16:26	15:46 (1)	15:45 (2)
35	08:33		15:45 (1)	07:41	16:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	07:57	08:39	11:27 (2)
36	16:40	20	16:05 (1)	17:40	18:34	20:32	21:25	22:00	21:46	21:01	21:11	19:37	18:24	16:25	15:46 (1)	15:45 (2)
37	08:32		15:45 (1)	07:39	16:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	07:59	08:40	11:28 (2)
38	16:41	22	16:07 (1)	17:42	18:36	20:33	21:27	22:00	21:45	21:08	21:18	19:34	18:22	16:23	15:46 (1)	15:45 (2)
39	08:31		15:45 (1)	07:37	16:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:01	08:41	11:27 (2)
40	16:43	23	16:08 (1)	17:44	18:38	20:35	21:28	22:00	21:44	21:06	21:16	19:32	18:20	16:22	15:46 (1)	15:45 (2)
41	08:30		15:45 (1)	07:34	16:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:03	08:03	08:41	11:28 (2)
42	16:45	26	16:11 (1)	17:46	18:40	20:37	21:30	22:01	21:42	21:04	21:14	19:29	18:17	16:20	15:46 (1)	15:45 (2)
43	08:29		15:44 (1)	07:32	16:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:04	08:42	11:28 (2)
44	16:47	27	16:11 (1)	17:48	18:42	20:39	21:31	22:01	21:41	21:02	21:12	19:27	18:15	16:19	15:44 (1)	15:43 (2)
45	08:27		15:45 (1)	07:30	16:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:06	08:42	11:29 (2)
46	16:49	27	16:12 (1)	17:50	18:43	20:41	21:33	22:01	21:39	21:09	21:19	19:24	18:13	16:18	15:43 (1)	15:42 (2)
47	08:26		15:44 (1)	07:28	16:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:08	08:43	11:29 (2)
48	16:51	28	16:12 (1)	17:52	18:45	20:43	21:34	22:01	21:38	21:07	21:17	19:22	18:11	16:17	15:42 (1)	15:41 (2)
49	08:25		15:45 (1)	07:25	16:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09	08:09	08:43	11:30 (2)
50	16:52	28	16:13 (1)	17:54	18:47	20:44	21:36	22:01	21:36	21:05	21:15	19:19	17:09	16:16	15:41 (1)	15:40 (2)
51	08:23		15:45 (1)	07:23	16:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:11	08:43	11:31 (2)
52	16:54	28	16:13 (1)	17:56	18:49	20:46	21:37	22:01	21:35	21:04	21:14	19:17	17:07	16:14	15:39 (1)	15:38 (2)
53	08:22		15:45 (1)	07:21	16:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:13	08:44	11:32 (2)
54	16:56	28	16:13 (1)	17:58	18:51	20:48	21:39	22:01	21:33	21:02	21:12	19:14	17:04	16:13	15:38 (1)	15:37 (2)
55	08:20		15:46 (1)	07:19	16:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14	08:14	08:44	11:32 (2)
56	16:58	28	16:14 (1)	18:00	18:53	20:50	21:40	22:01	21:32	21:01	21:11	19:12	17:02	16:12	15:37 (1)	15:36 (2)
57	08:19		15:46 (1)		16:09	05:56	05:06	04:57	05:34	06:28	07:22	07:18	08:16	08:16	08:44	11:33 (2)
58	17:00	27	16:13 (1)		18:55	20:52	21:42	22:01	21:30	21:00	21:10	19:10	17:00	16:12	15:35 (1)	15:34 (2)
59	08:17		15:46 (1)		17:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:18	08:44	11:34 (2)
60	17:02	27	16:13 (1)		18:56	20:54	21:43	22:00	21:28	21:07	21:17	19:07	16:58	16:11	15:35 (1)	15:34 (2)
61	08:15		15:46 (1)		17:04		05:04		05:37	06:31		07:22		08:44		11:34 (2)
62	17:04	27	16:13 (1)		18:58		21:44		21:27	20:21		16:56		16:13		12:06 (2)
Potential sun hours	250		273		367	420		494	510	512	460	382		259		
Total, worst case	663		131											564		907
Sun reduction	0.24		0.23											0.27		0.21
Oper. time red.	1.00		1.00											1.00		1.00
Wind dir. red.	0.64		0.66											0.66		0.60
Total reduction	0.16		0.15											0.18		0.12
Total, real	103		20											99		113

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GH - H190

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	16:03 (2) 18:02	07:16 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	16:05 (2) 18:04	07:14 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	16:08 (2) 18:05	07:12 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	16:12 (2) 18:07	07:09 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	18:07 20:07	07:07 20:07	05:44 21:03	05:02 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	18:09 20:09	07:04 21:04	05:42 21:04	05:03 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	18:11 20:11	07:02 21:06	05:40 21:52	05:04 21:57	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	18:13 20:13	07:00 21:08	05:38 21:53	05:05 21:56	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	18:15 20:15	06:57 21:10	05:36 21:54	05:06 21:55	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	18:17 20:17	06:55 21:11	05:34 21:55	05:07 21:55	05:07 21:58	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	18:19 20:19	06:52 21:13	05:32 21:55	05:08 21:54	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	18:21 20:20	06:50 21:15	05:31 21:55	05:09 21:53	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	18:23 20:22	06:48 21:17	05:29 21:57	05:10 21:52	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	18:25 20:24	06:45 21:18	05:27 21:58	05:12 21:51	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	18:27 20:26	06:43 21:20	05:25 21:58	05:13 21:50	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	15:59 (2) 16:00 (2)	18:28 20:28	06:40 21:22	05:24 21:59	05:14 21:49	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:04
17	08:34 16:38	15:59 (2) 16:02 (2)	18:30 20:30	06:38 21:23	05:22 21:59	05:16 21:47	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:25	08:39 16:05
18	08:33 16:39	15:58 (2) 16:05 (2)	18:32 20:31	06:35 21:25	05:21 22:00	05:17 21:46	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	15:58 (2) 16:07 (2)	18:34 20:33	06:33 21:27	05:19 22:00	05:18 21:45	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	15:57 (2) 16:08 (2)	18:36 20:35	06:31 21:28	05:17 22:00	05:20 21:44	05:20 21:44	06:11 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	15:57 (2) 16:11 (2)	18:38 20:37	06:28 21:30	05:16 22:01	05:21 21:42	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:42 16:06
22	08:29 16:47	15:57 (2) 16:12 (2)	18:40 20:39	06:26 21:31	05:15 22:01	05:23 21:41	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	15:57 (2) 16:15 (2)	18:41 20:41	06:23 21:33	05:13 22:01	05:24 21:39	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	15:57 (2) 16:16 (2)	18:43 20:43	06:21 21:34	05:12 22:01	05:25 21:38	05:25 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:24 16:52	15:58 (2) 16:18 (2)	18:45 20:44	06:18 21:36	05:10 22:01	05:27 21:36	05:27 21:36	06:20 20:35	07:15 19:19	08:09 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	15:58 (2) 16:18 (2)	18:47 20:46	06:16 21:37	05:09 22:01	05:29 21:35	05:29 21:35	06:22 20:32	07:17 19:17	08:11 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	15:58 (2) 16:18 (2)	18:48 20:48	06:13 21:39	05:08 22:01	05:30 21:33	05:30 21:33	06:24 20:30	07:19 19:14	08:13 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	15:59 (2) 16:18 (2)	18:51 20:50	06:11 21:40	05:07 22:01	05:32 21:32	05:32 21:32	06:26 20:28	07:21 19:12	08:14 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00	15:59 (2) 16:18 (2)	18:53 20:52	07:08 21:41	05:06 22:01	05:34 21:30	05:34 21:30	06:27 20:25	07:22 19:09	08:16 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02	16:00 (2) 16:17 (2)	19:04 20:54	07:06 21:43	05:05 22:00	05:35 21:28	05:35 21:28	06:29 20:23	07:24 19:07	08:18 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04	16:01 (2) 16:17 (2)	19:04 20:58	07:04 21:44	05:04 21:44	05:37 21:27	05:37 21:27	06:31 20:21	07:22 16:56	08:18 16:56	08:18 16:11	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	228	28									257	
Sun reduction	0.24	0.23									0.27	
Oper. time red.	1.00	1.00									1.00	
Wind dir. red.	0.66	0.66									0.66	
Total reduction	0.16	0.15									0.18	
Total, real	37	4									45	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GI - H191

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	15:00 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	15:23 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54
3	08:44	15:01 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26
4	16:16	15:24 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
5	08:44	15:01 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
6	16:17	15:23 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50
7	08:43	15:02 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30
8	16:18	15:24 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48
9	08:43	15:02 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32
10	16:19	15:24 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46
11	08:43	15:04 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34
12	16:21	15:25 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44
13	08:42	15:04 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36
14	16:22	15:24 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43
15	08:42	15:05 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38
16	16:23	15:24 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41
17	08:41	15:06 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40
18	16:25	15:25 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39
19	08:40	15:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42
20	16:26	15:25 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37
21	08:40	15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44
22	16:28	15:24 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35
23	08:39	15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46
24	16:29	15:24 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34
25	08:38	15:11 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47
26	16:31	15:23 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32
27	08:37	15:13 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49
28	16:33	15:22 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30
29	08:36	15:15 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51
30	16:34	15:20 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29
31	08:35	15:16 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53
32	16:36	15:17 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27
33	08:34	15:14 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55
34	16:38	15:18 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26
35	08:33	15:11 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57
36	16:39	15:19 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24
37	08:32	15:10 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59
38	16:41	15:20 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23
39	08:31	15:07 (2)	07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00
40	16:43	15:21 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22
41	08:30	15:04 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02
42	16:45	15:22 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20
43	08:29	15:01 (2)	07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04
44	16:47	15:23 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19
45	08:27	14:58 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06
46	16:49	15:24 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18
47	08:26	14:55 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08
48	16:50	15:25 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17
49	08:25	14:52 (2)	07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	08:11	08:09
50	16:52	15:26 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:15
51	08:23	14:49 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11
52	16:54	15:27 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14
53	08:22	14:46 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13
54	16:56	15:28 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13
55	08:20	14:43 (2)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14
56	16:58	15:29 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12
57	08:19	14:40 (2)	07:08	05:56	05:06	04:57	04:57	05:34	06:27	07:22	08:18	08:16
58	17:00	15:30 (2)	19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	16:11
59	08:17	14:37 (2)	07:06	05:54	05:05	04:58	04:58	05:35	06:29	07:24	08:20	08:18
60	17:02	15:31 (2)	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:11
61	08:15	14:34 (2)	07:04	05:52	05:03	04:57	04:57	05:32	06:26	07:21	08:16	08:14
62	17:04	15:32 (2)	19:58	20:56	21:44	22:01	21:27	20:21	19:05	16:56	16:11	16:11
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	266										40	695
Sun reduction	0.24										0.27	0.21
Oper. time red.	1.00										1.00	1.00
Wind dir. red.	0.65										0.65	0.65
Total reduction	0.16										0.17	0.13
Total, real	42										7	93

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GJ - H192

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	15:00 (2) 15:22 (2)	08:14 17:06	07:16 18:02	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05		08:19 16:10
2	08:44 16:16	15:00 (2) 15:22 (2)	08:12 17:08	07:14 18:04	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02		08:21 16:09
3	08:44 16:17	15:01 (2) 15:22 (2)	08:10 17:10	07:12 18:06	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00		08:22 16:08
4	08:43 16:18	15:02 (2) 15:23 (2)	08:08 17:12	07:09 18:07	05:46 20:06	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57		08:24 16:08
5	08:43 16:19	15:02 (2) 15:22 (2)	08:07 17:14	07:07 18:09	05:44 20:07	05:00 21:03	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55		08:25 16:07
6	08:43 16:21	15:03 (2) 15:23 (2)	08:05 17:16	07:04 18:11	05:42 20:09	05:00 21:04	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52		08:26 16:06
7	08:42 16:22	15:04 (2) 15:23 (2)	08:03 17:18	07:02 18:13	05:40 20:11	05:00 21:06	05:04 21:52	05:49 21:14	06:43 20:04	07:37 18:50		08:28 16:06
8	08:42 16:23	15:04 (2) 15:23 (2)	08:01 17:20	07:00 18:15	05:38 20:13	04:57 21:08	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:41		08:29 16:06
9	08:41 16:25	15:06 (2) 15:23 (2)	07:59 17:22	06:57 18:17	05:36 20:15	04:57 21:10	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45		08:30 16:05
10	08:40 16:26	15:07 (2) 15:23 (2)	07:57 17:24	06:55 18:19	05:34 20:17	04:56 21:12	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43		08:32 16:05
11	08:40 16:28	15:08 (2) 15:22 (2)	07:55 17:26	06:53 18:21	05:32 20:19	04:56 21:13	05:08 21:55	05:56 21:05	06:50 19:54	07:44 18:40		08:33 16:05
12	08:39 16:29	15:09 (2) 15:22 (2)	07:53 17:28	06:50 18:23	05:31 20:20	04:55 21:15	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38		08:34 16:05
13	08:38 16:31	15:11 (2) 15:21 (2)	07:51 17:30	06:48 18:25	05:29 20:22	04:55 21:17	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36		08:35 16:04
14	08:37 16:33	15:14 (2) 15:19 (2)	07:49 17:32	06:45 18:27	05:27 20:24	04:55 21:18	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33		08:36 16:04
15	08:36 16:34	15:15 (2) 17:34	07:47 17:34	06:43 18:28	05:25 20:26	04:54 21:20	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31		08:37 16:04
16	08:35 16:36	15:16 (2) 17:36	07:45 17:36	06:40 18:30	05:24 20:28	04:54 21:22	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29		08:38 16:05
17	08:34 16:38	15:17 (2) 17:38	07:43 17:38	06:38 18:32	05:22 20:30	04:54 21:23	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26		08:39 16:05
18	08:33 16:39	15:18 (2) 17:40	07:41 17:40	06:35 18:34	05:21 20:31	04:54 21:25	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24		08:39 16:05
19	08:32 16:41	15:19 (2) 17:42	07:39 17:42	06:33 18:36	05:19 20:33	04:54 21:27	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22		08:40 16:05
20	08:31 16:43	15:20 (2) 17:44	07:37 17:44	06:31 18:38	05:17 20:35	04:54 21:28	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20		08:41 16:05
21	08:30 16:45	15:21 (2) 17:46	07:34 17:46	06:28 18:40	05:16 20:37	04:54 21:30	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17		08:41 16:06
22	08:29 16:47	15:22 (2) 17:48	07:32 17:48	06:26 18:42	05:15 20:39	04:54 21:31	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:42 16:06
23	08:27 16:49	15:23 (2) 17:50	07:30 17:50	06:23 18:43	05:13 20:41	04:55 21:33	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13		08:42 16:07
24	08:26 16:50	15:24 (2) 17:52	07:28 17:52	06:21 18:45	05:12 20:43	04:55 21:34	05:26 22:01	06:19 20:37	07:13 19:22	08:09 18:11		08:43 16:07
25	08:25 16:52	15:25 (2) 17:54	07:25 17:54	06:18 18:47	05:10 20:44	04:55 21:36	05:27 22:01	06:20 20:35	07:15 19:19	08:09 17:09		08:43 16:08
26	08:23 16:54	15:26 (2) 17:56	07:23 17:56	06:16 18:49	05:09 20:46	04:56 21:37	05:29 22:01	06:22 20:32	07:17 19:17	08:11 17:06		08:43 16:09
27	08:22 16:56	15:27 (2) 17:58	07:21 17:58	06:13 18:51	05:08 20:48	04:56 21:39	05:30 22:01	06:24 20:30	07:19 19:14	08:13 17:04		08:44 16:10
28	08:20 16:58	15:28 (2) 18:00	07:18 18:00	06:11 18:53	05:07 20:50	04:57 21:40	05:32 22:01	06:26 20:28	07:21 19:12	08:14 17:02		08:44 16:11
29	08:19 17:00	15:29 (2) 18:01	07:16 18:01	06:08 18:54	05:06 20:51	04:57 21:41	05:34 22:01	06:27 20:25	07:22 19:09	08:16 17:00		08:44 16:11
30	08:17 17:02	15:30 (2) 18:02	07:14 18:02	06:06 18:56	05:05 20:54	04:58 21:43	05:35 22:00	06:29 20:23	07:24 19:07	08:18 16:58		08:44 16:11
31	08:15 17:04	15:31 (2) 18:03	07:12 18:03	06:04 18:58	05:04 20:56	04:59 21:44	05:37 22:01	06:31 20:21	07:25 16:56	08:19 16:56		08:44 16:13
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259
Total, worst case	239											28
Sun reduction	0.24											0.27
Oper. time red.	1.00											1.00
Wind dir. red.	0.65											0.65
Total reduction	0.16											0.17
Total, real	38											5

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GK - H193

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

		January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	14:56 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17	15:13 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:10
2	08:44	14:57 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21
	16:16	17	15:14 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	14:58 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	15	15:13 (2)	17:10	18:05	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:08
4	08:43	14:59 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24
	16:18	15	15:14 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	14:59 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25
	16:19	14	15:13 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:07
6	08:43	15:01 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26
	16:21	13	15:14 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:06
7	08:42	15:02 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28
	16:22	11	15:13 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	15:04 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29
	16:23	8	15:12 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
9	08:41	15:07 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
	16:25	4	15:11 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:05
10	08:40		07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32
	16:26		17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05
11	08:40		07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33
	16:28		17:26	18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	16:05
12	08:39		07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34
	16:29		17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05
13	08:38		07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35
	16:31		17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04
14	08:37		07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36
	16:33		17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04
15	08:36		07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37
	16:34		17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04
16	08:35		07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38
	16:36		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05
17	08:34		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39
	16:38		17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05
18	08:33		07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39
	16:39		17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05
19	08:32		07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40
	16:41		17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05
20	08:31		07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00	08:41
	16:43		17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05
21	08:30		07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41
	16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06
22	08:29		07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42
	16:47		17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06
23	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42
	16:49		17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07
24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43
	16:50		17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07
25	08:25		07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	07:11	08:09	08:43
	16:52		17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:15	16:08
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43
	16:54		17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	16:09
27	08:22		07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:44
	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:10
28	08:20		07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	08:44
	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16:10
29	08:19			07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	08:44
	17:00			19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	16:11
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44
	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:12
31	08:15			07:04		05:04		05:37	06:31		07:22		08:44
	17:04			19:58		21:44		21:27	20:21		16:56		16:13
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	233
Total, worst case		114											493
Sun reduction		0.24											0.21
Oper. time red.		1.00											1.00
Wind dir. red.		0.65											0.65
Total reduction		0.16											0.13
Total, real		18											66

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GL - H194

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15 15	14:56 (2) 15:11 (2) 17:06	08:14 17:06 18:02	07:16 18:02 20:00	07:01 20:00 20:55	05:52 20:55 21:45	05:03 21:45 22:00	04:59 22:00 21:25	05:39 21:25 20:18	06:33 20:18 19:05	07:26 19:05 16:54	08:19 16:54 16:10	
2	08:44 16:16 14	14:57 (2) 15:11 (2) 17:08	08:12 17:08 18:04	07:14 18:04 20:02	06:59 20:57 21:47	05:50 20:57 21:47	05:02 21:47 22:00	04:59 22:00 21:23	05:40 21:23 20:16	06:35 20:16 19:02	07:28 19:02 16:52	08:21 16:52 16:09	
3	08:44 16:17 13	14:57 (2) 15:10 (2) 17:10	08:10 17:10 18:05	07:12 18:05 20:04	06:56 20:54 21:48	05:48 20:59 21:48	05:01 21:48 21:59	05:00 21:59 21:21	05:42 21:21 20:13	06:36 20:13 19:00	07:30 19:00 16:50	08:22 16:50 16:08	
4	08:43 16:18 12	14:59 (2) 15:11 (2) 17:12	08:08 17:12 18:07	07:09 18:07 20:06	06:54 20:06 21:01	05:46 20:54 21:49	05:00 21:49 21:59	05:01 21:59 21:19	05:44 21:19 20:11	06:38 20:11 18:57	07:31 18:57 16:48	08:24 16:48 16:08	
5	08:43 16:19 10	15:00 (2) 15:10 (2) 17:14	08:07 17:14 18:09	07:07 18:09 20:07	06:51 20:07 21:03	05:44 21:03 21:50	04:59 21:50 21:58	05:02 21:58 21:17	05:45 21:17 20:09	06:40 20:09 18:55	07:33 18:55 16:46	08:25 16:46 16:07	14:49 (2) 14:53 (2)
6	08:43 16:21 8	15:02 (2) 15:10 (2) 17:16	08:05 17:16 18:11	07:04 18:11 20:09	06:49 21:04 21:51	05:42 21:04 21:58	04:58 21:58 21:58	05:03 21:58 21:15	05:47 21:15 20:06	06:42 20:06 18:52	07:35 18:52 16:44	08:26 16:44 16:06	14:48 (2) 14:56 (2)
7	08:42 16:22 4	15:04 (2) 15:08 (2) 17:18	08:03 17:18 18:13	07:02 18:13 20:11	06:47 20:11 21:06	05:40 21:06 21:52	04:58 21:52 21:57	05:04 21:57 21:14	05:49 21:14 20:04	06:43 20:04 18:50	07:37 18:50 16:42	08:28 16:42 16:06	14:47 (2) 14:57 (2)
8	08:42 16:23 16:23	15:08 (2) 17:20 18:15	08:01 17:20 18:15	07:00 18:15 20:13	06:44 20:13 21:08	05:38 21:08 21:53	04:57 21:53 21:56	05:05 21:56 21:12	05:50 21:12 20:01	06:45 20:01 18:48	07:39 18:48 16:41	08:29 16:41 16:06	14:46 (2) 14:58 (2)
9	08:41 16:25 16:25	17:22 18:17 19:02	07:59 18:17 19:02	06:57 20:15 21:10	06:42 21:10 21:54	05:36 21:54 21:55	04:57 21:55 21:55	05:06 21:55 21:10	05:52 21:10 19:59	06:47 19:59 18:45	07:41 18:45 16:39	08:30 16:39 16:05	14:47 (2) 14:59 (2)
10	08:40 16:26 16:26	17:22 18:19 19:04	07:57 18:19 19:04	06:55 20:17 21:12	06:39 21:12 21:55	05:34 21:55 21:55	04:56 21:55 21:55	05:07 21:55 21:08	05:54 21:08 19:56	06:49 19:56 18:43	07:42 18:43 16:37	08:32 16:37 16:05	14:46 (2) 15:00 (2)
11	08:40 16:28 16:28	17:26 18:21 19:06	07:55 18:21 19:06	06:53 20:19 21:13	06:37 21:13 21:55	05:32 21:55 21:54	04:56 21:54 21:54	05:08 21:54 21:06	05:56 21:06 19:54	06:50 19:54 18:40	07:44 18:40 16:35	08:33 16:35 16:05	14:46 (2) 15:01 (2)
12	08:39 16:29 16:29	17:28 18:23 19:08	07:53 18:23 19:08	06:50 20:20 21:15	06:35 21:15 21:56	05:31 21:56 21:53	04:55 21:53 21:03	05:09 21:03 21:03	05:57 21:03 19:51	06:52 19:51 18:38	07:46 18:38 16:34	08:34 16:34 16:05	14:46 (2) 15:01 (2)
13	08:38 16:31 16:31	17:30 18:25 19:10	07:51 18:25 19:10	06:48 20:22 21:17	06:32 21:17 21:57	05:29 21:57 21:52	04:55 21:52 21:01	05:10 21:01 19:49	05:59 19:49 18:36	06:54 18:36 16:32	07:48 16:32 16:04	08:35 16:04 16:04	14:47 (2) 15:03 (2)
14	08:37 16:33 16:33	17:32 18:27 19:12	07:49 18:27 19:12	06:45 20:24 21:18	06:30 21:18 21:58	05:27 21:58 21:51	04:55 21:51 21:01	05:12 21:01 20:59	06:01 20:59 19:47	06:56 19:47 18:33	07:50 18:33 16:30	08:36 16:30 16:04	14:47 (2) 15:04 (2)
15	08:36 16:34 16:34	17:34 18:28 19:13	07:47 18:28 19:13	06:43 20:26 21:20	06:28 21:20 21:58	05:25 21:58 21:50	04:54 21:50 21:00	05:13 21:00 20:57	06:03 20:57 19:44	06:58 19:44 18:31	07:52 18:31 16:29	08:37 16:29 16:04	14:46 (2) 15:03 (2)
16	08:35 16:36 16:36	17:36 18:30 19:15	07:45 18:30 19:15	06:40 20:28 21:22	06:25 21:22 21:59	05:24 21:59 21:49	04:54 21:49 21:05	05:14 21:05 20:55	06:04 20:55 19:42	06:59 19:42 18:29	07:54 18:29 16:27	08:38 16:27 16:05	14:47 (2) 15:04 (2)
17	08:34 16:38 16:38	17:38 18:32 19:17	07:43 18:32 19:17	06:38 20:30 21:23	06:23 21:23 21:59	05:22 21:59 21:47	04:54 21:47 20:53	05:16 20:53 19:39	06:06 19:39 18:26	07:01 18:26 16:26	07:55 16:26 16:05	08:39 16:05 16:05	14:47 (2) 15:05 (2)
18	08:33 16:39 16:39	17:38 18:32 19:17	07:41 18:32 19:17	06:35 20:31 21:25	06:21 21:25 22:00	05:21 22:00 21:46	04:54 21:46 21:00	05:17 21:00 20:51	06:08 20:51 19:37	07:03 19:37 18:24	07:57 18:24 16:24	08:39 16:24 16:05	14:48 (2) 15:06 (2)
19	08:32 16:41 16:41	17:40 18:34 19:19	07:40 18:34 19:19	06:34 20:31 21:25	06:20 21:25 22:00	05:20 22:00 21:45	04:54 21:45 21:00	05:18 21:00 20:48	06:10 20:48 19:34	07:05 19:34 18:22	07:59 18:22 16:23	08:40 16:23 16:05	14:49 (2) 15:06 (2)
20	08:31 16:43 16:43	17:42 18:36 19:21	07:39 18:36 19:21	06:33 20:33 21:27	06:18 21:27 22:00	05:19 22:00 21:45	04:54 21:45 21:00	05:18 21:00 20:48	06:10 20:48 19:34	07:05 19:34 18:22	07:59 18:22 16:23	08:40 16:23 16:05	14:49 (2) 15:06 (2)
21	08:30 16:45 16:45	17:44 18:38 19:23	07:38 18:38 19:23	06:32 20:35 21:28	06:16 21:28 22:00	05:17 22:00 21:44	04:54 21:44 21:00	05:20 21:00 20:46	06:12 20:46 19:32	07:06 19:32 18:20	07:06 18:20 16:22	08:01 16:22 16:05	14:48 (2) 15:06 (2)
22	08:29 16:46 16:46	17:44 18:38 19:23	07:36 18:38 19:23	06:31 20:35 21:28	06:15 21:28 22:00	05:16 22:00 21:44	04:54 21:44 21:00	05:21 21:00 20:46	06:13 20:46 19:32	07:08 19:32 18:20	07:08 18:20 16:22	08:03 16:22 16:05	14:49 (2) 15:07 (2)
23	08:27 16:49 16:49	17:42 18:36 19:21	07:34 18:36 19:21	06:28 20:37 21:30	06:14 21:30 22:01	05:16 22:01 21:42	04:54 21:42 21:00	05:21 21:00 20:46	06:13 20:46 19:32	07:08 19:32 18:20	07:08 18:20 16:22	08:03 16:22 16:05	14:49 (2) 15:07 (2)
24	08:26 16:50 16:50	17:40 18:34 19:19	07:32 18:34 19:19	06:26 20:37 21:30	06:11 21:30 22:01	05:15 22:01 21:42	04:54 21:42 21:00	05:23 21:00 20:46	06:15 20:46 19:32	07:10 19:32 18:20	08:05 18:20 16:22	08:04 16:22 16:05	14:49 (2) 15:07 (2)
25	08:25 16:52 16:52	17:38 18:32 19:17	07:28 18:32 19:17	06:21 20:39 21:31	06:07 21:31 22:01	05:12 22:01 21:41	04:55 21:41 21:00	05:26 21:00 20:46	06:19 20:46 19:32	07:13 19:32 18:20	08:09 18:20 16:22	08:08 16:22 16:05	14:51 (2) 15:08 (2)
26	08:23 16:54 16:54	17:34 18:28 19:13	07:25 18:28 19:13	06:18 20:26 21:20	06:05 21:20 21:58	05:10 21:58 21:50	04:55 21:50 21:00	05:27 21:00 20:57	06:20 20:57 19:44	07:15 19:44 18:31	08:09 18:31 16:29	08:43 16:29 16:04	14:51 (2) 15:09 (2)
27	08:22 16:56 16:56	17:32 18:26 19:11	07:21 18:26 19:11	06:13 20:26 21:20	06:00 21:20 21:59	05:08 21:59 21:49	04:56 21:49 21:00	05:30 21:00 20:46	06:24 20:46 19:32	07:19 19:32 18:20	07:15 18:20 16:22	08:13 16:22 16:05	14:53 (2) 15:10 (2)
28	08:20 16:58 16:58	17:28 18:22 19:07	07:18 18:22 19:07	06:11 20:28 21:22	05:58 21:22 22:01	05:07 22:01 21:42	04:57 21:42 21:00	05:32 21:00 20:46	06:26 20:46 19:32	07:21 19:32 18:20	07:16 18:20 16:22	08:14 16:22 16:05	14:53 (2) 15:10 (2)
29	08:19 17:00 17:00	17:26 18:20 19:05	07:16 18:20 19:05	06:09 20:31 21:25	05:13 21:25 22:00	04:55 22:00 21:46	05:24 21:46 21:00	05:24 21:00 20:46	06:17 20:46 19:32	07:12 19:32 18:20	08:07 18:20 16:22	08:06 16:22 16:05	14:50 (2) 15:07 (2)
30	08:17 17:02 17:02	17:24 18:18 19:03	07:14 18:18 19:03	06:07 20:33 21:27	05:11 21:27 22:01	05:12 22:01 21:41	04:55 21:41 21:00	05:26 21:00 20:46	06:19 20:46 19:32	07:13 19:32 18:20	08:09 18:20 16:22	08:08 16:22 16:05	14:51 (2) 15:08 (2)
31	08:15 17:04 17:04	17:22 18:16 19:01	07:12 18:16 19:01	06:05 20:35 21:29	05:09 21:29 22:01	05:10 22:01 21:42	04:55 21:42 21:00	05:27 21:00 20:46	06:20 20:46 19:32	07:15 19:32 18:20	08:09 18:20 16:22	08:43 16:22 16:05	14:51 (2) 15:08 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case	76												417
Sun reduction	0.24												0.21
Oper. time red.	1.00												1.00
Wind dir. red.	0.65												0.65
Total reduction	0.16												0.13
Total, real	12												56

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GM - H195

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	07:34 (1) 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:31 (1) 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:29 (1) 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:48 (1) 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:30 (1) 20:13	05:44 21:08	04:57 21:53	05:05 21:56	05:45 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:31 (1) 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:32 (1) 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:42 (1) 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:40 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:39 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	07:38 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	07:37 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	07:36 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	07:35 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	07:34 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	07:33 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	07:32 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	07:31 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	07:30 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	07:29 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	07:28 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	07:27 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 18:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	07:26 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:12 18:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	07:25 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:13 18:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	07:24 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:14 18:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	07:23 20:56	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:15 18:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	07:22 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	08:16 18:00	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	07:21 21:44	05:04 21:44	04:57 21:27	05:37 20:21	06:31 19:21	07:23 18:56	08:17 18:00	08:19 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		3	135							141		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		0	24							27		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GN - H196

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March		April	May	June	July	August	September	October		November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	3	07:41 (1) 07:44 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18		08:10 (1) 08:20 (1)	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	7	07:39 (1) 07:46 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	10	08:07 (1) 08:21 (1)	07:26 16:52
3	08:44 16:17	08:10 17:10	07:12 18:06	11	07:36 (1) 07:47 (1)	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	14	08:05 (1) 08:22 (1)	07:28 16:50
4	08:43 16:18	08:09 17:12	07:09 18:08	14	07:34 (1) 07:48 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	17	08:04 (1) 08:23 (1)	07:30 16:48
5	08:43 16:20	08:07 17:14	07:07 18:10	16	07:31 (1) 07:47 (1)	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	19	08:03 (1) 08:24 (1)	07:32 16:46
6	08:43 16:21	08:05 17:16	07:05 18:12	19	07:29 (1) 07:48 (1)	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	21	08:03 (1) 08:24 (1)	07:34 16:45
7	08:42 16:22	08:03 17:18	07:02 18:13	21	07:27 (1) 07:48 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	20	08:04 (1) 08:24 (1)	07:36 16:43
8	08:42 16:24	08:01 17:20	07:00 18:15	21	07:26 (1) 07:47 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	17	08:06 (1) 08:23 (1)	07:38 16:41
9	08:41 16:25	07:59 17:22	06:58 18:17	19	07:27 (1) 07:46 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	15	08:07 (1) 08:22 (1)	07:40 16:39
10	08:41 16:27	07:57 17:24	06:55 18:19	18	07:27 (1) 07:45 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	06:49 21:08	07:43 19:57	12	08:09 (1) 08:21 (1)	07:42 16:37
11	08:40 16:28	07:55 17:26	06:53 18:21	16	07:28 (1) 07:44 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	9	08:11 (1) 08:20 (1)	07:44 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	12	07:29 (1) 07:41 (1)	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	6	08:13 (1) 08:19 (1)	07:46 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	4	07:33 (1) 07:37 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	2	08:15 (1) 08:17 (1)	07:48 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27		06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34		07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29		06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31		07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31		06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29		07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32		06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27		07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34		06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24		07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22		07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20		08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18		08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44		06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13		08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11		08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09		08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49		06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07		08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51		06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05		08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53		05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02		08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55		05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00		08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57		05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58		08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58			05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56			08:44 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328		259	233
Total, worst case			181								183			
Sun reduction			0.27								0.29			
Oper. time red.			1.00								1.00			
Wind dir. red.			0.65								0.65			
Total reduction			0.18								0.19			
Total, real			32								35			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GO - H197

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	19 08:00 (1)	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	07:14	07:40 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04	20 08:00 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	07:12	07:39 (1)	06:57	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06	20 07:59 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
4	08:44	08:09	07:09	07:40 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08	18 07:58 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	08:07	07:07	07:40 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
	16:20	17:14	18:10	17 07:57 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05	07:05	07:42 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12	13 07:55 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03	07:02	07:44 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13	9 07:53 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01	07:00		06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:06
9	08:41	07:59	06:58		06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:31
	16:25	17:22	18:17		20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06
10	08:41	07:57	06:55		06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24	18:19		20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55	06:53		06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:33
	16:28	17:26	18:21		20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
12	08:39	07:53	06:50		06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:34
	16:30	17:28	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
13	08:38	07:51	06:48		06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
	16:31	17:30	18:25		20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:05
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:38
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:07
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:43
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
	16:51	17:52	4 07:53 (1)		20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17
25	08:25	07:26	06:19		06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:43
	16:53	17:54	8 07:59 (1)		20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17	08:11	08:44
	16:54	17:56	11 07:59 (1)		20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19	08:13	08:44
	16:56	17:58	14 08:00 (1)		20:48	21:39	22:01	21:33	20:30	19:15	17:05	16:14
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21	08:15	08:44
	16:58	18:00	17 08:00 (1)		20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	07:21	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:13
31	08:16		07:04			05:04		05:37	06:31		07:23	08:44
	17:04		19:58			21:44		21:27	20:21		16:56	16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328	259
Total, worst case				116							173	
Sun reduction		0.23		0.27							0.29	
Oper. time red.		1.00		1.00							1.00	
Wind dir. red.		0.65		0.65							0.65	
Total reduction		0.15		0.18							0.19	
Total, real		8		20							33	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GP - H198

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	07:54 (1) 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	07:55 (1) 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	07:54 (1) 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	07:54 (1) 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	07:54 (1) 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	07:54 (1) 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	07:54 (1) 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	07:54 (1) 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	07:54 (1) 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:58	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	07:54 (1) 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	07:54 (1) 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	07:54 (1) 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	07:54 (1) 16:05
14	08:38 16:33	07:49 17:32	06:45 18:15	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	07:54 (1) 16:05
15	08:37 16:35	07:47 17:34	06:43 18:13	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	07:54 (1) 16:05
16	08:36 16:36	07:45 17:36	06:41 18:11	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	07:54 (1) 16:05
17	08:35 16:38	07:43 17:38	06:38 18:11	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	07:54 (1) 16:05
18	08:34 16:40	07:41 17:40	06:36 18:10	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	07:54 (1) 16:05
19	08:32 16:42	07:39 17:42	06:33 18:11	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	07:54 (1) 16:05
20	08:31 16:43	07:37 17:44	06:31 18:12	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	07:54 (1) 16:06
21	08:30 16:45	07:34 17:46	06:28 18:14	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:04 16:21	07:54 (1) 16:06
22	08:29 16:47	07:32 17:48	06:26 18:17	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 16:19	07:54 (1) 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:07 16:18	07:54 (1) 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:09 16:17	07:54 (1) 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:11 16:16	07:54 (1) 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	07:13 16:15	07:54 (1) 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	07:15 16:14	07:54 (1) 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	07:17 16:13	07:54 (1) 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	07:19 16:12	07:54 (1) 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	07:21 16:11	07:54 (1) 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44			05:37 21:27	06:31 20:21		07:23 16:56	07:23 16:11	07:54 (1) 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		167								164	1	
Sun reduction		0.23								0.29	0.27	
Oper. time red.		1.00								1.00	1.00	
Wind dir. red.		0.63								0.63	0.63	
Total reduction		0.15								0.19	0.17	
Total, real		25								30	0	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GQ - H199

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:18 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24				08:19	08:54 (1)						
	16:15	10	09:28 (1)	17:06	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54				16:10	21	09:15 (1)					
2	08:44		09:18 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26				08:21		08:56 (1)					
	16:16	11	09:29 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				16:09	20	09:16 (1)					
3	08:44		09:18 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28				08:22		08:57 (1)					
	16:17	11	09:29 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50				16:08	18	09:15 (1)					
4	08:44		09:17 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30				08:24		08:59 (1)					
	16:18	13	09:30 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:48				16:08	17	09:16 (1)					
5	08:43		09:17 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32				08:25		09:00 (1)					
	16:20	14	09:31 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46				16:07	16	09:16 (1)					
6	08:43		09:16 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34				08:27		09:02 (1)					
	16:21	15	09:31 (1)	17:16	18:11	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45				16:07	15	09:17 (1)					
7	08:42		09:15 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36				08:28		09:03 (1)					
	16:22	16	09:31 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				16:06	14	09:17 (1)					
8	08:42		09:15 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38				08:29		09:05 (1)					
	16:24	17	09:32 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:41				16:06	13	09:18 (1)					
9	08:41		09:14 (1)	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				08:31		09:06 (1)					
	16:25	18	09:32 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39				16:05	12	09:18 (1)					
10	08:41		09:13 (1)	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42				08:32		09:07 (1)					
	16:27	19	09:32 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37				16:05	11	09:18 (1)					
11	08:40		09:12 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44				08:33		09:08 (1)					
	16:28	21	09:33 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36				16:05	10	09:18 (1)					
12	08:39		09:13 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46				08:34		09:10 (1)					
	16:30	20	09:33 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34				16:05	9	09:19 (1)					
13	08:38		09:13 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48				08:35		09:11 (1)					
	16:31	20	09:33 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32				16:05	8	09:19 (1)					
14	08:38		09:14 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50				08:36		09:12 (1)					
	16:33	19	09:33 (1)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31				16:05	7	09:19 (1)					
15	08:37		09:15 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51				08:37		09:13 (1)					
	16:35	18	09:33 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				16:05	7	09:20 (1)					
16	08:36		09:16 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53				08:38		09:14 (1)					
	16:36	18	09:34 (1)	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28				16:05	6	09:20 (1)					
17	08:35		09:16 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55				08:39		09:14 (1)					
	16:38	17	09:33 (1)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26				16:05	6	09:20 (1)					
18	08:34		09:17 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57				08:40		09:15 (1)					
	16:40	15	09:32 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25				16:05	5	09:20 (1)					
19	08:32		09:19 (1)	07:39	06:33	06:18	05:19	04:54	05:19	06:10	07:05	07:59	07:59				08:40		09:16 (1)					
	16:41	13	09:32 (1)	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23				16:05	5	09:21 (1)					
20	08:31		09:20 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01				08:41		09:16 (1)					
	16:43	11	09:31 (1)	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22				16:06	5	09:21 (1)					
21	08:30		09:22 (1)	07:34	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:03				08:58 (1)		09:17 (1)					
	16:45	7	09:29 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21				7	09:05 (1)	16:06	5	09:22 (1)			
22	08:29			07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04				08:57 (1)		08:42					
	16:47			17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19				11	09:08 (1)	16:07	5	09:23 (1)			
23	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				08:55 (1)		08:43					
	16:49			17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18				13	09:08 (1)	16:07	5	09:23 (1)			
24	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08				08:54 (1)		08:43					
	16:51			17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17				15	09:09 (1)	16:08	5	09:23 (1)			
25	08:25			07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:10				08:54 (1)		08:43					
	16:53			17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16				17	09:11 (1)	16:08	5	09:24 (1)			
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11				08:54 (1)		08:44					
	16:54			17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15				18	09:12 (1)	16:09	6	09:25 (1)			
27	08:22			07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13				08:54 (1)		08:44					
	16:56			17:58	18:51	20:48	21:39	22:01	21:34	20:30	19:15	17:05	16:14				18	09:12 (1)	16:10	6	09:25 (1)			
28	08:20			07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:15				08:54 (1)		08:44					
	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13				19	09:13 (1)	16:11	6	09:25 (1)			
29	08:19				07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16				08:55 (1)		08:44					
	17:00				19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12				19	09:14 (1)	16:12	7	09:26 (1)			
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:18				08:54 (1)		08:44					
	17:02				19:57	20:54	21:43	22:01	21:29	20:23	19:07	16:58	16:11				20	09:14 (1)	16:12	8	09:27 (1)			
31	08:16				07:04		05:04		05:37	06:31		07:23							08:44					
	17:04				19:58		21:44		21:27	20:21		16:56							16:13	9	09:28 (1)			
Potential sun hours	250																							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GR - H200

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February		March	April	May	June	July	August	September	October		November		December
1	08:44	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24	07:54 (1)	08:19
2	16:15	17:06		18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05		16:54	22 08:16 (1)	16:10
3	08:44	08:12	1 08:40 (1)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26	07:56 (1)	08:21
4	16:16	17:08	2 08:41 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	20 08:16 (1)	16:09
5	08:44	08:10	3 08:38 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30		07:28	07:58 (1)	08:22
6	16:17	17:10	4 08:42 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	18 08:16 (1)	16:09
7	08:43	08:09	5 08:36 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30	08:00 (1)	08:24
8	16:18	17:12	6 08:43 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	15 08:15 (1)	16:08
9	08:43	08:07	7 08:34 (1)	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33		07:32	08:02 (1)	08:25
10	16:20	17:14	8 08:44 (1)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	13 08:15 (1)	16:07
11	08:43	08:05	9 08:32 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34	08:04 (1)	08:27
12	16:21	17:16	10 08:45 (1)	18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53		16:45	10 08:14 (1)	16:07
13	08:42	08:03	11 08:30 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36	08:06 (1)	08:28
14	16:22	17:18	12 08:46 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	7 08:13 (1)	16:06
15	08:42	08:01	13 08:28 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38	08:09 (1)	08:29
16	16:24	17:20	14 08:46 (1)	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48		16:41	4 08:13 (1)	16:06
17	08:41	07:59	15 08:26 (1)	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		08:31
18	16:25	17:22	16 08:47 (1)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39		16:05
19	08:41	07:57	17 08:24 (1)	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43		07:42		08:32
20	16:27	17:24	18 08:47 (1)	18:19	20:17	21:12	21:55	21:58	21:08	19:57	18:43		16:37		16:05
21	08:40	07:55	19 08:23 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44		08:33
22	16:28	17:26	20 08:47 (1)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36		16:05
23	08:39	07:53	21 08:24 (1)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46		08:34
24	16:30	17:28	22 08:47 (1)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34		16:05
25	08:38	07:51	23 08:24 (1)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48		08:35
26	16:31	17:30	24 08:46 (1)	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36		16:32		16:05
27	08:37	07:49	25 08:24 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:50		08:36
28	16:33	17:32	26 08:45 (1)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34		16:31		16:05
29	08:37	07:47	27 08:25 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51		08:37
30	16:35	17:34	28 08:44 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29		16:05
31	08:36	07:45	29 08:26 (1)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54		07:53		08:38
32	16:36	17:36	30 08:43 (1)	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28		16:05
33	08:35	07:43	31 08:28 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55		08:39
34	16:38	17:38	1 08:42 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26		16:05
35	08:34	07:41	2 08:31 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58		07:57		08:39
36	16:40	17:40	3 08:39 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25		16:05
37	08:32	07:39	4 08:30 (1)	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59		07:59		08:40
38	16:41	17:42	5 08:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	17:09		16:23		16:05
39	08:31	07:37	6 06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01		08:01		08:41
40	16:43	17:44	7 08:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	17:07		16:22		16:06
41	08:30	07:34	8 06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:03		08:02		08:41
42	16:45	17:46	9 08:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	17:05		16:21		16:06
43	08:29	07:32	10 06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		08:04		08:42
44	16:47	17:48	11 08:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	17:02		16:19		16:07
45	08:27	07:30	12 06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		08:06		08:43
46	16:49	17:50	13 08:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	17:00		16:18		16:07
47	08:26	07:28	14 06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08		08:08		08:43
48	16:51	17:52	15 08:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	17:00	9 09:00 (1)	16:17		16:08
49	08:25	07:26	16 06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:09	10 07:57 (1)	16:10		08:43
50	16:53	17:54	17 08:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09	17:00	11 08:12 (1)	16:16		16:08
51	08:23	07:23	18 06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:12	08:11	12 07:56 (1)	16:11		08:44
52	16:54	17:56	19 08:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	17:00	13 08:13 (1)	16:15		16:09
53	08:22	07:21	20 06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:14	08:13	14 07:54 (1)	16:13		08:44
54	16:56	17:58	21 08:51	20:48	21:39	22:01	21:33	20:30	19:15	18:05	17:00	15 08:14 (1)	16:14		16:10
55	08:20	07:19	22 06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:16	08:15	16 07:53 (1)	16:15		08:44
56	16:58	18:00	23 08:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	17:00	17 08:15 (1)	16:13		16:11
57	08:19		24 07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:18	08:16	18 07:53 (1)	16:16		08:44
58	17:00		25 19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	17:00	19 08:15 (1)	16:12		16:12
59	08:17		26 07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:19	08:18	20 07:53 (1)	16:13		08:44
60	17:02		27 19:57	20:54	21:43	22:01	21:28	20:23	19:07	18:00	17:00	21 08:16 (1)	16:11		16:13
61	08:16		28 07:04		05:04		05:37	06:31		07:22	08:16	22 07:53 (1)	16:11		08:44
62	17:04		29 19:58		21:44		21:27	20:21		16:56	23 08:16 (1)	16:14			16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233			
Total, worst case		261								151	109				
Sun reduction		0.23								0.29	0.27				
Oper. time red.		1.00								1.00	1.00				
Wind dir. red.		0.62								0.62	0.62				
Total reduction		0.14								0.18	0.16				
Total, real		38								27	18				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GS - H201

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GT - H202

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GU - H203

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
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Total, worst case												
Sun reduction												
Oper. time red.												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GV - H204

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GW - H205
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GX - H206

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GY - H207

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GZ - H208

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HA - H209

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HB - H210

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HC - H211

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HD - H212

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HE - H213

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	05:03 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:54	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HF - H214

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HG - H215

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HH - H216

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HI - H217

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HJ - H218

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HK - H219

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HL - H220

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HM - H221

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HN - H222

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HO - H223

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HP - H224

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HQ - H225

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:54	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HR - H226

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	05:33 (5) 04:59	05:32 (5) 05:39	06:33 07:26	07:24 08:19	07:24 08:19	08:19
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:33 (5) 05:00	05:31 (5) 05:40	06:35 07:28	07:26 08:21	07:26 08:21	08:21
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:32 (5) 05:00	05:33 (5) 05:42	06:36 07:30	07:28 08:22	07:28 08:22	08:22
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:31 (5) 05:01	05:34 (5) 05:44	06:38 07:32	07:30 08:24	07:30 08:24	08:24
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:31 (5) 05:02	05:35 (5) 05:46	06:40 07:33	07:32 08:25	07:32 08:25	08:25
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:30 (5) 05:03	05:36 (5) 05:47	06:42 07:35	07:34 08:26	07:34 08:26	08:26
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:30 (5) 05:04	05:37 (5) 05:49	06:44 07:37	07:36 08:28	07:36 08:28	08:28
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:29 (5) 05:05	05:38 (5) 05:51	06:45 07:39	07:38 08:29	07:38 08:29	08:29
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:29 (5) 05:06	05:39 (5) 05:52	06:47 07:41	07:40 08:30	07:40 08:30	08:30
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:28 (5) 05:07	05:40 (5) 05:54	06:49 07:43	07:42 08:31	07:42 08:31	08:31
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:28 (5) 05:08	05:41 (5) 05:56	06:51 07:44	07:44 08:33	07:44 08:33	08:33
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:28 (5) 05:09	05:42 (5) 05:58	06:52 07:46	07:46 08:34	07:46 08:34	08:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:27 (5) 05:11	05:43 (5) 05:59	06:54 07:48	07:47 08:35	07:47 08:35	08:35
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:27 (5) 05:12	05:44 (5) 06:01	06:56 07:50	07:49 08:36	07:49 08:36	08:36
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:27 (5) 05:13	05:45 (5) 06:03	06:58 07:52	07:51 08:37	07:51 08:37	08:37
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:27 (5) 05:14	05:47 (5) 06:05	06:59 07:54	07:53 08:38	07:53 08:38	08:38
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:27 (5) 05:16	05:48 (5) 06:06	07:01 07:56	07:55 08:38	07:55 08:38	08:38
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:27 (5) 05:17	05:49 (5) 06:08	07:03 07:57	07:57 08:39	07:57 08:39	08:39
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:27 (5) 05:19	05:50 (5) 06:10	07:05 07:59	07:59 08:40	07:59 08:40	08:40
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:27 (5) 05:20	05:52 (5) 06:12	07:06 08:01	08:00 08:41	08:00 08:41	08:41
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:27 (5) 05:21	05:53 (5) 06:13	07:08 08:03	08:02 08:41	08:02 08:41	08:41
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:28 (5) 05:23	06:15 07:10	07:10 08:05	08:04 08:42	08:04 08:42	08:42
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:28 (5) 05:24	06:17 07:12	07:12 08:07	08:06 08:42	08:06 08:42	08:42
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:28 (5) 05:26	06:19 07:14	07:14 08:09	08:08 08:43	08:08 08:43	08:43
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:29 (5) 05:27	06:21 07:15	07:15 08:09	08:09 08:43	08:09 08:43	08:43
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 (5) 05:29	06:22 07:17	07:17 08:11	08:11 08:43	08:11 08:43	08:43
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:30 (5) 05:31	06:24 07:19	07:19 08:13	08:13 08:44	08:13 08:44	08:44
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:30 (5) 05:32	06:26 07:21	07:21 08:14	08:14 08:44	08:14 08:44	08:44
29	08:19 17:00	07:19 19:00	06:11 19:00	05:59 20:50	05:07 21:40	04:57 22:01	05:30 (5) 05:32	06:26 07:21	07:21 08:14	08:14 08:44	08:14 08:44	08:44
30	08:17 17:02	07:17 19:02	06:10 19:05	05:58 20:51	05:06 21:41	04:58 22:01	05:31 (5) 05:34	06:28 07:23	07:23 08:16	08:16 08:44	08:16 08:44	08:44
31	08:15 17:04	07:15 19:04	06:09 19:06	05:57 20:52	05:05 21:42	04:58 22:00	06:00 (5) 05:35	06:29 07:24	07:24 08:18	08:18 08:44	08:18 08:44	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					96	837	373					
Sun reduction					0.38	0.32	0.32					
Oper. time red.					1.00	1.00	1.00					
Wind dir. red.					0.66	0.66	0.66					
Total reduction					0.25	0.21	0.21					
Total, real					24	176	80					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HS - H227

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		08:14		07:16				07:01		07:41 (5)	05:52		06:18 (4)	05:03		
	16:15		17:06		18:02				20:00	22	08:03 (5)	20:55	13	06:31 (4)	21:45		
2	08:44		08:12		07:14				06:59		07:43 (5)	05:50		06:16 (4)	05:02		
	16:16		17:08		18:04				20:02	18	08:01 (5)	20:57	14	06:30 (4)	21:47		
3	08:44		08:10		07:12				06:56		07:45 (5)	05:48		06:14 (4)	05:01		
	16:17		17:10		18:06				20:04	12	07:57 (5)	20:59	15	06:29 (4)	21:48		
4	08:43		08:09		07:09				06:54			05:46		06:12 (4)	05:00		
	16:18		17:12		18:08				20:06			21:01	16	06:28 (4)	21:49		
5	08:43		08:07		07:07				06:52			05:44		06:12 (4)	04:59		05:31 (3)
	16:20		17:14		18:10				20:08			21:03	14	06:26 (4)	21:50	1	05:32 (3)
6	08:43		08:05		07:05				06:49			05:42		06:15 (4)	04:59		05:30 (3)
	16:21		17:16		18:11				20:09			21:04	10	06:25 (4)	21:51	2	05:32 (3)
7	08:42		08:03		07:02				06:47			05:40			04:58		05:30 (3)
	16:22		17:18		18:13				20:11			21:06			21:52	3	05:33 (3)
8	08:42		08:01		07:00				06:44			05:38			04:57		05:29 (3)
	16:24		17:20		18:15				20:13			21:08			21:53	4	05:33 (3)
9	08:41		07:59		06:57				06:42			05:36			04:57		05:29 (3)
	16:25		17:22		18:17				20:15			21:10			21:54	5	05:34 (3)
10	08:40		07:57		06:55				06:40			05:35			04:56		05:28 (3)
	16:27		17:24		18:19				20:17			21:12			21:55	6	05:34 (3)
11	08:40		07:55		06:53				06:37			05:33			04:56		05:28 (3)
	16:28		17:26		18:21				20:19			21:13			21:55	7	05:35 (3)
12	08:39		07:53		06:50				06:35			05:31			04:56		05:28 (3)
	16:30		17:28		18:23				20:20			21:15			21:56	7	05:35 (3)
13	08:38		07:51		06:48				06:32			05:29			04:55		05:27 (3)
	16:31		17:30		18:25				20:22			21:17			21:57	8	05:35 (3)
14	08:37		07:49		06:45				06:30			05:27			04:55		05:27 (3)
	16:33		17:32		18:27				20:24			21:18			21:58	8	05:35 (3)
15	08:36		07:47		06:43			07:07 (5)	06:28			05:26			04:55		05:27 (3)
	16:35		17:34		18:29	1	07:08 (5)	20:26				21:20			21:58	9	05:36 (3)
16	08:35		07:45		06:40		07:04 (5)	06:25				05:24			04:55		05:27 (3)
	16:36		17:36		18:30	5	07:09 (5)	20:28				21:22			21:59	9	05:36 (3)
17	08:34		07:43		06:38		07:02 (5)	06:23				05:22			04:54		05:27 (3)
	16:38		17:38		18:32	8	07:10 (5)	20:30				21:23			21:59	10	05:37 (3)
18	08:33		07:41		06:36		06:59 (5)	06:21				05:21			04:54		05:27 (3)
	16:40		17:40		18:34	11	07:10 (5)	20:32				21:25			22:00	10	05:37 (3)
19	08:32		07:39		06:33		06:57 (5)	06:18				05:19			04:54		05:27 (3)
	16:41		17:42		18:36	15	07:12 (5)	20:33				21:27			22:00	10	05:37 (3)
20	08:31		07:37		06:31		06:54 (5)	06:16				05:18			04:54		05:27 (3)
	16:43		17:44		18:38	17	07:11 (5)	20:35				21:28			22:00	10	05:37 (3)
21	08:30		07:34		06:28		06:52 (5)	06:14				05:16			04:55		05:27 (3)
	16:45		17:46		18:40	20	07:12 (5)	20:37				21:30			22:01	10	05:37 (3)
22	08:29		07:32		06:26		06:50 (5)	06:12				05:15			04:55		05:28 (3)
	16:47		17:48		18:42	23	07:13 (5)	20:39				21:31			22:01	10	05:38 (3)
23	08:27		07:30		06:23		06:47 (5)	06:09				05:13			04:55		05:28 (3)
	16:49		17:50		18:43	25	07:12 (5)	20:41				21:33			22:01	10	05:38 (3)
24	08:26		07:28		06:21		06:45 (5)	06:07				05:12			04:55		05:28 (3)
	16:51		17:52		18:45	27	07:12 (5)	20:43				21:34			22:01	10	05:38 (3)
25	08:25		07:25		06:18		06:42 (5)	06:05		06:30 (4)	05:11				04:56		05:29 (3)
	16:53		17:54		18:47	29	07:11 (5)	20:44	3	06:33 (4)	21:36				22:01	10	05:39 (3)
26	08:23		07:23		06:16		06:40 (5)	06:03		06:28 (4)	05:09				04:56		05:29 (3)
	16:54		17:56		18:49	31	07:11 (5)	20:46	5	06:33 (4)	21:37				22:01	9	05:38 (3)
27	08:22		07:21		06:14		06:37 (5)	06:01		06:26 (4)	05:08				04:57		05:30 (3)
	16:56		17:58		18:51	33	07:10 (5)	20:48	7	06:33 (4)	21:39				22:01	9	05:39 (3)
28	08:20		07:19		06:11		06:38 (5)	05:59		06:24 (4)	05:07				04:57		05:30 (3)
	16:58		18:00		18:53	31	07:09 (5)	20:50	9	06:33 (4)	21:40				22:01	9	05:39 (3)
29	08:19				07:09		07:38 (5)	05:56		06:22 (4)	05:06				04:58		05:31 (3)
	17:00				19:55	29	08:07 (5)	20:52	10	06:32 (4)	21:41				22:01	8	05:39 (3)
30	08:17				07:06		07:39 (5)	05:54		06:20 (4)	05:05				04:58		05:31 (3)
	17:02				19:56	28	08:07 (5)	20:54	12	06:32 (4)	21:43				22:00	8	05:39 (3)
31	08:15				07:04		07:39 (5)				05:04						
	17:04				19:58	25	08:04 (5)				21:44						
Potential sun hours	250		273		367			420			494				510		
Total, worst case					358			98					82		202		
Sun reduction					0.27			0.35					0.38		0.32		
Oper. time red.					1.00			1.00					1.00		1.00		
Wind dir. red.					0.67			0.67					0.68		0.66		
Total reduction					0.18			0.24					0.26		0.21		
Total, real					65			23					21		43		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HS - H227

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 7	05:32 (3) 05:39 (3) 21:25	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54
2	05:00 22:00 6	05:33 (3) 05:39 (3) 21:23	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52
3	05:00 21:59 6	05:33 (3) 05:39 (3) 21:21	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50
4	05:01 21:59 5	05:34 (3) 05:39 (3) 21:19	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48
5	05:02 21:58 4	05:35 (3) 05:39 (3) 21:17	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46
6	05:03 21:58 3	05:36 (3) 05:39 (3) 21:16	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45
7	05:04 21:57 2	05:37 (3) 05:39 (3) 21:14	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43
8	05:05 21:56 1	05:38 (3) 05:39 (3) 21:12	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41
9	05:06 21:55	05:39 (3) 21:10	15 05:52 16	06:47 19:59	07:40 (5) 18:45	07:40 16:39
10	05:07 21:55	05:54 21:08	15 06:39 (4) 19:57	10 07:50 (5) 18:45	07:43 18:43	07:42 16:37
11	05:08 21:54	05:56 21:06	14 06:25 (4) 19:54	18 07:33 (5) 18:41	07:44 18:36	07:44 16:36
12	05:09 21:53	05:58 21:03	13 06:27 (4) 19:52	22 07:55 (5) 18:41	07:46 18:38	07:46 16:34
13	05:11 21:52	05:59 21:01	11 06:28 (4) 19:49	24 07:30 (5) 18:36	07:48 18:36	07:47 16:32
14	05:12 21:51	06:01 20:59	28 06:30 (4) 19:47	30 07:58 (5) 18:34	07:50 18:34	07:49 16:31
15	05:13 21:50	06:03 20:57	30 06:32 (4) 19:44	31 07:58 (5) 18:31	07:52 18:31	07:51 16:29
16	05:14 21:49	06:05 20:55	8 06:40 (4) 19:42	32 07:58 (5) 18:29	07:54 18:29	07:53 16:28
17	05:16 21:47	06:06 20:53	6 06:35 (4) 19:39	32 07:59 (5) 18:27	07:56 18:27	07:55 16:26
18	05:17 21:46	06:08 20:51	4 06:39 (4) 19:37	31 07:59 (5) 18:27	07:57 18:27	07:57 16:26
19	05:19 21:45	06:10 20:48	2 06:39 (4) 19:37	29 07:58 (5) 18:24	07:59 18:24	07:59 16:25
20	05:20 21:44	06:12 20:46	28 07:05 19:34	28 07:31 (5) 18:22	07:59 18:22	07:59 16:23
21	05:21 21:42	06:13 20:44	25 07:06 19:32	25 07:58 (5) 18:20	08:01 18:20	08:01 16:22
22	05:23 21:41	06:15 20:42	23 07:08 19:29	23 07:35 (5) 18:18	08:03 18:18	08:02 16:21
23	05:24 21:39	06:17 20:39	21 07:10 19:27	21 07:36 (5) 18:15	08:05 18:15	08:04 16:19
24	05:26 21:38	06:19 20:37	18 07:12 19:24	18 07:38 (5) 18:11	08:07 18:11	08:06 16:17
25	05:27 21:36	06:21 20:35	15 07:14 19:22	15 07:40 (5) 18:09	08:09 18:09	08:08 16:16
26	05:29 21:35	06:22 20:32	13 07:17 19:19	13 07:43 (5) 17:07	08:11 17:07	08:11 16:16
27	05:31 21:33	06:24 20:30	9 07:19 19:15	9 07:52 (5) 17:05	08:13 17:05	08:13 16:14
28	05:32 21:32	06:26 20:28	6 07:21 19:12	6 07:51 (5) 17:05	08:14 17:05	08:14 16:14
29	05:34 21:30	06:28 20:25	2 07:23 19:10	2 07:47 (5) 17:02	08:16 17:02	08:16 16:11
30	05:35 21:28	06:29 20:23	19 07:24 19:07	17 07:18 16:58	08:18 16:11	08:18 16:13
31	05:37 21:27	06:31 20:21		16 07:22 16:56	08:44 16:11	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	34	132	415			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.68	0.67			
Total reduction	0.21	0.23	0.21			
Total, real	7	30	89			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HT - H228

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 05:34 (3)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 05:40 (3)
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 05:32 (3)
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 05:40 (3)
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 21:03	04:59 05:41 (3)
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 21:04	04:59 05:41 (3)
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:11 (5) 21:06	04:58 05:41 (3)
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:08 (5) 21:08	04:57 05:41 (3)
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:06 (5) 21:10	04:57 05:41 (3)
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:03 (5) 21:12	04:56 05:41 (3)
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:01 (5) 21:13	04:56 05:41 (3)
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	07:02 (5) 21:15	04:56 05:42 (3)
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	07:04 (5) 21:17	04:55 05:41 (3)
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	07:06 (5) 21:18	04:55 05:41 (3)
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 05:42 (3)
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 05:42 (3)
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 05:42 (3)
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 05:42 (3)
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 05:42 (3)
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 05:42 (3)
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 05:43 (3)
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 05:43 (3)
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 05:43 (3)
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 05:43 (3)
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 05:44 (3)
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 05:44 (3)
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 05:45 (3)
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 05:45 (3)
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 05:45 (3)
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 05:45 (3)
31	08:15 17:04		07:04 19:58		05:04 21:44	05:34 (3) 05:39 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case				151	13	392
Sun reduction				0.35	0.38	0.32
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.66	0.66
Total reduction				0.24	0.25	0.21
Total, real				36	3	83

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HT - H228

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 14	05:32 (3) 05:46 (3) 21:25	05:39 21:25	06:33 20:18 19	07:00 (5) 07:19 (5) 19:05	07:24 16:54 16:10
2	05:00 22:00 13	05:33 (3) 05:46 (3) 21:23	05:40 21:23	06:35 20:16 18	07:02 (5) 07:20 (5) 19:02	07:26 16:52 16:09
3	05:00 21:59 13	05:33 (3) 05:46 (3) 21:21	05:42 21:21	06:37 20:14 17	07:04 (5) 07:21 (5) 19:00	07:28 16:50 16:09
4	05:01 21:59 12	05:34 (3) 05:46 (3) 21:19	05:44 21:19	06:38 20:11 15	07:05 (5) 07:20 (5) 18:57	07:30 16:48 16:08
5	05:02 21:58 11	05:35 (3) 05:46 (3) 21:17	05:46 21:17	06:40 20:09 13	07:07 (5) 07:20 (5) 18:55	07:32 16:46 16:07
6	05:03 21:58 11	05:36 (3) 05:47 (3) 21:16	05:47 21:16	06:42 20:06 11	07:09 (5) 07:20 (5) 18:53	07:34 16:45 16:07
7	05:04 21:57 10	05:37 (3) 05:47 (3) 21:14	05:49 21:14	06:44 20:04 9	07:10 (5) 07:19 (5) 18:50	07:36 16:43 16:06
8	05:05 21:56 9	05:38 (3) 05:47 (3) 21:12	05:51 21:12	06:45 20:01 7	07:12 (5) 07:19 (5) 18:48	07:38 16:41 16:06
9	05:06 21:55 9	05:39 (3) 05:48 (3) 21:10	05:52 21:10	06:47 19:59 4	07:14 (5) 07:18 (5) 18:45	07:40 16:39 16:06
10	05:07 21:55 8	05:40 (3) 05:48 (3) 21:08	05:54 21:08	06:49 19:57 1	07:16 (5) 07:17 (5) 18:43	07:42 16:37 16:05
11	05:08 21:54 7	05:41 (3) 05:48 (3) 21:06	05:56 21:06	06:51 19:54 1	07:19 (5) 07:20 (5) 18:41	07:44 16:36 16:05
12	05:10 21:53 6	05:42 (3) 05:48 (3) 21:03	05:58 21:03	06:52 19:52 1	07:22 (5) 07:23 (5) 18:38	07:46 16:34 16:05
13	05:11 21:52 5	05:43 (3) 05:48 (3) 21:01	05:59 21:01	06:54 19:49 1	07:24 (5) 07:25 (5) 18:36	07:47 16:32 16:05
14	05:12 21:51 3	05:44 (3) 05:47 (3) 20:59	06:01 20:59	06:56 19:47 1	07:26 (5) 07:27 (5) 18:34	07:49 16:31 16:05
15	05:13 21:50 2	05:45 (3) 05:47 (3) 20:57	06:03 20:57	06:58 19:44 1	07:28 (5) 07:29 (5) 18:31	07:51 16:29 16:05
16	05:15 21:49 1	05:46 (3) 05:48 (3) 20:55	06:05 20:55	06:59 19:42 1	07:30 (5) 07:31 (5) 18:29	07:53 16:28 16:05
17	05:16 21:47 1	05:47 (3) 20:53	06:06 20:53	07:01 19:39 1	07:32 (5) 07:33 (5) 18:27	07:55 16:26 16:05
18	05:17 21:46 1	05:48 (3) 20:51	06:08 20:51	07:03 19:37 1	07:34 (5) 07:35 (5) 18:24	07:57 16:25 16:05
19	05:19 21:45 1	05:49 (3) 20:48	06:10 20:48	07:05 19:34 1	07:36 (5) 07:37 (5) 18:22	07:59 16:23 16:05
20	05:20 21:44 1	05:50 (3) 20:46	06:12 20:46	07:07 19:32 1	07:38 (5) 07:39 (5) 18:20	08:01 16:22 16:06
21	05:21 21:42 1	05:51 (3) 20:44	06:14 20:44	07:08 19:29 1	07:40 (5) 07:41 (5) 18:18	08:02 16:21 16:06
22	05:23 21:41 1	05:52 (3) 20:42	06:15 20:42	07:10 19:27 1	07:42 (5) 07:43 (5) 18:15	08:04 16:19 16:07
23	05:24 21:39 1	05:53 (3) 20:39	06:17 20:39	07:12 19:24 1	07:44 (5) 07:45 (5) 18:13	08:06 16:18 16:07
24	05:26 21:38 1	05:54 (3) 20:37	06:19 20:37	07:14 19:22 1	07:46 (5) 07:47 (5) 18:11	08:08 16:17 16:08
25	05:28 21:36 1	05:55 (3) 20:35	06:21 20:35	07:15 19:19 1	07:48 (5) 07:49 (5) 18:09	08:09 16:16 16:08
26	05:29 21:35 1	05:56 (3) 20:33	06:22 20:33	07:17 19:17 1	07:50 (5) 07:51 (5) 18:07	08:11 16:15 16:09
27	05:31 21:33 1	05:57 (3) 20:30	06:24 20:30	07:19 19:15 1	07:52 (5) 07:53 (5) 18:05	08:13 16:14 16:10
28	05:32 21:32 1	05:58 (3) 20:28	06:26 20:28	07:21 19:12 1	07:54 (5) 07:55 (5) 18:03	08:14 16:13 16:11
29	05:34 21:30 1	05:59 (3) 20:25	06:28 20:25	07:23 19:10 1	07:56 (5) 07:57 (5) 18:01	08:16 16:12 16:12
30	05:35 21:28 1	06:00 (3) 20:23	06:29 20:23	07:24 19:07 1	07:58 (5) 07:59 (5) 18:00	08:18 16:11 16:13
31	05:37 21:27 1	06:01 (3) 20:21	07:02 (5) 17:19 (5)	07:25 19:08 1	08:00 (5) 08:01 (5) 17:58	08:20 16:10 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	134	39	114			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.67	0.67			
Total reduction	0.21	0.23	0.22			
Total, real	29	9	25			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HU - H229

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:26 (1)	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:56	06:35 (1)	21:45	22:00	21:25	13	06:39 (1)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:40	06:25 (1)	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	06:35 (1)	21:47	22:00	21:23	15	06:40 (1)	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:57	05:48	06:14 (1)	05:01	05:00	05:42	06:23 (1)	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	06:35 (1)	21:48	21:59	21:21	18	06:41 (1)	20:14	19:00	16:50	16:09
4	08:43	08:09	07:09	06:54	05:46	06:12 (1)	05:00	05:01	05:44	06:23 (1)	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01	06:35 (1)	21:49	21:59	21:19	19	06:42 (1)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	06:11 (1)	04:59	05:02	05:46	06:23 (1)	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03	06:34 (1)	21:50	21:58	21:18	20	06:43 (1)	20:09	18:55	16:46	16:07
6	08:43	08:05	07:05	06:49	05:42	06:12 (1)	04:59	05:03	05:47	06:21 (1)	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:09	21:05	06:34 (1)	21:51	21:58	21:16	22	06:43 (1)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	06:12 (1)	04:58	05:04	05:49	06:21 (1)	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	06:34 (1)	21:52	21:57	21:14	23	06:44 (1)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	06:12 (1)	04:57	05:05	05:51	06:20 (1)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	06:33 (1)	21:53	21:56	21:12	24	06:44 (1)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36	06:13 (1)	04:57	05:06	05:52	06:22 (1)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	06:32 (1)	21:54	21:56	21:10	22	06:44 (1)	19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35	06:14 (1)	04:56	05:07	05:54	06:24 (1)	06:49	07:43	07:42	08:32	
	16:27	17:24	18:19	20:17	21:12	06:31 (1)	21:55	21:55	21:08	20	06:44 (1)	19:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33	06:15 (1)	04:56	05:08	05:56	06:25 (1)	06:51	07:44	07:44	08:33	
	16:28	17:26	18:21	20:19	21:13	06:30 (1)	21:56	21:54	21:06	19	06:44 (1)	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	06:17 (1)	04:56	05:10	05:58	06:27 (1)	06:52	07:46	07:46	08:34	
	16:30	17:28	18:23	20:21	21:15	06:27 (1)	21:56	21:53	21:04	17	06:44 (1)	19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29	06:20 (1)	04:55	05:11	05:59	06:29 (1)	06:54	07:48	07:48	08:35	
	16:31	17:30	18:25	20:22	21:17	06:25 (1)	21:57	21:52	21:01	14	06:43 (1)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	05:12	06:01	06:30 (1)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:19	21:58	21:51	21:51	20:59	12	06:42 (1)	19:47	18:34	16:31	16:05
15	08:37	07:47	06:43	06:28	05:26	04:55	05:13	05:13	06:03	06:32 (1)	06:58	07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	21:20	21:58	21:50	21:50	20:57	10	06:42 (1)	19:44	18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24	04:55	05:15	05:15	06:05	06:34 (1)	07:00	07:54	07:53	08:38	
	16:36	17:36	18:31	20:28	21:22	21:59	21:49	21:49	20:55	7	06:41 (1)	19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	05:16	06:06	06:35 (1)	07:01	07:56	07:55	08:39	
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	21:48	20:53	4	06:39 (1)	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21	04:54	05:17	05:17	06:08	07:03	07:58	07:57	07:57	08:39	
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	21:46	20:51		19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	05:19	06:10	07:05	07:59	07:59	07:59	08:40	
	16:42	17:42	18:36	20:34	21:27	22:00	21:45	21:45	20:49		19:34	18:22	16:23	16:05	
20	08:31	07:37	06:31	06:16	05:18	04:55	05:20	05:20	06:12	07:07	08:01	08:01	08:01	08:41	
	16:43	17:44	18:38	20:35	21:28	22:00	21:44	21:44	20:46		19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	05:21	06:14	07:08	08:03	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	21:42	20:44		19:29	18:18	16:21	16:06	
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	05:23	06:15	07:10	08:05	08:05	08:04	08:42	
	16:47	17:48	18:42	20:39	21:31	22:01	21:41	21:41	20:42		19:27	18:15	16:19	16:07	
23	08:27	07:30	06:23	06:10	05:13	04:55	05:24	05:24	06:17	07:12	08:07	08:07	08:06	08:42	
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	21:40	20:39		19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	05:26	06:19	07:14	08:09	08:09	08:08	08:43	
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	21:38	20:37		19:22	18:11	16:17	16:08	
25	08:25	07:26	06:19	06:05	06:30 (1)	05:11	04:56	05:28	06:21	07:15	07:11	08:09	08:09	08:43	
	16:53	17:54	18:47	20:45	1	06:31 (1)	21:36	22:01	20:35		19:20	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	06:28 (1)	05:10	04:56	05:29	06:22	07:17	07:13	08:11	08:11	08:44	
	16:55	17:56	18:49	20:46	4	06:32 (1)	21:37	22:01	20:33		19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	06:26 (1)	05:08	04:57	05:31	06:24	07:19	07:15	08:13	08:13	08:44	
	16:56	17:58	18:51	20:48	7	06:33 (1)	21:39	22:01	20:30		19:15	17:05	16:14	16:10	
28	08:20	07:19	06:11	05:59	06:24 (1)	05:07	04:57	05:32	06:26	07:21	07:17	08:15	08:15	08:44	
	16:58	18:00	18:53	20:50	10	06:34 (1)	21:40	22:01	20:28		19:12	17:02	16:13	16:11	
29	08:19		07:09	05:56	06:22 (1)	05:06	04:58	05:34	06:28	07:23	07:19	08:16	08:16	08:44	
	17:00		19:55	20:52	13	06:35 (1)	21:42	22:01	20:26		19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	06:20 (1)	05:05	04:58	05:36	06:29	07:24	07:21	08:18	08:18	08:44	
	17:02		19:57	20:54	15	06:35 (1)	21:43	22:00	20:23		19:07	16:58	16:11	16:13	
31	08:15		07:04		05:04		05:37		06:31		07:22			08:44	
	17:04		19:58		21:44		21:27	8	06:37 (1)	20:21	16:56			16:14	
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259		233	
Total, worst case					234				279						
Sun reduction					0.35				0.34						
Oper. time red.					1.00				1.00						
Wind dir. red.					0.68				0.68						
Total reduction					0.24				0.23						
Total, real					12				64						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HV - H230

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	07:25 (1)	05:52	05:03	04:59	05:39	06:33	07:08 (1)	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	6 07:31 (1)	20:56	21:45	22:00	21:25	20:18	21 07:29 (1)	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	07:23 (1)	05:50	05:02	05:00	05:40	06:35	07:08 (1)	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	9 07:32 (1)	20:57	21:47	22:00	21:23	20:16	21 07:29 (1)	19:02	16:52	16:09
3	08:44	08:10	07:12	06:57	07:20 (1)	05:48	05:01	05:00	05:42	06:37	07:07 (1)	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	13 07:33 (1)	20:59	21:48	21:59	21:21	20:14	23 07:30 (1)	19:00	16:50	16:09
4	08:43	08:09	07:09	06:54	07:18 (1)	05:46	05:00	05:01	05:44	06:38	07:06 (1)	07:32	07:30	08:24
	16:18	17:12	18:08	20:06	15 07:33 (1)	21:01	21:49	21:59	21:19	20:11	23 07:29 (1)	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	07:15 (1)	05:44	04:59	05:02	05:46	06:40	07:07 (1)	07:33	07:32	08:25
	16:20	17:14	18:10	20:08	18 07:33 (1)	21:03	21:50	21:58	21:18	20:09	22 07:29 (1)	18:55	16:46	16:07
6	08:43	08:05	07:05	06:49	07:13 (1)	05:42	04:59	05:03	05:47	06:42	07:09 (1)	07:35	07:34	08:27
	16:21	17:16	18:12	20:10	20 07:33 (1)	21:05	21:51	21:58	21:16	20:06	20 07:29 (1)	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	07:11 (1)	05:40	04:58	05:04	05:49	06:44	07:10 (1)	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	22 07:33 (1)	21:06	21:52	21:57	21:14	20:04	18 07:28 (1)	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	07:09 (1)	05:38	04:57	05:05	05:51	06:45	07:12 (1)	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	23 07:32 (1)	21:08	21:53	21:56	21:12	20:02	16 07:28 (1)	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	07:09 (1)	05:36	04:57	05:06	05:52	06:47	07:14 (1)	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	23 07:32 (1)	21:10	21:54	21:56	21:10	19:59	13 07:27 (1)	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	07:10 (1)	05:35	04:56	05:07	05:54	06:49	07:16 (1)	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21 07:31 (1)	21:12	21:55	21:55	21:08	19:57	10 07:26 (1)	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	07:09 (1)	05:33	04:56	05:08	05:56	06:51	07:17 (1)	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21 07:30 (1)	21:13	21:56	21:54	21:06	19:54	6 07:23 (1)	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	07:11 (1)	05:31	04:56	05:09	05:58	06:52	07:19 (1)	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	18 07:29 (1)	21:15	21:56	21:53	21:04	19:52	2 07:21 (1)	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	07:12 (1)	05:29	04:55	05:11	05:59	06:54		07:48	07:48	08:35
	16:31	17:30	18:25	20:22	15 07:27 (1)	21:17	21:57	21:52	21:02	19:49		18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	07:14 (1)	05:27	04:55	05:12	06:01	06:56		07:50	07:49	08:36
	16:33	17:32	18:27	20:24	10 07:24 (1)	21:19	21:58	21:51	20:59	19:47		18:34	16:31	16:05
15	08:37	07:47	06:43	06:28		05:26	04:55	05:13	06:03	06:58		07:52	07:51	08:37
	16:35	17:34	18:29	20:26		21:20	21:58	21:50	20:57	19:44		18:31	16:29	16:05
16	08:36	07:45	06:41	06:25		05:24	04:55	05:15	06:05	07:00		07:54	07:53	08:38
	16:36	17:36	18:31	20:28		21:22	21:59	21:49	20:55	19:42		18:29	16:28	16:05
17	08:35	07:43	06:38	06:23		05:22	04:54	05:16	06:06	07:01		07:56	07:55	08:39
	16:38	17:38	18:32	20:30		21:24	21:59	21:48	20:53	19:39		18:27	16:26	16:05
18	08:33	07:41	06:36	06:21		05:21	04:54	05:17	06:08	07:03		07:58	07:57	08:39
	16:40	17:40	18:34	20:32		21:25	22:00	21:46	20:51	19:37		18:24	16:25	16:05
19	08:32	07:39	06:33	06:19		05:19	04:54	05:19	06:10	07:05		07:59	07:59	08:40
	16:42	17:42	18:36	20:34		21:27	22:00	21:45	20:49	19:34		18:22	16:23	16:05
20	08:31	07:37	06:31	06:16		05:18	04:54	05:20	06:12	07:07		08:01	08:01	08:41
	16:43	17:44	18:38	20:35		21:28	22:01	21:44	20:46	19:32		18:20	16:22	16:06
21	08:30	07:34	06:28	06:14		05:16	04:55	05:21	06:14	07:08		08:03	08:02	08:41
	16:45	17:46	18:40	20:37		21:30	22:01	21:42	20:44	19:29		18:18	16:21	16:06
22	08:29	07:32	06:26	06:12		05:15	04:55	05:23	06:15	07:10		08:05	08:04	08:42
	16:47	17:48	18:42	20:39		21:32	22:01	21:41	20:42	19:27		18:15	16:19	16:07
23	08:27	07:30	06:23	06:10		05:13	04:55	05:24	06:17	07:12		08:07	08:06	08:42
	16:49	17:50	18:44	20:41		21:33	22:01	21:40	20:40	19:24		18:13	16:18	16:07
24	08:26	07:28	06:21	06:07		05:12	04:55	05:26	06:19	07:14		08:09	08:08	08:43
	16:51	17:52	18:45	20:43		21:35	22:01	21:38	20:37	19:22		18:11	16:17	16:08
25	08:25	07:26	06:19	06:05		05:11	04:56	05:28	06:21	07:15		07:11	08:09	08:43
	16:53	17:54	18:47	20:45		21:36	22:01	21:37	20:35	19:20		17:09	16:16	16:08
26	08:23	07:23	06:16	06:03		05:10	04:56	05:29	06:22	07:17		07:13	08:11	08:44
	16:54	17:56	18:49	20:46		21:37	22:01	21:35	20:33	19:17		17:07	16:15	16:09
27	08:22	07:21	06:14	06:01		05:08	04:57	05:31	06:24	07:19		07:15	08:13	08:44
	16:56	17:58	18:51	20:48		21:39	22:01	21:33	20:30	19:15		17:05	16:14	16:10
28	08:20	07:19	06:11	05:59		05:07	04:57	05:32	06:26	07:21		07:17	08:15	08:44
	16:58	18:00	18:53	20:50		21:40	22:01	21:32	20:28	19:12		17:02	16:13	16:11
29	08:19		07:09	05:56		05:06	04:58	05:34	06:28		07:14 (1)	07:23	07:19	08:16
	17:00		19:55	20:52		21:42	22:01	21:30	20:26	11	07:25 (1)	19:10	17:00	16:12
30	08:17		07:06	05:54		05:05	04:58	05:36	06:29		07:12 (1)	07:24	07:21	08:18
	17:02		19:57	20:54		21:43	22:01	21:28	20:23	15	07:27 (1)	19:07	16:58	16:11
31	08:15		07:04	07:27 (1)		05:04		05:37	06:31		07:10 (1)		07:22	08:44
	17:04		19:58	07:29 (1)		21:44		21:27	20:21	18	07:28 (1)		16:56	16:14
Potential sun hours	250	273	367	420		494	510	512	460	382		328	259	233
Total, worst case			2	234					44			195		
Sun reduction			0.27	0.35					0.34			0.32		
Oper. time red.			1.00	1.00					1.00			1.00		
Wind dir. red.			0.68	0.68					0.68			0.68		
Total reduction			0.18	0.24					0.23			0.22		
Total, real			0	56					10			42		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HW - H231

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 08:00 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 08:01 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:21 (1) 08:28 (1)
3	08:44 16:17	08:10 17:10	07:12 18:06	07:37 (1) 08:00 (1)	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	08:18 (1) 08:31 (1)
4	08:43 16:18	08:09 17:12	07:09 18:08	07:37 (1) 08:00 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:16 (1) 08:33 (1)
5	08:43 16:20	08:07 17:14	07:07 18:10	07:36 (1) 08:00 (1)	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	08:15 (1) 08:34 (1)
6	08:43 16:21	08:05 17:16	07:05 18:12	07:36 (1) 08:00 (1)	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:13 (1) 08:35 (1)
7	08:42 16:22	08:03 17:18	07:02 18:13	07:37 (1) 07:59 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:13 (1) 08:35 (1)
8	08:42 16:24	08:01 17:20	07:00 18:15	07:37 (1) 07:58 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	08:12 (1) 08:36 (1)
9	08:41 16:25	07:59 17:22	06:58 18:17	07:38 (1) 07:57 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:11 (1) 08:35 (1)
10	08:41 16:27	07:57 17:24	06:55 18:19	07:39 (1) 07:54 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:11 (1) 08:34 (1)
11	08:40 16:28	07:55 17:26	06:53 18:21	07:42 (1) 07:52 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:11 (1) 08:34 (1)
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	05:52 19:52	06:52 18:38	07:46 17:46	08:13 (1) 08:33 (1)
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 17:48	08:15 (1) 08:33 (1)
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 17:50	08:17 (1) 08:31 (1)
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:52 17:52	08:19 (1) 08:30 (1)
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:54 17:48	08:21 (1) 08:28 (1)
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:56 17:56	08:23 (1) 08:24 (1)
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:58 17:58	08:24 (1) 16:25
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 17:59	08:21 (1) 16:23
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 17:50	08:20 (1) 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 17:58	08:02 (1) 16:21
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 17:58	08:04 (1) 16:19
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:07 17:50	08:06 (1) 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:09 17:52	08:08 (1) 16:17
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 18:09	07:11 17:09	08:10 (1) 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 18:07	07:13 17:07	08:11 (1) 16:15
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 18:05	07:15 17:05	08:13 (1) 16:14
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 18:02	07:17 17:02	08:15 (1) 16:13
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 18:00	07:19 17:00	08:16 (1) 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 18:58	07:21 17:58	08:18 (1) 16:11
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56	07:22 16:56	08:44 (1) 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328	259
Total, worst case				222							265	233
Sun reduction		0.23		0.27							0.29	
Oper. time red.		1.00		1.00							1.00	
Wind dir. red.		0.65		0.65							0.65	
Total reduction		0.15		0.18							0.19	
Total, real		6		39							50	

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HX - H232

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	08:01 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04	08:02 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	07:12	07:37 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06	08:02 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
4	08:43	08:09	07:09	07:37 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08	08:03 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	08:07	07:07	07:36 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
	16:20	17:14	18:10	08:02 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05	07:05	07:36 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12	08:02 (1)	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03	07:02	07:37 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13	08:02 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01	07:00	07:36 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15	08:01 (1)	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
9	08:41	07:59	06:58	07:37 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
	16:25	17:22	18:17	08:00 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06
10	08:41	07:57	06:55	07:37 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24	18:19	07:59 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55	06:53	07:39 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
	16:28	17:26	18:21	07:58 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
12	08:39	07:53	06:50	07:40 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:34
	16:30	17:28	18:23	07:55 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
13	08:38	07:51	06:48	07:43 (1)	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
	16:31	17:30	18:25	07:52 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:05
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	06:59	07:54	08:38
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:07
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:08
25	08:25	07:26	06:19	07:50 (1)	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:10
	16:53	17:54	18:47	07:54 (1)	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:08
26	08:23	07:23	06:16	07:48 (1)	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11
	16:54	17:56	18:49	07:57 (1)	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:09
27	08:22	07:21	06:14	07:46 (1)	06:01	05:08	04:57	05:31	06:24	07:19	07:15	08:13
	16:56	17:58	18:51	08:00 (1)	20:48	21:39	22:01	21:33	20:30	19:15	17:05	16:10
28	08:20	07:19	06:11	07:43 (1)	06:01	05:07	04:57	05:32	06:26	07:21	07:17	08:15
	16:58	18:00	18:53	08:00 (1)	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:11
29	08:19		06:09		05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12
30	08:17		06:06		05:54	05:05	04:58	05:35	06:29	07:24	07:21	08:18
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	5	16:11
31	08:15		06:04		05:54	05:04		05:37	06:31		08:30 (1)	16:13
	17:04		19:58		21:44	21:27	20:21	21:27	20:21		16:56	16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		259
Total, worst case			284							5	327	233
Sun reduction		0.23	0.27							0.32	0.29	
Oper. time red.		1.00	1.00							1.00	1.00	
Wind dir. red.		0.65	0.65							0.65	0.65	
Total reduction		0.15	0.18							0.21	0.19	
Total, real		7	50							1	62	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HY - H233

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	08:42 (3) 09:04 (1)	07:16 18:02	08:36 (1) 09:08 (1)	07:01 20:00
2	08:44 16:16	08:12 17:08	08:40 (3) 09:06 (1)	07:14 18:04	08:38 (1) 09:06 (1)	06:59 20:02
3	08:44 16:17	08:10 17:10	08:38 (3) 09:08 (1)	07:12 18:06	08:40 (1) 09:03 (1)	06:56 20:04
4	08:43 16:18	08:09 17:12	08:36 (3) 09:09 (1)	07:09 18:08	08:43 (1) 09:00 (1)	06:54 20:06
5	08:43 16:20	08:07 17:14	08:34 (3) 09:11 (1)	07:07 18:10	06:52 20:08	05:44 21:03
6	08:43 16:21	08:05 17:16	08:33 (3) 09:12 (1)	07:05 18:11	06:49 20:09	05:42 21:05
7	08:42 16:22	08:03 17:18	08:33 (3) 09:13 (1)	07:02 18:13	06:47 20:11	05:40 21:06
8	08:42 16:24	08:01 17:20	08:34 (3) 09:14 (1)	07:00 18:15	06:44 07:24 (2)	05:38 20:13
9	08:41 16:25	07:59 17:22	08:33 (1) 09:15 (1)	06:57 18:17	07:22 (2) 07:29 (2)	05:36 20:15
10	08:41 16:27	07:57 17:24	08:32 (1) 09:16 (1)	06:55 18:19	07:19 (2) 07:29 (2)	05:35 20:17
11	08:40 16:28	07:55 17:26	08:32 (1) 09:16 (1)	06:53 18:21	07:17 (2) 07:29 (2)	05:33 20:19
12	08:39 16:30	07:53 17:28	08:32 (1) 09:17 (1)	06:50 18:23	07:14 (2) 07:29 (2)	05:31 20:21
13	08:38 16:31	07:51 17:30	08:31 (1) 09:18 (1)	06:48 18:25	07:12 (2) 07:29 (2)	05:29 20:22
14	08:37 16:33	07:49 17:32	08:30 (1) 09:17 (1)	06:45 18:27	07:09 (2) 07:27 (2)	05:27 20:24
15	08:37 16:35	07:47 17:34	08:30 (1) 09:18 (1)	06:43 18:29	07:09 (2) 07:27 (2)	05:26 20:26
16	08:36 16:36	07:45 17:36	08:30 (1) 09:18 (1)	06:41 18:30	07:09 (2) 07:25 (2)	05:24 20:28
17	08:35 16:38	07:43 17:38	08:30 (1) 09:18 (1)	06:38 18:32	07:11 (2) 07:23 (2)	05:22 20:30
18	08:33 16:40	07:41 17:40	08:31 (1) 09:18 (1)	06:36 18:34	07:14 (2) 07:19 (2)	05:21 20:32
19	08:32 16:41	07:39 17:42	08:30 (1) 09:17 (1)	06:33 18:36	06:18 20:33	05:19 21:27
20	08:31 16:43	07:37 17:44	08:30 (1) 09:17 (1)	06:31 18:38	06:16 20:35	05:18 21:28
21	08:30 16:45	07:34 17:46	08:31 (1) 09:17 (1)	06:28 18:40	06:14 20:37	05:16 21:30
22	08:29 16:47	07:32 17:48	08:30 (1) 09:16 (1)	06:26 18:42	06:12 20:39	05:15 21:31
23	08:27 16:49	07:30 17:50	08:31 (1) 09:16 (1)	06:23 18:44	06:09 20:41	05:13 21:33
24	08:26 16:51	07:28 17:52	08:32 (1) 09:15 (1)	06:21 18:45	06:07 20:43	05:12 21:35
25	08:25 16:53	07:26 17:54	08:32 (1) 09:14 (1)	06:18 18:47	06:05 20:45	05:11 21:36
26	08:23 16:54	07:23 17:56	08:33 (1) 09:13 (1)	06:16 18:49	06:03 20:46	05:09 21:37
27	08:22 16:56	07:21 17:58	08:34 (1) 09:12 (1)	06:14 18:51	06:01 20:48	05:08 21:39
28	08:20 16:58	08:49 (3) 08:52 (3)	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40
29	08:19 17:00	08:47 (3) 08:52 (3)		07:09 19:55	05:56 20:52	05:06 21:42
30	08:17 17:02	08:45 (3) 08:54 (1)		07:06 19:57	05:54 20:54	05:05 21:43
31	08:15 17:04	08:44 (3) 09:01 (1)		07:04 19:58	05:04 21:44	05:04 21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case	34	1156	234			
Sun reduction	0.24	0.23	0.27			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.61	0.61	0.64			
Total reduction	0.15	0.14	0.17			
Total, real	5	165	40			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
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abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HY - H233

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (2) 16:54	08:02 (1) 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (2) 16:52	08:03 (1) 16:09
3	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:56 (2) 16:50	08:03 (1) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:58 (2) 16:48	08:03 (3) 16:08
5	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	08:00 (2) 16:46	08:02 (3) 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:02 (2) 16:45	08:04 (3) 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:06 (3) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:09 (3) 16:06
9	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	09:20 (1) 16:39	08:11 (3) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	09:16 (1) 16:37	08:13 (3) 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	09:13 (1) 16:36	08:15 (3) 16:05
12	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	09:11 (1) 16:34	08:17 (3) 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	09:09 (1) 16:32	08:19 (3) 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	09:07 (1) 16:31	08:21 (3) 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	09:06 (1) 16:29	08:24 (3) 16:05
16	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	09:05 (1) 16:28	08:25 (3) 16:05
17	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	09:04 (1) 16:26	08:26 (3) 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	09:03 (1) 16:25	08:27 (3) 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	09:02 (1) 16:23	08:28 (3) 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	09:01 (1) 16:22	08:29 (3) 16:05
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	09:01 (1) 16:21	08:30 (3) 16:05
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	09:01 (1) 16:19	08:31 (3) 16:05
23	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	09:00 (1) 16:18	08:32 (3) 16:05
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	09:00 (1) 16:17	08:33 (3) 16:05
25	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	08:00 (1) 16:16	08:34 (3) 16:05
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 08:04 (2)	08:00 (1) 16:15	08:35 (3) 16:05
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 08:06 (2)	08:00 (1) 16:14	08:36 (3) 16:05
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 08:07 (2)	08:01 (1) 16:13	08:37 (3) 16:05
29	05:34 21:30	06:28 20:26	07:23 19:10	07:19 08:08 (2)	08:01 (1) 16:12	08:38 (3) 16:05
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 08:08 (2)	08:01 (1) 16:11	08:39 (3) 16:05
31	05:37 21:27	06:31 20:21		07:22 16:56	08:02 (1) 08:46 (1)	08:40 (3) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case			77	978	382	
Sun reduction			0.32	0.29	0.27	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.66	0.61	0.61	
Total reduction			0.21	0.18	0.16	
Total, real			16	176	62	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
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abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HZ - H234
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		12:17 (1)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		07:54 (2)	08:19		12:15 (1)				
	16:15	33	12:50 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	25	08:19 (2)	16:10	9	12:24 (1)				
2	08:44		12:18 (1)	08:12		08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		07:56 (2)	08:21		12:13 (1)			
	16:16	32	12:50 (1)	17:08	2	08:42 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	23	08:19 (2)	16:09	15	12:28 (1)			
3	08:44		12:18 (1)	08:10		08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		07:58 (2)	08:22		12:11 (1)			
	16:17	32	12:50 (1)	17:10	6	08:44 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	20	08:18 (2)	16:08	19	12:30 (1)			
4	08:43		12:20 (1)	08:09		08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		08:00 (2)	08:24		12:10 (1)			
	16:18	30	12:50 (1)	17:12	9	08:45 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	18	08:18 (2)	16:08	22	12:32 (1)			
5	08:43		12:21 (1)	08:07		08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32		08:02 (2)	08:25		12:09 (1)			
	16:20	28	12:49 (1)	17:14	12	08:46 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	15	08:17 (2)	16:07	24	12:33 (1)			
6	08:43		12:23 (1)	08:05		08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34		08:04 (2)	08:27		12:09 (1)			
	16:21	26	12:49 (1)	17:16	15	08:47 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:44	12	08:16 (2)	16:07	26	12:35 (1)			
7	08:42		12:24 (1)	08:03		08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36		08:06 (2)	08:28		12:08 (1)			
	16:22	24	12:48 (1)	17:18	18	08:48 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	9	08:15 (2)	16:06	28	12:36 (1)			
8	08:42		12:25 (1)	08:01		08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38		08:09 (2)	08:29		12:08 (1)			
	16:24	22	12:47 (1)	17:20	21	08:49 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	5	08:14 (2)	16:06	30	12:38 (1)			
9	08:41		12:28 (1)	07:59		08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		08:11 (2)	08:30		12:08 (1)			
	16:25	19	12:47 (1)	17:22	23	08:49 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	2	08:13 (2)	16:05	31	12:39 (1)			
10	08:40		12:30 (1)	07:57		08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42					12:07 (1)			
	16:27	15	12:45 (1)	17:24	26	08:50 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37					16:05	32	12:39 (1)	
11	08:40		12:33 (1)	07:55		08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44					16:05	33	12:40 (1)	
	16:28	10	12:43 (1)	17:26	28	08:50 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36					16:05	33	12:40 (1)	
12	08:39			07:53		08:21 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46					12:07 (1)			
	16:30			17:28	29	08:50 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34					16:05	34	12:41 (1)	
13	08:38			07:51		08:21 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48					12:08 (1)			
	16:31			17:30	29	08:50 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32					16:05	35	12:43 (1)	
14	08:37			07:49		08:21 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49					12:08 (1)			
	16:33			17:32	28	08:49 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31					16:05	35	12:43 (1)	
15	08:36			07:47		08:21 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51					12:08 (1)			
	16:34			17:34	28	08:49 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29					16:05	36	12:44 (1)	
16	08:36			07:45		08:22 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54		07:53					12:07 (1)			
	16:36			17:36	26	08:48 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28					16:05	37	12:44 (1)	
17	08:35			07:43		08:23 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55					12:08 (1)			
	16:38			17:38	25	08:48 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26					16:05	37	12:45 (1)	
18	08:33			07:41		08:23 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57					12:08 (1)			
	16:40			17:40	23	08:46 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25					16:05	37	12:45 (1)	
19	08:32			07:39		08:25 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		07:59					12:09 (1)			
	16:41			17:42	20	08:45 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22		16:23					16:05	37	12:46 (1)	
20	08:31			07:37		08:27 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		08:01					12:09 (1)			
	16:43			17:44	16	08:43 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	5	09:08 (2)	08:01				16:06	37	12:46 (1)	
21	08:30			07:34		08:29 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		08:03					12:10 (1)			
	16:45			17:46	12	08:41 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	13	09:12 (2)	08:02				16:06	37	12:47 (1)	
22	08:29			07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:56 (2)	08:04				12:10 (1)			
	16:47			17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	18	09:14 (2)	08:06				16:07	37	12:47 (1)	
23	08:27			07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:55 (2)	08:06				12:11 (1)			
	16:49			17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	21	09:16 (2)	08:08				16:07	37	12:48 (1)	
24	08:26			07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:53 (2)	08:08				12:11 (1)			
	16:51			17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	24	09:17 (2)	08:09				16:08	37	12:48 (1)	
25	08:25			07:25			06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11		07:52 (2)	08:17				12:11 (1)			
	16:52			17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09	25	08:17 (2)	08:16				16:08	37	12:48 (1)	
26	08:23			07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		07:51 (2)	08:11				12:13 (1)			
	16:54			17:56			18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	27	08:18 (2)	08:15				16:09	37	12:50 (1)	
27	08:22			07:21			06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15		07:51 (2)	08:13				12:13 (1)			
	16:56			17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	27	08:18 (2)	08:14				16:10	37	12:50 (1)	
28	08:20			07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17		07:50 (2)	08:14				12:14 (1)			
	16:58			18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	29	08:19 (2)	08:13				16:11	36	12:50 (1)	
29	08:19						07:09	05:56																

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IA - H235

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:25 (4)	08:14		08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26			07:24		08:12 (2)	08:19			13:10 (1)	
	16:15	48	13:42 (1)	17:06	30	09:12 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05			16:54	28	08:40 (2)	16:10	6		13:16 (1)	
2	08:44		09:26 (4)	08:12		08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28			07:26		08:11 (2)	08:21			13:07 (1)	
	16:16	46	13:42 (1)	17:08	32	09:12 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02			16:52	30	08:41 (2)	16:09	13		13:20 (1)	
3	08:44		09:27 (4)	08:10		08:40 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30			07:28		08:11 (2)	08:22			13:04 (1)	
	16:17	43	13:41 (1)	17:10	32	09:12 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00			16:50	30	08:41 (2)	16:08	18		13:22 (1)	
4	08:43		09:28 (4)	08:09		08:40 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32			07:30		08:10 (2)	08:24			09:19 (4)	
	16:18	41	13:41 (1)	17:12	32	09:12 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57			16:48	32	08:42 (2)	16:08	23		13:24 (1)	
5	08:43		09:29 (4)	08:07		08:40 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33			07:32		08:10 (2)	08:25			09:17 (4)	
	16:20	38	13:41 (1)	17:14	32	09:12 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55			16:46	32	08:42 (2)	16:07	30		13:25 (1)	
6	08:43		09:30 (4)	08:05		08:40 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35			07:34		08:10 (2)	08:27			09:17 (4)	
	16:21	35	13:41 (1)	17:16	32	09:12 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53			16:44	32	08:42 (2)	16:07	34		13:27 (1)	
7	08:42		09:32 (4)	08:03		08:41 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37			07:36		08:10 (2)	08:28			09:16 (4)	
	16:22	30	13:40 (1)	17:18	31	09:12 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50			16:43	32	08:42 (2)	16:06	38		13:28 (1)	
8	08:42		09:34 (4)	08:01		08:41 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39			07:38		08:11 (2)	08:29			09:16 (4)	
	16:24	24	13:39 (1)	17:20	31	09:12 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48			16:41	32	08:43 (2)	16:06	41		13:30 (1)	
9	08:41		13:21 (1)	07:59		08:42 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41			07:40		08:11 (2)	08:30			09:16 (4)	
	16:25	18	13:39 (1)	17:22	29	09:11 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45			16:39	32	08:43 (2)	16:05	43		13:30 (1)	
10	08:40		13:23 (1)	07:57		08:43 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43			07:42		08:13 (2)	08:32			09:15 (4)	
	16:27	14	13:37 (1)	17:24	27	09:10 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43			16:37	30	08:43 (2)	16:05	45		13:31 (1)	
11	08:40		13:27 (1)	07:55		08:44 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44			07:44		08:15 (2)	08:33			09:15 (4)	
	16:28	7	13:34 (1)	17:26	26	09:10 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41			16:36	27	08:42 (2)	16:05	48		13:32 (1)	
12	08:39		07:53			08:45 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46			07:46		08:17 (2)	08:34			09:15 (4)	
	16:30		17:28		24	09:09 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38			16:34	25	08:42 (2)	16:05	49		13:32 (1)	
13	08:38		07:51			08:46 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48			07:48		08:19 (2)	08:35			09:16 (4)	
	16:31		17:30		20	09:06 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36			16:32	22	08:41 (2)	16:05	50		13:34 (1)	
14	08:37		07:49			08:48 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50			07:49		08:21 (2)	08:36			09:17 (4)	
	16:33		17:32		17	09:05 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33			16:31	20	08:41 (2)	16:05	51		13:35 (1)	
15	08:36		07:47			08:51 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52			07:51		08:23 (2)	08:37			09:17 (4)	
	16:34		17:34		11	09:02 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31			16:29	17	08:40 (2)	16:05	52		13:35 (1)	
16	08:36		07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54				07:53		08:25 (2)	08:38			09:16 (4)	
	16:36		17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29				16:28	15	08:40 (2)	16:05	52		13:35 (1)	
17	08:34		07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56				07:55		08:27 (2)	08:39			09:17 (4)	
	16:38		17:38			18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27				16:26	12	08:39 (2)	16:05	53		13:36 (1)	
18	08:33		07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57				07:57		08:29 (2)	08:39			09:17 (4)	
	16:40		17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24				16:25	9	08:38 (2)	16:05	54		13:37 (1)	
19	08:32		07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59				07:59		08:31 (2)	08:40			09:18 (4)	
	16:41		17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22				16:23	6	08:37 (2)	16:05	55		13:38 (1)	
20	08:31		07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01				08:01		08:33 (2)	08:41			09:18 (4)	
	16:43		17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20				16:22	3	08:36 (2)	16:06	55		13:38 (1)	
21	08:30		07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03				08:02		08:32 (2)	08:41			09:19 (4)	
	16:45		17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17				16:20		08:35 (2)	16:06	54		13:39 (1)	
22	08:29		08:58 (2)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05				08:04		08:32 (2)	08:42			09:19 (4)	
	16:47	3	09:01 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15				16:19		08:32 (2)	16:07	54		13:39 (1)	
23	08:27		08:57 (2)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07				08:06		08:32 (2)	08:42			09:20 (4)	
	16:49	6	09:03 (2)	17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13				16:18		08:32 (2)	16:07	54		13:40 (1)	
24	08:26		08:55 (2)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09				08:08		08:43	09:20				
	16:51	9	09:04 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11				16:17		08:32 (2)	16:08	55		13:40 (1)	
25	08:25		08:54 (2)	07:25		06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11				08:09		08:43	09:20				
	16:52	12	09:06 (2)	17:54		18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09				16:16		08:32 (2)	16:08	54		13:40 (1)	
26	08:23		08:52 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13				08:11		08:44	09:22				
	16:54		09:07 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07				16:15		08:37 (2)	16:09	53		13:41 (1)	
27	08:22		08:51 (2)	07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15				08:13		08:39 (2)	09:22				
	16:56	17	09:08 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	13			16:14		08:32 (2)	16:14			13:41 (1)	
28	08:20		08:49 (2)	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17				08:17		08:32 (2)	09:24				
	16:58	20	09:09 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	18			16:13		08:35 (2)	16:13			13:41 (1)	
29	08:19		08:47 (2)			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19				08:15		08:32 (2)	09:24				
	17:00	23	09:10 (2)			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	21										

Licensed user:
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Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IB - H236

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:26 (4)	08:14		08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		08:14 (2)	08:19		08:14 (2)	08:19		13:11 (1)	
	16:15	48	13:44 (1)	17:06	31	09:13 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	27	08:41 (2)	16:10	8	13:19 (1)				
2	08:44		09:28 (4)	08:12		08:41 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		08:13 (2)	08:21		13:09 (1)				
	16:16	44	13:44 (1)	17:08	32	09:13 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	29	08:42 (2)	16:09	14	13:23 (1)				
3	08:44		09:28 (4)	08:10		08:41 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		08:12 (2)	08:22		13:06 (1)				
	16:17	43	13:44 (1)	17:10	33	09:14 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	30	08:42 (2)	16:08	18	13:24 (1)				
4	08:43		09:29 (4)	08:09		08:41 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		08:12 (2)	08:24		13:06 (1)				
	16:18	41	13:44 (1)	17:12	33	09:14 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	31	08:43 (2)	16:08	21	13:27 (1)				
5	08:43		09:30 (4)	08:07		08:41 (2)	07:07	06:52	05:44	05:00	05:02	05:45	06:40	07:33		07:32		08:11 (2)	08:25		13:09 (1)				
	16:20	38	13:43 (1)	17:14	32	09:13 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	32	08:43 (2)	16:07	29	13:28 (1)				
6	08:43		09:32 (4)	08:05		08:42 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34		08:11 (2)	08:27		13:09 (1)				
	16:21	34	13:43 (1)	17:16	31	09:13 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:44	32	08:43 (2)	16:07	35	13:30 (1)				
7	08:42		09:34 (4)	08:03		08:42 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36		08:11 (2)	08:28		13:07 (1)				
	16:22	29	13:43 (1)	17:18	31	09:13 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	32	08:43 (2)	16:06	38	13:30 (1)				
8	08:42		13:20 (1)	08:01		08:43 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38		08:12 (2)	08:29		13:08 (1)				
	16:24	22	13:42 (1)	17:20	30	09:13 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	32	08:44 (2)	16:06	40	13:32 (1)				
9	08:41		13:23 (1)	07:59		08:43 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		08:12 (2)	08:30		13:07 (1)				
	16:25	18	13:41 (1)	17:22	29	09:12 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	32	08:44 (2)	16:05	43	13:33 (1)				
10	08:40		13:25 (1)	07:57		08:44 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42		08:13 (2)	08:32		13:07 (1)				
	16:27	15	13:40 (1)	17:24	28	09:12 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	31	08:44 (2)	16:05	44	13:33 (1)				
11	08:40		13:29 (1)	07:55		08:45 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44		08:15 (2)	08:33		13:07 (1)				
	16:28	8	13:37 (1)	17:26	26	09:11 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	29	08:44 (2)	16:05	46	13:34 (1)				
12	08:39		07:53			08:47 (2)	07:00	06:55	05:45	05:05	05:06	05:52	06:46			07:46		08:17 (2)	08:35		13:08 (1)				
	16:30		17:28	23	09:10 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38			16:34	26	08:43 (2)	16:05	48	13:35 (1)				
13	08:38		07:51			08:47 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48		08:19 (2)	08:35		13:08 (1)				
	16:31		17:30	20	09:07 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36			16:32	24	08:43 (2)	16:05	49	13:36 (1)				
14	08:37		07:49			08:50 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49		08:21 (2)	08:36		13:08 (1)				
	16:33		17:32	15	09:05 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33			16:31	22	08:43 (2)	16:05	50	13:37 (1)				
15	08:36		07:47			08:53 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51		08:23 (2)	08:37		13:08 (1)				
	16:34		17:34	9	09:02 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31			16:29	19	08:42 (2)	16:05	51	13:38 (1)				
16	08:36		07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54			07:53		08:25 (2)	08:38		13:08 (1)				
	16:36		17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29			16:28	17	08:42 (2)	16:05	52	13:38 (1)				
17	08:34		07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56			07:55		08:27 (2)	08:39		13:08 (1)				
	16:38		17:38			18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27			16:26	14	08:41 (2)	16:05	53	13:39 (1)				
18	08:33		07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57			07:57		08:29 (2)	08:39		13:09 (1)				
	16:40		17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24			16:25	11	08:40 (2)	16:05	53	13:39 (1)				
19	08:32		07:39			06:33	06:18	05:18	04:54	05:16	06:09	07:04	07:59			07:59		08:30 (2)	08:40		13:09 (1)				
	16:41		17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22			16:23	8	08:39 (2)	16:05	53	13:40 (1)				
20	08:31		07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01			08:01		08:33 (2)	08:41		13:09 (1)				
	16:43		17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20			16:22	5	08:38 (2)	16:06	53	13:40 (1)				
21	08:30		09:00 (2)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03			08:02		08:35 (2)	08:41		13:09 (1)				
	16:45	2	09:02 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17			16:20	2	08:37 (2)	16:06	54	13:41 (1)				
22	08:29		08:58 (2)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05			08:04		08:42			13:09 (1)				
	16:47	5	09:03 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15			16:19		16:07	54	13:41 (1)					
23	08:27		08:57 (2)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07			08:06		08:42			13:09 (1)				
	16:49	8	09:05 (2)	17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13			16:18		16:07	54	13:42 (1)					
24	08:26		08:55 (2)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09			08:08		08:43			13:09 (1)				
	16:51	11	09:06 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11			16:17		16:08	53	13:42 (1)					
25	08:25		08:54 (2)	07:25		06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11			08:09		08:43			13:09 (1)				
	16:52	14	09:08 (2)	17:54		18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09			16:16		16:08	53	13:42 (1)					
26	08:23		08:52 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13			08:11		08:44			13:09 (1)				
	16:54		09:09 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07			16:15		16:09	53	13:43 (1)					
27	08:22		08:51 (2)	07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15			08:22 (2)	08:13				13:09 (1)				
	16:56	19	09:10 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	10		16:10	53	13:44 (1)			13:09 (1)				
28	08:20		08:49 (2)	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17			08:19 (2)	08:14				13:09 (1)				
	16:58	22	09:11 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16		16:11	52	13:44 (1)			13:09 (1)				
29	08:19		08:47 (2)			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19			08:17 (2)	08:16				13:09 (1)				
	17:00	24	09:11 (2)			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	20		16:11	51	13:44 (1)			13:09 (1)				
30	08:17		08:45 (2)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20			08:15 (2)	08:18				13:09 (1)				
	17:02	27	09:12 (2)			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	23		16:12	50	13:44 (1)	</						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IC - H237

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: ID - H238

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December						
1	08:44	08:14	07:16	07:01	05:52	05:03	20:28 (5)	04:59	20:32 (5)	05:39	06:33	07:26	07:24	08:19				
2	16:15	17:06	18:02	20:00	20:55	21:45	42	21:10 (5)	22:00	21:23 (5)	21:25	20:18	19:05	16:54	16:10			
	08:44	08:12	07:14	06:59	05:50	05:02		20:28 (5)	05:00	20:33 (5)	05:40	06:35	07:28	07:26	08:21			
3	16:16	17:08	18:04	20:02	20:57	21:46	44	21:12 (5)	22:00	21:23 (5)	21:23	20:16	19:02	16:52	16:09			
	08:43	08:10	07:12	06:56	05:48	05:01		20:28 (5)	05:00	20:32 (5)	05:42	06:36	07:30	07:28	08:22			
4	16:17	17:10	18:06	20:04	20:59	21:48	45	21:13 (5)	21:59	21:22 (5)	21:21	20:13	19:00	16:50	16:08			
	08:43	08:08	07:09	06:54	05:46	05:00		20:27 (5)	05:01	20:33 (5)	05:44	06:38	07:31	07:30	08:24			
5	16:18	17:12	18:08	20:06	21:01	21:49	47	21:14 (5)	21:59	21:23 (5)	21:19	20:11	18:57	16:48	16:08			
	08:43	08:07	07:07	06:51	05:44	04:59		20:28 (5)	05:02	20:33 (5)	05:45	06:40	07:33	07:32	08:25			
6	16:20	17:14	18:09	20:07	21:03	21:50	47	21:15 (5)	21:58	21:23 (5)	21:17	20:09	18:55	16:46	16:07			
	08:42	08:05	07:04	06:49	05:42	04:59		20:27 (5)	05:03	20:34 (5)	05:47	06:42	07:35	07:34	08:26			
7	16:21	17:16	18:11	20:09	21:04	21:51	49	21:16 (5)	21:57	21:22 (5)	21:15	20:06	18:52	16:44	16:07			
	08:42	08:03	07:02	06:47	05:40	04:58		20:27 (5)	05:04	20:34 (5)	05:49	06:43	07:37	07:36	08:28			
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	08:40	07:57	06:55	06:39	05:34	04:56		20:27 (5)	05:07	20:35 (5)	05:54	06:49	07:42	07:42	08:31			
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	08:40	07:55	06:53	06:37	05:33	04:56		20:28 (5)	05:08	20:36 (5)	05:56	06:51	07:44	07:44	08:33			
12	16:28	17:26	18:21	20:19	21:13	21:55	50	21:18 (5)	21:54	21:19 (5)	21:05	19:54	18:40	16:36	16:05			
	08:39	07:53	06:50	06:35	05:31	04:55		20:28 (5)	05:09	20:36 (5)	05:58	06:52	07:46	07:45	08:34			
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	08:34	07:43	06:38	06:23	05:22	20:39 (5)	04:54	20:29 (5)	05:16	20:39 (5)	06:06	07:01	07:55	07:55	08:38			
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	08:33	07:41	06:36	06:21	05:21	20:38 (5)	04:54	20:29 (5)	05:17	20:40 (5)	06:08	07:03	07:57	07:57	08:39			
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	08:32	07:39	06:33	06:18	05:19	20:36 (5)	04:54	20:29 (5)	05:18	20:40 (5)	06:10	07:05	07:59	07:59	08:40			
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	08:31	07:36	06:31	06:16	05:18	20:34 (5)	04:54	20:29 (5)	05:20	20:42 (5)	06:12	07:06	08:01	08:00	08:41			
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	08:28	07:32	06:26	06:12	05:15	20:33 (5)	04:55	20:30 (5)	05:23	20:43 (5)	06:15	07:10	08:05	08:04	08:42			
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	08:27	07:30	06:23	06:09	05:13	20:31 (5)	04:55	20:30 (5)	05:24	20:44 (5)	06:17	07:12	08:07	08:06	08:42			
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	08:26	07:28	06:21	06:07	05:12	20:31 (5)	04:55	20:30 (5)	05:26	20:45 (5)	06:19	07:13	08:09	08:08	08:43			
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27	16:54	17:56	18:49	20:46	21:37	33	21:03 (5)	22:01	51	21:22 (5)	21:35	13	21:02 (5)	20:32	19:17	17:07	16:15	16:09
	08:22	07:21	06:13	06:01	05:08	20:29 (5)	04:56	20:31 (5)	05:31	20:51 (5)	06:24	07:19	08:15	08:13	08:44			
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29	16:58	18:00	18:53	20:50	21:40	37	21:06 (5)	22:01	51	21:22 (5)	21:32	5	20:59 (5)	20:28	19:12	17:02	16:13	16:11
	08:18		07:09	05:56	05:06	20:29 (5)	04:58	20:32 (5)	05:34			06:28	07:22	08:17	08:16	08:44		
30	17:00		19:55	20:52	21:41	38	21:07 (5)	22:01	51	21:23 (5)	21:30		20:25	19:09	17:00	16:12	16:12	
	08:17		07:06	05:54	05:05	20:28 (5)	04:58	20:31 (5)	05:35			06:29	07:24	08:18	08:18	08:44		
31	17:02		19:56	20:53	21:43	40	21:08 (5)	22:00	51	21:22 (5)	21:28		20:23	19:07	16:58	16:11	16:12	
	08:15		07:04		05:04	20:28 (5)		20:28 (5)		05:37		06:31		07:22	08:44			
	17:04		19:58		21:44	41	21:09 (5)			21:26		20:21		16:56		16:13		
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233						
Total, worst case					437	1492	987											
Sun reduction					0.38	0.32	0.32											
Oper. time red.					1.00	1.00	1.00											
Wind dir. red.					0.62	0.62	0.62											
Total reduction					0.24	0.20	0.20											
Total, real					103	296	198											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IE - H239
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December					
1	08:44	08:14	07:16	07:01	05:52	05:03	20:28 (5)	04:59	20:35 (5)	05:39	06:33	07:26	07:24	08:19			
2	16:15	17:06	18:02	20:00	20:55	21:45	35	21:03 (5)	22:00	34	21:09 (5)	21:25	20:18	19:05	16:54	16:10	
	08:44	08:12	07:14	06:59	05:50	05:02		20:29 (5)	05:00		20:36 (5)	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	21:46	35	21:04 (5)	22:00	34	21:10 (5)	21:23	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:12	06:56	05:48	05:01		20:29 (5)	05:00		20:35 (5)	05:42	06:36	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	21:48	35	21:04 (5)	21:59	35	21:10 (5)	21:21	20:13	19:00	16:50	16:08	
	08:43	08:08	07:09	06:54	05:46	05:00		20:29 (5)	05:01		20:36 (5)	05:44	06:38	07:31	07:30	08:24	
4	16:18	17:12	18:07	20:06	21:01	21:49	35	21:04 (5)	21:59	34	21:10 (5)	21:19	20:11	18:57	16:48	16:08	
	08:43	08:07	07:07	06:51	05:44	04:59		20:30 (5)	05:02		20:36 (5)	05:45	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:03	21:50	35	21:05 (5)	21:58	34	21:10 (5)	21:17	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42	04:59		20:30 (5)	05:03		20:36 (5)	05:47	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04	21:51	35	21:05 (5)	21:57	35	21:11 (5)	21:15	20:06	18:52	16:44	16:07	
	08:42	08:03	07:02	06:47	05:40	04:58		20:30 (5)	05:04		20:36 (5)	05:49	06:43	07:37	07:36	08:28	
8	16:22	17:18	18:13	20:11	21:06	21:52	34	21:04 (5)	21:57	35	21:11 (5)	21:13	20:04	18:50	16:43	16:06	
	08:41	08:01	07:00	06:44	05:38	04:57		20:30 (5)	05:05		20:36 (5)	05:51	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	21:53	35	21:05 (5)	21:56	35	21:11 (5)	21:11	20:01	18:48	16:41	16:06	
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	16:30	17:28	18:23	20:20	21:15	20:43 (5)	21:56	34	21:06 (5)	21:53	35	21:12 (5)	21:03	19:51	18:38	16:34	16:05
	08:38	07:51	06:48	06:32	05:29	20:37 (5)	04:55		20:31 (5)	05:11		20:37 (5)	05:59	06:54	07:48	07:47	08:35
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	08:35	07:45	06:40	06:25	05:24	20:33 (5)	04:54		20:32 (5)	05:14		20:38 (5)	06:05	06:59	07:54	07:53	08:38
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	16:40	17:40	18:34	20:31	21:25	20:52 (5)	21:59	33	21:06 (5)	21:46	34	21:12 (5)	20:50	19:37	18:24	16:25	16:05
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	16:54	17:56	18:49	20:46	21:37	21:03 (5)	22:01	33	21:08 (5)	21:35	20	21:02 (5)	20:32	19:17	17:07	16:15	16:09
27	08:22	07:21	06:13	06:01	05:08	20:28 (5)	04:56		20:35 (5)	05:31		20:43 (5)	06:24	07:19	08:14	08:13	08:44
	16:56	17:58	18:51	20:48	21:39	21:03 (5)	22:01	34	21:09 (5)	21:33	18	21:01 (5)	20:30	19:14	17:04	16:14	16:10
	08:20	07:18	06:11	05:58	05:07	20:28 (5)	04:57		20:35 (5)	05:32		20:44 (5)	06:26	07:21	08:16	08:14	08:44
28	16:58	18:00	18:53	20:50	21:40	21:03 (5)	22:01	33	21:08 (5)	21:32	15	20:59 (5)	20:28	19:12	17:02	16:13	16:11
	08:18		07:09	05:56	05:06	20:28 (5)	04:58		20:35 (5)	05:34		20:46 (5)	06:28	07:22	08:18	08:16	08:44
	17:00		19:54	20:52	21:41	21:03 (5)	22:00	34	21:09 (5)	21:30	12	20:58 (5)	20:25	19:09	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05	20:28 (5)	04:58		20:35 (5)	05:35		20:47 (5)	06:29	07:24	08:20	08:17	08:44
	17:02		19:56	20:53	21:43	21:03 (5)	22:00	34	21:09 (5)	21:28	9	20:56 (5)	20:23	19:07	16:58	16:11	16:12
	08:15		07:04		05:04	20:28 (5)				05:37		20:49 (5)	06:31		07:22		08:44
	17:04		19:58		21:44	21:03 (5)				21:26	6	20:55 (5)	20:21		16:56		16:13
Potential sun hours	250	273	367	420	494	510				512		460		382	328	259	233
Total, worst case					502	1015				898							
Sun reduction					0.38	0.32				0.32							
Oper. time red.					1.00	1.00				1.00							
Wind dir. red.					0.63	0.63				0.63							
Total reduction					0.24	0.20				0.20							
Total, real					120	204				182							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IF - H240

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IG - H241

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IH - H242

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	16:30 (5) 18:02	17:23 (4) 20:00	05:52 20:55	20:06 (2) 21:45
2	08:44 16:16	08:12 17:08	16:30 (5) 18:04	17:21 (4) 20:02	05:50 20:57	20:05 (2) 21:46
3	08:43 16:17	08:10 17:10	16:29 (5) 18:06	17:20 (4) 20:04	05:48 20:59	20:05 (2) 21:48
4	08:43 16:18	08:08 17:12	16:29 (5) 18:07	17:19 (4) 20:06	05:46 21:01	20:04 (2) 21:49
5	08:43 16:19	08:07 17:14	16:28 (5) 18:09	17:17 (4) 20:07	05:44 21:03	20:04 (2) 21:50
6	08:42 16:21	08:05 17:16	16:28 (5) 18:11	17:17 (4) 20:09	05:42 21:04	20:03 (2) 21:51
7	08:42 16:22	08:03 17:18	16:28 (5) 18:13	17:16 (4) 20:11	05:40 21:06	20:04 (2) 21:52
8	08:42 16:24	08:01 17:20	16:28 (5) 18:15	17:16 (4) 20:13	05:38 21:08	20:04 (2) 21:53
9	08:41 16:25	07:59 17:22	16:28 (5) 18:17	17:15 (4) 20:15	05:36 21:10	20:04 (2) 21:54
10	08:40 16:26	07:57 17:24	16:29 (5) 18:19	17:15 (4) 20:17	05:34 21:11	20:04 (2) 21:55
11	08:40 16:28	07:55 17:26	16:29 (5) 18:21	17:15 (4) 20:19	05:33 21:13	20:05 (2) 21:55
12	08:39 16:30	07:53 17:28	16:29 (5) 18:23	17:15 (4) 20:20	05:31 21:15	20:05 (2) 21:56
13	08:38 16:31	07:51 17:30	16:30 (5) 18:25	17:16 (4) 20:22	05:29 21:17	20:05 (2) 21:57
14	08:37 16:33	07:49 17:32	16:32 (5) 18:27	17:15 (4) 20:24	05:27 21:18	20:07 (2) 21:57
15	08:36 16:34	07:47 17:34	16:34 (5) 18:28	17:16 (4) 20:26	05:26 21:20	20:07 (2) 21:58
16	08:35 16:36	07:45 17:36	16:38 (5) 18:30	17:17 (4) 20:28	05:24 21:22	20:09 (2) 21:59
17	08:34 16:38	07:43 17:38	16:43 (5) 18:32	18:04 (3) 20:30	21:22 21:23	20:28 (2) 21:59
18	08:33 16:40	07:41 17:40	18:32 18:34	17:19 (4) 20:31	05:21 21:25	20:11 (2) 22:00
19	08:32 16:41	07:39 17:42	18:33 18:36	17:21 (4) 20:33	05:19 21:27	20:14 (2) 22:00
20	08:31 16:43	07:36 17:44	18:36 18:38	17:23 (4) 20:35	05:18 21:28	20:18 (2) 22:00
21	08:30 16:45	07:34 17:46	18:38 18:40	17:56 (3) 20:37	05:16 21:30	20:19 (2) 22:01
22	08:28 16:47	07:32 17:48	18:40 18:41	18:13 (3) 20:39	05:15 21:31	22:01
23	08:27 16:49	07:30 17:50	18:42 18:43	17:56 (3) 20:41	05:13 21:33	04:55
24	08:26 16:50	07:28 17:52	18:44 18:45	17:56 (3) 20:42	05:12 21:34	22:01
25	08:24 16:52	07:25 17:54	18:46 18:47	17:57 (3) 20:44	05:11 21:36	04:55
26	08:23 16:54	07:23 17:56	18:48 18:49	18:15 (3) 20:46	05:09 21:37	22:01
27	08:22 16:56	07:21 17:58	17:28 (4) 18:51	18:00 (3) 20:48	20:10 (2) 21:39	04:56
28	08:20 16:58	07:18 18:00	17:24 (4) 18:53	18:11 (3) 20:50	9 20:19 (2) 20:09 (2)	22:01
29	08:18 17:00	07:16 18:02	17:26 (4) 18:55	18:13 (3) 20:52	12 20:21 (2) 20:22 (2)	04:57
30	08:17 17:02	07:14 18:04	17:28 (4) 18:57	18:15 (3) 20:54	14 20:23 (2) 20:24 (2)	22:01
31	08:15 17:04	07:12 18:06	17:30 (4) 18:59	18:17 (3) 20:56	17 20:25 (2) 21:43	04:58
Potential sun hours	250	273	367	420	494	510
Total, worst case		256	704	57	450	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.66	0.68	0.65	0.65	
Total reduction		0.15	0.18	0.23	0.25	
Total, real		39	129	13	111	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IH - H242

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1 04:59	05:39	20:15 (2) 06:33	07:26	17:54 (4) 07:24	15:58 (5) 08:19	
22:00	21:25	27 20:42 (2) 20:18	19:05	35 18:29 (4) 16:54	23 16:21 (5) 16:10	
2 04:59	05:40	20:15 (2) 06:35	07:28	17:53 (4) 07:26	15:58 (5) 08:21	
22:00	21:23	28 20:43 (2) 20:16	19:02	36 18:29 (4) 16:52	23 16:21 (5) 16:09	
3 05:00	05:42	20:14 (2) 06:36	07:30	17:53 (4) 07:28	15:58 (5) 08:22	
21:59	21:21	28 20:42 (2) 20:13	19:00	36 18:29 (4) 16:50	21 16:19 (5) 16:08	
4 05:01	05:44	20:14 (2) 06:38	07:31	17:53 (4) 07:30	15:58 (5) 08:24	
21:59	21:19	29 20:43 (2) 20:11	18:57	36 18:29 (4) 16:48	19 16:17 (5) 16:08	
5 05:02	05:45	20:13 (2) 06:40	07:33	17:53 (4) 07:32	15:58 (5) 08:25	
21:58	21:17	30 20:43 (2) 20:09	18:55	33 18:26 (4) 16:46	17 16:15 (5) 16:07	
6 05:03	05:47	20:14 (2) 06:42	07:35	17:53 (4) 07:34	15:58 (5) 08:26	
21:58	21:15	29 20:43 (2) 20:06	18:52	31 18:24 (4) 16:44	14 16:12 (5) 16:07	
7 05:04	05:49	20:14 (2) 06:43	07:37	17:52 (4) 07:36	15:59 (5) 08:28	
21:57	21:13	29 20:43 (2) 20:04	18:50	29 18:21 (4) 16:43	11 16:10 (5) 16:06	
8 05:05	05:50	20:13 (2) 06:45	07:39	17:52 (4) 07:38	15:59 (5) 08:29	
21:56	21:11	28 20:41 (2) 20:01	18:48	26 18:18 (4) 16:41	9 16:08 (5) 16:06	
9 05:06	05:52	20:14 (2) 06:47	07:41	17:53 (4) 07:40	16:00 (5) 08:30	
21:55	21:10	25 20:39 (2) 19:59	18:45	23 18:16 (4) 16:39	6 16:06 (5) 16:05	
10 05:07	05:54	20:13 (2) 06:49	07:42	17:53 (4) 07:42	16:02 (5) 08:31	
21:55	21:07	24 20:37 (2) 19:56	18:43	21 18:14 (4) 16:37	3 16:05 (5) 16:05	
11 05:08	05:56	20:14 (2) 06:50	07:44	17:54 (4) 07:44	08:33	
21:54	21:05	21 20:35 (2) 19:54	18:40	17 18:11 (4) 16:35	16:05	
12 05:09	05:57	20:15 (2) 06:52	07:46	17:55 (4) 07:45	08:34	
21:53	21:03	19 20:34 (2) 19:51	18:38	14 18:09 (4) 16:34	16:05	
13 05:10	05:59	20:14 (2) 06:54	07:48	17:57 (4) 07:47	08:35	
21:52	21:01	17 20:31 (2) 19:49	18:36	10 18:07 (4) 16:32	16:05	
14 05:12	06:01	20:15 (2) 06:56	07:50	17:58 (4) 07:49	08:36	
21:51	20:59	14 20:29 (2) 19:47	18:33	6 18:04 (4) 16:31	16:04	
15 05:13	06:03	20:17 (2) 06:58	07:52	18:01 (4) 07:51	08:37	
21:50	20:57	11 20:28 (2) 19:44	18:31	1 18:02 (4) 16:29	16:05	
16 05:14	06:04	20:17 (2) 06:59	10 18:50 (3) 07:54	07:53	08:38	
21:49	20:55	8 20:25 (2) 19:42	10 19:00 (3) 18:29	16:27	16:05	
17 05:16	06:06	20:19 (2) 07:01	10 18:47 (3) 07:55	07:55	08:38	
21:47	20:53	4 20:23 (2) 19:39	14 19:01 (3) 18:26	16:26	16:05	
18 05:17	06:08	07:03	14 18:45 (3) 07:57	07:57	08:39	
21:46	20:50	19:37	18 19:03 (3) 18:24	16:24	16:05	
19 05:18	06:10	07:05	18 18:44 (3) 07:59	07:59	08:40	
21:45	20:48	19:34	20 19:04 (3) 18:22	16:23	16:05	
20 05:20	06:12	07:06	20 18:43 (3) 08:01	08:00	08:41	
21:44	20:46	19:32	21 19:04 (3) 18:20	16:22	16:06	
21 05:21	06:13	07:08	21 18:41 (3) 08:03	08:02	08:41	
21:42	20:44	19:29	20 19:01 (3) 18:17	16:20	16:06	
22 05:23	06:15	07:10	20 18:41 (3) 08:05	08:04	08:42	
21:41	20:42	19:27	17 18:58 (3) 18:15	16:19	16:06	
23 05:24	06:17	07:12	17 18:09 (4) 08:07	08:06	08:42	
21:39	20:39	19:24	26 18:56 (3) 18:13	16:18	16:07	
24 05:26	20:25 (2) 06:19	07:13	26 18:06 (4) 08:09	08:08	08:43	
21:38	20:32 (2) 20:37	19:22	31 18:54 (3) 18:11	16:17	16:08	
25 05:27	20:23 (2) 06:20	07:15	31 18:02 (4) 07:11	08:09	08:43	
21:36	20:35 (2) 20:35	19:19	34 18:51 (3) 17:09	16:16	16:08	
26 05:29	20:21 (2) 06:22	07:17	34 18:00 (4) 07:13	16:06 (5) 08:11	08:43	
21:35	20:37 (2) 20:32	19:17	33 18:48 (3) 17:06	7 16:13 (5) 16:14	16:09	
27 05:30	20:19 (2) 06:24	07:19	33 17:59 (4) 07:14	16:03 (5) 08:13	08:44	
21:33	20:37 (2) 20:30	19:14	32 18:46 (3) 17:04	13 16:16 (5) 16:13	16:10	
28 05:32	20:19 (2) 06:26	07:21	32 17:58 (4) 07:16	16:01 (5) 08:14	08:44	
21:32	20:39 (2) 20:28	19:12	31 18:44 (3) 17:02	16 16:17 (5) 16:12	16:11	
29 05:34	20:17 (2) 06:27	07:22	31 17:56 (4) 07:18	16:00 (5) 08:16	08:44	
21:30	20:39 (2) 20:25	19:09	33 18:29 (4) 17:00	18 16:18 (5) 16:12	16:11	
30 05:35	20:17 (2) 06:29	07:24	33 17:55 (4) 07:20	15:59 (5) 08:18	08:44	
21:28	20:41 (2) 20:23	19:07	33 18:28 (4) 16:58	20 16:19 (5) 16:11	16:12	
31 05:37	20:17 (2) 06:31	07:22	07:22	15:58 (5) 08:18	08:44	
21:26	25 20:42 (2) 20:21	16:56	22 16:20 (5) 16:13	16:13	16:13	
Potential sun hours	512	460	382	328	259	233
Total, worst case	144	371	373	450	146	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.65	0.65	0.68	0.67	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.17	
Total, real	30	82	81	89	25	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: II - H243

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:09 (3) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	20:26 (3) 20:57	21:45 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	20:08 (3) 20:59	21:45 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	20:08 (3) 21:01	21:45 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	20:08 (3) 21:03	21:45 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	20:31 (3) 21:04	21:50 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	20:09 (3) 21:06	21:51 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	20:36 (4) 21:08	21:52 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	20:10 (3) 21:10	21:53 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	20:39 (4) 21:11	21:54 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	17:50 (5) 20:19	20:40 (4) 21:13	21:55 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	17:46 (5) 20:20	20:42 (4) 21:15	21:55 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	17:44 (5) 20:22	20:16 (3) 21:17	21:56 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	17:42 (5) 20:24	20:44 (4) 21:18	21:57 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	17:41 (5) 20:26	20:20 (4) 21:20	21:57 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	17:39 (5) 20:28	20:19 (4) 21:22	21:58 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	17:39 (5) 20:30	20:50 (4) 21:23	21:59 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	17:38 (5) 20:31	20:18 (4) 21:25	21:59 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	17:38 (5) 20:33	20:53 (4) 21:27	22:00 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	17:37 (5) 20:35	20:18 (4) 21:28	22:01 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	17:37 (5) 20:37	20:54 (4) 21:30	22:01 22:00
22	08:28 16:47	07:32 17:48	06:26 18:42	17:37 (5) 20:39	20:57 (4) 21:31	22:01 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	17:37 (5) 20:41	20:58 (4) 21:33	22:01 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	17:37 (5) 20:42	20:16 (4) 21:34	22:01 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	17:38 (5) 20:44	20:58 (4) 21:36	22:01 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	17:40 (5) 20:46	20:58 (4) 21:37	22:01 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:41 (5) 20:48	20:17 (3) 21:39	22:01 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	17:43 (5) 20:50	20:58 (4) 21:40	22:01 22:01
29	08:18 17:00		07:08 19:54	18:47 (5) 20:52	20:59 (4) 21:41	22:01 22:01
30	08:17 17:02		07:06 19:56	18:52 (5) 20:54	20:59 (4) 21:43	22:01 22:01
31	08:15 17:04		07:04 19:58		20:59 (4) 21:44	22:01 22:01
Potential sun hours	250	273	367	420	494	510
Total, worst case			402	48	1009	1157
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.65	0.64	0.63
Total reduction			0.18	0.23	0.24	0.20
Total, real			73	11	245	234

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: II - H243

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		July		August		September		October		November		December	
1	04:59		20:25 (4)	05:39		20:23 (3)	06:33		07:26		18:24 (5)	07:24	08:19
	22:00	39	21:04 (4)	21:25	30	20:53 (4)	20:18		19:05	12	18:36 (5)	16:54	16:10
2	05:00		20:26 (4)	05:40		20:22 (3)	06:35		07:28		18:26 (5)	07:26	08:21
	22:00	38	21:04 (4)	21:23	30	20:52 (4)	20:16		19:02	7	18:33 (5)	16:52	16:09
3	05:00		20:25 (4)	05:42		20:21 (3)	06:36		07:30			07:28	08:22
	21:59	39	21:04 (4)	21:21	29	20:50 (4)	20:13		19:00			16:50	16:08
4	05:01		20:25 (4)	05:44		20:20 (3)	06:38		07:31			07:30	08:24
	21:59	40	21:05 (4)	21:19	28	20:48 (4)	20:11		18:57			16:48	16:08
5	05:02		20:25 (4)	05:45		20:19 (3)	06:40		07:33			07:32	08:25
	21:58	40	21:05 (4)	21:17	27	20:46 (4)	20:09		18:55			16:46	16:07
6	05:03		20:26 (4)	05:47		20:18 (3)	06:42		07:35			07:34	08:26
	21:57	39	21:05 (4)	21:15	27	20:45 (4)	20:06		18:52			16:44	16:07
7	05:04		20:26 (4)	05:49		20:18 (3)	06:43		07:37			07:36	08:28
	21:57	40	21:06 (4)	21:13	23	20:41 (3)	20:04		18:50			16:43	16:06
8	05:05		20:26 (4)	05:51		20:17 (3)	06:45		07:39			07:38	08:29
	21:56	40	21:06 (4)	21:11	24	20:41 (3)	20:01		18:48			16:41	16:06
9	05:06		20:26 (4)	05:52		20:17 (3)	06:47		07:41			07:40	08:30
	21:55	40	21:06 (4)	21:09	22	20:39 (3)	19:59		18:45			16:39	16:05
10	05:07		20:26 (4)	05:54		20:17 (3)	06:49		07:42			07:42	08:31
	21:55	41	21:07 (4)	21:07	20	20:37 (3)	19:56		18:43			16:37	16:05
11	05:08		20:26 (4)	05:56		20:17 (3)	06:50		07:44			07:44	08:33
	21:54	41	21:07 (4)	21:05	18	20:35 (3)	19:54		18:40			16:36	16:05
12	05:09		20:26 (4)	05:57		20:17 (3)	06:52		07:46			07:45	08:34
	21:53	41	21:07 (4)	21:03	17	20:34 (3)	19:51		18:38			16:34	16:05
13	05:11		20:26 (4)	05:59		20:17 (3)	06:54		07:48			07:47	08:35
	21:52	41	21:07 (4)	21:01	14	20:31 (3)	19:49		18:36			16:32	16:05
14	05:12		20:26 (4)	06:01		20:17 (3)	06:56		07:50			07:49	08:36
	21:51	41	21:07 (4)	20:59	12	20:29 (3)	19:47		18:33			16:31	16:05
15	05:13		20:26 (4)	06:03		20:18 (3)	06:58		18:33 (5)			07:51	08:37
	21:50	41	21:07 (4)	20:57	10	20:28 (3)	19:44	13	18:46 (5)			16:29	16:05
16	05:14		20:26 (4)	06:05		20:18 (3)	06:59		18:30 (5)			07:53	08:38
	21:49	42	21:08 (4)	20:55	7	20:25 (3)	19:42	18	18:48 (5)			16:27	16:05
17	05:16		20:26 (4)	06:06		20:20 (3)	07:01		18:27 (5)			07:55	08:38
	21:47	42	21:08 (4)	20:53	3	20:23 (3)	19:39	22	18:49 (5)			16:26	16:05
18	05:17		20:26 (4)	06:08			07:03		18:26 (5)			07:57	08:39
	21:46	42	21:08 (4)	20:50			19:37	24	18:50 (5)			16:25	16:05
19	05:18		20:26 (4)	06:10			07:05		18:25 (5)			07:59	08:40
	21:45	41	21:07 (4)	20:48			19:34	26	18:51 (5)			16:23	16:05
20	05:20		20:27 (4)	06:12			07:06		18:24 (5)			08:00	08:41
	21:44	41	21:08 (4)	20:46			19:32	27	18:51 (5)			16:22	16:06
21	05:21		20:27 (4)	06:13			07:08		18:22 (5)			08:02	08:41
	21:42	41	21:08 (4)	20:44			19:29	29	18:51 (5)			16:20	16:06
22	05:23		20:27 (4)	06:15			07:10		18:22 (5)			08:04	08:42
	21:41	40	21:07 (4)	20:42			19:27	29	18:51 (5)			16:19	16:06
23	05:24		20:27 (4)	06:17			07:12		18:21 (5)			08:06	08:42
	21:39	40	21:07 (4)	20:39			19:24	30	18:51 (5)			16:18	16:07
24	05:26		20:27 (4)	06:19			07:13		18:21 (5)			08:08	08:43
	21:38	38	21:05 (4)	20:37			19:22	30	18:51 (5)			16:17	16:08
25	05:27		20:28 (4)	06:20			07:15		18:20 (5)			08:09	08:43
	21:36	36	21:04 (4)	20:35			19:19	30	18:50 (5)			16:16	16:08
26	05:29		20:28 (4)	06:22			07:17		18:21 (5)			08:11	08:43
	21:35	34	21:02 (4)	20:32			19:17	27	18:48 (5)			16:15	16:09
27	05:30		20:29 (4)	06:24			07:19		18:21 (5)			08:13	08:44
	21:33	32	21:01 (4)	20:30			19:14	25	18:46 (5)			16:13	16:10
28	05:32		20:29 (4)	06:26			07:21		18:22 (5)			08:14	08:44
	21:32	30	20:59 (4)	20:28			19:12	22	18:44 (5)			16:12	16:11
29	05:34		20:30 (4)	06:28			07:22		18:22 (5)			08:16	08:44
	21:30	28	20:58 (4)	20:25			19:09	19	18:41 (5)			16:12	16:11
30	05:35		20:30 (4)	06:29			07:24		18:22 (5)			08:17	08:44
	21:28	26	20:56 (4)	20:23			19:07	16	18:38 (5)			16:11	16:12
31	05:37		20:26 (3)	06:31					07:22				08:44
	21:26	29	20:55 (4)	20:21					16:56				16:13
Potential sun hours	512			460			382		328			259	233
Total, worst case	1183			341			387		19				
Sun reduction	0.32			0.34			0.32		0.29				
Oper. time red.	1.00			1.00			1.00		1.00				
Wind dir. red.	0.63			0.64			0.67		0.67				
Total reduction	0.20			0.22			0.22		0.20				
Total, real	242			75			83		4				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IJ - H244

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	18:02	07:01	20:00	26	19:07 (5)	05:52	20:55	05:03	20:42 (3)	
2	08:44	16:16	08:12	17:08	18:04	07:12	18:04	18:04	06:59	20:02	30	19:05 (5)	05:48	20:50	05:02	20:43 (3)	
3	08:43	16:17	08:10	17:10	18:06	07:09	18:06	18:06	06:56	20:04	31	19:05 (5)	05:46	20:50	05:01	20:44 (3)	
4	08:43	16:18	08:08	17:12	18:07	07:07	18:07	18:07	06:54	20:06	32	19:05 (5)	05:44	20:50	05:00	20:45 (3)	
5	08:43	16:20	08:07	17:14	18:09	07:04	18:09	18:09	06:51	20:07	32	19:04 (5)	05:42	20:50	04:59	20:46 (3)	
6	08:42	16:21	08:05	17:16	18:11	07:03	18:11	18:11	06:49	20:09	32	19:04 (5)	05:40	20:50	04:58	20:47 (3)	
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	18:13	06:47	20:11	30	19:04 (5)	05:38	20:50	04:57	20:48 (3)	
8	08:41	16:24	08:01	17:20	18:15	07:00	18:15	18:15	06:44	20:13	30	19:04 (5)	05:36	20:50	04:56	20:49 (3)	
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	18:17	06:42	20:15	29	19:05 (5)	05:34	20:50	04:55	20:50 (3)	
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	18:19	06:39	20:17	27	19:05 (5)	05:33	20:50	04:54	20:51 (3)	
11	08:40	16:28	07:55	17:26	18:21	06:52	18:21	18:21	06:37	20:19	25	19:06 (5)	05:31	20:50	04:53	20:52 (3)	
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	18:23	06:35	20:20	23	19:07 (5)	05:29	20:50	04:52	20:53 (3)	
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	18:25	06:32	20:22	19	19:08 (5)	05:27	20:50	04:51	20:54 (3)	
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	18:27	06:30	20:24	14	19:09 (5)	05:26	20:50	04:50	20:55 (3)	
15	08:36	16:34	07:47	17:34	18:28	06:43	18:28	18:28	06:28	20:26	5	19:10 (5)	05:24	20:50	04:49	20:56 (3)	
16	08:35	16:36	07:45	17:36	18:30	06:40	18:30	18:30	06:25	20:28			05:22	20:50	04:48	20:57 (3)	
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	18:32	06:23	20:30			05:21	20:50	04:47	20:58 (3)	
18	08:33	16:40	07:41	17:40	18:34	06:35	18:34	18:34	06:21	20:31			05:19	20:50	04:46	20:59 (3)	
19	08:32	16:41	07:39	17:42	18:36	06:33	18:36	18:36	06:18	20:33			05:17	20:50	04:45	21:00 (3)	
20	08:31	16:43	07:36	17:44	18:38	06:31	18:38	18:38	06:16	20:35			05:15	20:50	04:44	21:01 (3)	
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	18:40	06:14	20:37			05:13	20:50	04:43	21:02 (3)	
22	08:28	16:47	07:32	17:48	18:42	06:26	18:42	18:42	06:12	20:39			05:11	20:50	04:42	21:03 (3)	
23	08:27	16:49	07:30	17:50	18:43	06:23	18:43	18:43	06:09	20:41			05:09	20:50	04:41	21:04 (3)	
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45	18:45	06:07	20:42			05:07	20:50	04:40	21:05 (3)	
25	08:24	16:52	07:25	17:54	18:47	06:18	18:47	18:47	06:05	20:44			05:05	20:50	04:39	21:06 (3)	
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	18:49	06:03	20:46			05:03	20:50	04:38	21:07 (3)	
27	08:22	16:56	07:21	17:58	18:51	06:13	18:51	18:51	06:01	20:48			05:01	20:50	04:37	21:08 (3)	
28	08:20	16:58	07:18	18:00	18:53	06:11	18:53	18:53	05:58	20:50			04:59	20:50	04:36	21:09 (3)	
29	08:18	17:00	07:16	18:02	18:55	06:09	18:55	18:55	05:56	20:52			04:57	20:50	04:35	21:10 (3)	
30	08:17	17:02	07:14	18:04	18:57	06:07	18:57	18:57	05:54	20:54			04:55	20:50	04:34	21:11 (3)	
31	08:15	17:04	07:12	18:06	18:59	06:05	18:59	18:59	05:52	20:56			04:53	20:50	04:33	21:12 (3)	
Potential sun hours	250	273	367	420	494	510	79	1.00	0.63	0.24	0.20	16					
Total, worst case																	
Sun reduction																	
Oper. time red.																	
Wind dir. red.																	
Total reduction																	
Total, real																	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IJ - H244

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59		05:39	20:50 (3)	06:33	19:05 (5)	07:26	07:24	08:19		
	22:00		21:25	3 20:53 (3)	20:18	25 19:30 (5)	19:05	16:54	16:10		
2	05:00		05:40	20:51 (3)	06:35	19:04 (5)	07:28	07:26	08:21		
	22:00		21:23	1 20:52 (3)	20:16	27 19:31 (5)	19:02	16:52	16:09		
3	05:00		05:42		06:36	19:03 (5)	07:30	07:28	08:22		
	21:59		21:21		20:13	29 19:32 (5)	19:00	16:50	16:08		
4	05:01		05:44		06:38	19:01 (5)	07:31	07:30	08:24		
	21:59		21:19		20:11	30 19:31 (5)	18:57	16:48	16:08		
5	05:02		05:45		06:40	19:01 (5)	07:33	07:32	08:25		
	21:58		21:17		20:09	31 19:32 (5)	18:55	16:46	16:07		
6	05:03	20:55 (3)	05:47		06:42	19:00 (5)	07:35	07:34	08:26		
	21:57	5 21:00 (3)	21:15		20:06	32 19:32 (5)	18:52	16:44	16:07		
7	05:04		20:53 (3)	05:49	06:43	18:59 (5)	07:37	07:36	08:28		
	21:57	9 21:02 (3)	21:13		20:04	32 19:31 (5)	18:50	16:43	16:06		
8	05:05		20:53 (3)	05:51	06:45	18:59 (5)	07:39	07:38	08:29		
	21:56	10 21:03 (3)	21:11		20:01	32 19:31 (5)	18:48	16:41	16:06		
9	05:06		20:52 (3)	05:52	06:47	18:59 (5)	07:41	07:40	08:30		
	21:55	12 21:04 (3)	21:09		19:59	32 19:31 (5)	18:45	16:39	16:05		
10	05:07		20:51 (3)	05:54	06:49	18:58 (5)	07:42	07:42	08:31		
	21:55	14 21:05 (3)	21:07		19:56	30 19:28 (5)	18:43	16:37	16:05		
11	05:08		20:50 (3)	05:56	06:50	18:59 (5)	07:44	07:44	08:33		
	21:54	16 21:06 (3)	21:05		19:54	27 19:26 (5)	18:40	16:36	16:05		
12	05:09		20:50 (3)	05:58	06:52	18:59 (5)	07:46	07:45	08:34		
	21:53	17 21:07 (3)	21:03		19:51	25 19:24 (5)	18:38	16:34	16:05		
13	05:11		20:49 (3)	05:59	06:54	19:00 (5)	07:48	07:47	08:35		
	21:52	18 21:07 (3)	21:01		19:49	22 19:22 (5)	18:36	16:32	16:05		
14	05:12		20:49 (3)	06:01	06:56	19:00 (5)	07:50	07:49	08:36		
	21:51	19 21:08 (3)	20:59		19:47	18 19:18 (5)	18:33	16:31	16:05		
15	05:13		20:48 (3)	06:03	06:58	19:01 (5)	07:52	07:51	08:37		
	21:50	20 21:08 (3)	20:57		19:44	15 19:16 (5)	18:31	16:29	16:05		
16	05:14		20:49 (3)	06:05	06:59	19:03 (5)	07:54	07:53	08:38		
	21:48	20 21:09 (3)	20:55		19:42	11 19:14 (5)	18:29	16:27	16:05		
17	05:16		20:48 (3)	06:06	07:01	19:05 (5)	07:55	07:55	08:38		
	21:47	22 21:10 (3)	20:53		19:39	6 19:11 (5)	18:26	16:26	16:05		
18	05:17		20:48 (3)	06:08	07:03		07:57	07:57	08:39		
	21:46	22 21:10 (3)	20:50		19:37		18:24	16:25	16:05		
19	05:18		20:47 (3)	06:10	07:05		07:59	07:59	08:40		
	21:45	23 21:10 (3)	20:48		19:34		18:22	16:23	16:05		
20	05:20		20:48 (3)	06:12	07:06		08:01	08:00	08:41		
	21:44	22 21:10 (3)	20:46		19:32		18:20	16:22	16:06		
21	05:21		20:47 (3)	06:13	07:08		08:03	08:02	08:41		
	21:42	22 21:09 (3)	20:44		19:29		18:17	16:20	16:06		
22	05:23		20:47 (3)	06:15	07:10		08:05	08:04	08:42		
	21:41	20 21:07 (3)	20:42		19:27		18:15	16:19	16:07		
23	05:24		20:47 (3)	06:17	07:12		08:07	08:06	08:42		
	21:39	20 21:07 (3)	20:39		19:24		18:13	16:18	16:07		
24	05:26		20:47 (3)	06:19	07:13		08:09	08:08	08:43		
	21:38	18 21:05 (3)	20:37		19:22		18:11	16:17	16:08		
25	05:27		20:47 (3)	06:20	07:15		07:11	08:09	08:43		
	21:36	17 21:04 (3)	20:35		19:19		17:09	16:16	16:08		
26	05:29		20:47 (3)	06:22	07:17		07:13	08:11	08:43		
	21:35	15 21:02 (3)	20:32		19:17		17:06	16:15	16:09		
27	05:30		20:48 (3)	06:24	07:19		07:14	08:13	08:44		
	21:33	13 21:01 (3)	20:30		19:14		17:04	16:13	16:10		
28	05:32		20:48 (3)	06:26	19:15 (5)	07:21	07:16	08:14	08:44		
	21:32	11 20:59 (3)	20:28	7 19:22 (5)	19:12		17:02	16:13	16:11		
29	05:34		20:49 (3)	06:28	19:11 (5)	07:22	07:18	08:16	08:44		
	21:30	9 20:58 (3)	20:25	15 19:26 (5)	19:09		17:00	16:12	16:11		
30	05:35		20:49 (3)	06:29	19:09 (5)	07:24	07:20	08:17	08:44		
	21:28	7 20:56 (3)	20:23	19 19:28 (5)	19:07		16:58	16:11	16:12		
31	05:37		20:50 (3)	06:31	19:06 (5)		07:22		08:44		
	21:26	5 20:55 (3)	20:21	23 19:29 (5)			16:56		16:13		
Potential sun hours	512		460		382		328	259	233		
Total, worst case	406		68		424						
Sun reduction	0.32		0.34		0.32						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.63		0.67		0.67						
Total reduction	0.20		0.23		0.22						
Total, real	83		16		91						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IK - H245

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	19:13 (5) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	19:11 (5) 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	19:11 (5) 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	19:10 (5) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	19:09 (5) 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	19:09 (5) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	19:08 (5) 21:06	04:58 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	19:08 (5) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	19:08 (5) 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	19:08 (5) 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	19:08 (5) 21:13	04:56 21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	19:09 (5) 21:15	04:55 21:57
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:09 (5) 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:10 (5) 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:12 (5) 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:13 (5) 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:15 (5) 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:21 (5) 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	19:22 (5) 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:22 (5) 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:22 (5) 21:30	04:54 22:00
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	19:22 (5) 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:22 (5) 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:22 (5) 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19:22 (5) 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:22 (5) 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:22 (5) 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	19:22 (5) 21:40	04:57 22:01
29	08:18 17:00	07:09 19:54	06:09 19:54	05:56 20:52	19:22 (5) 21:41	04:58 22:01
30	08:17 17:02	07:06 19:56	06:06 19:56	05:54 20:53	19:22 (5) 21:43	04:58 22:00
31	08:15 17:04	07:04 19:58	06:04 19:58	05:52 19:58	19:22 (5) 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			40	453	290	238
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.67	0.63	0.63
Total reduction			0.18	0.24	0.24	0.20
Total, real			7	107	69	48

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IK - H245

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July			August			September			October			November			December		
1	04:59		20:55 (3)	05:39		06:33		19:07 (5)	07:26		07:24		08:19				
	22:00	10	21:05 (3)	21:25		20:18	30	19:37 (5)	19:05		16:54		16:10				
2	05:00		20:55 (3)	05:40		06:35		19:07 (5)	07:28		07:26		08:21				
	22:00	12	21:07 (3)	21:23		20:16	31	19:38 (5)	19:02		16:52		16:09				
3	05:00		20:54 (3)	05:42		06:36		19:06 (5)	07:30		07:28		08:22				
	21:59	13	21:07 (3)	21:21		20:13	32	19:38 (5)	19:00		16:50		16:08				
4	05:01		20:54 (3)	05:44		06:38		19:05 (5)	07:31		07:30		08:24				
	21:59	14	21:08 (3)	21:19		20:11	32	19:37 (5)	18:57		16:48		16:08				
5	05:02		20:54 (3)	05:45		06:40		19:05 (5)	07:33		07:32		08:25				
	21:58	14	21:08 (3)	21:17		20:09	32	19:37 (5)	18:55		16:46		16:07				
6	05:03		20:53 (3)	05:47		06:42		19:05 (5)	07:35		07:34		08:26				
	21:57	16	21:09 (3)	21:15		20:06	32	19:37 (5)	18:52		16:44		16:07				
7	05:04		20:53 (3)	05:49		06:43		19:04 (5)	07:37		07:36		08:28				
	21:57	17	21:10 (3)	21:13		20:04	31	19:35 (5)	18:50		16:43		16:06				
8	05:05		20:53 (3)	05:51		06:45		19:04 (5)	07:39		07:38		08:29				
	21:56	18	21:11 (3)	21:11		20:01	29	19:33 (5)	18:48		16:41		16:06				
9	05:06		20:53 (3)	05:52		06:47		19:05 (5)	07:41		07:40		08:30				
	21:55	18	21:11 (3)	21:09		19:59	26	19:31 (5)	18:45		16:39		16:05				
10	05:07		20:52 (3)	05:54		06:49		19:05 (5)	07:42		07:42		08:31				
	21:55	20	21:12 (3)	21:07		19:56	23	19:28 (5)	18:43		16:37		16:05				
11	05:08		20:52 (3)	05:56		06:50		19:06 (5)	07:44		07:44		08:33				
	21:54	20	21:12 (3)	21:05		19:54	20	19:26 (5)	18:40		16:36		16:05				
12	05:09		20:52 (3)	05:58		06:52		19:07 (5)	07:46		07:45		08:34				
	21:53	21	21:13 (3)	21:03		19:51	17	19:24 (5)	18:38		16:34		16:05				
13	05:11		20:51 (3)	05:59		06:54		19:08 (5)	07:48		07:47		08:35				
	21:52	22	21:13 (3)	21:01		19:49	14	19:22 (5)	18:36		16:32		16:05				
14	05:12		20:51 (3)	06:01		06:56		19:09 (5)	07:50		07:49		08:36				
	21:51	22	21:13 (3)	20:59		19:47	9	19:18 (5)	18:33		16:31		16:05				
15	05:13		20:51 (3)	06:03		06:58		19:12 (5)	07:52		07:51		08:37				
	21:50	23	21:14 (3)	20:57		19:44	4	19:16 (5)	18:31		16:29		16:05				
16	05:14		20:51 (3)	06:05		06:59			07:54		07:53		08:38				
	21:48	24	21:15 (3)	20:55		19:42			18:29		16:27		16:05				
17	05:16		20:51 (3)	06:06		07:01			07:55		07:55		08:38				
	21:47	23	21:14 (3)	20:53		19:39			18:26		16:26		16:05				
18	05:17		20:51 (3)	06:08		07:03			07:57		07:57		08:39				
	21:46	21	21:12 (3)	20:50		19:37			18:24		16:25		16:05				
19	05:18		20:50 (3)	06:10		07:05			07:59		07:59		08:40				
	21:45	21	21:11 (3)	20:48		19:34			18:22		16:23		16:05				
20	05:20		20:51 (3)	06:12		07:06			08:01		08:00		08:41				
	21:44	19	21:10 (3)	20:46		19:32			18:20		16:22		16:06				
21	05:21		20:51 (3)	06:13		07:08			08:03		08:02		08:41				
	21:42	18	21:09 (3)	20:44		19:29			18:17		16:20		16:06				
22	05:23		20:51 (3)	06:15		07:10			08:05		08:04		08:42				
	21:41	16	21:07 (3)	20:42		19:27			18:15		16:19		16:07				
23	05:24		20:51 (3)	06:17		07:12			08:07		08:06		08:42				
	21:39	16	21:07 (3)	20:39		19:24			18:13		16:18		16:07				
24	05:26		20:51 (3)	06:19		07:13			08:09		08:08		08:43				
	21:38	14	21:05 (3)	20:37		19:22			18:11		16:17		16:08				
25	05:27		20:52 (3)	06:20	19:22 (5)	07:15			07:11		08:09		08:43				
	21:36	12	21:04 (3)	20:35	5	19:17 (5)			17:09		16:16		16:08				
26	05:29		20:52 (3)	06:22	19:27 (5)	07:17			07:13		08:11		08:43				
	21:35	10	21:02 (3)	20:32	14	19:31 (5)			17:06		16:15		16:09				
27	05:30		20:53 (3)	06:24	19:15 (5)	07:19			07:14		08:13		08:44				
	21:33	8	21:01 (3)	20:30	19	19:34 (5)			17:04		16:13		16:10				
28	05:32		20:53 (3)	06:26	19:12 (5)	07:21			07:16		08:14		08:44				
	21:32	6	20:59 (3)	20:28	22	19:34 (5)			17:02		16:13		16:11				
29	05:34		20:54 (3)	06:28	19:11 (5)	07:22			07:18		08:16		08:44				
	21:30	4	20:58 (3)	20:25	25	19:36 (5)			17:00		16:12		16:11				
30	05:35		20:55 (3)	06:29	19:10 (5)	07:24			07:20		08:17		08:44				
	21:28	1	20:56 (3)	20:23	27	19:37 (5)			16:58		16:11		16:12				
31	05:37			06:31		19:08 (5)			07:22				08:44				
	21:26			20:21	28	19:36 (5)			16:56				16:13				
Potential sun hours	512			460		382			328		259		233				
Total, worst case		473			140		362										
Sun reduction		0.32			0.34		0.32										
Oper. time red.		1.00			1.00		1.00										
Wind dir. red.		0.63			0.67		0.67										
Total reduction		0.20			0.23		0.22										
Total, real		96			32		78										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IL - H246

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

		January	February		March	April	May	June	July	August	September	October		November	December
1	08:44	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24	08:19	
	16:15	17:06		18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05		16:54	16:10	
2	08:44	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26	08:21	
	16:16	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	16:09	
3	08:44	08:10		07:12	06:57	05:48	05:01	05:00	05:42	06:37	07:30		07:28	08:22	
	16:17	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	16:09	
4	08:44	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30	08:24	
	16:18	17:12		18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57		16:48	16:08	
5	08:43	08:07		07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:34		07:32	08:25	
	16:20	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	16:07	
6	08:43	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34	08:27	
	16:21	17:16		18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53		16:45	16:07	
7	08:42	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36	08:28	
	16:22	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	16:06	
8	08:42	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38	08:29	
	16:24	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48		16:41	16:06	
9	08:41	07:59		06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40	08:31	
	16:25	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	16:06	
10	08:41	07:57		06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43		07:42	08:32	
	16:27	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	16:05	
11	08:40	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45		07:44	08:33	
	16:28	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	16:05	
12	08:39	07:53		06:50	06:35	05:31	04:56	05:09	05:58	06:52	07:46		07:46	08:34	
	16:30	17:28		18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	16:05	
13	08:38	07:51		06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48	08:35	
	16:31	17:30		18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36		16:32	16:05	
14	08:38	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:50	08:36	
	16:33	17:32		18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34		16:31	16:05	
15	08:37	07:47	08:13 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51	08:37	
	16:35	17:34	4 08:17 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	16:05	
16	08:36	07:45	08:11 (1)	06:41	06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:37 (1)	07:53	08:38	
	16:36	17:36	7 08:18 (1)	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	9 08:46 (1)	16:28	16:05	
17	08:35	07:43	08:09 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:35 (1)	07:55	08:39	
	16:38	17:38	10 08:19 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	13 08:48 (1)	16:26	16:05	
18	08:34	07:41	08:07 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:34 (1)	07:57	08:39	
	16:40	17:40	13 08:20 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	15 08:49 (1)	16:25	16:05	
19	08:32	07:39	08:04 (1)	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:33 (1)	07:59	08:40	
	16:42	17:42	15 08:19 (1)	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	17 08:50 (1)	16:23	16:05	
20	08:31	07:37	08:02 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:32 (1)	08:01	08:41	
	16:43	17:44	18 08:20 (1)	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	18 08:50 (1)	16:22	16:06	
21	08:30	07:34	08:01 (1)	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:31 (1)	08:03	08:41	
	16:45	17:46	19 08:20 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	19 08:50 (1)	16:21	16:06	
22	08:29	07:32	08:02 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:33 (1)	08:04	08:42	
	16:47	17:48	18 08:20 (1)	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	17 08:50 (1)	16:19	16:07	
23	08:27	07:30	08:02 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:35 (1)	08:06	08:43	
	16:49	17:50	16 08:18 (1)	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	15 08:50 (1)	16:18	16:07	
24	08:26	07:28	08:03 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:37 (1)	08:08	08:43	
	16:51	17:52	14 08:17 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	12 08:49 (1)	16:17	16:08	
25	08:25	07:26	08:05 (1)	06:19	06:05	05:11	04:56	05:27	06:21	07:15	07:11	07:39 (1)	08:10	08:43	
	16:53	17:54	11 08:16 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	9 07:48 (1)	16:16	16:08	
26	08:23	07:23	08:07 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	07:41 (1)	08:11	08:44	
	16:54	17:56	5 08:12 (1)	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	6 07:47 (1)	16:15	16:09	
27	08:22	07:21		06:14	06:01	05:08	04:57	05:31	06:24	07:19	07:15	07:43 (1)	08:13	08:44	
	16:56	17:58		18:51	20:48	21:39	22:01	21:34	20:30	19:15	17:05	3 07:46 (1)	16:14	16:10	
28	08:20	07:19		06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17		08:15	08:44	
	16:58	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02		16:13	16:11	
29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19		08:16	08:44	
	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00		16:12	16:12	
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21		08:18	08:44	
	17:02			19:57	20:54	21:43	22:01	21:29	20:23	19:07	16:58		16:11	16:13	
31	08:16			07:04		05:04		05:37	06:31		07:23			08:44	
	17:04			19:58		21:44		21:27	20:21		16:56			16:14	
Potential sun hours	250	273		367		420		510		512		460		382	
Total, worst case			150										153		
Sun reduction			0.23										0.29		
Oper. time red.			1.00										1.00		
Wind dir. red.			0.64										0.64		
Total reduction			0.15										0.19		
Total, real			22										29		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IM - H247

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:56	10	06:28 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:41	06:23 (1)	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	12	06:28 (1)	21:47	22:00	21:23	9	06:32 (1)	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:57	05:48	06:14 (1)	05:01	05:01	05:42	06:21 (1)	06:37	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	14	06:28 (1)	21:48	21:59	21:21	12	06:33 (1)	20:14	19:00	16:50	16:09
4	08:43	08:09	07:09	06:54	05:46	06:12 (1)	05:00	05:01	05:44	06:20 (1)	06:38	07:32	07:30	08:24		
	16:18	17:12	18:08	20:06	21:01	15	06:27 (1)	21:49	21:59	21:19	15	06:35 (1)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	06:10 (1)	04:59	05:02	05:46	06:19 (1)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:10	20:08	21:03	17	06:27 (1)	21:50	21:58	21:18	17	06:36 (1)	20:09	18:55	16:47	16:07
6	08:43	08:05	07:05	06:49	05:42	06:09 (1)	04:59	05:03	05:47	06:18 (1)	06:42	07:35	07:34	08:27		
	16:21	17:16	18:12	20:10	21:05	18	06:27 (1)	21:51	21:58	21:16	18	06:36 (1)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	06:09 (1)	04:58	05:04	05:49	06:19 (1)	06:44	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	17	06:26 (1)	21:52	21:57	21:14	18	06:37 (1)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	06:09 (1)	04:57	05:05	05:51	06:20 (1)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	16	06:25 (1)	21:53	21:56	21:12	16	06:36 (1)	20:02	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36	06:10 (1)	04:57	05:06	05:52	06:22 (1)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	14	06:24 (1)	21:54	21:56	21:10	15	06:37 (1)	19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35	06:12 (1)	04:56	05:07	05:54	06:24 (1)	06:49	07:43	07:42	08:32		
	16:27	17:24	18:19	20:17	21:12	11	06:23 (1)	21:55	21:55	21:08	13	06:37 (1)	19:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33	06:14 (1)	04:56	05:08	05:56	06:25 (1)	06:51	07:44	07:44	08:33		
	16:28	17:26	18:21	20:19	21:13	6	06:20 (1)	21:56	21:54	21:06	11	06:36 (1)	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	06:27 (1)	06:52	07:46	07:46	08:34		
	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	9	06:36 (1)	19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	06:29 (1)	06:54	07:48	07:48	08:35		
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	7	06:36 (1)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:30 (1)	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	4	06:34 (1)	19:47	18:34	16:31	16:05	
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:32 (1)	06:58	07:52	07:51	08:37		
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	2	06:34 (1)	19:44	18:31	16:29	16:05	
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	07:00	07:54	07:53	08:38			
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	19:42	18:29	16:28	16:05			
17	08:35	07:43	06:38	06:23	05:22		04:54	05:16	06:06	07:01	07:56	07:55	08:39			
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	19:39	18:27	16:26	16:05			
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08	07:03	07:58	07:57	08:39			
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51	19:37	18:24	16:25	16:05			
19	08:32	07:39	06:33	06:19	05:19		04:54	05:19	06:10	07:05	07:59	07:59	08:40			
	16:42	17:42	18:36	20:34	21:27		22:00	21:45	20:49	19:34	18:22	16:23	16:05			
20	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12	07:07	08:01	08:01	08:41			
	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46	19:32	18:20	16:22	16:06			
21	08:30	07:34	06:28	06:14	05:16		04:55	05:22	06:14	07:08	08:03	08:02	08:41			
	16:45	17:46	18:40	20:37	21:30		22:01	21:42	20:44	19:29	18:18	16:21	16:06			
22	08:29	07:32	06:26	06:12	05:15		04:55	05:23	06:15	07:10	08:05	08:04	08:42			
	16:47	17:48	18:42	20:39	21:32		22:01	21:41	20:42	19:27	18:15	16:19	16:07			
23	08:27	07:30	06:23	06:10	05:13		04:55	05:24	06:17	07:12	08:07	08:06	08:42			
	16:49	17:50	18:44	20:41	21:33		22:01	21:40	20:40	19:24	18:13	16:18	16:07			
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26	06:19	07:14	08:09	08:08	08:43			
	16:51	17:52	18:45	20:43	21:35		22:01	21:38	20:37	19:22	18:11	16:17	16:08			
25	08:25	07:26	06:19	06:05	05:11		04:56	05:28	06:21	07:15	07:11	08:09	08:43			
	16:53	17:54	18:47	20:45	21:36		22:01	21:37	20:35	19:20	17:09	16:16	16:08			
26	08:23	07:23	06:16	06:03	05:10		04:56	05:29	06:22	07:17	07:13	08:11	08:44			
	16:55	17:56	18:49	20:46	21:37		22:01	21:35	20:33	19:17	17:07	16:15	16:09			
27	08:22	07:21	06:14	06:01	05:08		04:57	05:31	06:24	07:19	07:15	08:13	08:44			
	16:56	17:58	18:51	20:48	21:39		22:01	21:33	20:30	19:15	17:05	16:14	16:10			
28	08:20	07:19	06:11	05:59	05:07	06:24 (1)	04:57	05:32	06:26	07:21	07:17	08:15	08:44			
	16:58	18:00	18:53	20:50	2 06:26 (1)	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16:11			
29	08:19		07:09	05:56	06:22 (1)	05:06	04:58	05:34	06:28	07:23	07:19	08:16	08:44			
	17:00		19:55	20:52	5 06:27 (1)	21:42	22:01	21:30	20:26	19:10	17:00	16:12	16:12			
30	08:17		07:06	05:54	06:20 (1)	05:05	04:58	05:36	06:30	07:24	07:21	08:18	08:44			
	17:02		19:57	20:54	8 06:28 (1)	21:43	22:01	21:28	20:23	19:07	16:58	16:11	16:13			
31	08:15		07:04		05:04			05:37	06:31		07:22		08:44			
	17:04		19:58		21:44			21:27	20:21		16:56		16:14			
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233			
Total, worst case				15	150				166							
Sun reduction				0.35	0.38				0.34							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.67	0.67				0.67							
Total reduction				0.24	0.26				0.23							
Total, real				4	39				38							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IN - H248

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December
1	08:44 16:15	08:14 17:06	07:16 18:02		07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18		07:26 19:05		07:53 (1) 08:13 (1)	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04		06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16		07:28 19:02	20	07:54 (1) 08:12 (1)	07:26 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06		06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14		07:30 19:00	16	07:56 (1) 08:12 (1)	07:28 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08		06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11		07:32 18:57	13	07:58 (1) 08:11 (1)	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10		06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09		07:33 18:55	10	08:00 (1) 08:10 (1)	07:32 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12		07:29 (1) 07:31 (1)	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	06:42 20:06		07:35 18:53	7	08:02 (1) 08:09 (1)	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	2	07:27 (1) 07:33 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	06:44 20:04		07:37 18:50	4	08:04 (1) 08:08 (1)	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	6	07:24 (1) 07:33 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	06:45 20:02		07:39 18:48		07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	9	07:22 (1) 07:34 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	06:47 19:59		07:41 18:45		07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	12	07:19 (1) 07:34 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:58	06:49 19:57		07:43 18:43		07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	15	07:17 (1) 07:34 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	06:51 19:54		07:45 18:41		07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	17	07:14 (1) 07:33 (1)	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	06:52 19:52		07:46 18:38		07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	19	07:13 (1) 07:33 (1)	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	06:54 19:49		07:48 18:36		07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	20	07:13 (1) 07:31 (1)	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:56 19:47		07:50 18:34		07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	18	07:14 (1) 07:31 (1)	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:58 19:44		07:52 18:31		07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	17	07:14 (1) 07:28 (1)	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	07:00 19:42		07:54 18:29		07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	14	07:17 (1) 07:26 (1)	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	07:01 19:39		07:56 18:27		07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	9	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37		07:58 18:24		07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34		07:59 18:22		07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32		08:01 18:20		08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29		08:03 18:18		08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27		08:05 18:15		08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44		06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24		08:07 18:13		08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22		08:09 18:11		08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20		07:11 17:09		08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49		06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17		07:13 17:07		08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51		06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	7	08:07 (1) 07:55 (1)		07:15 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53		05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	13	08:10 (1) 07:55 (1)		07:17 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55		05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	16	08:11 (1) 07:54 (1)		07:19 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57		05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	18	08:12 (1) 07:53 (1)		07:21 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58			05:04 21:44		05:37 21:27	06:31 20:21		20	08:13 (1)		07:23 16:16	08:44 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233
Total, worst case				158							74		88		
Sun reduction				0.27							0.32		0.29		
Oper. time red.				1.00							1.00		1.00		
Wind dir. red.				0.65							0.65		0.65		
Total reduction				0.18							0.21		0.19		
Total, real				28							15		17		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IO - H249

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December
1	08:44 16:15	08:14 17:06	07:16 18:02		07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18		07:26 19:05		07:56 (1) 08:15 (1)	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04		06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16		07:28 19:02	19	07:54 (1) 08:15 (1)	07:26 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06		06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14		07:30 19:00	19	07:56 (1) 08:15 (1)	07:28 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08		06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11		07:32 18:57	17	07:58 (1) 08:15 (1)	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10		06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09		07:33 18:55	14	08:00 (1) 08:14 (1)	07:32 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	3	07:29 (1) 07:36 (1)	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	06:42 20:06		07:35 18:53	11	08:02 (1) 08:13 (1)	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	7	07:27 (1) 07:37 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	06:44 20:04		07:37 18:50	8	08:04 (1) 08:12 (1)	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	10	07:24 (1) 07:37 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	06:45 20:02		07:39 18:48	5	08:06 (1) 08:11 (1)	07:38 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	13	07:22 (1) 07:37 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	06:47 19:59		07:41 18:45	1	08:07 (1) 08:08 (1)	07:40 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	15	07:19 (1) 07:37 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:58	06:49 19:57		07:43 18:43		07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	18	07:17 (1) 07:37 (1)	06:37 20:19	05:33 21:13	04:56 21:54	05:08 21:56	06:51 19:54		07:45 18:41		07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	20	07:16 (1) 07:36 (1)	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	06:52 19:52		07:46 18:38		07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	20	07:17 (1) 07:35 (1)	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	06:54 19:49		07:48 18:36		07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	18	07:17 (1) 07:34 (1)	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:56 19:47		07:50 18:34		07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	17	07:18 (1) 07:32 (1)	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:58 19:44		07:52 18:31		07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	14	07:20 (1) 07:29 (1)	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	07:00 19:42		07:54 18:29		07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	9	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:05 20:53	07:01 19:39		07:56 18:27		07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34		06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37		07:58 18:24		07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34		07:59 18:22		07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32		08:01 18:20		08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29		08:03 18:18		08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27		08:05 18:15		08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44		06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24		08:07 18:13		08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22		08:09 18:11		08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20		08:11 17:09		08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49		06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17		08:13 17:07		08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51		06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:03 (1) 08:10 (1)	07:15 17:05		08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53		05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:00 (1) 08:12 (1)	07:17 17:02		08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55		05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:58 (1) 08:14 (1)	07:19 17:00		08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57		05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:57 (1) 08:15 (1)	07:21 16:58		08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58			05:04 21:44		05:37 21:27	06:31 20:21			07:23 16:56			08:44 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233
Total, worst case			164							53		115			
Sun reduction			0.27							0.32		0.29			
Oper. time red.			1.00							1.00		1.00			
Wind dir. red.			0.65							0.65		0.65			
Total reduction			0.18							0.21		0.19			
Total, real			29							11		22			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IP - H250
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50
4	08:44 16:18	08:09 17:12	07:09 18:08	07:34 (1) 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48
5	08:43 16:20	08:07 17:14	07:07 18:10	07:31 (1) 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46
6	08:43 16:21	08:05 17:16	07:05 18:12	07:29 (1) 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45
7	08:42 16:22	08:03 17:18	07:02 18:13	07:30 (1) 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43
8	08:42 16:24	08:01 17:20	07:00 18:15	07:29 (1) 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41
9	08:41 16:25	07:59 17:22	06:58 18:17	07:31 (1) 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39
10	08:41 16:27	07:57 17:24	06:55 18:19	07:32 (1) 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37
11	08:40 16:28	07:55 17:26	06:53 18:21	07:36 (1) 18:21	06:37 20:19	05:33 21:13	04:56 21:54	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	07:40 (1) 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	07:41 (1) 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	07:42 (1) 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31
15	08:37 16:35	07:47 17:34	06:43 18:29	07:43 (1) 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29
16	08:36 16:36	07:45 17:36	06:41 18:31	07:44 (1) 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28
17	08:35 16:38	07:43 17:38	06:38 18:32	07:45 (1) 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26
18	08:34 16:40	07:41 17:40	06:36 18:34	07:46 (1) 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25
19	08:32 16:42	07:39 17:42	06:33 18:36	07:47 (1) 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23
20	08:31 16:43	07:37 17:44	06:31 18:38	07:48 (1) 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	07:49 (1) 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21
22	08:29 16:47	07:32 17:48	06:26 18:42	07:50 (1) 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 16:19
23	08:27 16:49	07:30 17:50	06:23 18:44	07:51 (1) 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	07:52 (1) 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17
25	08:25 16:53	07:26 17:54	06:19 18:47	07:53 (1) 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	08:11 18:09	08:10 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	07:54 (1) 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:11 18:07	08:11 16:15
27	08:22 16:56	07:21 17:58	06:14 18:51	07:55 (1) 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:13 18:05	08:13 16:14
28	08:20 16:58	07:19 18:00	06:11 18:53	07:56 (1) 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:15 18:02	08:15 16:11
29	08:19 17:00		07:09 19:55	07:57 (1) 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:16 18:00	08:16 16:12
30	08:17 17:02		07:06 19:57	07:58 (1) 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	08:18 18:00	08:18 16:13
31	08:16 17:04		07:04 19:58	07:59 (1) 19:58	05:54 21:44	05:04 21:44	04:57 21:27	05:37 20:21	06:31 19:07	07:23 18:00	08:19 18:00	08:19 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		3	147							149		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		0	26							28		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IQ - H251

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50
4	08:44 16:18	08:09 17:12	07:09 18:08	07:34 (1) 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48
5	08:43 16:20	08:07 17:14	07:07 18:10	07:31 (1) 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46
6	08:43 16:21	08:05 17:16	07:05 18:12	07:29 (1) 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45
7	08:42 16:22	08:03 17:18	07:02 18:13	07:29 (1) 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43
8	08:42 16:24	08:01 17:20	07:00 18:15	07:29 (1) 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41
9	08:41 16:25	07:59 17:22	06:58 18:17	07:30 (1) 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39
10	08:41 16:27	07:57 17:24	06:55 18:19	07:31 (1) 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37
11	08:40 16:28	07:55 17:26	06:53 18:21	07:33 (1) 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	07:42 (1) 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	05:25 21:57	05:11 21:52	05:59 21:02	06:54 20:19	07:48 18:36	07:48 16:32	07:48 16:30
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	05:27 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	07:50 16:29
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	05:26 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:52 16:29	07:52 16:27
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	05:24 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:54 16:28	07:54 16:26
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	05:22 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:56 16:26	07:56 16:24
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	05:21 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:58 16:25	07:58 16:23
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	05:19 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	07:59 16:21
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:18 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:01 16:20
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:16 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:03 16:19
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	05:15 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 16:19	08:05 16:17
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	05:13 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:07 16:18	08:07 16:16
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	05:12 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:09 16:17	08:09 16:15
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	05:11 22:01	05:27 21:37	06:21 20:35	07:15 19:20	08:11 18:09	08:11 16:16	08:11 16:14
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	05:09 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 18:07	08:13 16:15	08:13 16:13
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	05:08 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 18:05	08:15 16:14	08:15 16:12
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	05:07 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 18:02	08:17 16:13	08:17 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	05:06 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 18:00	08:19 16:12	08:19 16:10
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	05:05 22:01	05:35 21:28	06:29 20:23	07:24 19:07	08:21 18:00	08:21 16:11	08:21 16:09
31	08:16 17:04		07:04 19:58	05:54 21:44	05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	07:23 18:56	08:23 18:00	08:23 16:10	08:23 16:08
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		3	156							160		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		0	27							30		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IR - H252

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

		January	February		March	April	May	June	July	August	September	October		November	December
1	08:44	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24	08:19	
	16:15	17:06		18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05		16:54	16:10	
2	08:44	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26	08:21	
	16:16	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	16:09	
3	08:44	08:10		07:12	06:57	05:48	05:01	05:00	05:42	06:37	07:30		07:28	08:22	
	16:17	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	16:09	
4	08:44	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30	08:24	
	16:18	17:12		18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57		16:48	16:08	
5	08:43	08:07		07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33		07:32	08:25	
	16:20	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	16:07	
6	08:43	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34	08:27	
	16:21	17:16		18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53		16:45	16:07	
7	08:42	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36	08:28	
	16:22	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	16:06	
8	08:42	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38	08:29	
	16:24	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48		16:41	16:06	
9	08:41	07:59		06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40	08:31	
	16:25	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	16:06	
10	08:41	07:57		06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43		07:42	08:32	
	16:27	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	16:05	
11	08:40	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45		07:44	08:33	
	16:28	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	16:05	
12	08:39	07:53		06:50	06:35	05:31	04:56	05:09	05:58	06:52	07:46		07:46	08:34	
	16:30	17:28		18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	16:05	
13	08:38	07:51		06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48	08:35	
	16:31	17:30		18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36		16:32	16:05	
14	08:37	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36 (1)	07:50	08:36	
	16:33	17:32		18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	10	08:46 (1)	16:31	
15	08:37	07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:34 (1)	07:51	08:37	
	16:35	17:34		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	14	08:48 (1)	16:29	
16	08:36	07:45	08:11 (1)	06:41	06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:32 (1)	07:53	08:38	
	16:36	17:36	5	08:16 (1)	18:31	20:28	21:22	21:59	21:49	20:55	19:42	17	08:49 (1)	16:28	
17	08:35	07:43		08:09 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:31 (1)	07:55	
	16:38	17:38	8	08:17 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	19	08:50 (1)	16:26	
18	08:34	07:41		08:07 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:30 (1)	07:57	
	16:40	17:40	12	08:19 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	20	08:50 (1)	16:25	
19	08:32	07:39		08:04 (1)	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:30 (1)	07:59	
	16:42	17:42	15	08:19 (1)	18:36	20:34	21:27	22:00	21:45	20:49	19:34	20	08:50 (1)	16:23	
20	08:31	07:37		08:02 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:30 (1)	08:01	
	16:43	17:44	17	08:19 (1)	18:38	20:35	21:28	22:01	21:44	20:46	19:32	20	08:50 (1)	16:22	
21	08:30	07:34		08:00 (1)	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:31 (1)	08:02	
	16:45	17:46	20	08:20 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	19	08:50 (1)	16:21	
22	08:29	07:32		07:58 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:33 (1)	08:04	
	16:47	17:48	21	08:19 (1)	18:42	20:39	21:32	22:01	21:41	20:42	19:27	17	08:50 (1)	16:19	
23	08:27	07:30		07:59 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:35 (1)	08:06	
	16:49	17:50	20	08:19 (1)	18:44	20:41	21:33	22:01	21:40	20:40	19:24	14	08:49 (1)	16:18	
24	08:26	07:28		07:59 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:37 (1)	08:08	
	16:51	17:52	20	08:19 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	11	08:48 (1)	16:17	
25	08:25	07:26		08:00 (1)	06:19	06:05	05:11	04:56	05:27	06:21	07:15	07:11	07:39 (1)	08:10	
	16:53	17:54	18	08:18 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20	8	07:47 (1)	16:16	
26	08:23	07:23		08:01 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	07:41 (1)	08:11	
	16:54	17:56	16	08:17 (1)	18:49	20:46	21:38	22:01	21:35	20:33	19:17	4	07:45 (1)	16:15	
27	08:22	07:21		08:02 (1)	06:14	06:01	05:08	04:57	05:31	06:24	07:19	07:15	08:13	08:44	
	16:56	17:58	13	08:15 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15		16:14	16:10	
28	08:20	07:19		08:04 (1)	06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17	08:15	08:44	
	16:58	18:00	8	08:12 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12		16:13	16:11	
29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19		08:16	08:44	
	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00		16:12	16:12	
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21		08:18	08:44	
	17:02			19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58		16:11	16:13	
31	08:16			07:04		05:04		05:37	06:31		07:23			08:44	
	17:04			19:58		21:44		21:27	20:21		16:56			16:14	
Potential sun hours	250	273		367	420	494	510	512	460	382	328		259	233	
Total, worst case		193										193			
Sun reduction		0.23										0.29			
Oper. time red.		1.00										1.00			
Wind dir. red.		0.64										0.64			
Total reduction		0.15										0.19			
Total, real		29										36			

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IS - H253

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15 08:44 16:16 08:44 16:17 08:44 16:18	08:14 17:06 08:12 17:08 08:10 17:10 08:09 17:12	07:16 18:02 07:14 18:04 07:12 18:06 07:09 18:08	07:01 20:00 06:59 20:02 06:57 20:04 06:54 20:06	05:52 20:56 05:50 20:57 05:48 20:59 05:46 21:01	05:03 21:46 05:02 21:47 05:01 21:48 05:01 21:49	04:59 22:00 05:00 22:00 05:00 21:59 05:01 21:59	05:39 21:25 05:40 21:23 05:42 21:21 05:44 21:20	06:33 20:18 06:35 20:16 06:37 20:14 06:38 20:11	07:26 19:05 07:28 19:02 07:30 19:00 07:32 18:57	07:24 16:54 07:26 16:52 07:28 16:50 07:30 16:48	08:19 16:10 08:21 16:09 08:22 16:09 08:24 16:08
2	08:44 16:16 08:44 16:17 08:44 16:18	08:12 17:08 08:10 17:10 08:09 17:12	07:14 18:04 07:12 18:06 07:09 18:08	06:59 20:02 06:57 20:04 06:54 20:06	05:50 20:57 05:48 20:59 05:46 21:01	05:02 21:47 05:01 21:48 05:01 21:49	05:00 22:00 05:00 21:59 05:01 21:59	05:40 21:23 05:42 21:21 05:44 21:20	06:35 20:16 06:37 20:14 06:38 20:11	07:28 19:02 07:30 19:00 07:32 18:57	07:26 16:52 07:28 16:50 07:30 16:48	08:21 16:09 08:22 16:09 08:24 16:08
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4	08:44 16:18 08:43 16:20 08:43 16:21 08:42 16:22	08:09 17:12 08:07 17:14 08:05 17:16 08:03 17:18	07:09 18:08 07:07 18:10 07:05 18:12 07:02 18:13	06:54 20:06 06:52 20:08 06:49 20:10 06:47 20:11	05:46 21:01 05:44 21:03 05:42 21:05 05:40 21:06	05:01 21:49 05:02 21:50 05:03 21:51 05:04 21:52	05:01 21:59 05:02 21:58 05:03 21:56 05:04 21:57	05:44 21:20 05:46 21:18 05:47 21:16 05:49 21:14	06:38 20:11 06:40 20:09 06:42 20:06 06:44 20:04	07:32 18:57 07:33 18:55 07:35 18:53 07:37 18:50	07:30 16:48 07:32 16:46 07:34 16:45 07:36 16:06	08:24 16:08 08:25 16:07 08:27 16:07 08:28 16:06
5	08:43 16:20 08:43 16:21 08:42 16:22	08:07 17:14 08:05 17:16 08:03 17:18	07:07 18:10 07:05 18:12 07:02 18:13	06:52 20:08 06:49 20:10 06:47 20:11	05:44 21:03 05:42 21:05 05:40 21:06	05:02 21:50 05:03 21:51 05:04 21:52	05:02 21:58 05:03 21:56 05:04 21:57	05:46 21:18 05:47 21:16 05:49 21:14	06:40 20:09 06:42 20:06 06:44 20:04	07:33 18:55 07:35 18:53 07:37 18:50	07:32 16:46 07:34 16:45 07:36 16:06	08:25 16:07 08:27 16:07 08:28 16:06
6	08:43 16:21 08:42 16:22	08:05 17:16 08:03 17:18	07:05 18:12 07:02 18:13	06:49 20:10 06:47 20:11	05:42 21:05 05:40 21:06	05:03 21:51 05:04 21:52	05:03 21:56 05:04 21:57	05:47 21:16 05:49 21:14	06:42 20:06 06:44 20:04	07:35 18:53 07:37 18:50	07:34 16:45 07:36 16:06	08:27 16:07 08:28 16:06
7	08:42 16:22 08:42 16:24 08:41 16:25 08:41 16:27	08:03 17:18 08:01 17:20 07:59 17:22 07:57 17:24	07:02 18:13 07:00 18:15 06:58 18:17 06:55 18:19	06:47 20:11 06:44 20:13 06:42 20:15 06:40 20:17	05:40 21:06 05:38 21:08 05:36 21:10 05:35 21:12	05:04 21:52 05:05 21:53 05:06 21:54 05:07 21:55	05:04 21:57 05:05 21:56 05:06 21:57 05:07 21:58	05:49 21:14 05:51 21:12 05:52 21:10 05:54 21:08	06:44 20:04 06:45 20:02 06:47 19:59 06:49 19:57	07:37 18:50 07:39 18:48 07:41 18:45 07:43 18:43	07:36 16:43 07:38 16:41 07:40 16:39 07:42 16:37	08:28 16:06 08:29 16:06 08:31 16:06 08:32 16:05
8	08:42 16:24 08:41 16:25 08:41 16:27	08:01 17:20 07:59 17:22 07:57 17:24	07:00 18:15 06:58 18:17 06:55 18:19	06:44 20:13 06:42 20:15 06:40 20:17	05:38 21:08 05:36 21:10 05:35 21:12	05:05 21:53 05:06 21:54 05:07 21:55	05:05 21:56 05:06 21:57 05:07 21:58	05:51 21:12 05:52 21:10 05:54 21:08	06:45 20:02 06:47 19:59 06:49 19:57	07:39 18:48 07:41 18:45 07:43 18:43	07:38 16:41 07:40 16:39 07:42 16:37	08:29 16:06 08:31 16:06 08:32 16:05
9	08:41 16:25 08:41 16:27	07:59 17:22 07:57 17:24	06:58 18:17 06:55 18:19	06:42 20:15 06:40 20:17	05:36 21:10 05:35 21:12	05:06 21:54 05:07 21:55	05:06 21:57 05:07 21:58	05:52 21:10 05:54 21:08	06:47 19:59 06:49 19:57	07:41 18:45 07:43 18:43	07:40 16:39 07:42 16:37	08:31 16:06 08:32 16:05
10	08:41 16:27 08:40 16:28	07:57 17:24 07:55 17:26	06:55 18:19 06:53 18:21	06:40 20:17 06:37 20:19	05:35 21:12 05:33 21:13	05:07 21:55 05:08 21:56	05:07 21:58 05:08 21:54	05:54 21:08 05:56 21:06	06:49 19:57 06:51 19:54	07:43 18:43 07:45 18:41	07:42 16:37 07:44 16:36	08:32 16:05 08:33 16:05
11	08:40 16:28 08:39 16:30	07:55 17:26 07:53 17:28	06:53 18:21 06:50 18:23	06:37 20:19 06:35 20:21	05:33 21:13 05:31 21:15	05:08 21:56 05:09 21:56	05:08 21:54 05:09 21:53	05:56 21:06 05:58 21:04	06:51 19:54 06:52 19:52	07:45 18:41 07:46 18:38	07:44 16:36 07:46 16:34	08:33 16:05 08:34 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	05:09 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	05:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	05:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	05:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	05:54 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	05:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	05:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	05:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	05:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	05:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:07 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	05:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:09 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:20 18:47	06:05 20:45	05:11 21:36	05:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:11 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	05:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:13 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	05:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	08:14 17:05	08:14 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	05:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:15 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	05:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:16 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	05:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	08:17 16:58	08:17 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44	05:37 21:27	05:37 20:21	06:31 20:21	07:23 16:56	08:18 16:56	08:18 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		169								175		
Sun reduction		0.23								0.29		
Oper. time red.		1.00								1.00		
Wind dir. red.		0.64								0.64		
Total reduction		0.15								0.19		
Total, real		25								33		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IT - H254

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

		January	February		March	April	May	June	July	August	September	October		November	December
1	08:44	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24	08:19	
	16:15	17:06		18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05		16:54	16:10	
2	08:44	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26	08:21	
	16:16	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	16:09	
3	08:44	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30		07:28	08:22	
	16:17	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	16:09	
4	08:44	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30	08:24	
	16:18	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	16:08	
5	08:43	08:07		07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33		07:32	08:25	
	16:20	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	16:07	
6	08:43	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34	08:27	
	16:21	17:16		18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53		16:45	16:07	
7	08:42	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36	08:28	
	16:22	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	16:06	
8	08:42	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38	08:29	
	16:24	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48		16:41	16:06	
9	08:41	07:59		06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40	08:31	
	16:25	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	16:06	
10	08:41	07:57		06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43		07:42	08:32	
	16:27	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	16:05	
11	08:40	07:55	08:22 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44	08:33	
	16:28	17:26	4	08:26 (1)	18:21	20:19	21:13	21:56	21:54	21:06	18:41		16:36	16:05	
12	08:39	07:53	08:20 (1)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46	08:34	
	16:30	17:28	7	08:27 (1)	18:23	20:21	21:15	21:56	21:53	21:04	18:38		16:34	16:05	
13	08:38	07:51	08:18 (1)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48	08:35	
	16:31	17:30	10	08:28 (1)	18:25	20:22	21:17	21:57	21:52	21:02	18:36		16:32	16:05	
14	08:37	07:49	08:15 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:50	08:36	
	16:33	17:32	13	08:28 (1)	18:27	20:24	21:19	21:58	21:51	20:59	18:34		16:31	16:05	
15	08:37	07:47	08:13 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51	08:37	
	16:35	17:34	16	08:29 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44		16:29	16:05	
16	08:36	07:45	08:11 (1)	06:41	06:25	05:24	04:55	05:14	06:05	06:59	07:54		07:53	08:38	
	16:36	17:36	18	08:29 (1)	18:31	20:28	21:22	21:59	21:49	20:55	19:42		16:28	16:05	
17	08:35	07:43	08:09 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55	08:39	
	16:38	17:38	21	08:30 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39		16:26	16:05	
18	08:34	07:41	08:09 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:45 (1)	07:57	08:39	
	16:40	17:40	21	08:30 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	9	08:54 (1)	16:25	
19	08:32	07:39	08:08 (1)	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:43 (1)	07:59	08:40	
	16:41	17:42	21	08:29 (1)	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	13	08:56 (1)	16:23
20	08:31	07:37	08:09 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41 (1)	08:01	08:41	
	16:43	17:44	19	08:28 (1)	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	17	08:58 (1)	16:22
21	08:30	07:34	08:10 (1)	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:40 (1)	08:02	08:41	
	16:45	17:46	18	08:28 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	18	08:58 (1)	16:21
22	08:29	07:32	08:10 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:39 (1)	08:04	08:42	
	16:47	17:48	16	08:26 (1)	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	20	08:59 (1)	16:19
23	08:27	07:30	08:12 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:38 (1)	08:06	08:43	
	16:49	17:50	12	08:24 (1)	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	21	08:59 (1)	16:18
24	08:26	07:28	08:15 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:38 (1)	08:08	08:43	
	16:51	17:52	7	08:22 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	21	08:59 (1)	16:17
25	08:25	07:26		06:19	06:05	05:11	04:56	05:27	06:21	07:15	07:11	07:39 (1)	08:10	08:43	
	16:53	17:54		18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	20	07:59 (1)	16:16	
26	08:23	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	07:41 (1)	08:11	08:44	
	16:54	17:56		18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	18	07:59 (1)	16:15	
27	08:22	07:21		06:14	06:01	05:08	04:57	05:31	06:24	07:19	07:15	07:43 (1)	08:13	08:44	
	16:56	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	15	07:58 (1)	16:14	
28	08:20	07:19		06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17	07:45 (1)	08:15	08:44	
	16:58	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	13	07:58 (1)	16:13	
29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	07:48 (1)	08:16	08:44	
	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	10	07:58 (1)	16:12	
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21	07:50 (1)	08:18	08:44	
	17:02			19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	7	07:57 (1)	16:11	
31	08:16			07:04		05:04		05:37	06:31		07:23	07:52 (1)		08:44	
	17:04			19:58		21:44		21:27	20:21		16:56	3	07:55 (1)	16:14	
Potential sun hours	250	273		367	420	494	510	512	460	382	328		259	233	
Total, worst case		203										205			
Sun reduction		0.23										0.29			
Oper. time red.		1.00										1.00			
Wind dir. red.		0.63										0.63			
Total reduction		0.15										0.19			
Total, real		30										38			

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IU - H255

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April	May	June	July	August	September	October	November	December
1	08:44		08:14		09:03 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15		17:06	10	09:13 (1)	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44		08:12		09:06 (1)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21
	16:16		17:08	4	09:10 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44		08:10			07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22
	16:17		17:10			18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:09
4	08:44		08:09			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24
	16:18		17:12			18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:48	16:08
5	08:43		08:07			07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32	08:25
	16:20		17:14			18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07
6	08:43		08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27
	16:21		17:16			18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45	16:07
7	08:42		08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28
	16:22		17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06
8	08:42		08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29
	16:24		17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:41	16:06
9	08:41		07:59			06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:31
	16:25		17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	5 08:36 (1) 16:05
10	08:41		07:57			06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42	08:32
	16:27		17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	11 08:44 (1) 16:05
11	08:40		07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45	07:44	08:32 (1) 16:05
	16:28		17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	13 08:45 (1) 16:05
12	08:39		07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:31 (1) 16:05
	16:30		17:28			18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	15 08:46 (1) 16:05
13	08:38		07:51			06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:30 (1) 16:05
	16:31		17:30			18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32	17 08:47 (1) 16:05
14	08:38		07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50	08:30 (1) 16:05
	16:33		17:32			18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31	18 08:48 (1) 16:05
15	08:37		07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:29 (1) 16:05
	16:35		17:34			18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	19 08:49 (1) 16:05
16	08:36		09:07 (1)	07:45		06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:29 (1) 16:05
	16:36	3	09:10 (1)	17:36		18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	20 08:49 (1) 16:05
17	08:35		09:05 (1)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:29 (1) 16:05
	16:38	5	09:10 (1)	17:38		18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	20 08:49 (1) 16:05
18	08:34		09:04 (1)	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57	08:30 (1) 16:05
	16:40	8	09:12 (1)	17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	20 08:50 (1) 16:05
19	08:32		09:03 (1)	07:39		06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59	08:32 (1) 16:05
	16:41	10	09:13 (1)	17:42		18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23	18 08:50 (1) 16:05
20	08:31		09:01 (1)	07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01	08:34 (1) 16:05
	16:43	12	09:13 (1)	17:44		18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	16 08:50 (1) 16:06
21	08:30		09:00 (1)	07:34		06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:03	08:36 (1) 16:06
	16:45	14	09:14 (1)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	14 08:50 (1) 16:06
22	08:29		08:59 (1)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:38 (1) 16:06
	16:47	16	09:15 (1)	17:48		18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	12 08:50 (1) 16:07
23	08:27		08:57 (1)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:39 (1) 16:07
	16:49	18	09:15 (1)	17:50		18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	10 08:49 (1) 16:07
24	08:26		08:56 (1)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:41 (1) 16:08
	16:51	20	09:16 (1)	17:52		18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	8 08:49 (1) 16:08
25	08:25		08:56 (1)	07:26		06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:10	08:43 (1) 16:08
	16:53	20	09:16 (1)	17:54		18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16	6 08:49 (1) 16:08
26	08:23		08:56 (1)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:45 (1) 16:09
	16:54	20	09:16 (1)	17:56		18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15	3 08:48 (1) 16:09
27	08:22		08:57 (1)	07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13	08:44
	16:56	19	09:16 (1)	17:58		18:51	20:48	21:39	22:01	21:34	20:30	19:15	17:05	16:14	16:10
28	08:20		08:58 (1)	07:19		06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:15	08:44
	16:58	18	09:16 (1)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16:11
29	08:19		08:58 (1)			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16	08:44
	17:00	17	09:15 (1)			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	16:12
30	08:17		08:59 (1)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:18	08:44
	17:02	16	09:15 (1)			19:57	20:54	21:43	22:01	21:29	20:23	19:07	16:58	16:11	16:12
31	08:16		09:01 (1)			07:04		05:04		05:37	06:31		07:23		08:44
	17:04	13	09:14 (1)			19:58		21:44		21:27	20:21		16:56		16:13
Potential sun hours	250		273			367	420	494	510	512	460	382	328	259	233
Total, worst case		229		14										245	
Sun reduction		0.24		0.23										0.27	
Oper. time red.		1.00		1.00										1.00	
Wind dir. red.		0.61		0.61										0.61	
Total reduction		0.15		0.14										0.16	
Total, real		34		2										40	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IV - H256

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March	April	May	June	July	August	September	October	November		December
1	08:44	09:18 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19
	16:15	4	09:22 (1)	17:06	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	09:18 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26		08:21
	16:16	5	09:23 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	09:18 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28		08:22
	16:17	6	09:24 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08
4	08:44	09:17 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24
	16:18	7	09:24 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:48	16:08
5	08:43	09:17 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25
	16:20	8	09:25 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07
6	08:43	09:16 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:27
	16:21	9	09:25 (1)	17:16	18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45	16:07
7	08:42	09:15 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36		08:28
	16:22	11	09:26 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06
8	08:42	09:15 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38		08:29
	16:24	12	09:27 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:41	16:06
9	08:41	09:14 (1)	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:31
	16:25	13	09:27 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05
10	08:41	09:13 (1)	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42		08:32
	16:27	15	09:28 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05
11	08:40	09:12 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44		08:33
	16:28	16	09:28 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05
12	08:39	09:11 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46		08:34
	16:30	17	09:28 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05
13	08:38	09:10 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48		08:35
	16:31	19	09:29 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32	16:05
14	08:38	09:10 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50		08:36
	16:33	19	09:29 (1)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31	16:05
15	08:37	09:10 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51		08:37
	16:35	19	09:29 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05
16	08:36	09:11 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53		08:38
	16:36	19	09:30 (1)	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16:05
17	08:35	09:11 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55		08:39
	16:38	18	09:29 (1)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	16:05
18	08:34	09:12 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57		08:40
	16:40	17	09:29 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:05
19	08:32	09:13 (1)	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59	08:55 (1)	08:40
	16:41	16	09:29 (1)	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23	5 09:00 (1)
20	08:31	09:14 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01	08:52 (1)	08:41
	16:43	14	09:28 (1)	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	10 09:02 (1)
21	08:30	09:15 (1)	07:34	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:03	08:51 (1)	08:42
	16:45	13	09:28 (1)	17:46	18:40	20:37	21:30	22:01	21:43	20:44	19:29	18:18	16:21	13 09:04 (1)
22	08:29	09:17 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:51 (1)	08:42
	16:47	10	09:27 (1)	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	14 09:05 (1)
23	08:27	09:20 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:49 (1)	08:43
	16:49	5	09:25 (1)	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	16 09:05 (1)
24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:49 (1)	08:43
	16:51		17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	17 09:06 (1)	16:08
25	08:25		07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:10	08:49 (1)	08:43
	16:53		17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16	18 09:07 (1)	16:08
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:49 (1)	08:44
	16:54		17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15	19 09:08 (1)	16:09
27	08:22		07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13	08:49 (1)	08:44
	16:56		17:58	18:51	20:48	21:39	22:01	21:34	20:30	19:15	17:05	16:14	20 09:09 (1)	16:10
28	08:20		07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:15	08:50 (1)	08:44
	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	19 09:09 (1)	16:11
29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16	08:51 (1)	08:44
	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	19 09:10 (1)	16:12
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:18	08:52 (1)	08:44
	17:02			19:57	20:54	21:43	22:01	21:29	20:23	19:07	18:07	16:11	17 09:09 (1)	16:12
31	08:16			07:04		05:04		05:37	06:31		07:23		08:44	
	17:04			19:58		21:44		21:27	20:21		16:56		16:13	3 09:22 (1)
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	233	
Total, worst case		292											187	119
Sun reduction		0.24											0.27	0.21
Oper. time red.		1.00											1.00	1.00
Wind dir. red.		0.60											0.60	0.60
Total reduction		0.15											0.16	0.13
Total, real		43											30	15

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IW - H257

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	08:54 (1)
	16:15	17:06	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54	16:10	6 09:00 (1)
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	08:56 (1)
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	4 09:00 (1)
3	08:44	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22	08:57 (1)
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08	2 08:59 (1)
4	08:44	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07	
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:41	16:06	
9	08:41	09:14 (1)	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:31
	16:25	2 09:16 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05
10	08:41	09:13 (1)	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42	08:32
	16:27	4 09:17 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05
11	08:40	09:12 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33
	16:28	6 09:18 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05
12	08:39	09:11 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34
	16:30	8 09:19 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05
13	08:38	09:10 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:35
	16:31	10 09:20 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32	6 08:50 (1) 16:05
14	08:38	09:09 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50	08:42 (1) 08:36
	16:33	11 09:20 (1)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31	11 08:53 (1) 16:05
15	08:37	09:08 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:40 (1) 08:37
	16:35	13 09:21 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	14 08:54 (1) 16:05
16	08:36	09:07 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:39 (1) 08:38
	16:36	15 09:22 (1)	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16 08:55 (1) 16:05
17	08:35	09:05 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39 (1) 08:39
	16:38	17 09:22 (1)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	17 08:56 (1) 16:05
18	08:34	09:04 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57	08:39 (1) 08:39
	16:40	19 09:23 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	19 08:58 (1) 16:05
19	08:32	09:03 (1)	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59	08:39 (1) 08:40
	16:41	20 09:23 (1)	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23	20 08:59 (1) 16:05
20	08:31	09:02 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01	08:39 (1) 08:41
	16:43	21 09:23 (1)	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	20 08:59 (1) 16:06
21	08:30	09:03 (1)	07:34	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:02	08:39 (1) 08:41
	16:45	21 09:24 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	21 09:00 (1) 16:06
22	08:29	09:04 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:39 (1) 08:42
	16:47	20 09:24 (1)	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	21 09:00 (1) 16:07
23	08:27	09:04 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:39 (1) 08:43
	16:49	20 09:24 (1)	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	20 08:59 (1) 16:07
24	08:26	09:05 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:41 (1) 08:43
	16:51	19 09:24 (1)	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	19 09:00 (1) 16:08
25	08:25	09:06 (1)	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:10	08:43 (1) 08:43
	16:53	17 09:23 (1)	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16	17 09:00 (1) 16:08
26	08:23	09:06 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:45 (1) 08:44
	16:54	16 09:22 (1)	17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15	15 09:00 (1) 16:09
27	08:22	09:08 (1)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13	08:47 (1) 08:44
	16:56	14 09:22 (1)	17:58	18:51	20:48	21:39	22:01	21:34	20:30	19:15	17:05	16:14	13 09:00 (1) 16:10
28	08:20	09:10 (1)	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:15	08:49 (1) 08:44
	16:58	11 09:21 (1)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	12 09:01 (1) 16:11
29	08:19	09:12 (1)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16	08:51 (1) 08:44
	17:00	6 09:18 (1)		19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	10 09:01 (1) 16:12
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:18	08:52 (1) 08:44
	17:02			19:57	20:54	21:43	22:01	21:29	20:23	19:07	16:58	16:11	8 09:00 (1) 16:12
31	08:16			07:04		05:04		05:37	06:31		07:23		08:44
	17:04			19:58		21:44		21:27	20:21		16:56		16:13
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	233
Total, worst case		290										279	12
Sun reduction		0.24										0.27	0.21
Oper. time red.		1.00										1.00	1.00
Wind dir. red.		0.61										0.61	0.61
Total reduction		0.15										0.16	0.13
Total, real		43										45	2

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IX - H258

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IY - H259

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IZ - H260

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JA - H261

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
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Total, worst case												
Sun reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JB - H262

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JC - H263

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JD - H264

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JE - H265

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JF - H266

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JG - H267

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JH - H268

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JI - H269

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JJ - H270

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JK - H271

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JL - H272

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JM - H273

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JN - H274

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JO - H275

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:22 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JP - H276
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JQ - H277

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:13	07:30 19:00	07:28 16:50	08:22 16:09
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JR - H278

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JS - H279
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Total, worst case												
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	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JT - H280
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JU - H281

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JV - H282

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JW - H283

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JX - H284
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JY - H285

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: JZ - H286

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KA - H287

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KB - H288

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KC - H289

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:05	08:13 16:14	08:44 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KD - H290
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KE - H291

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KF - H292

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours), [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March	April	May	June	July	August	September	October	November	December							
1	08:44	08:14	07:16	07:01	05:52	06:18 (5)	05:03	05:33 (4)	04:59	05:32 (4)	05:39	06:23 (5)	06:33	07:26	07:24	08:19				
	16:15	17:06	18:02	20:00	20:55	27	06:45 (5)	21:45	7	05:40 (4)	22:00	13	05:45 (4)	21:25	26	06:49 (5)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	05:59	05:50	06:16 (5)	05:02	05:33 (4)	05:00	05:33 (4)	05:40	06:23 (5)	06:35	07:28	07:26	08:21				
	16:16	17:08	18:04	20:02	20:57	28	06:44 (5)	21:47	8	05:41 (4)	22:00	13	05:46 (4)	21:23	27	06:50 (5)	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	05:56	05:48	06:14 (5)	05:01	05:32 (4)	05:00	05:33 (4)	05:42	06:22 (5)	06:36	07:30	07:28	08:22				
	16:17	17:10	18:06	20:04	20:59	30	06:44 (5)	21:48	9	05:41 (4)	21:59	12	05:45 (4)	21:21	29	06:51 (5)	20:14	19:00	16:50	16:09
4	08:43	08:08	07:09	05:54	05:46	06:12 (5)	05:00	05:31 (4)	05:01	05:34 (4)	05:44	06:21 (5)	06:38	07:32	07:30	08:24				
	16:18	17:12	18:08	20:06	21:01	32	06:44 (5)	21:49	10	05:41 (4)	21:59	12	05:46 (4)	21:19	31	06:52 (5)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	05:52	05:44	06:10 (5)	04:59	05:31 (4)	05:02	05:35 (4)	05:46	06:21 (5)	06:40	07:33	07:32	08:25				
	16:20	17:14	18:10	20:08	21:03	33	06:43 (5)	21:50	10	05:41 (4)	21:58	11	05:46 (4)	21:17	32	06:53 (5)	20:09	18:55	16:46	16:07
6	08:43	08:05	07:05	05:49	05:42	06:10 (5)	04:59	05:30 (4)	05:03	05:36 (4)	05:47	06:20 (5)	06:42	07:35	07:34	08:26				
	16:21	17:16	18:11	20:09	21:04	34	06:44 (5)	21:51	11	05:41 (4)	21:58	11	05:47 (4)	21:16	32	06:52 (5)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	05:47	05:40	06:11 (5)	04:58	05:30 (4)	05:04	05:37 (4)	05:49	06:20 (5)	06:46	07:37	07:36	08:28				
	16:22	17:18	18:13	20:11	21:06	32	06:43 (5)	21:52	11	05:41 (4)	21:57	10	05:47 (4)	21:14	33	06:53 (5)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	05:44	05:38	06:11 (5)	04:57	05:29 (4)	05:05	05:38 (4)	05:51	06:20 (5)	06:45	07:39	07:38	08:29				
	16:24	17:20	18:15	20:13	21:08	31	06:42 (5)	21:53	12	05:41 (4)	21:56	10	05:48 (4)	21:12	33	06:53 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	05:42	05:36	06:11 (5)	04:57	05:29 (4)	05:06	05:39 (4)	05:52	06:22 (5)	06:47	07:41	07:40	08:30				
	16:25	17:22	18:17	20:15	21:10	30	06:41 (5)	21:54	12	05:41 (4)	21:55	9	05:48 (4)	21:10	31	06:53 (5)	19:59	18:45	16:39	16:06
10	08:40	07:57	06:55	05:40	05:35	06:12 (5)	04:56	05:28 (4)	05:07	05:40 (4)	05:54	06:24 (5)	06:49	07:43	07:42	08:32				
	16:27	17:24	18:19	20:17	21:12	29	06:41 (5)	21:55	12	05:40 (4)	21:55	8	05:48 (4)	21:08	30	06:54 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:53	05:37	05:33	06:13 (5)	04:56	05:28 (4)	05:08	05:41 (4)	05:56	06:25 (5)	06:51	07:44	07:44	08:33				
	16:28	17:26	18:21	20:19	21:13	27	06:40 (5)	21:55	13	05:41 (4)	21:54	8	05:49 (4)	21:06	28	06:53 (5)	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	05:35	05:31	06:13 (5)	04:55	05:28 (4)	05:09	05:42 (4)	05:58	06:27 (5)	06:52	07:46	07:46	08:34				
	16:30	17:28	18:23	20:20	21:15	25	06:39 (5)	21:50	13	05:41 (4)	21:53	7	06:53 (5)	21:03	26	06:53 (5)	19:48	18:34	16:29	16:04
13	08:38	07:51	06:48	05:32	05:29	06:15 (5)	04:55	05:27 (4)	05:11	05:43 (4)	05:59	06:29 (5)	06:54	07:48	07:47	08:35				
	16:31	17:30	18:25	20:22	21:17	23	06:38 (5)	21:57	13	05:40 (4)	21:52	6	05:49 (4)	21:01	24	06:53 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	05:30	05:27	06:16 (5)	04:55	05:27 (4)	05:12	05:44 (4)	06:01	06:30 (5)	06:56	07:50	07:49	08:36				
	16:33	17:32	18:27	20:24	21:18	20	06:36 (5)	21:58	14	05:41 (4)	21:51	5	05:49 (4)	20:59	22	06:52 (5)	19:47	18:34	16:31	16:05
15	08:36	07:47	06:43	05:28	05:26	06:17 (5)	04:55	05:27 (4)	05:13	05:45 (4)	06:03	06:32 (5)	06:58	07:52	07:51	08:37				
	16:35	17:34	18:29	20:26	21:20	17	06:34 (5)	21:58	14	05:41 (4)	21:50	4	05:49 (4)	20:57	20	06:52 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	05:25	05:24	06:19 (5)	04:55	05:27 (4)	05:14	05:47 (4)	06:05	06:33 (5)	06:59	07:54	07:53	08:38				
	16:36	17:36	18:30	20:28	21:22	13	06:32 (5)	21:59	14	05:41 (4)	21:49	3	05:50 (4)	21:05	18	06:51 (5)	19:42	18:29	16:28	16:05
17	08:34	07:43	06:38	05:23	05:22	06:23 (5)	04:54	05:27 (4)	05:16	05:48 (4)	06:06	06:35 (5)	07:01	07:56	07:55	08:38				
	16:38	17:38	18:32	20:30	21:23	7	06:30 (5)	21:59	14	05:41 (4)	21:47	1	05:49 (4)	20:53	15	06:50 (5)	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	05:21	05:21	06:24 (5)	04:54	05:27 (4)	05:17	05:47 (4)	06:08	06:37 (5)	07:03	07:57	07:57	08:39				
	16:40	17:40	18:34	20:32	21:25	22	06:30 (5)	22:00	14	05:41 (4)	21:46	20:51	13	06:50 (5)	19:37	18:24	16:25	16:05		
19	08:32	07:39	06:33	05:18	05:19	06:24 (5)	04:54	05:27 (4)	05:15	05:47 (4)	06:09	06:38 (5)	07:05	07:59	07:59	08:40				
	16:42	17:42	18:36	20:34	21:27	23	06:32 (5)	22:00	14	05:41 (4)	21:45	10	06:48 (5)	21:03	10	06:48 (5)	19:33	18:22	16:22	16:04
20	08:31	07:37	06:31	05:16	05:14	06:24 (5)	04:54	05:27 (4)	05:20	05:47 (4)	06:12	06:40 (5)	07:06	08:01	08:00	08:41				
	16:43	17:44	18:38	20:35	21:28	22	06:30 (5)	22:00	14	05:41 (4)	21:44	20:46	7	06:47 (5)	19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	05:14	05:16	06:39 (5)	05:16	05:27 (4)	05:21	05:46 (4)	06:13	06:42 (5)	07:08	08:03	08:02	08:41				
	16:45	17:46	18:40	20:37	1	06:40 (5)	21:30	22:01	14	05:41 (4)	21:42	20:44	4	06:46 (5)	19:29	18:18	16:21	16:06		
22	08:29	07:32	06:26	05:12	05:15	06:36 (5)	05:15	05:28 (4)	05:23	05:46 (4)	06:15	07:10	08:05	08:04	08:42					
	16:47	17:48	18:42	20:39	4	06:40 (5)	21:31	22:01	14	05:42 (4)	21:41	20:42	19:17	18:15	16:19	16:07				
23	08:27	07:30	06:23	05:09	05:13	06:34 (5)	05:13	05:28 (4)	05:24	05:45 (4)	06:17	07:12	08:07	08:06	08:42					
	16:49	17:50	18:43	20:41	7	06:41 (5)	21:33	22:01	14	05:42 (4)	21:39	20:39	19:24	18:13	16:18	16:07				
24	08:26	07:28	06:21	05:07	05:12	06:32 (5)	05:12	05:28 (4)	05:26	05:46 (4)	06:19	07:14	08:09	08:08	08:43					
	16:51	17:52	18:45	20:43	10	06:42 (5)	21:34	22:01	14	05:42 (4)	21:38	20:37	19:22	18:11	16:17	16:08				
25	08:25	07:25	06:18	05:05	05:11	06:30 (5)	05:11	05:29 (4)	05:27	05:47 (4)	06:21	07:15	07:11	08:09	08:43					
	16:53	17:54	18:47	20:44	13	06:43 (5)	21:36	22:01	14	05:43 (4)	21:36	20:35	19:17	17:09	16:16	16:08				
26	08:23	07:23	06:16	05:03	05:09	06:28 (5)	05:09	05:29 (4)	05:25	05:48 (4)	06:17	07:17	08:13	08:11	08:46					
	16:54	17:55	18:49	20:46	16	06:44 (5)	21:37	1	05:40 (4)	22:01	14	05:43 (4)	05:39	20:32	19:17	17:07	16:15	16:09		
27	08:22	07:21	06:14	05:01	05:08	06:26 (5)	05:08	05:38 (4)	04:57	05:30 (4)	05:31	06:32 (5)	06:24	07:19	07:15	08:13	08:44			
	16:56	17:58	18:51	20:48	18	06:44 (5)	21:39	2	05:40 (4)	22:01	14	05:44 (4)	05:33	10	06:42 (5)	20:30	19:15	17:05	16:14	16:10
28	08:20	07:19	06:11	05:59	06:24 (5)	05:07	05:37 (4)	04:57	05:30 (4)	05:32	06:29 (5)	06:26	07:21	07:17	08:14	08:44				
	16:58	18:00	18:53	20:50	20	06:44 (5)	21:40	3	05:40 (4)	22:01	14	05:44 (4)	21:32	15	06:44 (5)	20:28	19:12	17:02	16:13	16:11
29	08:19	07:09	05:56	06:22 (5)	05:06	05:36 (4)	04:58	05:31 (4)	05:34	06:28 (5)	06:28	07:23	07:18	08:16	08:44					
	17:00	19:55	20:52	23	06:45 (5)	21:41	4	05:40 (4)	22:01	13	05:44 (4)	21:30	18	06:46 (5)	20:25	19:10	17:00	16:12	16:12	
30	08:17	07:06	05:54	06:20 (5)	05:05	05:35 (4)	04:58	05:31 (4)	05:35	06:26 (5)	06:23	07:24	07:20	08:18	08:44					
	17:02	19:56	20:54	25	06:45 (5)	21:43	5	05:40 (4)	22:00	13	05:44 (4)	21:28	21	06:47 (5)	20:29	19:07	16:58	16:11	16:13	
31	08:15	07:04	05:58	06:14	05:04	05:34 (4)	04:58	05:37	05:37	06:25 (5)	06:31	07:22	07:22	08:44						
	17:04	19:58	20:56	21:44	6	05:40 (4)	22:00	21:27	24	06:49 (5)	20:21	16:56	16:14							
Potential sun hours	250	273	367	420	494	459	510	377	231	491	382	328	259	233						
Total, worst case				137	0.35	0.38		0.32	0.32	0.34										
Sun reduction				1.00	1.00	1.00		1.00	1.00	1.00										
Oper. time red.				0.68	0.68	0.68		0.66	0.67	0.68										
Wind dir. red.				0.24	0.26	0.21		0.22	0.22	0.23										
Total reduction				33	118	79		50	113											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KG - H293

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 07:26 (5)	05:52 20:55
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 07:27 (5)	05:50 20:57
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 07:27 (5)	05:48 20:59
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 07:28 (5)	05:46 21:01
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 07:28 (5)	05:44 21:03
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 07:28 (5)	05:42 21:04
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:11 (5) 07:28 (5)	05:40 21:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:08 (5) 07:27 (5)	05:38 21:08
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:06 (5) 07:27 (5)	05:36 21:10
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:03 (5) 07:25 (5)	05:35 21:12
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:01 (5) 07:25 (5)	05:33 21:13
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	07:02 (5) 07:24 (5)	05:31 21:15
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	07:03 (5) 07:22 (5)	05:29 21:17
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	07:04 (5) 07:20 (5)	05:27 21:18
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	07:06 (5) 07:17 (5)	05:26 21:20
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:57
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58		05:04 21:44	05:34 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case				221	56	89
Sun reduction				0.35	0.38	0.32
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.67	0.66
Total reduction				0.24	0.26	0.21
Total, real				53	14	19

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KG - H293

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:32 (3) 21:25	06:33 20:18	07:00 (5) 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00	05:33 (3) 21:23	06:15 (4) 20:16	07:02 (5) 19:02	07:28 16:52	08:21 16:09
3	05:00 21:59	05:33 (3) 21:21	06:12 (4) 20:14	07:04 (5) 19:00	07:30 16:50	08:22 16:09
4	05:01 21:59	05:34 (3) 21:21	06:21 (4) 20:11	07:05 (5) 18:57	07:32 16:48	08:24 16:08
5	05:02 21:58	05:44 21:19	06:23 (4) 20:11	07:07 (5) 18:57	07:33 16:48	08:25 16:08
6	05:03 21:58	05:46 21:17	06:16 (4) 20:09	07:07 (5) 18:55	07:33 16:46	08:25 16:07
7	05:04 21:57	05:47 21:16	06:17 (4) 20:06	07:09 (5) 18:53	07:35 16:45	08:26 16:07
8	05:05 21:56	05:49 21:14	06:25 (4) 20:04	07:24 (5) 18:50	07:36 16:43	08:28 16:06
9	05:06 21:55	05:51 21:12	06:26 (4) 20:01	07:23 (5) 18:50	07:37 16:43	08:29 16:06
10	05:07 21:55	05:52 21:10	06:22 (4) 19:59	07:22 (5) 18:45	07:39 16:39	08:30 16:05
11	05:08 21:54	05:54 21:08	06:24 (4) 19:57	07:22 (5) 18:43	07:40 16:37	08:31 16:05
12	05:09 21:53	05:56 21:06	06:25 (4) 19:54	07:21 (5) 18:41	07:41 16:36	08:32 16:05
13	05:11 21:52	05:58 21:03	06:26 (4) 19:52	07:19 (5) 18:38	07:42 16:34	08:33 16:05
14	05:12 21:51	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
15	05:13 21:50	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
16	05:15 21:49	06:03 20:55	06:58 19:42	07:52 18:29	07:51 16:28	08:37 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21	07:25 (5) 19:07	07:22 16:56	08:19 16:11	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	5	128	156			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.67	0.67			
Total reduction	0.21	0.23	0.22			
Total, real	1	29	34			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KH - H294

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16	07:01	07:25 (5)	05:52	06:18 (4)	05:03	05:34 (3)								
	16:15	17:06	18:02	20:00	9	07:34 (5)	20:55	6	06:24 (4)	21:45	11	05:45 (3)					
2	08:44	08:12	07:14	06:59	07:23 (5)	05:50	06:16 (4)	05:02	05:33 (3)								
	16:16	17:08	18:04	20:02	11	07:34 (5)	20:57	7	06:23 (4)	21:47	12	05:45 (3)					
3	08:44	08:10	07:12	06:56	07:20 (5)	05:48	06:14 (4)	05:01	05:32 (3)								
	16:17	17:10	18:06	20:04	14	07:34 (5)	20:59	8	06:22 (4)	21:48	13	05:45 (3)					
4	08:43	08:09	07:09	06:54	07:18 (5)	05:46	06:12 (4)	05:00	05:31 (3)								
	16:18	17:12	18:08	20:06	16	07:34 (5)	21:01	8	06:20 (4)	21:49	14	05:45 (3)					
5	08:43	08:07	07:07	06:52	07:15 (5)	05:44	06:14 (4)	04:59	05:31 (3)								
	16:20	17:14	18:10	20:08	17	07:32 (5)	21:03	2	06:16 (4)	21:50	15	05:46 (3)					
6	08:43	08:05	07:05	06:49	07:13 (5)	05:42	04:59	05:30 (3)									
	16:21	17:16	18:11	20:09	19	07:32 (5)	21:04	15	05:45 (3)								
7	08:42	08:03	07:02	06:47	07:11 (5)	05:40	04:58	05:30 (3)									
	16:22	17:18	18:13	20:11	20	07:31 (5)	21:06	16	05:46 (3)								
8	08:42	08:01	07:00	06:44	07:10 (5)	05:38	04:57	05:29 (3)									
	16:24	17:20	18:15	20:13	20	07:30 (5)	21:08	17	05:46 (3)								
9	08:41	07:59	06:57	06:42	07:11 (5)	05:36	04:57	05:29 (3)									
	16:25	17:22	18:17	20:15	17	07:28 (5)	21:10	17	05:46 (3)								
10	08:40	07:57	06:55	06:40	07:12 (5)	05:35	04:56	05:28 (3)									
	16:27	17:24	18:19	20:17	13	07:25 (5)	21:12	18	05:46 (3)								
11	08:40	07:55	06:53	06:37	07:15 (5)	05:33	04:56	05:28 (3)									
	16:28	17:26	18:21	20:19	7	07:22 (5)	21:13	18	05:46 (3)								
12	08:39	07:53	06:50	06:35	05:31	04:56	05:28 (3)										
	16:30	17:28	18:23	20:21	21:15	21:56	18	05:46 (3)									
13	08:38	07:51	06:48	06:32	05:29	04:55	05:27 (3)										
	16:31	17:30	18:25	20:22	21:17	21:57	19	05:46 (3)									
14	08:37	07:49	06:45	06:30	05:27	04:55	05:27 (3)										
	16:33	17:32	18:27	20:24	21:18	21:58	19	05:46 (3)									
15	08:36	07:47	06:43	06:28	05:26	04:55	05:27 (3)										
	16:35	17:34	18:29	20:26	21:20	21:58	19	05:46 (3)									
16	08:35	07:45	06:41	06:25	05:24	04:55	05:27 (3)										
	16:36	17:36	18:30	20:28	21:22	21:59	19	05:46 (3)									
17	08:34	07:43	06:38	06:23	05:22	04:54	05:27 (3)										
	16:38	17:38	18:32	20:30	21:23	21:59	20	05:47 (3)									
18	08:33	07:41	06:36	06:21	05:21	04:54	05:27 (3)										
	16:40	17:40	18:34	20:32	21:25	22:00	20	05:47 (3)									
19	08:32	07:39	06:33	06:19	05:19	04:54	05:27 (3)										
	16:42	17:42	18:36	20:33	21:27	22:00	20	05:47 (3)									
20	08:31	07:37	06:31	06:16	05:18	04:55	05:27 (3)										
	16:43	17:44	18:38	20:35	21:28	22:00	20	05:47 (3)									
21	08:30	07:34	06:28	06:14	05:16	04:55	05:27 (3)										
	16:45	17:46	18:40	20:37	21:30	22:01	20	05:47 (3)									
22	08:29	07:32	06:26	06:12	05:15	04:55	05:28 (3)										
	16:47	17:48	18:42	20:39	21:31	22:01	20	05:48 (3)									
23	08:27	07:30	06:23	06:09	05:13	04:55	05:28 (3)										
	16:49	17:50	18:44	20:41	21:33	22:01	20	05:48 (3)									
24	08:26	07:28	06:21	06:07	05:12	04:55	05:28 (3)										
	16:51	17:52	18:45	20:43	21:34	1	05:42 (3)	22:01	20	05:48 (3)							
25	08:25	07:25	06:18	06:05	05:11	04:56	05:29 (3)										
	16:53	17:54	18:47	20:44	21:36	3	05:43 (3)	22:01	20	05:49 (3)							
26	08:23	07:23	06:16	06:03	05:10	04:56	05:29 (3)										
	16:54	17:56	18:49	20:46	21:37	4	05:43 (3)	22:01	19	05:48 (3)							
27	08:22	07:21	06:14	06:01	05:08	04:57	05:30 (3)										
	16:56	17:58	18:51	20:48	21:39	6	05:44 (3)	22:01	19	05:49 (3)							
28	08:20	07:19	06:11	05:59	06:24 (4)	05:07	05:37 (3)	04:57	05:30 (3)								
	16:58	18:00	18:53	20:50	2	06:26 (4)	21:40	7	05:44 (3)	22:01	19	05:49 (3)					
29	08:19	07:09	05:56	05:56	06:22 (4)	05:06	05:36 (3)	04:58	05:31 (3)								
	17:00	19:55	20:52	4	06:26 (4)	21:41	8	05:44 (3)	22:01	19	05:50 (3)						
30	08:17	07:06	05:54	05:54	06:20 (4)	05:05	05:35 (3)	04:58	05:31 (3)								
	17:02	19:56	3	07:33 (5)	20:54	5	06:25 (4)	21:43	9	05:44 (3)	22:00	18	05:49 (3)				
31	08:15	07:04	05:54	05:54	07:27 (5)	05:04	05:34 (3)										
	17:04	19:58	6	07:33 (5)	21:44	10	05:44 (3)										
Potential sun hours	250	273	367	420		494		510									
Total, worst case			9	174		79		534									
Sun reduction			0.27	0.35		0.38		0.32									
Oper. time red.			1.00	1.00		1.00		1.00									
Wind dir. red.			0.68	0.68		0.66		0.66									
Total reduction			0.18	0.24		0.25		0.21									
Total, real			2	41		20		112									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KH - H294

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 18	05:32 (3) 05:50 (3) 21:25	05:39 21:25	06:33 20:18 7	07:14 (5) 07:21 (5) 19:05	07:24 16:54 16:10
2	05:00 22:00 18	05:33 (3) 05:51 (3) 21:23	05:40 21:23	06:35 20:16 13	07:11 (5) 07:24 (5) 19:02	07:26 16:52 16:09
3	05:00 21:59 17	05:33 (3) 05:50 (3) 21:21	05:42 21:21	06:37 20:14 17	07:09 (5) 07:26 (5) 19:00	07:28 16:50 16:09
4	05:01 21:59 17	05:34 (3) 05:51 (3) 21:19	05:44 21:19	06:38 20:11 20	07:07 (5) 07:27 (5) 18:57	07:30 16:48 16:08
5	05:02 21:58 16	05:35 (3) 05:51 (3) 21:17	05:46 21:17	06:40 20:09 21	07:07 (5) 07:28 (5) 18:55	07:32 16:46 16:07
6	05:03 21:58 16	05:36 (3) 05:52 (3) 21:16	05:47 21:16	06:42 20:06 19	07:09 (5) 07:28 (5) 18:53	07:34 16:45 16:07
7	05:04 21:57 15	05:37 (3) 05:52 (3) 21:14	05:49 21:14	06:44 20:04 18	07:10 (5) 07:28 (5) 18:50	07:36 16:43 16:06
8	05:05 21:56 14	05:38 (3) 05:52 (3) 21:12	05:51 21:12	06:45 20:01 16	07:12 (5) 07:28 (5) 18:48	07:38 16:41 16:06
9	05:06 21:55 14	05:39 (3) 05:53 (3) 21:10	05:52 21:10	06:47 19:59 14	07:14 (5) 07:28 (5) 18:45	07:41 16:39 16:06
10	05:07 21:55 13	05:40 (3) 05:53 (3) 21:08	05:54 21:08	06:49 19:57 12	07:16 (5) 07:28 (5) 18:43	07:42 16:37 16:05
11	05:08 21:54 12	05:41 (3) 05:53 (3) 21:06	05:56 21:06	06:51 19:54 9	07:17 (5) 07:26 (5) 18:41	07:44 16:36 16:05
12	05:10 21:53 11	05:42 (3) 05:53 (3) 21:03	05:58 21:03	06:52 19:52 6	07:19 (5) 07:25 (5) 18:38	07:46 16:34 16:05
13	05:11 21:52 10	05:43 (3) 05:53 (3) 21:01	05:59 21:01	06:54 19:49 5	07:21 (5) 07:25 (5) 18:36	07:47 16:32 16:05
14	05:12 21:51 9	05:44 (3) 05:53 (3) 20:59	06:01 20:59	06:56 19:47 3	07:50 18:34 16:31	07:49 16:05
15	05:13 21:50 8	05:45 (3) 05:53 (3) 20:57	06:03 20:57	06:58 19:44 2	07:52 18:31 16:29	07:51 16:05
16	05:15 21:49 6	05:47 (3) 05:53 (3) 20:55	06:05 20:55	06:59 19:42	07:54 18:29 16:28	07:53 16:05
17	05:16 21:47 5	05:48 (3) 05:53 (3) 20:53	06:06 20:53	07:01 19:39	07:56 18:27 16:26	07:55 16:05
18	05:17 21:46 4	05:49 (3) 05:53 (3) 20:51	06:08 20:51	07:03 19:37	07:57 18:24 16:25	07:57 16:05
19	05:19 21:45 2	05:50 (3) 05:52 (3) 20:48	06:10 20:48	07:05 19:34	07:59 18:22 16:23	07:59 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20 16:22	08:01 16:22	08:41 16:06
21	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18 16:21	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15 16:19	08:04 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13 16:18	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11 16:17	08:08 16:17	08:43 16:08
25	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09 16:16	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07 16:15	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05 16:14	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02 16:13	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00 16:12	08:16 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58 16:11	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	225	45	176			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.67	0.68			
Total reduction	0.21	0.23	0.22			
Total, real	48	10	38			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KI - H295

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16	07:01	07:25 (5)	05:52	05:03	05:34 (3)	07:01	07:25 (5)	05:52	05:03	05:34 (3)		05:03	05:34 (3)	
	16:15	17:06	18:02	20:00	8	07:33 (5)	20:55	21:45	16	07:33 (5)	20:55	21:45	16	05:50 (3)	05:50 (3)	05:50 (3)	
2	08:44	08:12	07:14	06:59	07:23 (5)	05:50	05:02	05:33 (3)		07:23 (5)	05:50	05:02	05:33 (3)		05:02	05:33 (3)	
	16:16	17:08	18:04	20:02	11	07:34 (5)	20:57	21:47	17	07:34 (5)	20:57	21:47	17	05:50 (3)	05:50 (3)	05:50 (3)	
3	08:44	08:10	07:12	06:56	07:20 (5)	05:48	05:01	05:32 (3)		07:20 (5)	05:48	05:01	05:32 (3)		05:01	05:32 (3)	
	16:17	17:10	18:06	20:04	13	07:33 (5)	20:59	21:48	17	07:33 (5)	20:59	21:48	17	05:49 (3)	05:49 (3)	05:49 (3)	
4	08:43	08:09	07:09	06:54	07:18 (5)	05:46	05:00	05:31 (3)		07:18 (5)	05:46	05:00	05:31 (3)		05:00	05:31 (3)	
	16:18	17:12	18:08	20:06	15	07:33 (5)	21:01	21:49	18	07:33 (5)	21:01	21:49	18	05:49 (3)	05:49 (3)	05:49 (3)	
5	08:43	08:07	07:07	06:52	07:15 (5)	05:44	04:59	05:31 (3)		07:15 (5)	05:44	04:59	05:31 (3)		04:59	05:31 (3)	
	16:20	17:14	18:10	20:08	16	07:31 (5)	21:03	21:50	18	07:31 (5)	21:03	21:50	18	05:49 (3)	05:49 (3)	05:49 (3)	
6	08:43	08:05	07:05	06:49	07:13 (5)	05:42	04:59	05:30 (3)		07:13 (5)	05:42	04:59	05:30 (3)		04:59	05:30 (3)	
	16:21	17:16	18:11	20:09	18	07:31 (5)	21:04	21:51	19	07:31 (5)	21:04	21:51	19	05:49 (3)	05:49 (3)	05:49 (3)	
7	08:42	08:03	07:02	06:47	07:12 (5)	05:40	04:58	05:30 (3)		07:12 (5)	05:40	04:58	05:30 (3)		04:58	05:30 (3)	
	16:22	17:18	18:13	20:11	18	07:30 (5)	21:06	21:52	19	07:30 (5)	21:06	21:52	19	05:49 (3)	05:49 (3)	05:49 (3)	
8	08:42	08:01	07:00	06:44	07:12 (5)	05:38	04:57	05:30 (3)		07:12 (5)	05:38	04:57	05:30 (3)		04:57	05:30 (3)	
	16:24	17:20	18:15	20:13	15	07:27 (5)	21:08	21:53	18	07:27 (5)	21:08	21:53	18	05:48 (3)	05:48 (3)	05:48 (3)	
9	08:41	07:59	06:57	06:42	07:14 (5)	05:36	04:57	05:31 (3)		07:14 (5)	05:36	04:57	05:31 (3)		04:57	05:31 (3)	
	16:25	17:22	18:17	20:15	11	07:25 (5)	21:10	21:54	17	07:25 (5)	21:10	21:54	17	05:48 (3)	05:48 (3)	05:48 (3)	
10	08:40	07:57	06:55	06:40		05:35	04:56	05:31 (3)			05:35	04:56	05:31 (3)		04:56	05:31 (3)	
	16:27	17:24	18:19	20:17		21:12	21:55	21:55	17		21:12	21:55	17	05:48 (3)	05:48 (3)	05:48 (3)	
11	08:40	07:55	06:53	06:37		05:33	04:56	05:32 (3)			05:33	04:56	05:32 (3)		04:56	05:32 (3)	
	16:28	17:26	18:21	20:19		21:13	21:55	21:55	16		21:13	21:55	16	05:48 (3)	05:48 (3)	05:48 (3)	
12	08:39	07:53	06:50	06:35		05:31	04:56	05:33 (3)			05:31	04:56	05:33 (3)		04:56	05:33 (3)	
	16:30	17:28	18:23	20:21		21:15	21:56	21:56	15		21:15	21:56	15	05:48 (3)	05:48 (3)	05:48 (3)	
13	08:38	07:51	06:48	06:32		05:29	04:55	05:33 (3)			05:29	04:55	05:33 (3)		04:55	05:33 (3)	
	16:31	17:30	18:25	20:22		21:17	21:57	21:57	14		21:17	21:57	14	05:47 (3)	05:47 (3)	05:47 (3)	
14	08:37	07:49	06:45	06:30		05:27	04:55	05:34 (3)			05:27	04:55	05:34 (3)		04:55	05:34 (3)	
	16:33	17:32	18:27	20:24		21:18	21:58	21:58	13		21:18	21:58	13	05:47 (3)	05:47 (3)	05:47 (3)	
15	08:36	07:47	06:43	06:28		05:26	04:55	05:34 (3)			05:26	04:55	05:34 (3)		04:55	05:34 (3)	
	16:35	17:34	18:29	20:26		21:20	21:58	21:58	13		21:20	21:58	13	05:47 (3)	05:47 (3)	05:47 (3)	
16	08:35	07:45	06:41	06:25		05:24	04:55	05:35 (3)			05:24	04:55	05:35 (3)		04:55	05:35 (3)	
	16:36	17:36	18:30	20:28		21:22	21:59	21:59	12		21:22	21:59	12	05:47 (3)	05:47 (3)	05:47 (3)	
17	08:34	07:43	06:38	06:23		05:22	04:54	05:35 (3)			05:22	04:54	05:35 (3)		04:54	05:35 (3)	
	16:38	17:38	18:32	20:30		21:23	21:59	21:59	12		21:23	21:59	12	05:47 (3)	05:47 (3)	05:47 (3)	
18	08:33	07:41	06:36	06:21		05:21	04:54	05:36 (3)			05:21	04:54	05:36 (3)		04:54	05:36 (3)	
	16:40	17:40	18:34	20:32		21:25	22:00	22:00	11		21:25	22:00	11	05:47 (3)	05:47 (3)	05:47 (3)	
19	08:32	07:39	06:33	06:19		05:19	04:54	05:36 (3)			05:19	04:54	05:36 (3)		04:54	05:36 (3)	
	16:42	17:42	18:36	20:33		21:27	22:00	22:00	11		21:27	22:00	11	05:47 (3)	05:47 (3)	05:47 (3)	
20	08:31	07:37	06:31	06:16		05:18	04:55	05:36 (3)			05:18	04:55	05:36 (3)		04:55	05:36 (3)	
	16:43	17:44	18:38	20:35		21:28	22:00	22:00	11		21:28	22:00	11	05:47 (3)	05:47 (3)	05:47 (3)	
21	08:30	07:34	06:28	06:14		05:16	04:55	05:37 (3)			05:16	04:55	05:37 (3)		04:55	05:37 (3)	
	16:45	17:46	18:40	20:37		21:30	22:01	22:01	11		21:30	22:01	11	05:48 (3)	05:48 (3)	05:48 (3)	
22	08:29	07:32	06:26	06:12		05:15	04:54	05:37 (3)			05:15	04:54	05:37 (3)		04:54	05:37 (3)	
	16:47	17:48	18:42	20:39		21:31	22:01	22:01	11		21:31	22:01	11	05:48 (3)	05:48 (3)	05:48 (3)	
23	08:27	07:30	06:23	06:09		05:13	04:53	05:37 (3)			05:13	04:53	05:37 (3)		04:53	05:37 (3)	
	16:49	17:50	18:44	20:41		21:33	22:01	22:01	11		21:33	22:01	11	05:48 (3)	05:48 (3)	05:48 (3)	
24	08:26	07:28	06:21	06:07		05:12	04:55	05:37 (3)			05:12	04:55	05:37 (3)		04:55	05:37 (3)	
	16:51	17:52	18:45	20:43		21:34	22:01	22:01	11		21:34	22:01	11	05:48 (3)	05:48 (3)	05:48 (3)	
25	08:25	07:25	06:18	06:05		05:11	04:54	05:37 (3)			05:11	04:54	05:37 (3)		04:54	05:37 (3)	
	16:53	17:54	18:47	20:44		21:36	22:01	22:01	12		21:36	22:01	12	05:49 (3)	05:49 (3)	05:49 (3)	
26	08:23	07:23	06:16	06:03		05:10	04:53	05:37 (3)			05:10	04:53	05:37 (3)		04:53	05:37 (3)	
	16:54	17:56	18:49	20:46		21:37	22:01	22:01	12		21:37	22:01	12	05:49 (3)	05:49 (3)	05:49 (3)	
27	08:22	07:21	06:14	06:01		05:08	04:57	05:37 (3)			05:08	04:57	05:37 (3)		04:57	05:37 (3)	
	16:56	17:58	18:51	20:48		21:39	22:01	22:01	13		21:39	22:01	13	05:50 (3)	05:50 (3)	05:50 (3)	
28	08:20	07:19	06:11	05:59		05:07	04:57	05:37 (3)			05:07	04:57	05:37 (3)		04:57	05:37 (3)	
	16:58	18:00	18:53	20:50		21:40	22:01	22:01	13		21:40	22:01	13	05:50 (3)	05:50 (3)	05:50 (3)	
29	08:19		07:09	05:56		05:06	04:58	05:37 (3)			05:06	04:58	05:37 (3)		04:58	05:37 (3)	
	17:00		19:55	20:52		21:41	22:01	22:01	14		21:41	22:01	14	05:51 (3)	05:51 (3)	05:51 (3)	
30	08:17		07:06	05:54		05:05	04:58	05:36 (3)			05:05	04:58	05:36 (3)		04:58	05:36 (3)	
	17:02		19:56	20:54		21:43	22:00	22:00	15		21:43	22:00	15	05:51 (3)	05:51 (3)	05:51 (3)	
31	08:15		07:04			05:04	05:34 (3)				05:04	05:34 (3)					
	17:04		19:58	6	07:33 (5)	21:44	15	05:49 (3)			21:44	15	05:49 (3)				
Potential sun hours	250	273	367	420		494	510				494	510					
Total, worst case				9	125		115	427									
Sun reduction				0.27	0.35		0.38	0.32									
Oper. time red.				1.00	1.00		1.00	1.00									
Wind dir. red.				0.68	0.68		0.66	0.66									
Total reduction				0.18	0.24		0.25	0.21									
Total, real				2	30		29	89									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KI - H295

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 15	05:37 (3) 05:52 (3) 21:25	05:39 21:25 20:18	06:33 20:18	07:26 19:05 16:54	08:19 16:10
2	05:00 22:00 16	05:37 (3) 05:53 (3) 21:23	05:40 21:23 20:16	06:35 20:16	07:28 19:02 16:52	08:21 16:09
3	05:00 21:59 17	05:36 (3) 05:53 (3) 21:21	05:42 21:21 20:14	06:37 20:14	07:30 19:00 16:50	08:22 16:09
4	05:01 21:59 17	05:36 (3) 05:53 (3) 21:19	05:44 21:19 20:11	06:38 20:11	07:32 18:57 16:48	08:24 16:08
5	05:02 21:58 18	05:36 (3) 05:54 (3) 21:17	05:46 21:17 20:09	06:40 20:09	07:33 18:55 16:46	08:25 16:07
6	05:03 21:58 19	05:36 (3) 05:55 (3) 21:16	05:47 21:16 20:06	06:42 20:06	07:35 18:53 16:45	08:26 16:07
7	05:04 21:57 18	05:37 (3) 05:55 (3) 21:14	05:49 21:14 20:04	06:44 20:04	07:37 18:50 16:43	08:28 16:06
8	05:05 21:56 18	05:38 (3) 05:56 (3) 21:12	05:51 21:12 20:01	06:45 20:01	07:39 18:48 16:41	08:29 16:06
9	05:06 21:55 17	05:39 (3) 05:56 (3) 21:10	05:52 21:10 19:59	06:47 19:59	07:41 18:45 16:39	08:30 16:06
10	05:07 21:55 17	05:40 (3) 05:57 (3) 21:08	05:54 21:08 19:57	06:49 19:57	07:43 18:43 16:37	08:32 16:05
11	05:08 21:54 16	05:41 (3) 05:57 (3) 21:06	05:56 21:06 19:54	06:51 19:54	07:44 18:41 16:36	08:33 16:05
12	05:10 21:53 16	05:42 (3) 05:58 (3) 21:04	05:58 21:04 19:52	06:52 19:52	07:46 18:38 16:34	08:34 16:05
13	05:11 21:52 15	05:43 (3) 05:58 (3) 21:01	05:59 21:01 19:49	06:54 19:49	07:48 18:36 16:32	08:35 16:05
14	05:12 21:51 14	05:44 (3) 05:58 (3) 20:59	06:01 20:59 19:47	06:56 19:47	07:50 18:34 16:31	08:36 16:05
15	05:13 21:50 13	05:45 (3) 05:58 (3) 20:57	06:03 20:57 19:44	06:58 19:44	07:52 18:31 16:29	08:37 16:05
16	05:15 21:49 12	05:47 (3) 05:59 (3) 20:55	06:05 20:55 19:42	06:59 19:42	07:54 18:29 16:28	08:38 16:05
17	05:16 21:47 11	05:48 (3) 05:59 (3) 20:53	06:06 20:53 19:39	07:01 19:39	07:56 18:27 16:26	08:39 16:05
18	05:17 21:46 10	05:49 (3) 05:59 (3) 20:51	06:08 20:51 19:37	07:03 19:37	07:57 18:24 16:25	08:39 16:05
19	05:19 21:45 9	05:51 (3) 06:00 (3) 20:48	07:05 20:48 19:34	07:05 19:34	07:59 18:22 16:23	08:40 16:05
20	05:20 21:44 8	05:52 (3) 06:00 (3) 20:46	07:07 20:46 19:32	07:07 19:32	08:01 18:20 16:22	08:41 16:06
21	05:21 21:42 6	05:53 (3) 05:59 (3) 20:44	07:08 20:44 19:29	07:08 19:29	08:03 18:18 16:21	08:41 16:06
22	05:23 21:41 5	05:55 (3) 06:00 (3) 20:42	07:10 20:42 19:27	07:10 19:27	08:05 18:15 16:19	08:42 16:07
23	05:24 21:39 3	05:56 (3) 05:59 (3) 20:39	07:12 20:39 19:24	07:12 19:24	08:07 18:13 16:18	08:42 16:07
24	05:26 21:38 2	05:57 (3) 05:59 (3) 20:37	07:14 20:37 19:22	07:14 19:22	08:09 18:11 16:17	08:43 16:08
25	05:28 21:36 1	06:01 (3) 06:21 20:35	07:16 20:35 19:19	07:16 19:19	08:11 17:09 16:16	08:44 16:08
26	05:29 21:35 1	06:02 (3) 06:22 20:33	07:17 20:33 19:17	07:17 19:17	08:11 17:07 16:15	08:43 16:09
27	05:31 21:33 1	06:04 (3) 06:24 20:30	07:19 20:30 19:15	07:19 19:15	08:13 17:05 16:14	08:44 16:10
28	05:32 21:32 1	06:06 (3) 06:26 20:28	07:21 20:28 19:12	07:21 19:12	08:14 17:02 16:13	08:44 16:11
29	05:34 21:30 1	06:08 (3) 06:28 20:25	07:23 20:25 19:10	07:23 19:10	08:16 17:00 16:12	08:44 16:12
30	05:35 21:28 1	06:09 (3) 06:29 20:23	07:24 20:23 19:07	07:24 19:07	08:18 16:58 16:11	08:44 16:13
31	05:37 21:27 1	06:31 20:21	07:26 19:07	07:26 16:56	08:19 16:56	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	312		137			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	66		30			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KJ - H296
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:09 (1) 06:13 (1)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:11 (1) 06:13 (1)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09	
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08	
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07	
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06	
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06	
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06	
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05	
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	06:00 (1) 06:03 (1)	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	05:58 (1) 06:03 (1)	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	05:57 (1) 06:03 (1)	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	05:55 (1) 06:03 (1)	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	05:54 (1) 06:04 (1)	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	05:52 (1) 06:03 (1)	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	05:51 (1) 06:03 (1)	04:55 21:59	05:16 21:48	06:07 2 06:04 (1)	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	05:49 (1) 06:03 (1)	04:54 22:00	05:17 21:46	06:08 8 06:07 (1)	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	05:48 (1) 06:03 (1)	04:54 22:00	05:19 21:45	06:10 11 06:09 (1)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:46 (1) 06:02 (1)	04:55 22:00	05:20 21:44	06:12 13 06:10 (1)	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:45 (1) 06:02 (1)	04:55 22:01	05:22 21:42	06:14 14 06:10 (1)	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	05:46 (1) 06:01 (1)	04:55 22:01	05:23 21:41	06:15 16 06:12 (1)	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	05:47 (1) 06:01 (1)	04:55 22:01	05:24 21:40	06:17 16 06:12 (1)	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	05:47 (1) 05:59 (1)	04:55 22:01	05:26 21:38	06:19 15 06:12 (1)	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	05:49 (1) 05:58 (1)	04:56 22:01	05:28 21:37	06:21 14 06:13 (1)	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	05:51 (1) 05:56 (1)	04:56 22:01	05:29 21:35	06:22 13 06:13 (1)	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	05:32 12 06:14 (1)	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	05:32 11 06:14 (1)	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	05:34 9 06:14 (1)	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	05:36 7 06:13 (1)	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:08 (1) 6 06:14 (1)	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233
Total, worst case					172			167	6				
Sun reduction					0.38			0.32	0.34				
Oper. time red.					1.00			1.00	1.00				
Wind dir. red.					0.66			0.66	0.66				
Total reduction					0.25			0.21	0.23				
Total, real					43			36	1				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KK - H297

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:09 (1) 20:18	06:33 19:05	07:26 16:54	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:11 (1) 20:16	06:35 19:02	07:28 16:52	07:26 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:12 (1) 20:14	06:37 19:00	07:30 16:50	07:28 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:14 (1) 20:11	06:38 18:57	07:32 16:48	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:16 (1) 20:09	07:33 18:55	07:32 16:47	07:32 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	06:09 (1) 21:51	05:03 21:58	05:47 21:16	06:23 (1) 20:06	07:35 18:53	07:35 16:45	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	06:07 (1) 21:52	05:04 21:57	05:49 21:14	06:17 (1) 20:04	07:36 18:50	07:36 16:43	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	06:05 (1) 21:53	05:05 21:56	05:51 21:12	06:21 (1) 20:01	07:39 18:48	07:38 16:41	07:38 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	06:03 (1) 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	07:40 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	06:02 (1) 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	07:42 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	06:00 (1) 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	07:44 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	05:58 (1) 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	07:46 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	05:57 (1) 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	07:48 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	06:13 (1) 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	07:49 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	05:54 (1) 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	07:51 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	05:52 (1) 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	07:53 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	05:53 (1) 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	07:55 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	05:54 (1) 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	07:57 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	05:55 (1) 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	07:59 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:55 (1) 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:01 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:57 (1) 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:02 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	05:59 (1) 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:04 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	06:06 (1) 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:06 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	06:08 (1) 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:08 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	06:05 (1) 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:09 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	06:04 (1) 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:11 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	06:03 (1) 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:13 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	06:03 (1) 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:15 16:11
29	08:19 17:00	07:09 19:00	05:56 20:52	05:06 21:42	05:06 21:42	06:05 (1) 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:16 16:12
30	08:17 17:02	07:06 19:07	05:54 20:54	05:05 21:43	05:05 21:43	06:06 (1) 22:01	05:36 21:28	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:18 16:13
31	08:15 17:04	07:04 19:08	05:04 20:58	05:04 21:44	05:04 21:44	06:08 (1) 22:01	05:37 21:27	06:31 20:21	07:22 16:56	07:22 16:56	08:19 16:14	08:19 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					216		160	59				
Sun reduction					0.38		0.32	0.34				
Oper. time red.					1.00		1.00	1.00				
Wind dir. red.					0.67		0.67	0.67				
Total reduction					0.25		0.22	0.23				
Total, real					55		35	13				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KL - H298
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:09 (1)	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20	06:29 (1)	20:18	19:05	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:41	06:11 (1)	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	18	06:29 (1)	20:16	19:02	16:52
3	08:44	08:10	07:12	06:57	05:48	05:01	05:01	05:42	06:12 (1)	06:37	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	17	06:29 (1)	20:14	19:00	16:50
4	08:43	08:09	07:09	06:54	05:46	05:01	05:01	05:44	06:14 (1)	06:38	07:32	07:30	08:24
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	15	06:29 (1)	20:11	18:57	16:48
5	08:43	08:07	07:07	06:52	05:44	05:02	05:02	05:46	06:16 (1)	06:40	07:33	07:32	08:25
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	14	06:30 (1)	20:09	18:55	16:47
6	08:43	08:05	07:05	06:49	05:42	05:03	05:03	05:47	06:17 (1)	06:42	07:35	07:34	08:27
	16:21	17:16	18:12	20:09	21:05	21:51	21:58	21:16	12	06:29 (1)	20:06	18:53	16:45
7	08:42	08:03	07:02	06:47	05:40	05:04	05:04	05:49	06:19 (1)	06:44	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	10	06:29 (1)	20:04	18:50	16:43
8	08:42	08:01	07:00	06:44	05:38	05:05	05:05	05:51	06:20 (1)	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	7	06:27 (1)	20:01	18:48	16:41
9	08:41	07:59	06:58	06:42	05:36	05:06	05:06	05:52	06:22 (1)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	5	06:27 (1)	19:59	18:45	16:39
10	08:41	07:57	06:55	06:40	05:35	05:07	05:07	05:54	06:24 (1)	06:49	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	2	06:26 (1)	19:57	18:43	16:37
11	08:40	07:55	06:53	06:37	05:33	05:08	05:08	05:56		06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06		19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	05:58 (1)	05:56	05:58		06:52	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04		19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29	05:58 (1)	05:55	05:59		06:54	07:48	07:48	08:35
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:01		19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27	05:59 (1)	05:55	05:12		06:01	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59		19:47	18:34	16:31	16:05
15	08:37	07:47	06:43	06:28	05:26	06:00 (1)	05:55	05:13		06:03	07:52	07:51	08:37
	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57		19:44	18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24	06:00 (1)	05:55	05:15		06:05	07:54	07:53	08:38
	16:36	17:36	18:31	20:28	21:22	21:59	21:49	20:55		19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22	06:02 (1)	05:54	05:16		06:06	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53		19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21	06:02 (1)	05:54	05:17		06:08	07:58	07:57	08:39
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51		19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19	06:05 (1)	05:54	05:19		06:10	07:59	07:59	08:40
	16:42	17:42	18:36	20:34	21:27	22:00	21:45	20:49		19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	06:16	05:18	04:55	05:20	06:12		07:07	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46		19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	04:55	05:22	06:14		07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44		19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15		07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42		19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13	04:55	05:24	06:17		07:12	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:39		19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19		07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	2	06:19 (1)	06:37	19:22	18:11	16:17
25	08:25	07:26	06:19	06:05	05:11	04:56	05:28	06:21		06:21	07:15	07:11	08:09
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	9	06:23 (1)	06:35	19:20	17:09	16:16
26	08:23	07:23	06:16	06:03	05:10	04:56	05:29	06:22		06:22	07:17	07:13	08:11
	16:55	17:56	18:49	20:46	21:37	22:01	21:35	12	06:24 (1)	06:33	19:17	17:07	16:15
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24		06:24	07:19	07:15	08:13
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	15	06:26 (1)	06:30	19:15	17:05	16:14
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26		06:26	07:21	07:17	08:15
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	17	06:27 (1)	06:28	19:12	17:02	16:13
29	08:19		07:09	05:56	05:06	04:58	05:34	06:10		06:28	07:23	07:19	08:16
	17:00		19:55	20:52	21:42	22:01	21:30	18	06:28 (1)	06:26	19:10	17:00	16:12
30	08:17		07:06	05:54	05:05	04:58	05:36	06:09		06:29	07:24	07:21	08:18
	17:02		19:57	20:54	21:43	22:00	21:28	19	06:28 (1)	06:23	19:07	16:58	16:11
31	08:15		07:04		05:04		05:37	06:09		06:31		07:22	08:14
	17:04		19:58		21:44		21:27	20	06:29 (1)	06:21		16:56	16:14
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233
Total, worst case					228			112		120			
Sun reduction					0.38			0.32		0.34			
Oper. time red.					1.00			1.00		1.00			
Wind dir. red.					0.67			0.67		0.67			
Total reduction					0.26			0.22		0.23			
Total, real					58			24		27			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KM - H299

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	06:27 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	18	06:45 (1)	21:45	22:00	21:25	20:18	19:05	16:54
2	08:44	08:12	07:14	06:59	05:50		06:27 (1)	05:02	05:00	05:40	06:35	07:28	07:26
	16:16	17:08	18:04	20:02	20:57	17	06:44 (1)	21:47	22:00	21:23	20:16	19:02	16:52
3	08:44	08:10	07:12	06:57	05:48		06:29 (1)	05:01	05:00	05:42	06:37	07:30	07:28
	16:17	17:10	18:06	20:04	20:59	13	06:42 (1)	21:48	21:59	21:21	20:14	19:00	16:50
4	08:43	08:09	07:09	06:54	05:46		06:30 (1)	05:00	05:01	05:44	06:38	07:32	07:30
	16:18	17:12	18:08	20:06	21:01	10	06:40 (1)	21:49	21:59	21:19	20:11	18:57	16:48
5	08:43	08:07	07:07	06:52	05:44			04:59	05:02	05:46	06:40	07:33	07:32
	16:20	17:14	18:10	20:08	21:03			21:50	21:58	21:18	20:09	18:55	16:47
6	08:43	08:05	07:05	06:49	05:42			04:59	05:03	05:47	06:42	07:35	07:34
	16:21	17:16	18:12	20:09	21:05			21:51	21:58	21:16	20:06	18:53	16:45
7	08:42	08:03	07:02	06:47	05:40			04:58	05:04	05:49	06:44	07:37	07:36
	16:22	17:18	18:13	20:11	21:06			21:52	21:57	21:14	20:04	18:50	16:43
8	08:42	08:01	07:00	06:44	05:38			04:57	05:05	05:51	06:42 (1)	06:45	07:39
	16:24	17:20	18:15	20:13	21:08			21:53	21:56	21:12	5	06:47 (1)	20:01
9	08:41	07:59	06:58	06:42	05:36			04:57	05:06	05:52	06:39 (1)	06:47	07:41
	16:25	17:22	18:17	20:15	21:10			21:54	21:56	21:10	11	06:50 (1)	19:59
10	08:41	07:57	06:55	06:40	05:35			04:56	05:07	05:54	06:38 (1)	06:49	07:43
	16:27	17:24	18:19	20:17	21:12			21:55	21:55	21:08	14	06:52 (1)	19:57
11	08:40	07:55	06:53	06:37	05:33			04:56	05:08	05:56	06:36 (1)	06:51	07:44
	16:28	17:26	18:21	20:19	21:13			21:56	21:54	21:06	17	06:53 (1)	19:54
12	08:39	07:53	06:50	06:35	05:31			04:56	05:10	05:58	06:35 (1)	06:52	07:46
	16:30	17:28	18:23	20:21	21:15			21:56	21:53	21:04	19	06:54 (1)	19:52
13	08:38	07:51	06:48	06:33	05:29			04:55	05:11	05:59	06:34 (1)	06:54	07:48
	16:31	17:30	18:25	20:22	21:17			21:57	21:52	21:01	21	06:55 (1)	19:49
14	08:37	07:49	06:45	06:30	05:27			04:55	05:12	06:01	06:33 (1)	06:56	07:50
	16:33	17:32	18:27	20:24	21:19			21:58	21:51	20:59	22	06:55 (1)	19:47
15	08:37	07:47	06:43	06:28	05:26			04:55	05:13	06:03	06:33 (1)	06:58	07:52
	16:35	17:34	18:29	20:26	21:20			21:58	21:50	20:57	22	06:55 (1)	19:44
16	08:36	07:45	06:41	06:25	05:24			04:55	05:15	06:05	06:34 (1)	07:00	07:54
	16:36	17:36	18:31	20:28	21:22			21:59	21:49	20:55	22	06:56 (1)	19:42
17	08:35	07:43	06:38	06:23	05:22			04:54	05:16	06:06	06:35 (1)	07:01	07:56
	16:38	17:38	18:32	20:30	21:24			21:59	21:48	20:53	20	06:55 (1)	19:39
18	08:33	07:41	06:36	06:21	05:21			04:54	05:17	06:08	06:37 (1)	07:03	07:58
	16:40	17:40	18:34	20:32	21:25			22:00	21:46	20:51	18	06:55 (1)	19:37
19	08:32	07:39	06:33	06:19	05:19			04:54	05:19	06:10	06:39 (1)	07:05	07:59
	16:42	17:42	18:36	20:34	2	06:43 (1)	21:27	22:00	21:45	20:49	16	06:55 (1)	19:34
20	08:31	07:37	06:31	06:16	05:18			04:55	05:20	06:12	06:40 (1)	07:07	08:01
	16:43	17:44	18:38	20:35	6	06:47 (1)	21:28	22:00	21:44	20:46	14	06:54 (1)	19:32
21	08:30	07:34	06:28	06:14	05:16			04:55	05:21	06:14	06:42 (1)	07:08	08:03
	16:45	17:46	18:40	20:37	9	06:48 (1)	21:30	22:01	21:42	20:44	11	06:53 (1)	19:29
22	08:29	07:32	06:26	06:12	05:15			04:55	05:23	06:15	06:44 (1)	07:10	08:05
	16:47	17:48	18:42	20:39	11	06:47 (1)	21:32	22:01	21:41	20:42	8	06:52 (1)	19:27
23	08:27	07:30	06:23	06:10	05:13			04:55	05:24	06:17	06:45 (1)	07:12	08:07
	16:49	17:50	18:44	20:41	14	06:48 (1)	21:33	22:01	21:40	20:39	5	06:50 (1)	19:24
24	08:26	07:28	06:21	06:07	05:12			04:55	05:26	06:19	06:47 (1)	07:14	08:09
	16:51	17:52	18:45	20:43	16	06:48 (1)	21:35	22:01	21:38	20:37	2	06:49 (1)	19:22
25	08:25	07:26	06:19	06:05	05:11			04:56	05:28	06:21		07:15	07:11
	16:53	17:54	18:47	20:45	18	06:48 (1)	21:36	22:01	21:37	20:35		19:20	17:09
26	08:23	07:23	06:16	06:03	05:10			04:56	05:29	06:22		07:17	07:13
	16:55	17:56	18:49	20:46	20	06:48 (1)	21:37	22:01	21:35	20:33		19:17	17:07
27	08:22	07:21	06:14	06:01	05:08			04:57	05:31	06:24		07:19	07:15
	16:56	17:58	18:51	20:48	22	06:48 (1)	21:39	22:01	21:33	20:30		19:15	17:05
28	08:20	07:19	06:11	05:59	05:07			04:57	05:32	06:26		07:21	07:17
	16:58	18:00	18:53	20:50	23	06:48 (1)	21:40	22:01	21:32	20:28		19:12	17:02
29	08:19		07:09	05:56	05:06			04:58	05:34	06:28		07:23	07:19
	17:00		19:55	20:52	21	06:47 (1)	21:42	22:01	21:30	20:26		19:10	17:00
30	08:17		07:06	05:54	05:05			04:58	05:36	06:29		07:24	07:21
	17:02		19:57	20:54	20	06:46 (1)	21:43	22:01	21:28	20:23		19:07	16:58
31	08:15		07:04		05:04				05:37	06:31		07:22	
	17:04		19:58		21:44				21:27	20:21		16:56	
Potential sun hours	250	273	367	420	494		510	512		460		382	328
Total, worst case				182	58					247			
Sun reduction				0.35	0.38					0.34			
Oper. time red.				1.00	1.00					1.00			
Wind dir. red.				0.68	0.68					0.68			
Total reduction				0.24	0.26					0.23			
Total, real				43	15					57			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

6918 Kellystown

5 no. turbine Wind Farm, Co. Louth

Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 09:39/4.0.547

Calculation: Kellystown SG155 Worst Case Shadow receptor: KN - H300

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

Table layout: For each day in each month the following matrix apply

windPRO 4.0.547 by EMD International A/S. Tel. +45 69 16 48 50. www.emd-international.com. support@emd.dk

11/07/2024 14:30 / 368

windPRO 

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KO - H301

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:00 (1) 07:04 (1)	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16		07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:51	05:42 21:21	06:37 20:14		07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11		07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09		07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06		07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04		07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01		07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59		07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57		07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:01 (1) 07:05 (1)	05:33 21:13	04:56 21:56	05:08 21:54	05:56 19:54		07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	06:59 (1) 07:07 (1)	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04		07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	06:57 (1) 07:08 (1)	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01		07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	06:54 (1) 07:08 (1)	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59		07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	06:52 (1) 07:08 (1)	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57		07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	06:50 (1) 07:09 (1)	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55		07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	06:47 (1) 07:08 (1)	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	06:55 (1)	07:01 19:39	07:56 18:27	07:55 16:26
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 (1) 07:08 (1)	04:54 21:25	05:17 22:00	06:08 21:46	06:08 20:51	07:06 (1) 07:08 (1)	19:39 19:37	07:57 18:24	07:57 16:25
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 (1) 07:08 (1)	04:54 21:27	05:19 22:00	06:10 21:45	06:10 20:49	06:52 (1) 07:10 (1)	07:05 19:34	07:59 18:22	07:59 16:23
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 (1) 07:07 (1)	04:54 21:28	05:20 22:00	06:12 21:44	06:12 20:46	06:50 (1) 07:10 (1)	07:07 19:32	08:01 18:20	08:01 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 (1) 07:07 (1)	04:55 21:30	05:21 22:01	06:14 21:42	06:14 20:44	06:49 (1) 07:11 (1)	07:08 19:29	08:03 18:18	08:02 16:21
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 (1) 07:05 (1)	04:55 21:32	05:23 22:01	06:15 21:41	06:15 20:42	06:48 (1) 07:12 (1)	07:10 19:27	08:05 18:15	08:04 16:19
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 (1) 07:04 (1)	04:55 21:33	05:24 22:01	06:17 21:40	06:17 20:39	07:12 (1) 07:11 (1)	07:12 19:24	08:07 18:13	08:06 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 (1) 07:03 (1)	04:55 21:35	05:26 22:01	06:19 21:38	06:19 20:37	07:14 (1) 07:11 (1)	07:14 19:22	08:09 18:11	08:08 16:17
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 (1) 07:01 (1)	04:56 21:36	05:28 22:01	06:21 21:37	06:21 20:35	07:15 (1) 07:12 (1)	07:15 19:20	07:11 17:09	08:09 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 (1) 06:58 (1)	04:56 21:37	05:29 22:01	06:22 21:35	06:22 20:33	07:17 (1) 07:11 (1)	07:17 19:17	07:13 17:07	08:11 16:15
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	06:24 20:30	07:19 (1) 07:10 (1)	07:19 19:15	07:15 17:05	08:13 16:14
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	06:26 20:28	07:21 (1) 07:10 (1)	07:21 19:12	07:17 17:02	08:15 16:13
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	06:28 20:26	06:55 (1) 07:08 (1)	07:23 19:10	07:19 17:00	08:16 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:29 20:23	06:29 20:23	07:24 (1) 07:08 (1)	07:24 19:07	07:21 16:58	08:18 16:11
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21	06:31 20:21	06:59 (1) 07:07 (1)		07:22 16:56	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382		328	259	233
Total, worst case				271				268		4			
Sun reduction				0.35				0.34		0.32			
Oper. time red.				1.00				1.00		1.00			
Wind dir. red.				0.68				0.68		0.68			
Total reduction				0.24				0.23		0.22			
Total, real				65				62		1			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KP - H302

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:02 (1) 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:02 (1) 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:04 (1) 19:00	07:30 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:05 (1) 18:57	07:32 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:07 (1) 18:55	07:33 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:09 (1) 18:53	07:35 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:10 (1) 18:50	07:37 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:12 (1) 18:48	07:39 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:14 (1) 18:45	07:41 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:16 (1) 18:43	07:43 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:17 (1) 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:18 (1) 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:19 (1) 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:20 (1) 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:21 (1) 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:22 (1) 18:29	07:54 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:23 (1) 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:24 (1) 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:25 (1) 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:07 19:32	07:26 (1) 18:20	07:59 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	07:27 (1) 18:18	07:59 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	07:28 (1) 18:15	07:59 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	07:29 (1) 18:13	07:59 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	07:30 (1) 18:11	07:59 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:31 (1) 18:09	07:59 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:32 (1) 18:08	07:59 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:33 (1) 18:07	07:59 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:34 (1) 18:06	07:59 16:13	08:44 16:11
29	08:19 17:00	07:09 19:55	05:56 20:52	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:35 (1) 18:04	07:59 16:12	08:44 16:12
30	08:17 17:02	07:06 19:57	05:54 20:54	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:29 20:23	07:24 19:07	07:36 (1) 18:03	07:59 16:11	08:44 16:13
31	08:15 17:04	07:04 19:58	05:54 20:54	05:54 20:54	05:04 21:44	04:58 22:01	05:37 21:27	06:31 20:21	07:25 (1) 18:02	07:37 (1) 18:02	07:59 16:11	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				267								
Sun reduction				0.35								
Oper. time red.				1.00								
Wind dir. red.				0.67								
Total reduction				0.24								
Total, real				64								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KQ - H303

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December
1	08:44 16:15	08:14 17:06	07:16 18:02		07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18		07:26 19:05		07:56 (1) 08:20 (1)	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04		06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16		07:28 19:02	24	07:55 (1) 08:19 (1)	07:26 16:52
3	08:44 16:17	08:10 17:10	07:12 18:06		06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14		07:30 19:00	22	07:56 (1) 08:18 (1)	07:28 16:50
4	08:43 16:18	08:09 17:12	07:09 18:08		06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11		07:32 18:57	20	07:58 (1) 08:18 (1)	07:30 16:48
5	08:43 16:20	08:07 17:14	07:07 18:10		06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09		07:33 18:55	17	08:00 (1) 08:17 (1)	07:32 16:46
6	08:43 16:21	08:05 17:16	07:05 18:12	6	07:29 (1) 07:38 (1)	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	06:42 20:06		07:35 18:53	14	08:02 (1) 08:16 (1)	07:34 16:45
7	08:42 16:22	08:03 17:18	07:02 18:13	9	07:27 (1) 07:40 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	06:44 20:04		07:37 18:50	11	08:04 (1) 08:15 (1)	07:36 16:43
8	08:42 16:24	08:01 17:20	07:00 18:15	13	07:24 (1) 07:40 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	06:45 20:02		07:39 18:48	8	08:06 (1) 08:14 (1)	07:38 16:41
9	08:41 16:25	07:59 17:22	06:58 18:17	16	07:22 (1) 07:41 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	06:47 19:59		07:41 18:45	3	08:07 (1) 08:10 (1)	07:40 16:39
10	08:41 16:27	07:57 17:24	06:55 18:19	19	07:19 (1) 07:40 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:58	06:49 19:57		07:43 18:43		07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	21	07:17 (1) 07:41 (1)	06:37 20:19	05:33 21:13	04:56 21:54	05:08 21:56	06:51 19:54		07:44 18:41		07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	24	07:16 (1) 07:40 (1)	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	06:52 19:52		07:46 18:38		07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	23	07:17 (1) 07:40 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	06:54 19:49		07:48 18:36		07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	21	07:17 (1) 07:38 (1)	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:56 19:47		07:50 18:34		07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	20	07:18 (1) 07:38 (1)	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:58 19:44		07:52 18:31		07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	18	07:18 (1) 07:36 (1)	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:59 19:42		07:54 18:29		07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	14	07:20 (1) 07:34 (1)	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	07:01 19:39		07:56 18:27		07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	10	07:21 (1) 07:31 (1)	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	07:03 19:37		07:58 18:24		07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36			06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	07:05 19:34		07:59 18:22		07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38			06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	07:07 19:32		08:01 18:20		08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40			06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	07:08 19:29		08:03 18:18		08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42			06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	07:10 19:27		08:05 18:15		08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44			06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	07:12 19:24		08:07 18:13		08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45			06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	07:14 19:22		08:09 18:11		08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47			06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	07:15 19:20		08:11 18:13		08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49			06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	07:17 19:17	6	08:13 (1) 08:15 (1)	17	08:12 (1) 08:00 (1)	07:13 16:15
27	08:22 16:56	07:21 17:58	06:14 18:51			06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	07:19 19:15	13	08:17 (1) 07:59 (1)	17	08:18 (1) 07:59 (1)	07:15 16:14
28	08:20 16:58	07:19 18:00	06:11 18:53			05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	07:21 19:12	17	08:19 (1) 07:58 (1)	17	08:19 (1) 07:57 (1)	07:17 16:12
29	08:19 17:00		07:09 19:55			05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	07:23 19:10	19	08:20 (1) 08:19 (1)	19	08:20 (1) 07:57 (1)	07:19 16:11
30	08:17 17:02		07:06 19:57			05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	07:24 19:07	21	08:21 (1) 08:19 (1)	21	08:21 (1) 07:58 (1)	07:21 16:11
31	08:16 17:04		07:04 19:58				05:04 21:44		05:37 21:27	06:31 20:21	22	08:22 (1) 08:19 (1)	22	08:22 (1) 07:58 (1)	06:31 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233
Total, worst case				238						98		143			
Sun reduction				0.27						0.32		0.29			
Oper. time red.				1.00						1.00		1.00			
Wind dir. red.				0.65						0.65		0.65			
Total reduction				0.18						0.21		0.19			
Total, real				42						20		27			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KR - H304

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 07:54 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	08:14 (1) 17	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 07:56 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:11 (1) 20	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 07:56 (1)	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	08:10 (1) 22	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	07:34 (1) 07:57 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:09 (1) 24	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:32 (1) 07:57 (1)	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	08:09 (1) 24	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:32 (1) 07:57 (1)	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:08 (1) 25	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:32 (1) 07:57 (1)	06:47 20:11	05:40 21:06	05:04 21:52	05:49 21:57	06:44 21:14	06:44 20:04	07:37 18:50	08:08 (1) 25	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:31 (1) 07:56 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	08:08 (1) 25	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:32 (1) 07:56 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:07 (1) 24	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:32 (1) 07:55 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:09 (1) 22	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:33 (1) 07:54 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:11 (1) 19	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:33 (1) 07:52 (1)	06:35 20:21	05:31 21:15	04:56 21:53	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:13 (1) 15	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:35 (1) 07:50 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:15 (1) 12	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	07:37 (1) 07:47 (1)	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:17 (1) 8	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29		06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:19 (1) 1	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31		06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29		07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32		06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27		07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34		06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24		07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22		07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20		08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18		08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44		06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13		08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11		08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09		08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49		06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07		08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	07:46 (1) 18:51	06:14 07:50 (1)	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05		08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	07:43 (1) 18:53	06:11 07:52 (1)	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02		08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55		05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:19 (1) 7	08:16 (1) 07:21	08:44 16:12
30	08:17 17:02		07:06 19:57		05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 17:02	08:16 (1) 13	08:18 (1) 16:58	08:44 16:13
31	08:15 17:04		07:04 19:58			05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56			08:44 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382			259	233
Total, worst case				285							20		283	
Sun reduction		0.23		0.27							0.32		0.29	
Oper. time red.		1.00		1.00							1.00		1.00	
Wind dir. red.		0.65		0.65							0.65		0.65	
Total reduction		0.15		0.18							0.21		0.19	
Total, real		2		50							4		54	

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KS - H305

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 18:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	07:54 (1) 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	07:55 (1) 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	07:54 (1) 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	07:54 (1) 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	07:54 (1) 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	07:54 (1) 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	07:54 (1) 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	07:54 (1) 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	07:54 (1) 16:05
10	08:41 16:27	07:57 17:24	06:55 18:24 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	07:54 (1) 16:05
11	08:40 16:28	07:55 17:26	06:53 18:29 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:56	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	07:54 (1) 16:05
12	08:39 16:30	07:53 17:28	06:50 18:30 (1)	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	07:54 (1) 16:05
13	08:38 16:31	07:51 17:30	06:48 18:32 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	07:54 (1) 16:05
14	08:37 16:33	07:49 17:32	06:45 18:32 (1)	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	07:54 (1) 16:05
15	08:37 16:35	07:47 17:34	06:43 18:33 (1)	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:52 16:29	07:54 (1) 16:05
16	08:36 16:36	07:45 17:36	06:41 18:34 (1)	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:54 16:28	07:54 (1) 16:05
17	08:35 16:38	07:43 17:38	06:38 18:34 (1)	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:56 16:26	07:54 (1) 16:05
18	08:34 16:40	07:41 17:40	06:36 18:35 (1)	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	07:03 20:51	07:58 19:37	07:58 18:24	07:58 16:25	07:54 (1) 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36 (1)	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	07:05 20:49	07:59 19:34	07:59 18:22	07:59 16:23	07:54 (1) 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38 (1)	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	07:07 20:46	08:01 19:32	08:01 18:20	08:01 16:22	07:54 (1) 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40 (1)	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	07:08 20:44	08:03 19:29	08:03 18:18	08:03 16:21	07:54 (1) 16:05
22	08:29 16:47	07:32 17:48	06:26 18:42 (1)	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	07:10 20:42	08:05 19:27	08:05 18:15	08:05 16:19	07:54 (1) 16:05
23	08:27 16:49	07:30 17:50	06:23 18:44 (1)	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	07:12 20:40	08:07 19:24	08:07 18:13	08:07 16:18	07:54 (1) 16:05
24	08:26 16:51	07:28 17:52	06:21 18:45 (1)	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	07:14 20:37	08:09 19:22	08:09 18:11	08:09 16:17	07:54 (1) 16:05
25	08:25 16:53	07:26 17:54	06:19 18:49 (1)	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	07:15 20:35	08:11 19:20	08:11 17:09	08:11 16:16	07:54 (1) 16:05
26	08:23 16:54	07:23 17:56	06:16 18:51 (1)	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	07:17 20:33	08:13 19:17	08:13 17:07	08:13 16:15	07:54 (1) 16:05
27	08:22 16:56	07:21 17:58	06:14 18:51 (1)	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	07:19 20:30	08:15 19:15	08:15 17:05	08:15 16:14	07:54 (1) 16:05
28	08:20 16:58	07:19 18:00	06:11 18:53 (1)	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	07:21 20:28	08:17 19:12	08:17 17:02	08:17 16:13	07:54 (1) 16:05
29	08:19 17:00		06:09 19:55 (1)	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	07:23 20:26	08:19 19:10	08:19 17:00	08:19 16:12	07:54 (1) 16:05
30	08:17 17:02		06:06 19:57 (1)	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	07:24 20:23	08:21 19:07	08:21 16:58	08:21 16:11	07:54 (1) 16:05
31	08:15 17:04		06:04 19:58 (1)	05:04 21:44			05:37 21:27	07:22 20:21	08:22 16:56	08:22 16:56	08:22 16:11	07:54 (1) 16:05
Potential sun hours	250	273	340	367	420	494	510	512	460	382	328	259
Total, worst case			340									1
Sun reduction			0.23									0.27
Oper. time red.			1.00									1.00
Wind dir. red.			0.63									0.63
Total reduction			0.15									0.17
Total, real			50									0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KT - H306

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	08:42 (3)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	17:06	08:44 (3)	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54
3	08:44	08:12	08:44 (3)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
4	16:16	17:08	08:44 (3)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
5	08:44	08:10	08:38 (3)	17:12	16:56	15:48	15:01	15:00	15:42	16:37	17:30	17:28
6	16:17	17:10	08:45 (3)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50
7	08:43	08:09	08:36 (3)	17:09	16:54	15:46	15:00	15:01	15:44	16:38	17:32	17:30
8	16:18	17:12	08:45 (3)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48
9	08:43	08:07	08:34 (3)	17:07	16:52	15:44	15:02	15:02	15:46	16:40	17:33	17:32
10	16:20	17:14	08:45 (3)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46
11	08:43	08:05	08:32 (3)	17:05	16:49	15:42	15:04	15:03	15:47	16:42	17:35	17:34
12	16:21	17:16	08:46 (1)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45
13	08:42	08:03	08:30 (3)	17:02	16:47	15:40	15:04	15:04	15:49	16:44	17:37	17:36
14	16:22	17:18	08:47 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43
15	08:42	08:01	08:28 (3)	17:00	16:44	15:38	15:05	15:05	15:51	16:45	17:39	17:38
16	16:24	17:20	08:49 (1)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41
17	08:41	07:59	08:26 (1)	16:57	16:42	15:36	15:06	15:06	15:52	16:47	17:41	17:40
18	16:25	17:22	08:50 (1)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39
19	08:41	07:57	08:24 (1)	16:55	16:40	15:35	15:06	15:07	15:54	16:49	17:43	17:42
20	16:27	17:24	08:51 (1)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37
21	08:40	07:55	08:22 (1)	16:53	16:37	15:33	15:06	15:08	15:56	16:51	17:44	17:44
22	16:28	17:26	08:52 (1)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36
23	08:39	07:53	08:21 (1)	16:50	16:35	15:31	15:05	15:09	15:58	16:52	17:46	17:46
24	16:30	17:28	08:53 (1)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34
25	08:38	07:51	08:21 (1)	16:48	16:32	15:29	15:05	15:11	15:59	16:54	17:48	17:48
26	16:31	17:30	08:54 (1)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32
27	08:37	07:49	08:20 (1)	16:45	16:30	15:27	15:05	15:12	16:01	16:56	17:50	17:49
28	16:33	17:32	08:53 (1)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31
29	08:37	07:47	08:20 (1)	16:43	16:28	15:26	15:05	15:13	16:03	16:58	17:52	17:51
30	16:35	17:34	08:54 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29
31	08:36	07:45	08:20 (1)	16:41	16:25	15:24	15:04	15:14	16:05	16:59	17:54	17:53
32	16:36	17:36	08:54 (1)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28
33	08:35	07:43	08:20 (1)	16:38	16:23	15:22	15:04	15:16	16:06	16:59	17:56	17:55
34	16:38	17:38	08:54 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26
35	08:33	07:41	08:20 (1)	16:36	16:21	15:21	15:04	15:17	16:08	16:59	17:58	17:57
36	16:40	17:40	08:54 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25
37	08:32	07:39	08:20 (1)	16:33	16:18	15:19	15:04	15:19	16:10	16:59	17:59	17:59
38	16:41	17:42	08:53 (1)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23
39	08:31	07:37	08:20 (1)	16:31	16:16	15:18	15:04	15:20	16:12	16:59	17:59	17:59
40	16:43	17:44	08:53 (1)	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22
41	08:30	07:34	08:21 (1)	16:28	16:14	15:16	15:05	15:21	16:13	16:59	17:59	17:59
42	16:45	17:46	08:53 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21
43	08:29	07:32	08:21 (1)	16:26	16:12	15:15	15:05	15:23	16:15	16:59	17:59	17:59
44	16:47	17:48	08:51 (1)	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19
45	08:27	07:30	08:22 (1)	16:23	16:09	15:13	15:05	15:24	16:17	16:59	17:59	17:59
46	16:49	17:50	08:50 (1)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18
47	08:26	07:28	08:23 (1)	16:21	16:07	15:12	15:05	15:26	16:19	16:59	17:59	17:59
48	16:51	17:52	08:49 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17
49	08:25	07:26	08:24 (1)	16:18	16:05	15:11	15:05	15:27	16:21	16:59	17:59	17:59
50	16:53	17:54	08:47 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16
51	08:23	07:23	08:26 (1)	16:16	16:03	15:09	15:05	15:29	16:22	16:59	17:59	17:59
52	16:54	17:56	08:45 (1)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15
53	08:22	07:21	08:28 (1)	16:14	16:01	15:08	15:04	15:31	16:24	16:59	17:59	17:59
54	16:56	17:58	08:43 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	16:14
55	08:20	07:19	08:33 (1)	16:11	15:59	15:07	15:04	15:32	16:26	16:59	17:59	17:59
56	16:58	18:00	08:37 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13
57	08:19			17:09	16:56	15:06	15:04	15:34	16:28	16:59	17:59	17:59
58	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12
59	08:17			17:06	16:54	15:05	15:04	15:35	16:29	16:59	17:59	17:59
60	17:02			19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11
61	08:15			17:04	16:54	15:04	15:04	15:37	16:31		17:59	17:59
62	17:04			19:58	21:44			21:27	20:21	16:56	30	08:22 (1)
Potential sun hours	250	273	643	367	420	494	510	512	460	382	328	259
Total, worst case			643									132
Sun reduction			0.23									0.27
Oper. time red.			1.00									1.00
Wind dir. red.			0.62									0.62
Total reduction			0.14									0.16
Total, real			93									22

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KU - H307

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	08:42 (3)	07:16	08:32 (1)	07:01
	16:15	17:06	12 08:54 (1)	18:02	09:03 (1)	20:00
2	08:44	08:12	08:40 (3)	07:14	08:35 (1)	06:59
	16:16	17:08	17 08:57 (1)	18:04	09:01 (1)	20:02
3	08:44	08:10	08:38 (3)	07:12	08:36 (1)	06:56
	16:17	17:10	22 09:00 (1)	18:06	08:57 (1)	20:04
4	08:43	08:09	08:36 (3)	07:09	08:40 (1)	06:54
	16:18	17:12	26 09:02 (1)	18:08	08:54 (1)	20:06
5	08:43	08:07	08:34 (3)	07:07		06:52
	16:20	17:14	30 09:04 (1)	18:10		20:08
6	08:43	08:05	08:32 (3)	07:05		06:49
	16:21	17:16	33 09:05 (1)	18:11		20:09
7	08:42	08:03	08:31 (3)	07:02		06:47
	16:22	17:18	35 09:06 (1)	18:13		20:11
8	08:42	08:01	08:31 (1)	07:00	07:24 (2)	06:44
	16:24	17:20	36 09:07 (1)	18:15	4 07:28 (2)	20:13
9	08:41	07:59	08:30 (1)	06:57	7 07:22 (2)	06:42
	16:25	17:22	38 09:08 (1)	18:17	7 07:29 (2)	20:15
10	08:41	07:57	08:29 (1)	06:55	10 07:19 (2)	06:40
	16:27	17:24	40 09:09 (1)	18:19	10 07:29 (2)	20:17
11	08:40	07:55	08:29 (1)	06:53	12 07:17 (2)	06:37
	16:28	17:26	41 09:10 (1)	18:21	12 07:29 (2)	20:19
12	08:39	07:53	08:28 (1)	06:50	14 07:14 (2)	06:35
	16:30	17:28	43 09:11 (1)	18:23	14 07:28 (2)	20:21
13	08:38	07:51	08:28 (1)	06:48	16 07:12 (2)	06:32
	16:31	17:30	44 09:12 (1)	18:25	16 07:28 (2)	20:22
14	08:37	07:49	08:27 (1)	06:45	18 07:09 (2)	06:30
	16:33	17:32	44 09:11 (1)	18:27	18 07:27 (2)	20:24
15	08:37	07:47	08:27 (1)	06:43	17 07:09 (2)	06:28
	16:35	17:34	45 09:12 (1)	18:29	17 07:26 (2)	20:26
16	08:36	07:45	08:27 (1)	06:41	14 07:10 (2)	06:25
	16:36	17:36	45 09:12 (1)	18:30	14 07:24 (2)	20:28
17	08:35	07:43	08:27 (1)	06:38	10 07:12 (2)	06:23
	16:38	17:38	45 09:12 (1)	18:32	10 07:22 (2)	20:30
18	08:33	07:41	08:27 (1)	06:36		06:21
	16:40	17:40	45 09:12 (1)	18:34		20:32
19	08:32	07:39	08:26 (1)	06:33		06:18
	16:41	17:42	46 09:12 (1)	18:36		20:33
20	08:31	07:37	08:26 (1)	06:31		06:16
	16:43	17:44	46 09:12 (1)	18:38		20:35
21	08:30	07:34	08:27 (1)	06:28		06:14
	16:45	17:46	44 09:11 (1)	18:40		20:37
22	08:29	07:32	08:27 (1)	06:26		06:12
	16:47	17:48	43 09:10 (1)	18:42		20:39
23	08:27	07:30	08:27 (1)	06:23		06:09
	16:49	17:50	43 09:10 (1)	18:44		20:41
24	08:26	07:28	08:28 (1)	06:21		06:07
	16:51	17:52	41 09:09 (1)	18:45		20:43
25	08:25	07:26	08:28 (1)	06:18		06:05
	16:53	17:54	40 09:08 (1)	18:47		20:45
26	08:23	07:23	08:29 (1)	06:16		06:03
	16:54	17:56	38 09:07 (1)	18:49		20:46
27	08:22	07:21	08:30 (1)	06:14		06:01
	16:56	17:58	36 09:06 (1)	18:51		20:48
28	08:20	07:19	08:31 (1)	06:11		05:59
	16:58	18:00	33 09:04 (1)	18:53		20:50
29	08:19	08:47 (3)		07:09		05:56
	17:00	2 08:49 (3)		19:55		20:52
30	08:17	08:45 (3)		07:06		05:54
	17:02	5 08:50 (3)		19:57		20:54
31	08:15	08:44 (3)		07:04		05:04
	17:04	8 08:52 (3)		19:58		21:44
Potential sun hours	250	273		367	420	510
Total, worst case	15	1051		214		
Sun reduction	0.24	0.23		0.27		
Oper. time red.	1.00	1.00		1.00		
Wind dir. red.	0.61	0.62		0.64		
Total reduction	0.15	0.14		0.17		
Total, real	2	150		37		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KU - H307

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (2) 16:54	07:59 (1) 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (2) 16:52	08:00 (1) 16:09
3	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:56 (2) 16:50	08:00 (1) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:58 (2) 16:48	08:01 (3) 16:08
5	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	08:00 (2) 16:46	08:02 (3) 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:02 (2) 16:45	08:04 (3) 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:06 (3) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:09 (3) 16:06
9	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	09:17 (1) 16:39	08:11 (3) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	09:12 (1) 16:37	08:13 (3) 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	09:09 (1) 16:36	08:15 (3) 16:05
12	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	09:07 (1) 16:34	08:17 (3) 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	09:05 (1) 16:32	08:19 (3) 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	09:03 (1) 16:31	08:21 (3) 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	09:38 (1) 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	09:02 (1) 16:28	08:38 16:05
17	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	09:00 (1) 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	09:40 (1) 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	09:41 (1) 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	09:42 (1) 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	09:42 (1) 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	09:42 (1) 16:19	08:42 16:07
23	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	09:42 (1) 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	09:42 (1) 16:17	08:43 16:08
25	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	09:42 (1) 16:16	08:43 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 08:03 (2)	09:42 (1) 16:15	08:44 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 08:05 (2)	09:42 (1) 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 08:06 (2)	09:42 (1) 16:13	08:44 16:11
29	05:34 21:30	06:28 20:26	07:23 19:10	07:19 08:07 (2)	09:42 (1) 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:21 08:08 (2)	09:42 (1) 16:11	08:44 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56	09:42 (1) 16:10	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case			70	933	300	
Sun reduction			0.32	0.29	0.27	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.66	0.62	0.61	
Total reduction			0.21	0.18	0.16	
Total, real			15	169	49	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KV - H308
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	09:39 (3)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
2	08:44	09:41 (3)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
3	08:44	09:41 (3)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
4	08:43	09:43 (3)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
5	08:43	09:44 (3)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25
6	08:43	09:46 (3)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
7	08:42	09:48 (3)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
8	08:42	11:15 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
9	08:41	11:17 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
10	08:41	11:18 (1)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32
11	08:40	11:19 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
12	08:39	11:20 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34
13	08:38	11:22 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
14	08:37	11:24 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
15	08:36	11:27 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
16	08:36	11:31 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38
17	08:35	11:40 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
18	08:33	11:46 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39
19	08:32	11:47 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:40
20	08:31	11:49 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:41
21	08:30	11:50 (1)	07:35	06:29	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:42
22	08:29	11:51 (1)	07:33	06:27	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:43
23	08:27	11:52 (1)	07:31	06:25	06:10	05:13	04:55	05:24	06:17	07:12	08:07	08:44
24	08:26	11:53 (1)	07:29	06:23	06:08	05:11	04:54	05:25	06:18	07:13	08:08	08:45
25	08:25	11:54 (1)	07:27	06:21	06:06	05:09	04:53	05:26	06:19	07:14	08:09	08:46
26	08:23	11:55 (1)	07:25	06:19	06:04	05:07	04:51	05:27	06:20	07:15	08:10	08:47
27	08:22	11:56 (1)	07:23	06:17	06:02	05:05	04:50	05:28	06:21	07:16	08:11	08:48
28	08:20	11:57 (1)	07:21	06:15	06:00	05:03	04:49	05:29	06:22	07:17	08:12	08:49
29	08:19	11:58 (1)	07:19	06:13	05:58	05:01	04:47	05:30	06:23	07:18	08:13	08:50
30	08:17	11:59 (1)	07:17	06:11	05:56	05:00	04:45	05:31	06:24	07:19	08:14	08:51
31	08:15	12:00 (1)	07:15	06:09	05:54	05:00	04:43	05:32	06:25	07:20	08:15	08:52
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	575	256										1735
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.60	0.64										0.60
Total reduction	0.15	0.15										0.12
Total, real	84	38										215

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KW - H309
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44		12:23 (1)	08:14		08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	05:39	06:33	07:26			07:24		07:54 (2)	08:19					
	16:15	31	12:54 (1)	17:06	3	08:45 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	20:18	19:05			16:54	28	08:22 (2)	16:10					
2	08:44		12:24 (1)	08:12		08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28				07:26		07:56 (2)	08:21			12:22 (1)		
	16:16	30	12:54 (1)	17:08	7	08:47 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02				16:52	26	08:22 (2)	16:09	8		12:30 (1)		
3	08:44		12:25 (1)	08:10		08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30				07:28		07:58 (2)	08:22			12:18 (1)		
	16:17	28	12:53 (1)	17:10	10	08:48 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00				16:50	24	08:22 (2)	16:08	15		12:33 (1)		
4	08:43		12:26 (1)	08:09		08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32				07:30		08:00 (2)	08:24			12:17 (1)		
	16:18	28	12:54 (1)	17:12	13	08:49 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57				16:48	21	08:21 (2)	16:08	18		12:35 (1)		
5	08:43		12:27 (1)	08:07		08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33				07:32		08:02 (2)	08:25			12:16 (1)		
	16:20	26	12:53 (1)	17:14	16	08:50 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55				16:46	19	08:21 (2)	16:07	21		12:37 (1)		
6	08:43		12:29 (1)	08:05		08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35				07:34		08:04 (2)	08:27			12:15 (1)		
	16:21	24	12:53 (1)	17:16	19	08:51 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53				16:44	16	08:20 (2)	16:07	24		12:39 (1)		
7	08:42		12:30 (1)	08:03		08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37				07:36		08:06 (2)	08:28			12:14 (1)		
	16:22	22	12:52 (1)	17:18	22	08:52 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50				16:43	13	08:19 (2)	16:06	26		12:40 (1)		
8	08:42		12:32 (1)	08:01		08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39				07:38		08:09 (2)	08:29			12:14 (1)		
	16:24	18	12:50 (1)	17:20	24	08:52 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48				16:41	10	08:19 (2)	16:06	28		12:42 (1)		
9	08:41		12:35 (1)	07:59		08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41				07:40		08:11 (2)	08:30			12:14 (1)		
	16:25	15	12:50 (1)	17:22	26	08:52 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45				16:39	7	08:18 (2)	16:05	29		12:43 (1)		
10	08:40		12:38 (1)	07:57		08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43				07:42		08:13 (2)	08:32			12:13 (1)		
	16:27	9	12:47 (1)	17:24	29	08:53 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43				16:37	3	08:16 (2)	16:05	30		12:43 (1)		
11	08:40		07:55		08:24 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44					07:44			08:33			12:13 (1)		
	16:28		17:26	29	08:53 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41					16:36			16:05	31		12:44 (1)		
12	08:39		07:53		08:24 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46					07:46			08:34			12:13 (1)		
	16:30		17:28	29	08:53 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38					16:34			16:05	32		12:45 (1)		
13	08:38		07:51		08:24 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48					07:48			08:35			12:14 (1)		
	16:31		17:30	29	08:53 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36					16:32			16:05	33		12:47 (1)		
14	08:37		07:49		08:24 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50					07:49			08:36			12:14 (1)		
	16:33		17:32	28	08:52 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33					16:31			16:05	33		12:47 (1)		
15	08:36		07:47		08:25 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52					07:51			08:37			12:14 (1)		
	16:34		17:34	26	08:51 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31					16:29			16:05	34		12:48 (1)		
16	08:36		07:45		08:26 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54					07:53			08:38			12:13 (1)		
	16:36		17:36	25	08:51 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29					16:28			16:05	35		12:48 (1)		
17	08:35		07:43		08:27 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56					07:55			08:39			12:14 (1)		
	16:38		17:38	23	08:50 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27					16:26			16:05	35		12:49 (1)		
18	08:33		07:41		08:27 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57					07:57			08:39			12:14 (1)		
	16:40		17:40	21	08:48 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24					16:25			16:05	36		12:50 (1)		
19	08:32		07:39		08:29 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59					07:59			08:40			12:15 (1)		
	16:41		17:42	17	08:46 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22					16:23			16:05	35		12:50 (1)		
20	08:31		07:37		08:32 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01					08:01			08:41			12:15 (1)		
	16:43		17:44	11	08:43 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20					16:22			16:06	35		12:50 (1)		
21	08:30		07:34		08:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03					09:06 (2)			08:02			08:41		12:16 (1)	
	16:45		17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17					4	09:10 (2)			16:20			16:06	35	12:51 (1)
22	08:29		07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05					09:01 (2)			08:04			08:42		12:16 (1)	
	16:47		17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15					14	09:15 (2)			16:19			16:07	35	12:51 (1)
23	08:27		07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07					08:59 (2)			08:06			08:42		12:17 (1)	
	16:49		17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13					18	09:17 (2)			16:18			16:07	35	12:52 (1)
24	08:26		07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09					08:57 (2)			08:08			08:43		12:17 (1)	
	16:51		17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11					21	09:18 (2)			16:17			16:08	35	12:52 (1)
25	08:25		07:25		06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11					07:56 (2)			08:09			08:43		12:17 (1)	
	16:52		17:54		18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09					23	08:19 (2)			16:16			16:08	36	12:53 (1)
26	08:23		07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13					07:55 (2)			08:11			08:44		12:19 (1)	
	16:54		17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07					25	08:20 (2)			16:15			16:09	35	12:54 (1)
27	08:22		07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15					07:54 (2)			08:13			08:44		12:19 (1)	
	16:56		17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04					27	08:21 (2)			16:14			16:10	35	12:54 (1)
28	08:20		07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17					07:53 (2)			08:14			08:44		12:20 (1)	
	16:58		18:00		18:53	20:50	21:40	22:01	21:32																	

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KX - H310
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KY - H311

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:54	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KZ - H312

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	16:28 (5) 18:02	07:16 17:34 (4)	07:01 20:00	05:52 20:25
2	08:44 16:16	08:12 17:08	16:28 (5) 18:04	07:14 17:36 (4)	06:59 20:02	25 20:26 (2)
3	08:43 16:17	08:10 17:10	16:28 (5) 18:06	07:11 17:38 (4)	06:56 20:04	20:01 (2) 05:02
4	08:43 16:18	08:08 17:12	16:27 (5) 18:07	07:09 17:41 (4)	06:54 20:06	20:00 (2) 05:00
5	08:43 16:19	08:07 17:14	16:27 (5) 18:09	07:07 17:42 (4)	06:51 20:07	20:29 (2) 21:49
6	08:42 16:21	08:05 17:16	16:27 (5) 18:11	07:04 17:45 (4)	06:49 20:09	20:00 (2) 04:59
7	08:42 16:22	08:03 17:18	16:27 (5) 18:13	07:02 17:46 (4)	06:47 20:11	20:28 (2) 21:52
8	08:42 16:24	08:01 17:20	16:27 (5) 18:15	07:00 17:48 (4)	06:44 20:13	20:01 (2) 04:57
9	08:41 16:25	07:59 17:22	16:28 (5) 18:17	06:57 17:47 (4)	06:42 20:15	20:28 (2) 21:53
10	08:40 16:26	07:57 17:24	16:29 (5) 18:19	06:55 17:47 (4)	06:39 20:17	20:02 (2) 04:56
11	08:40 16:28	07:55 17:26	16:29 (5) 18:21	06:52 17:44 (4)	06:37 20:19	20:26 (2) 21:55
12	08:39 16:30	07:53 17:28	16:30 (5) 18:23	06:50 17:45 (4)	06:35 20:20	20:04 (2) 04:55
13	08:38 16:31	07:51 17:30	16:31 (5) 18:25	06:48 17:45 (4)	06:32 20:22	20:24 (2) 21:56
14	08:37 16:33	07:49 17:32	16:33 (5) 18:27	06:45 17:43 (4)	06:30 20:24	20:05 (2) 04:55
15	08:36 16:34	07:47 17:34	16:44 (5) 18:27	06:43 17:17 (4)	06:28 18:02 (3)	20:22 (2) 21:57
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 18:04 (3)	06:25 20:28	20:09 (2) 04:54
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 18:06 (3)	06:23 20:30	20:19 (2) 21:58
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 18:07 (3)	06:21 20:31	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 18:10 (3)	06:18 20:33	04:54 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 18:11 (3)	06:16 20:35	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 18:13 (3)	06:14 20:37	04:54 22:01
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 18:15 (3)	06:12 20:39	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 18:14 (3)	20:09 (2) 20:41	05:13 21:33
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 18:12 (3)	20:07 (2) 20:42	05:12 21:34
25	08:24 16:52	07:25 17:54	17:24 (4) 18:47	06:05 18:11 (3)	20:06 (2) 20:44	05:11 21:36
26	08:23 16:54	07:23 17:56	2 17:26 (4) 18:49	06:03 18:00 (3)	20:15 (2) 20:04 (2)	22:01 04:56
27	08:22 16:56	07:21 17:58	6 17:28 (4) 18:51	7 18:07 (3)	20:17 (2) 20:03 (2)	21:37 05:08
28	08:20 16:58	07:18 18:00	11 17:31 (4) 18:53	16 20:19 (2)	20:19 (2) 20:03 (2)	22:01 04:57
29	08:18 17:00	07:18 18:00	14 17:32 (4) 19:54	18 20:21 (2)	20:21 (2) 20:02 (2)	22:01 04:57
30	08:17 17:02	07:18 18:00	14 17:32 (4) 19:54	18 20:21 (2)	20:21 (2) 20:02 (2)	22:01 04:57
31	08:15 17:04	16:29 (5) 16:32 (5)	07:04 19:58	23 20:24 (2)	05:04 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case	3	255	633	109	351	
Sun reduction	0.24	0.23	0.27	0.35	0.38	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.66	0.66	0.68	0.65	0.65	
Total reduction	0.16	0.15	0.18	0.23	0.25	
Total, real	0	39	116	25	86	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KZ - H312

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1 04:59	05:39	20:14 (2) 06:33	07:26	17:53 (4) 07:24	15:58 (5) 08:19	
22:00	21:25	21 20:35 (2) 20:18	19:05	31 18:24 (4) 16:54	21 16:19 (5) 16:10	
2 04:59	05:40	20:14 (2) 06:35	07:28	17:52 (4) 07:26	15:57 (5) 08:21	
22:00	21:23	22 20:36 (2) 20:16	19:02	33 18:25 (4) 16:52	23 16:20 (5) 16:09	
3 05:00	05:42	20:12 (2) 06:36	07:30	17:51 (4) 07:28	15:57 (5) 08:22	
21:59	21:21	24 20:36 (2) 20:13	19:00	34 18:25 (4) 16:50	22 16:19 (5) 16:08	
4 05:01	05:44	20:12 (2) 06:38	07:31	17:51 (4) 07:30	15:57 (5) 08:24	
21:59	21:19	25 20:37 (2) 20:11	18:57	34 18:25 (4) 16:48	20 16:17 (5) 16:08	
5 05:02	05:45	20:11 (2) 06:40	07:33	17:50 (4) 07:32	15:57 (5) 08:25	
21:58	21:17	26 20:37 (2) 20:09	18:55	35 18:25 (4) 16:46	18 16:15 (5) 16:07	
6 05:03	05:47	20:11 (2) 06:42	07:35	17:50 (4) 07:34	15:57 (5) 08:26	
21:58	21:15	27 20:38 (2) 20:06	18:52	34 18:24 (4) 16:44	15 16:12 (5) 16:07	
7 05:04	05:49	20:10 (2) 06:43	07:37	17:49 (4) 07:36	15:57 (5) 08:28	
21:57	21:13	29 20:39 (2) 20:04	18:50	32 18:21 (4) 16:43	13 16:10 (5) 16:06	
8 05:05	05:50	20:09 (2) 06:45	07:39	17:49 (4) 07:38	15:58 (5) 08:29	
21:56	21:11	29 20:38 (2) 20:01	18:48	29 18:18 (4) 16:41	10 16:08 (5) 16:06	
9 05:06	05:52	20:10 (2) 06:47	07:41	17:49 (4) 07:40	15:58 (5) 08:30	
21:55	21:10	29 20:39 (2) 19:59	18:45	27 18:16 (4) 16:39	8 16:06 (5) 16:05	
10 05:07	05:54	20:09 (2) 06:49	07:42	17:49 (4) 07:42	16:00 (5) 08:31	
21:55	21:07	28 20:37 (2) 19:56	18:43	25 18:14 (4) 16:37	5 16:05 (5) 16:05	
11 05:08	05:56	20:09 (2) 06:50	07:44	17:50 (4) 07:44	16:01 (5) 08:33	
21:54	21:05	26 20:35 (2) 19:54	18:40	21 18:11 (4) 16:35	2 16:03 (5) 16:05	
12 05:09	05:57	20:09 (2) 06:52	07:46	17:50 (4) 07:45	08:34	
21:53	21:03	25 20:34 (2) 19:51	18:38	19 18:09 (4) 16:34	16:05	
13 05:10	05:59	20:09 (2) 06:54	07:48	17:51 (4) 07:47	08:35	
21:52	21:01	22 20:31 (2) 19:49	18:36	16 18:07 (4) 16:32	16:05	
14 05:12	06:01	20:09 (2) 06:56	07:50	17:52 (4) 07:49	08:36	
21:51	20:59	20 20:29 (2) 19:47	18:33	12 18:04 (4) 16:31	16:04	
15 05:13	06:03	20:10 (2) 06:58	07:52	17:53 (4) 07:51	08:37	
21:50	20:57	18 20:28 (2) 19:44	18:31	9 18:02 (4) 16:29	16:05	
16 05:14	06:04	20:10 (2) 06:59	07:54	17:55 (4) 07:53	08:38	
21:49	20:55	15 20:25 (2) 19:42	18:29	4 17:59 (4) 16:27	16:05	
17 05:16	06:06	20:11 (2) 07:01	18:50 (3) 07:55	07:55	08:38	
21:47	20:53	12 20:23 (2) 19:39	4 18:54 (3) 18:26	16:26	16:05	
18 05:17	06:08	20:12 (2) 07:03	18:46 (3) 07:57	07:57	08:39	
21:46	20:50	10 20:22 (2) 19:37	11 18:57 (3) 18:24	16:24	16:05	
19 05:18	06:10	20:13 (2) 07:05	18:44 (3) 07:59	07:59	08:40	
21:45	20:48	6 20:19 (2) 19:34	15 18:59 (3) 18:22	16:23	16:05	
20 05:20	06:12	20:15 (2) 07:06	18:42 (3) 08:01	08:00	08:41	
21:44	20:46	2 20:17 (2) 19:32	18 19:00 (3) 18:20	16:22	16:06	
21 05:21	06:13	07:08	18:40 (3) 08:03	08:02	08:41	
21:42	20:44	19:29	20 19:00 (3) 18:17	16:20	16:06	
22 05:23	06:15	07:10	18:39 (3) 08:05	08:04	08:42	
21:41	20:42	19:27	19 18:58 (3) 18:15	16:19	16:06	
23 05:24	06:17	07:12	18:39 (3) 08:07	08:06	08:42	
21:39	20:39	19:24	17 18:56 (3) 18:13	16:18	16:07	
24 05:26	06:19	07:13	18:39 (3) 08:09	08:08	08:43	
21:38	20:37	19:22	15 18:54 (3) 18:11	16:17	16:08	
25 05:27	06:20	07:15	18:09 (4) 07:11	08:09	08:43	
21:36	20:35	19:19	16 18:51 (3) 17:09	16:16	16:08	
26 05:29	06:22	07:17	18:03 (4) 07:13	08:11	08:43	
21:35	20:32	19:17	25 18:48 (3) 17:06	16:14	16:09	
27 05:30	06:24	07:19	18:00 (4) 07:14	16:06 (5) 08:13	08:44	
21:33	20:30	19:14	28 18:46 (3) 17:04	5 16:11 (5) 16:13	16:10	
28 05:32	20:22 (2) 06:26	07:21	17:58 (4) 07:16	16:02 (5) 08:14	08:44	
21:32	6 20:28 (2) 20:28	19:12	29 18:44 (3) 17:02	12 16:14 (5) 16:12	16:11	
29 05:34	20:19 (2) 06:27	07:22	17:56 (4) 07:18	16:00 (5) 08:16	08:44	
21:30	11 20:30 (2) 20:25	19:09	28 18:41 (3) 17:00	16 16:16 (5) 16:12	16:11	
30 05:35	20:17 (2) 06:29	07:24	17:54 (4) 07:20	15:59 (5) 08:18	08:44	
21:28	15 20:32 (2) 20:23	19:07	29 18:23 (4) 16:58	18 16:17 (5) 16:11	16:12	
31 05:37	20:16 (2) 06:31		07:22	15:58 (5)	08:44	
21:26	18 20:34 (2) 20:21		16:56	20 16:18 (5)	16:13	
Potential sun hours	512	460	382	328	259	233
Total, worst case	50	416	274	466	157	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.65	0.65	0.68	0.67	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.17	
Total, real	10	92	59	92	27	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LA - H313

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	19:08 (3) 20:55	20:25 (2) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	19:15 (3) 20:57	20:26 (2) 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	20:58 20:59	20:27 (2) 21:48
4	08:43 16:18	08:08 17:12	16:39 (5) 18:07	06:54 20:06	05:46 21:01	20:20 (2) 21:49
5	08:43 16:19	08:07 17:14	16:37 (5) 18:09	17:39 (4) 20:07	05:44 21:03	20:17 (2) 21:50
6	08:42 16:21	08:05 17:16	16:43 (5) 18:11	17:46 (4) 20:09	05:42 21:04	20:32 (2) 21:51
7	08:42 16:22	08:03 17:18	16:36 (5) 18:13	17:33 (4) 20:11	05:40 21:06	20:16 (2) 21:52
8	08:42 16:24	08:01 17:20	16:35 (5) 18:15	17:28 (4) 20:13	05:38 21:08	20:15 (2) 21:53
9	08:41 16:25	07:59 17:22	16:35 (5) 18:17	17:29 (4) 20:15	05:36 21:10	20:14 (2) 21:54
10	08:40 16:26	07:57 17:24	16:34 (5) 18:19	17:50 (4) 20:17	05:34 21:11	20:39 (2) 21:55
11	08:40 16:28	07:55 17:26	16:54 (5) 18:21	17:52 (4) 20:19	05:33 21:13	20:14 (2) 21:56
12	08:39 16:30	07:53 17:28	16:33 (5) 18:23	17:25 (4) 20:20	05:31 21:15	20:42 (2) 21:57
13	08:38 16:31	07:51 17:30	16:34 (5) 18:25	17:26 (4) 20:22	05:29 21:17	20:13 (2) 21:58
14	08:37 16:33	07:49 17:32	16:34 (5) 18:27	17:25 (4) 20:24	05:27 21:18	20:14 (2) 21:59
15	08:36 16:34	07:47 17:34	16:35 (5) 18:28	18:00 (4) 20:26	05:26 21:20	20:43 (2) 21:59
16	08:35 16:36	07:45 17:36	16:36 (5) 18:30	17:24 (4) 20:28	05:24 21:22	20:14 (2) 21:59
17	08:34 16:38	07:43 17:38	16:37 (5) 18:32	18:01 (4) 20:30	05:22 21:23	20:14 (2) 21:59
18	08:33 16:40	07:41 17:40	16:38 (5) 18:34	17:23 (4) 20:31	05:21 21:25	20:14 (2) 22:00
19	08:32 16:41	07:39 17:42	16:40 (5) 18:36	18:00 (4) 20:33	05:19 21:27	20:15 (2) 22:00
20	08:31 16:43	07:36 17:44	16:44 (5) 18:38	17:24 (4) 20:35	05:18 21:28	20:42 (2) 22:01
21	08:30 16:45	07:34 17:46	16:48 (5) 18:40	18:11 (3) 20:37	21:28 21:30	20:41 (2) 22:01
22	08:28 16:47	07:32 17:48	18:40 18:41	17:25 (4) 20:39	05:15 21:31	20:17 (2) 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	17:26 (4) 20:41	05:13 21:33	20:17 (2) 22:01
24	08:26 16:50	07:28 17:52	06:21 18:45	17:26 (4) 20:42	05:12 21:34	20:18 (2) 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	17:28 (4) 20:44	05:11 21:36	20:19 (2) 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	18:21 (3) 20:46	05:09 21:37	20:38 (2) 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:33 (4) 20:48	05:08 21:39	20:21 (2) 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	18:03 (3) 20:50	05:07 21:40	20:22 (2) 22:01
29	08:18 17:00		07:08 19:54	19:03 (3) 20:52	05:06 21:41	20:24 (2) 22:01
30	08:17 17:02		07:06 19:56	19:04 (3) 20:53	05:05 21:43	20:26 (2) 22:00
31	08:15 17:04		07:04 19:58	19:05 (3) 21:44	05:04 21:44	20:32 (2) 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case		264	789	7	610	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.66	0.67	0.68	0.64	
Total reduction		0.15	0.18	0.24	0.24	
Total, real		40	144	2	149	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LA - H313

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	29	20:24 (2) 20:53 (2)	06:33 20:18		07:26 19:05	18:05 (4) 18:36 (4)	07:24 16:54	16:04 (5) 16:23 (5)	08:19 16:10
2	04:59 22:00	05:40 21:23	28	20:24 (2) 20:52 (2)	06:35 20:16		07:28 19:02	18:05 (4) 18:33 (4)	07:26 16:52	16:04 (5) 16:21 (5)	08:21 16:09
3	05:00 21:59	05:42 21:21	26	20:24 (2) 20:50 (2)	06:36 20:13		07:30 19:00	18:06 (4) 18:31 (4)	07:28 16:50	16:05 (5) 16:19 (5)	08:22 16:08
4	05:01 21:59	05:44 21:19	23	20:25 (2) 20:48 (2)	06:38 20:11		07:31 18:57	18:07 (4) 18:29 (4)	07:30 16:48	16:05 (5) 16:17 (5)	08:24 16:08
5	05:02 21:58	05:45 21:17	21	20:25 (2) 20:46 (2)	06:40 20:09		07:33 18:55	18:08 (4) 18:26 (4)	07:32 16:46	16:06 (5) 16:15 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	20	20:25 (2) 20:45 (2)	06:42 20:06		07:35 18:52	18:09 (4) 18:24 (4)	07:34 16:44	16:07 (5) 16:12 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	17	20:26 (2) 20:43 (2)	06:43 20:04		07:37 18:50	18:10 (4) 18:21 (4)	07:36 16:43	16:09 (5) 16:10 (5)	08:28 16:06
8	05:05 21:56	05:50 21:11	14	20:27 (2) 20:41 (2)	06:45 20:01		07:39 18:48	18:12 (4) 18:18 (4)	07:38 16:41	08:29 16:17	16:06
9	05:06 21:55	05:52 21:09	11	20:28 (2) 20:39 (2)	06:47 19:59		07:41 18:45		07:40 16:39		08:30 16:05
10	05:07 21:55	05:54 21:07	8	20:29 (2) 20:37 (2)	06:49 19:56		07:42 18:43		07:42 16:37		08:31 16:05
11	05:08 21:54	05:56 21:05	4	20:31 (2) 20:35 (2)	06:50 19:54	19:01 (3) 19:07 (3)	07:44 18:40		07:44 16:35		08:33 16:05
12	05:09 21:53	05:57 21:03		06:52 19:51	18:58 (3) 19:10 (3)	07:46 18:38	07:45 16:34		07:45 16:34		08:34 16:05
13	05:10 21:52	05:59 21:01		06:54 19:49	18:56 (3) 19:12 (3)	07:48 18:36	07:47 16:32		07:47 16:32		08:35 16:05
14	05:12 21:51	20:34 (2) 20:42 (2)	8	06:01 20:59	06:56 19:47	18:53 (3) 19:12 (3)	07:50 18:33		07:49 16:31		08:36 16:04
15	05:13 21:50	20:32 (2) 20:44 (2)	12	06:03 20:57	06:58 19:44	18:52 (3) 19:13 (3)	07:52 18:31		07:51 16:29		08:37 16:05
16	05:14 21:49	20:30 (2) 20:45 (2)	15	06:04 20:55	06:59 19:42	18:23 (4) 19:13 (3)	07:54 18:29		07:53 16:27		08:38 16:05
17	05:16 21:47	20:30 (2) 20:47 (2)	17	06:06 20:53	07:01 19:39	18:19 (4) 19:11 (3)	07:55 18:26		07:55 16:26		08:38 16:05
18	05:17 21:46	20:29 (2) 20:48 (2)	19	06:08 20:50	07:03 19:37	18:16 (4) 19:08 (3)	07:57 18:24		07:57 16:24		08:39 16:05
19	05:18 21:45	20:28 (2) 20:48 (2)	20	06:10 20:48	07:05 19:34	18:14 (4) 19:06 (3)	07:59 18:22		07:59 16:23		08:40 16:05
20	05:20 21:44	20:28 (2) 20:50 (2)	22	06:12 20:46	07:06 19:32	18:13 (4) 19:04 (3)	08:01 18:20		08:00 16:22		08:41 16:06
21	05:21 21:42	20:27 (2) 20:50 (2)	23	06:13 20:44	07:08 19:29	18:10 (4) 19:01 (3)	08:03 18:17		08:02 16:20		08:41 16:06
22	05:23 21:41	20:26 (2) 20:50 (2)	24	06:15 20:42	07:10 19:27	18:09 (4) 18:58 (3)	08:05 18:15	17:13 (5) 17:20 (5)	08:04 16:19		08:42 16:06
23	05:24 21:39	20:26 (2) 20:52 (2)	26	06:17 20:39	07:12 19:24	18:09 (4) 18:56 (3)	08:07 18:13	17:10 (5) 17:23 (5)	08:06 16:18		08:42 16:07
24	05:26 21:38	20:25 (2) 20:52 (2)	27	06:19 20:37	07:13 19:22	18:08 (4) 18:54 (3)	08:09 18:11	17:08 (5) 17:24 (5)	08:08 16:17		08:43 16:08
25	05:27 21:36	20:25 (2) 20:53 (2)	28	06:20 20:35	07:15 19:19	18:06 (4) 18:42 (4)	07:11 17:09	16:06 (5) 16:25 (5)	08:09 16:16		08:43 16:08
26	05:29 21:35	20:25 (2) 20:53 (2)	29	06:22 20:32	07:17 19:17	18:06 (4) 18:43 (4)	07:13 17:06	16:05 (5) 16:26 (5)	08:11 16:14		08:43 16:09
27	05:30 21:33	20:24 (2) 20:52 (2)	30	06:24 20:30	07:19 19:14	18:06 (4) 18:43 (4)	07:14 17:04	16:04 (5) 16:26 (5)	08:13 16:13		08:44 16:10
28	05:32 21:32	20:24 (2) 20:53 (2)	31	06:26 20:28	07:21 19:12	18:05 (4) 18:42 (4)	07:16 17:02	16:04 (5) 16:27 (5)	08:14 16:12		08:44 16:11
29	05:34 21:30	20:24 (2) 20:53 (2)	29	06:27 20:25	07:22 19:09	18:05 (4) 18:41 (4)	07:18 17:00	16:03 (5) 16:27 (5)	08:16 16:12		08:44 16:11
30	05:35 21:28	20:24 (2) 20:53 (2)	30	06:29 20:23	07:24 19:07	18:05 (4) 18:38 (4)	07:20 16:58	16:03 (5) 16:27 (5)	08:18 16:11		08:44 16:12
31	05:37 21:26	20:24 (2) 20:54 (2)	31	06:31 20:21			07:22 16:56	16:03 (5) 16:25 (5)			08:44 16:13
Potential sun hours	512			460		382	328	259		233	
Total, worst case		414		201		649		77			
Sun reduction		0.32		0.34		0.32	0.29	0.27			
Oper. time red.		1.00		1.00		1.00		1.00			
Wind dir. red.		0.64		0.64		0.68	0.66	0.66			
Total reduction		0.21		0.22		0.22	0.19	0.17			
Total, real		86		44		140	67	13			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LB - H314

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:44 (4) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:44 (4) 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:46 (4) 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:48 (4) 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	18:49 (4) 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	18:53 (4) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	19:20 (3) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	19:25 (3) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	16:52 (5) 18:21	06:52 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	16:50 (5) 18:23	06:50 20:20	05:31 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	16:49 (5) 18:25	06:48 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	16:48 (5) 18:27	06:45 20:24	05:27 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	16:48 (5) 18:28	06:43 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	16:48 (5) 18:30	06:40 20:28	05:24 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	16:48 (5) 18:32	06:38 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	16:47 (5) 18:34	06:35 20:31	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	16:47 (5) 18:36	06:33 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	16:48 (5) 18:38	06:31 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	16:48 (5) 18:40	06:28 20:37	05:16 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	16:48 (5) 18:41	06:26 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	16:49 (5) 18:43	06:23 20:41	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	16:51 (5) 18:45	06:21 20:42	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	16:53 (5) 18:47	06:18 20:44	05:11 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	16:57 (5) 18:49	06:16 20:46	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	05:43 (4) 19:31 (3)	05:04 21:44	20:31 (2) 20:56 (2)
Potential sun hours	250	273	367	420	494	510
Total, worst case		258		526		435
Sun reduction		0.23		0.27		0.32
Oper. time red.		1.00		1.00		1.00
Wind dir. red.		0.67		0.68		0.63
Total reduction		0.15		0.18		0.20
Total, real		40		96		88

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LB - H314

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July			August			September			October			November		December	
1	04:59		20:43 (2)	05:39		20:43 (2)	06:33			07:26			07:24		08:19	
	22:00	15	20:58 (2)	21:25	10	20:53 (2)	20:18			19:05			16:54		16:10	
2	04:59		20:43 (2)	05:40		20:44 (2)	06:35			07:28			07:26		08:21	
	22:00	16	20:59 (2)	21:23	8	20:52 (2)	20:16			19:02			16:52		16:09	
3	05:00		20:42 (2)	05:42		20:45 (2)	06:36			07:30			07:28		08:22	
	21:59	17	20:59 (2)	21:21	5	20:50 (2)	20:13			19:00			16:50		16:08	
4	05:01		20:42 (2)	05:44			06:38			07:31			07:30		08:24	
	21:59	18	21:00 (2)	21:19			20:11			18:57			16:48		16:08	
5	05:02		20:42 (2)	05:45			06:40		19:17 (3)	07:33			07:32		08:25	
	21:58	18	21:00 (2)	21:17			20:09	5	19:22 (3)	18:55			16:46		16:07	
6	05:03		20:41 (2)	05:47			06:42		18:50 (4)	07:35			07:34		08:26	
	21:58	20	21:01 (2)	21:15			20:06	21	19:25 (3)	18:52			16:44		16:07	
7	05:04		20:41 (2)	05:49			06:43		18:45 (4)	07:37			07:36		08:28	
	21:57	21	21:02 (2)	21:13			20:04	32	19:26 (3)	18:50			16:43		16:06	
8	05:05		20:41 (2)	05:51			06:45		18:42 (4)	07:39			07:38		08:29	
	21:56	21	21:02 (2)	21:11			20:01	40	19:27 (3)	18:48			16:41		16:06	
9	05:06		20:41 (2)	05:52			06:47		18:40 (4)	07:41			07:40		08:30	
	21:55	22	21:03 (2)	21:09			19:59	45	19:28 (3)	18:45			16:39		16:05	
10	05:07		20:40 (2)	05:54			06:49		18:38 (4)	07:42			07:42		08:31	
	21:55	23	21:03 (2)	21:07			19:56	50	19:28 (3)	18:43			16:37		16:05	
11	05:08		20:40 (2)	05:56			06:50		18:36 (4)	07:44			07:44		08:33	
	21:54	24	21:04 (2)	21:05			19:54	50	19:26 (3)	18:40			16:35		16:05	
12	05:09		20:40 (2)	05:57			06:52		18:35 (4)	07:46			07:45		08:34	
	21:53	24	21:04 (2)	21:03			19:51	49	19:24 (3)	18:38			16:34		16:05	
13	05:10		20:40 (2)	05:59			06:54		18:34 (4)	07:48			07:47		08:35	
	21:52	25	21:05 (2)	21:01			19:49	48	19:22 (3)	18:36			16:32		16:05	
14	05:12		20:39 (2)	06:01			06:56		18:33 (4)	07:50			07:49		08:36	
	21:51	26	21:05 (2)	20:59			19:47	45	19:18 (3)	18:33			16:31		16:04	
15	05:13		20:39 (2)	06:03			06:58		18:32 (4)	07:52			07:51		08:37	
	21:50	26	21:05 (2)	20:57			19:44	44	19:16 (3)	18:31			16:29		16:05	
16	05:14		20:38 (2)	06:04			06:59		18:32 (4)	07:54		17:27 (5)	07:53		08:38	
	21:49	27	21:05 (2)	20:55			19:42	42	19:14 (3)	18:29	8	17:35 (5)	16:27		16:05	
17	05:16		20:39 (2)	06:06			07:01		18:30 (4)	07:55		17:24 (5)	07:55		08:38	
	21:47	27	21:06 (2)	20:53			19:39	41	19:11 (3)	18:26	13	17:37 (5)	16:26		16:05	
18	05:17		20:39 (2)	06:08			07:03		18:30 (4)	07:57		17:22 (5)	07:57		08:39	
	21:46	27	21:06 (2)	20:50			19:37	38	19:08 (3)	18:24	17	17:39 (5)	16:24		16:05	
19	05:18		20:38 (2)	06:10			07:05		18:30 (4)	07:59		17:20 (5)	07:59		08:40	
	21:45	28	21:06 (2)	20:48			19:34	36	19:06 (4)	18:22	20	17:40 (5)	16:23		16:05	
20	05:20		20:39 (2)	06:12			07:06		18:30 (4)	08:01		17:19 (5)	08:00		08:41	
	21:44	28	21:07 (2)	20:46			19:32	34	19:04 (4)	18:20	22	17:41 (5)	16:22		16:06	
21	05:21		20:39 (2)	06:13			07:08		18:30 (4)	08:03		17:18 (5)	08:02		08:41	
	21:42	28	21:07 (2)	20:44			19:29	31	19:01 (4)	18:17	23	17:41 (5)	16:20		16:06	
22	05:23		20:38 (2)	06:15			07:10		18:30 (4)	08:05		17:18 (5)	08:04		08:42	
	21:41	29	21:07 (2)	20:42			19:27	28	18:58 (4)	18:15	23	17:41 (5)	16:19		16:06	
23	05:24		20:39 (2)	06:17			07:12		18:31 (4)	08:07		17:17 (5)	08:06		08:42	
	21:39	28	21:07 (2)	20:39			19:24	25	18:56 (4)	18:13	25	17:42 (5)	16:18		16:07	
24	05:26		20:39 (2)	06:19			07:13		18:31 (4)	08:09		17:17 (5)	08:08		08:43	
	21:38	26	21:05 (2)	20:37			19:22	23	18:54 (4)	18:11	24	17:41 (5)	16:17		16:08	
25	05:27		20:40 (2)	06:20			07:15		18:31 (4)	07:11		16:17 (5)	08:09		08:43	
	21:36	24	21:04 (2)	20:35			19:19	20	18:51 (4)	17:09	21	16:38 (5)	16:16		16:08	
26	05:29		20:39 (2)	06:22			07:17		18:33 (4)	07:13		16:17 (5)	08:11		08:43	
	21:35	23	21:02 (2)	20:32			19:17	15	18:48 (4)	17:06	19	16:36 (5)	16:14		16:09	
27	05:30		20:39 (2)	06:24			07:19		18:34 (4)	07:14		16:18 (5)	08:13		08:44	
	21:33	21	21:00 (2)	20:30			19:14	12	18:46 (4)	17:04	16	16:34 (5)	16:13		16:10	
28	05:32		20:40 (2)	06:26			07:21		18:36 (4)	07:16		16:18 (5)	08:14		08:44	
	21:32	19	20:59 (2)	20:28			19:12	8	18:44 (4)	17:02	13	16:31 (5)	16:12		16:11	
29	05:34		20:40 (2)	06:27			07:22		18:40 (4)	07:18		16:19 (5)	08:16		08:44	
	21:30	17	20:57 (2)	20:25			19:09	1	18:41 (4)	17:00	10	16:29 (5)	16:12		16:11	
30	05:35		20:41 (2)	06:29			07:24			07:20		16:20 (5)	08:18		08:44	
	21:28	15	20:56 (2)	20:23			19:07			16:58	7	16:27 (5)	16:11		16:12	
31	05:37		20:42 (2)	06:31						07:22		16:21 (5)			08:44	
	21:26	13	20:55 (2)	20:21						16:56	4	16:25 (5)			16:13	
Potential sun hours	512			460			382			328			259		233	
Total, worst case		696			23		783			265						
Sun reduction		0.32			0.34		0.32			0.29						
Oper. time red.		1.00			1.00		1.00			1.00						
Wind dir. red.		0.63			0.63		0.67			0.67						
Total reduction		0.20			0.22		0.22			0.19						
Total, real		142			5		169			52						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LC - H315

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:02 (3) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	20:02 (3) 20:57	21:45 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	20:02 (3) 20:59	21:45 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	20:03 (3) 21:01	21:45 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	20:03 (3) 21:03	21:45 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	20:04 (3) 21:04	21:45 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	20:06 (3) 21:06	21:45 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	17:43 (5) 20:13	20:07 (3) 21:08	21:45 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	17:39 (5) 20:15	20:07 (4) 21:10	21:45 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	17:37 (5) 20:17	20:06 (4) 21:11	21:45 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	17:36 (5) 20:19	20:06 (4) 21:13	21:45 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	17:34 (5) 20:20	20:05 (4) 21:15	21:45 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	17:34 (5) 20:22	20:04 (4) 21:17	21:45 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	17:32 (5) 20:24	20:05 (4) 21:18	21:45 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	17:32 (5) 20:26	20:04 (4) 21:20	21:45 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	17:31 (5) 20:28	20:04 (4) 21:22	21:45 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	17:31 (5) 20:30	20:04 (4) 21:23	21:45 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	17:31 (5) 20:31	20:04 (4) 21:25	21:45 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	17:31 (5) 20:33	20:05 (4) 21:27	21:45 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	17:31 (5) 20:35	20:04 (4) 21:28	21:45 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	17:32 (5) 20:37	20:05 (4) 21:30	21:45 22:00
22	08:28 16:47	07:32 17:48	06:26 18:42	17:32 (5) 20:39	20:05 (4) 21:31	21:45 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	17:34 (5) 20:41	20:06 (3) 21:33	21:45 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	17:35 (5) 20:42	20:05 (3) 21:34	21:45 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	17:38 (5) 20:44	20:04 (3) 21:36	21:45 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	17:49 (5) 20:46	20:15 (3) 21:37	21:45 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	20:46 20:48	20:03 (3) 21:39	21:45 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	20:50 20:52	20:02 (3) 21:41	21:45 22:01
29	08:18 17:00		07:08 19:54	20:56 20:52	20:02 (3) 21:41	21:45 22:01
30	08:17 17:02		07:06 19:56	20:54 20:53	20:02 (3) 21:43	21:45 22:00
31	08:15 17:04		07:04 19:58		20:24 (3) 21:44	21:45 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			390	119	1119	842
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.65	0.64	0.64
Total reduction			0.18	0.23	0.24	0.20
Total, real			71	27	273	172

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
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abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LC - H315

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:19 (4)	05:39	20:16 (4)	06:33	07:26	18:13 (5)	07:24	08:19		
	22:00	28	20:47 (4)	21:25	37	20:53 (4)	20:18	19:05	23	18:36 (5)	16:54
2	05:00	20:19 (4)	05:40	20:16 (4)	06:35	07:28	18:14 (5)	07:26	08:21		
	22:00	29	20:48 (4)	21:23	36	20:52 (4)	20:16	19:02	19	18:33 (5)	16:52
3	05:00	20:18 (4)	05:42	20:16 (4)	06:36	07:30	18:15 (5)	07:28	08:22		
	21:59	29	20:47 (4)	21:21	34	20:50 (4)	20:13	19:00	16	18:31 (5)	16:50
4	05:01	20:18 (4)	05:44	20:17 (4)	06:38	07:31	18:16 (5)	07:30	08:24		
	21:59	30	20:48 (4)	21:19	31	20:48 (4)	20:11	18:57	13	18:29 (5)	16:48
5	05:02	20:18 (4)	05:45	20:16 (3)	06:40	07:33	18:18 (5)	07:32	08:25		
	21:58	31	20:49 (4)	21:17	30	20:46 (4)	20:09	18:55	8	18:26 (5)	16:46
6	05:03	20:18 (4)	05:47	20:15 (3)	06:42	07:35	18:23 (5)	07:34	08:26		
	21:57	31	20:49 (4)	21:15	30	20:45 (4)	20:06	18:52	1	18:24 (5)	16:44
7	05:04	20:18 (4)	05:49	20:14 (3)	06:43	07:37		07:36	08:28		
	21:57	32	20:50 (4)	21:13	29	20:43 (4)	20:04	18:50		16:43	16:06
8	05:05	20:17 (4)	05:51	20:12 (3)	06:45	07:39		07:38	08:29		
	21:56	34	20:51 (4)	21:11	29	20:41 (4)	20:01	18:48		16:41	16:06
9	05:06	20:17 (4)	05:52	20:12 (3)	06:47	07:41		07:40	08:30		
	21:55	34	20:51 (4)	21:09	27	20:39 (4)	19:59	18:45		16:39	16:05
10	05:07	20:17 (4)	05:54	20:10 (3)	06:49	07:42		07:42	08:31		
	21:55	35	20:52 (4)	21:07	27	20:37 (4)	19:56	18:43		16:37	16:05
11	05:08	20:17 (4)	05:56	20:10 (3)	06:50	07:44		07:44	08:33		
	21:54	35	20:52 (4)	21:05	25	20:35 (4)	19:54	18:40		16:36	16:05
12	05:09	20:16 (4)	05:57	20:10 (3)	06:52	07:46		07:45	08:34		
	21:53	36	20:52 (4)	21:03	24	20:34 (3)	19:51	18:38		16:34	16:05
13	05:11	20:16 (4)	05:59	20:09 (3)	06:54	07:48		07:47	08:35		
	21:52	37	20:53 (4)	21:01	22	20:31 (3)	19:49	18:36		16:32	16:05
14	05:12	20:15 (4)	06:01	20:09 (3)	06:56	07:50		07:49	08:36		
	21:51	37	20:53 (4)	20:59	20	20:29 (3)	19:47	18:33		16:31	16:05
15	05:13	20:15 (4)	06:03	20:10 (3)	06:58	07:52		07:51	08:37		
	21:50	38	20:53 (4)	20:57	18	20:28 (3)	19:44	18:31		16:29	16:05
16	05:14	20:16 (4)	06:05	20:09 (3)	06:59	07:54		07:53	08:38		
	21:49	39	20:55 (4)	20:55	16	20:25 (3)	19:42	18:29		16:27	16:05
17	05:16	20:16 (4)	06:06	20:10 (3)	07:01	07:55		07:55	08:38		
	21:47	39	20:55 (4)	20:53	13	20:23 (3)	19:39	18:26		16:26	16:05
18	05:17	20:15 (4)	06:08	20:11 (3)	07:03	07:57	18:26 (5)	07:57	08:39		
	21:46	40	20:55 (4)	20:50	11	20:22 (3)	19:37	18:36 (5)	18:24	16:25	16:05
19	05:18	20:15 (4)	06:10	20:11 (3)	07:05	07:59	18:23 (5)	07:59	08:40		
	21:45	40	20:55 (4)	20:48	8	20:19 (3)	19:34	18:39 (5)	18:22	16:23	16:05
20	05:20	20:15 (4)	06:12	20:12 (3)	07:06	08:01	18:21 (5)	08:01	08:41		
	21:44	41	20:56 (4)	20:46	5	20:17 (3)	19:32	18:40 (5)	18:20	16:22	16:06
21	05:21	20:15 (4)	06:13	20:14 (3)	07:08	08:03	18:18 (5)	08:03	08:41		
	21:42	41	20:56 (4)	20:44	1	20:15 (3)	19:29	18:41 (5)	18:17	16:20	16:06
22	05:23	20:14 (4)	06:15		07:10	08:05	18:17 (5)	08:05	08:42		
	21:41	41	20:55 (4)	20:42		19:27	25	18:42 (5)	18:15	16:19	16:06
23	05:24	20:15 (4)	06:17		07:12	08:07	18:16 (5)	08:07	08:42		
	21:39	41	20:56 (4)	20:39		19:24	26	18:42 (5)	18:13	16:18	16:07
24	05:26	20:14 (4)	06:19		07:13	08:09	18:15 (5)	08:09	08:43		
	21:38	42	20:56 (4)	20:37		19:22	28	18:43 (5)	18:11	16:17	16:08
25	05:27	20:15 (4)	06:20		07:15	07:11	18:14 (5)	07:11	08:09	08:43	
	21:36	41	20:56 (4)	20:35		19:19	28	18:42 (5)	17:09	16:16	16:08
26	05:29	20:15 (4)	06:22		07:17	07:13	18:13 (5)	07:13	08:11	08:43	
	21:35	41	20:56 (4)	20:32		19:17	29	18:42 (5)	17:06	16:15	16:09
27	05:30	20:15 (4)	06:24		07:19	07:14	18:13 (5)	07:14	08:13	08:44	
	21:33	42	20:57 (4)	20:30		19:14	29	18:42 (5)	17:04	16:13	16:10
28	05:32	20:15 (4)	06:26		07:21	07:16	18:13 (5)	07:16	08:14	08:44	
	21:32	41	20:56 (4)	20:28		19:12	29	18:42 (5)	17:02	16:12	16:11
29	05:34	20:15 (4)	06:28		07:22	07:18	18:13 (5)	07:18	08:16	08:44	
	21:30	41	20:56 (4)	20:25		19:09	28	18:41 (5)	17:00	16:12	16:11
30	05:35	20:15 (4)	06:29		07:24	07:20	18:12 (5)	07:20	08:17	08:44	
	21:28	41	20:56 (4)	20:23		19:07	26	18:38 (5)	16:58	16:11	16:12
31	05:37	20:16 (4)	06:31			07:22			08:44		
	21:26	39	20:55 (4)	20:21		16:56			16:13		
Potential sun hours	512		460		382		328		259		233
Total, worst case	1146		473		316		80				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.64		0.64		0.67		0.67				
Total reduction	0.21		0.22		0.22		0.20				
Total, real	237		104		68		16				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
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abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LD - H316

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:14 (3) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	20:14 (3) 20:57	21:45 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	20:13 (3) 20:59	21:45 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	20:13 (3) 21:01	21:45 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	20:12 (3) 21:03	21:45 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	20:12 (3) 21:04	21:45 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	20:13 (3) 21:06	21:45 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	20:13 (3) 21:08	21:45 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	20:13 (3) 21:10	21:45 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	20:13 (3) 21:11	21:45 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	20:14 (3) 21:13	21:45 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	20:15 (3) 21:15	21:45 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	17:55 (5) 20:22	20:15 (3) 21:17	21:45 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	17:51 (5) 20:24	20:17 (3) 21:18	21:45 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	17:49 (5) 20:26	20:18 (3) 21:20	21:45 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	17:46 (5) 20:28	20:21 (3) 21:22	21:45 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	17:45 (5) 20:30	20:29 (4) 21:23	21:45 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	17:44 (5) 20:31	20:29 (4) 21:25	21:45 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	17:43 (5) 20:33	20:28 (4) 21:27	21:45 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	17:42 (5) 20:35	20:27 (4) 21:28	21:45 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	17:42 (5) 20:37	20:27 (4) 21:30	21:45 22:00
22	08:28 16:47	07:32 17:48	06:26 18:42	17:41 (5) 20:39	20:27 (4) 21:31	21:45 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	17:41 (5) 20:41	20:26 (4) 21:33	21:45 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	17:41 (5) 20:42	20:26 (4) 21:34	21:45 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	17:41 (5) 20:44	20:26 (4) 21:36	21:45 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	17:42 (5) 20:46	20:26 (4) 21:37	21:45 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:42 (5) 20:48	20:26 (4) 21:39	21:45 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	17:43 (5) 20:50	20:26 (4) 21:40	21:45 22:01
29	08:18 17:00		07:09 19:54	18:44 (5) 20:52	20:16 (3) 20:22 (3)	20:26 (4) 21:41
30	08:17 17:02		07:06 19:56	18:46 (5) 20:53	20:15 (3) 20:24 (3)	20:26 (4) 21:43
31	08:15 17:04		07:04 19:58	18:48 (5) 20:55	05:04 21:44	20:25 (4) 21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case			413	18	863	1238
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.64	0.63	0.63
Total reduction			0.18	0.23	0.24	0.20
Total, real			76	4	208	248

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
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abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LD - H316

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 41	20:32 (4) 21:13 (4) 21	05:39 21:25 25	20:25 (3) 20:53 (4) 20:18	07:26 19:05 16:10	08:19 16:10 16:10
2	05:00 22:00 41	20:33 (4) 21:14 (4) 22	05:40 21:23 22	20:25 (3) 20:52 (4) 20:16	07:28 19:02 16:52	08:21 16:09 16:09
3	05:00 21:59 41	20:32 (4) 21:13 (4) 21	05:42 21:21 22	20:23 (3) 20:45 (3) 20:13	07:30 19:00 16:50	08:22 16:08 16:08
4	05:01 21:59 42	20:32 (4) 21:14 (4) 21	05:44 21:19 23	20:23 (3) 20:46 (3) 20:11	07:31 18:57 16:48	08:24 16:08 16:08
5	05:02 21:58 41	20:33 (4) 21:14 (4) 21	05:45 21:17 24	20:22 (3) 20:46 (3) 20:09	07:33 18:55 16:46	08:25 16:07 16:07
6	05:03 21:57 42	20:33 (4) 21:15 (4) 21	05:47 21:15 23	20:22 (3) 20:45 (3) 20:06	07:35 18:52 16:44	08:26 16:07 16:07
7	05:04 21:57 42	20:33 (4) 21:15 (4) 21	05:49 21:13 20	20:23 (3) 20:43 (3) 20:04	07:37 18:50 16:43	08:28 16:06 16:06
8	05:05 21:56 42	20:33 (4) 21:15 (4) 21	05:51 21:11 19	20:22 (3) 20:41 (3) 20:01	07:39 18:48 16:41	08:29 16:06 16:06
9	05:06 21:55 41	20:34 (4) 21:15 (4) 21	05:52 21:09 17	20:22 (3) 20:39 (3) 19:59	07:41 18:45 16:39	08:30 16:05 16:05
10	05:07 21:55 41	20:34 (4) 21:15 (4) 21	05:54 21:07 15	20:22 (3) 20:37 (3) 19:56	07:42 18:43 16:37	08:31 16:05 16:05
11	05:08 21:54 42	20:34 (4) 21:16 (4) 21	05:56 21:05 13	20:22 (3) 20:35 (3) 19:54	07:44 18:40 16:36	08:33 16:05 16:05
12	05:09 21:53 42	20:34 (4) 21:16 (4) 21	05:57 21:03 11	20:23 (3) 20:34 (3) 19:51	07:46 18:50 (5) 18:38	08:34 16:05 16:05
13	05:11 21:52 41	20:34 (4) 21:15 (4) 21	05:59 21:01 8	20:23 (3) 20:31 (3) 19:49	07:48 18:38 (5) 18:36	08:35 16:05 16:05
14	05:12 21:51 41	20:34 (4) 21:15 (4) 21	06:01 20:59 5	20:24 (3) 20:29 (3) 19:47	07:50 18:35 (5) 18:33	08:36 16:05 16:05
15	05:13 21:50 41	20:34 (4) 21:15 (4) 21	06:03 20:57 2	20:26 (3) 19:44 23	07:52 18:33 (5) 18:31	08:37 16:05 16:05
16	05:14 21:49 40	20:35 (4) 21:15 (4) 20	06:05 20:55 1	06:59 19:42 25	07:54 18:32 (5) 18:29	08:38 16:05 16:05
17	05:16 21:47 39	20:35 (4) 21:14 (4) 20	06:06 20:53 1	07:01 19:39 26	07:55 18:30 (5) 18:26	08:38 16:05 16:05
18	05:17 21:46 37	20:35 (4) 21:12 (4) 20	06:08 20:50 1	07:03 19:37 28	07:57 18:29 (5) 18:24	08:39 16:05 16:05
19	05:18 21:45 36	20:35 (4) 21:11 (4) 20	06:10 20:48 1	07:05 19:34 29	07:59 18:28 (5) 18:22	08:40 16:05 16:05
20	05:20 21:44 34	20:36 (4) 21:10 (4) 20	06:12 20:46 1	07:06 19:32 29	08:01 18:28 (5) 18:20	08:41 16:06 16:06
21	05:21 21:42 33	20:36 (4) 21:09 (4) 20	06:13 20:44 1	07:08 19:29 30	08:03 18:26 (5) 18:17	08:41 16:06 16:06
22	05:23 21:41 30	20:37 (4) 21:07 (4) 20	06:15 20:42 1	07:10 19:27 30	08:05 18:26 (5) 18:15	08:42 16:06 16:06
23	05:24 21:39 29	20:38 (4) 21:07 (4) 20	06:17 20:39 1	07:12 19:24 30	08:07 18:26 (5) 18:13	08:42 16:07 16:07
24	05:26 21:38 27	20:38 (4) 21:05 (4) 20	06:19 20:37 1	07:13 19:22 27	08:09 18:27 (5) 18:11	08:43 16:08 16:08
25	05:27 21:36 25	20:39 (4) 21:04 (4) 20	06:20 20:35 1	07:15 19:19 25	08:09 18:26 (5) 17:09	08:43 16:08 16:08
26	05:29 21:35 23	20:39 (4) 21:02 (4) 20	06:22 20:32 1	07:17 19:17 21	08:11 18:27 (5) 17:13	08:43 16:09 16:09
27	05:30 21:33 20	20:41 (4) 21:01 (4) 20	06:24 20:30 1	07:19 19:14 18	08:13 18:28 (5) 17:14	08:44 16:10 16:10
28	05:32 21:32 27	20:41 (4) 20:59 (4) 20	06:26 20:28 1	07:21 19:12 15	08:14 18:29 (5) 17:16	08:44 16:11 16:11
29	05:34 21:30 28	20:41 (4) 20:58 (4) 20	06:28 20:25 1	07:22 19:09 10	08:16 18:31 (5) 17:18	08:44 16:12 16:12
30	05:35 21:28 29	20:41 (4) 20:56 (4) 20	06:29 20:23 1	07:24 19:07 6	08:17 18:32 (5) 17:20	08:44 16:13 16:13
31	05:37 21:26 28	20:41 (4) 20:55 (4) 20	06:31 20:21 1	07:22 16:56 1	08:18 18:33 (5) 17:21	08:44 16:13 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case	1106	249	415			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.63	0.64	0.67			
Total reduction	0.20	0.22	0.22			
Total, real	225	55	90			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LE - H317

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		18:50 (5)	05:52			05:03		20:43 (4)
	16:15	17:06	18:02						20:00	25	19:15 (5)	20:55			21:45	27	21:10 (4)
2	08:44	08:12	07:14						06:59		18:50 (5)	05:50		20:26 (3)	05:02		20:44 (4)
	16:16	17:08	18:04						20:02	23	19:13 (5)	20:57	1	20:27 (3)	21:46	28	21:12 (4)
3	08:43	08:10	07:12						06:56		18:52 (5)	05:48		20:25 (3)	05:01		20:44 (4)
	16:17	17:10	18:06						20:04	19	19:11 (5)	20:59	4	20:29 (3)	21:48	29	21:13 (4)
4	08:43	08:08	07:09						06:54		18:54 (5)	05:46		20:23 (3)	05:00		20:43 (4)
	16:18	17:12	18:07						20:06	15	19:09 (5)	21:01	7	20:30 (3)	21:49	31	21:14 (4)
5	08:43	08:07	07:07						06:51		18:57 (5)	05:44		20:22 (3)	04:59		20:44 (4)
	16:20	17:14	18:09						20:07	8	19:05 (5)	21:03	10	20:32 (3)	21:50	31	21:15 (4)
6	08:42	08:05	07:04						06:49			05:42		20:22 (3)	04:59		20:43 (4)
	16:21	17:16	18:11						20:09			21:04	11	20:33 (3)	21:51	33	21:16 (4)
7	08:42	08:03	07:02						06:47			05:40		20:22 (3)	04:58		20:43 (4)
	16:22	17:18	18:13						20:11			21:06	14	20:36 (3)	21:52	33	21:16 (4)
8	08:41	08:01	07:00						06:44			05:38		20:21 (3)	04:57		20:43 (4)
	16:24	17:20	18:15						20:13			21:08	16	20:37 (3)	21:53	35	21:18 (4)
9	08:41	07:59	06:57						06:42			05:36		20:21 (3)	04:57		20:43 (4)
	16:25	17:22	18:17						20:15			21:10	17	20:38 (3)	21:54	35	21:18 (4)
10	08:40	07:57	06:55						06:39			05:34		20:20 (3)	04:56		20:43 (4)
	16:27	17:24	18:19						20:17			21:11	20	20:40 (3)	21:55	36	21:19 (4)
11	08:40	07:55	06:52						06:37			05:33		20:21 (3)	04:56		20:44 (4)
	16:28	17:26	18:21						20:19			21:13	21	20:42 (3)	21:55	36	21:20 (4)
12	08:39	07:53	06:50						06:35			05:31		20:21 (3)	04:55		20:44 (4)
	16:30	17:28	18:23						20:20			21:15	22	20:43 (3)	21:56	37	21:21 (4)
13	08:38	07:51	06:48						06:32			05:29		20:21 (3)	04:55		20:43 (4)
	16:31	17:30	18:25						20:22			21:17	23	20:44 (3)	21:57	38	21:21 (4)
14	08:37	07:49	06:45						06:30			05:27		20:21 (3)	04:55		20:44 (4)
	16:33	17:32	18:27						20:24			21:18	23	20:44 (3)	21:57	38	21:22 (4)
15	08:36	07:47	06:43						06:28			05:26		20:21 (3)	04:55		20:44 (4)
	16:34	17:34	18:28						20:26			21:20	23	20:44 (3)	21:58	38	21:22 (4)
16	08:35	07:45	06:40						06:25			05:24		20:22 (3)	04:54		20:44 (4)
	16:36	17:36	18:30						20:28			21:22	22	20:44 (3)	21:59	39	21:23 (4)
17	08:34	07:43	06:38		18:03 (5)	06:23			06:23			05:22		20:23 (3)	04:54		20:44 (4)
	16:38	17:38	18:32	3	18:06 (5)	20:30			20:30			21:23	19	20:42 (3)	21:59	39	21:23 (4)
18	08:33	07:41	06:35		17:58 (5)	06:21			06:21			05:21		20:24 (3)	04:54		20:45 (4)
	16:40	17:40	18:34	9	18:07 (5)	20:31			20:31			21:25	18	20:42 (3)	22:00	39	21:24 (4)
19	08:32	07:39	06:33		17:56 (5)	06:18			06:18			05:19		20:25 (3)	04:54		20:45 (4)
	16:41	17:42	18:36	14	18:10 (5)	20:33			20:33			21:27	17	20:42 (3)	22:00	39	21:24 (4)
20	08:31	07:36	06:31		17:54 (5)	06:16			06:16			05:18		20:26 (3)	04:54		20:45 (4)
	16:43	17:44	18:38	17	18:11 (5)	20:35			20:35			21:28	16	20:55 (4)	22:00	39	21:24 (4)
21	08:30	07:34	06:28		17:53 (5)	06:14			06:14			05:16		20:27 (3)	04:54		20:45 (4)
	16:45	17:46	18:40	20	18:13 (5)	20:37			20:37			21:30	18	20:57 (4)	22:00	39	21:24 (4)
22	08:28	07:32	06:26		17:51 (5)	06:12			06:12			05:15		20:30 (3)	04:55		20:46 (4)
	16:47	17:48	18:42	24	18:15 (5)	20:39			20:39			21:31	17	20:59 (4)	22:01	39	21:25 (4)
23	08:27	07:30	06:23		17:50 (5)	06:09			06:09			05:13		20:48 (4)	04:55		20:46 (4)
	16:49	17:50	18:43	27	18:17 (5)	20:41			20:41			21:33	11	20:59 (4)	22:01	39	21:25 (4)
24	08:26	07:28	06:21		17:49 (5)	06:07			06:07			05:12		20:47 (4)	04:55		20:46 (4)
	16:51	17:52	18:45	29	18:18 (5)	20:42			20:42			21:34	14	21:01 (4)	22:01	39	21:25 (4)
25	08:24	07:25	06:18		17:49 (5)	06:05			06:05			05:11		20:47 (4)	04:56		20:46 (4)
	16:52	17:54	18:47	31	18:20 (5)	20:44			20:44			21:36	15	21:02 (4)	22:01	39	21:25 (4)
26	08:23	07:23	06:16		17:49 (5)	06:03			06:03			05:09		20:46 (4)	04:56		20:46 (4)
	16:54	17:56	18:49	31	18:20 (5)	20:46			20:46			21:37	18	21:04 (4)	22:01	39	21:25 (4)
27	08:22	07:21	06:13		17:48 (5)	06:01			06:01			05:08		20:45 (4)	04:56		20:46 (4)
	16:56	17:58	18:51	31	18:19 (5)	20:48			20:48			21:39	20	21:05 (4)	22:01	38	21:24 (4)
28	08:20	07:18	06:11		17:48 (5)	05:58			05:58			05:07		20:45 (4)	04:57		20:47 (4)
	16:58	18:00	18:53	31	18:19 (5)	20:50			20:50			21:40	21	21:06 (4)	22:01	38	21:25 (4)
29	08:18		07:09		18:48 (5)	05:56			05:56			05:06		20:45 (4)	04:58		20:47 (4)
	17:00		19:54	30	19:18 (5)	20:52			20:52			21:41	22	21:07 (4)	22:01	38	21:25 (4)
30	08:17		07:06		18:49 (5)	05:54			05:54			05:05		20:44 (4)	04:58		20:47 (4)
	17:02		19:56	28	19:17 (5)	20:53			20:53			21:43	24	21:08 (4)	22:00	37	21:24 (4)
31	08:15		07:04		18:48 (5)							05:04		20:44 (4)			
	17:04		19:58	28	19:16 (5)							21:44	25	21:09 (4)			
Potential sun hours	250	273	367		420				494			510					
Total, worst case				353	90						509				1085		
Sun reduction				0.27	0.35				0.38						0.32		
Oper. time red.				1.00	1.00				1.00						1.00		
Wind dir. red.				0.68	0.68				0.63						0.61		
Total reduction				0.18	0.24				0.24						0.20		
Total, real				65	21				122						213		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LE - H317

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 36	20:48 (4) 21:24 (4) 21:25	05:39 22 20:53 (3) 20:18		07:26 19:05 16:54 16:10	
2	05:00 22:00 36	20:48 (4) 21:24 (4) 21:23	05:40 21 20:52 (3) 20:16		07:28 19:02 16:52 16:09	
3	05:00 21:59 35	20:48 (4) 21:23 (4) 21:21	05:42 19 20:50 (3) 20:13		07:30 19:00 16:50 16:08	
4	05:01 21:59 35	20:48 (4) 21:23 (4) 21:19	05:44 17 20:48 (3) 20:11		07:31 18:57 16:48 16:08	
5	05:02 21:58 34	20:49 (4) 21:23 (4) 21:17	05:45 15 20:46 (3) 20:09		07:33 18:55 16:46 16:07	
6	05:03 21:57 33	20:49 (4) 21:22 (4) 21:15	05:47 14 20:45 (3) 20:06		07:35 18:52 16:44 16:07	
7	05:04 21:57 32	20:50 (4) 21:22 (4) 21:13	05:49 11 20:43 (3) 20:04	8	18:52 (5) 19:00 (5) 18:50 16:43 16:06	
8	05:05 21:56 31	20:50 (4) 21:21 (4) 21:11	05:51 9 20:41 (3) 20:01	15	18:48 (5) 19:03 (5) 18:48 16:41 16:06	
9	05:06 21:55 30	20:51 (4) 21:21 (4) 21:09	05:52 6 20:39 (3) 19:59	19	18:46 (5) 19:05 (5) 18:45 16:39 16:05	
10	05:07 21:55 29	20:51 (4) 21:20 (4) 21:07	05:54 4 20:37 (3) 19:56	23	18:43 (5) 19:06 (5) 18:43 16:37 16:05	
11	05:08 21:54 27	20:52 (4) 21:19 (4) 21:05	05:56 19:54 25	18:42 (5) 19:07 (5) 18:40 16:36 16:05		07:44 07:44 16:36 16:05 16:05
12	05:09 21:53 26	20:52 (4) 21:18 (4) 21:03	05:57 19:51 27	18:41 (5) 19:08 (5) 18:38 16:34 16:05		07:46 07:45 16:34 16:05 16:05
13	05:11 21:52 25	20:52 (4) 21:17 (4) 21:01	05:59 19:49 29	18:40 (5) 19:09 (5) 18:36 16:32 16:05		07:48 18:36 16:32 16:05 16:05
14	05:12 21:51 23	20:53 (4) 21:16 (4) 20:59	06:01 19:47 30	18:38 (5) 19:08 (5) 18:33 16:31 16:05		07:50 18:33 16:31 16:05 16:05
15	05:13 21:50 22	20:53 (4) 21:15 (4) 20:57	06:03 19:44 30	18:38 (5) 19:08 (5) 18:31 16:29 16:05		07:52 18:31 16:29 16:05 16:05
16	05:14 21:48 20	20:55 (4) 21:15 (4) 20:55	06:05 19:42 30	18:38 (5) 19:08 (5) 18:29 16:27 16:05		07:54 18:29 16:27 16:05 16:05
17	05:16 21:47 19	20:55 (4) 21:14 (4) 20:53	06:06 19:39 31	18:36 (5) 19:07 (5) 18:26 16:26 16:05		07:55 18:26 16:26 16:05 16:05
18	05:17 21:46 16	20:56 (4) 21:12 (4) 20:50	06:08 19:37 31	18:36 (5) 19:07 (5) 18:24 16:25 16:05		07:57 18:24 16:25 16:05 16:05
19	05:18 21:45 15	20:56 (4) 21:11 (4) 20:48	06:10 19:34 29	18:37 (5) 19:06 (5) 18:22 16:23 16:05		07:59 18:22 16:23 16:05 16:05
20	05:20 21:44 12	20:58 (4) 21:10 (4) 20:46	06:12 19:32 27	18:37 (5) 19:04 (5) 18:20 16:22 16:06		08:00 18:20 16:22 16:06 16:06
21	05:21 21:42 15	20:41 (3) 21:09 (4) 20:44	06:13 19:29 25	18:36 (5) 19:01 (5) 18:17 16:20 16:06		08:03 18:17 16:20 16:06 16:06
22	05:23 21:41 17	20:38 (3) 21:07 (4) 20:42	06:15 19:27 22	18:37 (5) 18:59 (5) 18:15 16:19 16:06		08:05 18:15 16:19 16:06 16:06
23	05:24 21:39 18	20:37 (3) 21:07 (4) 20:39	06:17 19:24 18	18:38 (5) 18:56 (5) 18:13 16:18 16:07		08:07 18:13 16:18 16:07 16:07
24	05:26 21:38 17	20:35 (3) 21:05 (4) 20:37	06:19 19:22 15	18:39 (5) 18:54 (5) 18:11 16:17 16:08		08:09 18:11 16:17 16:08 16:08
25	05:27 21:36 17	20:35 (3) 20:52 (3) 20:35	06:20 19:19 11	18:40 (5) 18:51 (5) 17:09 16:16 16:08		07:11 17:09 16:16 16:08 16:08
26	05:29 21:35 19	20:34 (3) 20:53 (3) 20:32	06:22 19:17 5	18:43 (5) 18:48 (5) 17:06 16:15 16:09		07:13 17:06 16:15 16:09 16:09
27	05:30 21:33 20	20:34 (3) 20:54 (3) 20:30	06:24 19:14 28	17:14 17:04 16:13 16:10 16:08		08:13 17:04 16:13 16:10 16:10
28	05:32 21:32 21	20:33 (3) 20:54 (3) 20:28	06:26 19:12 29	17:16 17:02 16:13 16:11 16:08		08:14 17:02 16:13 16:11 16:11
29	05:34 21:30 22	20:33 (3) 20:55 (3) 20:25	06:28 19:09 30	17:18 17:00 16:12 16:11 16:08		08:16 16:12 16:11 16:11 16:11
30	05:35 21:28 23	20:32 (3) 20:55 (3) 20:23	06:29 19:07 31	17:24 16:58 16:11 16:12 16:08		08:17 16:11 16:12 16:12 16:12
31	05:37 21:26 23	20:32 (3) 20:55 (3) 20:21	06:31 19:07 32	17:22 16:56 16:13 16:10 16:07		08:19 16:13 16:10 16:07 16:07
Potential sun hours	512	460	382	328	259	233
Total, worst case	748	138	450			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.62	0.64	0.68			
Total reduction	0.20	0.22	0.22			
Total, real	150	30	97			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LF - H318

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		08:14		07:16				07:01			19:01 (5)	05:52		05:03		21:02 (4)
	16:15		17:06		18:02				20:00	30		19:31 (5)	20:55		21:45	8	21:10 (4)
2	08:44		08:12		07:14				06:59			19:00 (5)	05:50		05:02		21:02 (4)
	16:16		17:08		18:04				20:02	30		19:30 (5)	20:57		21:46	10	21:12 (4)
3	08:43		08:10		07:11				06:56			19:00 (5)	05:48		05:01		21:01 (4)
	16:17		17:10		18:06				20:04	30		19:30 (5)	20:59		21:48	12	21:13 (4)
4	08:43		08:08		07:09				06:54			19:01 (5)	05:46		05:00		21:01 (4)
	16:18		17:12		18:07				20:06	29		19:30 (5)	21:01		21:49	13	21:14 (4)
5	08:43		08:07		07:07				06:51			19:00 (5)	05:44		04:59		21:01 (4)
	16:20		17:14		18:09				20:07	28		19:28 (5)	21:03		21:50	14	21:15 (4)
6	08:42		08:05		07:04				06:49			19:01 (5)	05:42		04:59		21:00 (4)
	16:21		17:16		18:11				20:09	27		19:28 (5)	21:04		21:51	16	21:16 (4)
7	08:42		08:03		07:02				06:47			19:01 (5)	05:40		04:58		21:00 (4)
	16:22		17:18		18:13				20:11	25		19:26 (5)	21:06	3	20:36 (3)	16	21:16 (4)
8	08:41		08:01		07:00				06:44			19:03 (5)	05:38		20:32 (3)		21:00 (4)
	16:24		17:20		18:15				20:13	21		19:24 (5)	21:08	5	20:37 (3)	18	21:18 (4)
9	08:41		07:59		06:57				06:42			19:05 (5)	05:36		20:31 (3)		21:00 (4)
	16:25		17:22		18:17				20:15	18		19:23 (5)	21:10	7	20:38 (3)	19	21:19 (4)
10	08:40		07:57		06:55				06:39			19:06 (5)	05:34		20:30 (3)		21:00 (4)
	16:27		17:24		18:19				20:17	13		19:19 (5)	21:11	10	20:40 (3)	19	21:19 (4)
11	08:40		07:55		06:52				06:37			19:11 (5)	05:33		20:30 (3)		21:00 (4)
	16:28		17:26		18:21				20:19	3		19:14 (5)	21:13	12	20:42 (3)	20	21:20 (4)
12	08:39		07:53		06:50				06:35				05:31		20:30 (3)		21:00 (4)
	16:30		17:28		18:23				20:20				21:15	13	20:43 (3)	21	21:21 (4)
13	08:38		07:51		06:48				06:32				05:29		20:29 (3)		21:00 (4)
	16:31		17:30		18:25				20:22				21:17	15	20:44 (3)	21	21:21 (4)
14	08:37		07:49		06:45				06:30				05:27		20:30 (3)		21:00 (4)
	16:33		17:32		18:27				20:24				21:18	17	20:47 (3)	22	21:22 (4)
15	08:36		07:47		06:43				06:28				05:26		20:29 (3)		21:00 (4)
	16:34		17:34		18:28				20:26				21:20	19	20:48 (3)	22	21:22 (4)
16	08:35		07:45		06:40				06:25				05:24		20:30 (3)		21:00 (4)
	16:36		17:36		18:30				20:28				21:22	20	20:50 (3)	23	21:23 (4)
17	08:34		07:43		06:38				06:23				05:22		20:29 (3)		21:00 (4)
	16:38		17:38		18:32				20:30				21:23	22	20:51 (3)	23	21:23 (4)
18	08:33		07:41		06:35				06:21				05:21		20:30 (3)		21:00 (4)
	16:40		17:40		18:34				20:31				21:25	23	20:53 (3)	24	21:24 (4)
19	08:32		07:39		06:33				06:18				05:19		20:31 (3)		21:01 (4)
	16:41		17:42		18:36				20:33				21:27	22	20:53 (3)	23	21:24 (4)
20	08:31		07:36		06:31				06:16				05:18		20:31 (3)		21:01 (4)
	16:43		17:44		18:38				20:35				21:28	21	20:52 (3)	23	21:24 (4)
21	08:30		07:34		06:28				06:14				05:16		20:32 (3)		21:01 (4)
	16:45		17:46		18:40				20:37				21:30	20	20:52 (3)	23	21:24 (4)
22	08:28		07:32		06:26				06:12				05:15		20:32 (3)		21:02 (4)
	16:47		17:48		18:42				20:39				21:31	19	20:51 (3)	23	21:25 (4)
23	08:27		07:30		06:23			18:14 (5)	06:09				05:13		20:32 (3)		21:02 (4)
	16:49		17:50		18:43	3		18:17 (5)	20:41				21:33	18	20:50 (3)	23	21:25 (4)
24	08:26		07:28		06:21			18:10 (5)	06:07				05:12		20:34 (3)		21:02 (4)
	16:51		17:52		18:45	8		18:18 (5)	20:42				21:34	15	20:49 (3)	23	21:25 (4)
25	08:24		07:25		06:18			18:08 (5)	06:05				05:11		20:35 (3)		21:02 (4)
	16:52		17:54		18:47	13		18:21 (5)	20:44				21:36	14	20:49 (3)	23	21:25 (4)
26	08:23		07:23		06:16			18:06 (5)	06:03				05:09		20:36 (3)		21:02 (4)
	16:54		17:56		18:49	17		18:23 (5)	20:46				21:37	12	20:48 (3)	23	21:25 (4)
27	08:22		07:21		06:13			18:04 (5)	06:01				05:08		20:38 (3)		21:02 (4)
	16:56		17:58		18:51	20		18:24 (5)	20:48				21:39	9	20:47 (3)	22	21:24 (4)
28	08:20		07:18		06:11			18:04 (5)	05:58				05:07		20:40 (3)		21:03 (4)
	16:58		18:00		18:53	22		18:26 (5)	20:50				21:40	4	20:44 (3)	22	21:25 (4)
29	08:18				07:09			19:02 (5)	05:56				05:06		21:05 (4)		21:04 (4)
	17:00				19:54	26		19:28 (5)	20:52				21:41	2	21:07 (4)	21	21:25 (4)
30	08:17				07:06			19:02 (5)	05:54				05:05		21:04 (4)		21:03 (4)
	17:02				19:56	28		19:30 (5)	20:53				21:43	4	21:08 (4)	21	21:24 (4)
31	08:15				07:04			19:01 (5)					05:04		21:03 (4)		
	17:04				19:58	30		19:31 (5)					21:44	6	21:09 (4)		
Potential sun hours	250		273		367			420				494			510		
Total, worst case					167			254				332			591		
Sun reduction					0.27			0.35				0.38			0.32		
Oper. time red.					1.00			1.00				1.00			1.00		
Wind dir. red.					0.67			0.67				0.63			0.61		
Total reduction					0.18			0.24				0.24			0.19		
Total, real					31			60				80			115		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LF - H318

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	21:04 (4)	05:39	20:40 (3)	06:33	19:10 (5)	07:26	07:24	08:19		
	22:00	20	21:24 (4)	21:25	13	20:53 (3)	20:18	4	19:14 (5)	19:05	16:54
2	05:00	21:05 (4)	05:40	20:41 (3)	06:35	19:05 (5)	07:28	07:26	08:21		
	22:00	19	21:24 (4)	21:23	11	20:52 (3)	20:16	14	19:19 (5)	19:02	16:52
3	05:00	21:05 (4)	05:42	20:41 (3)	06:36	19:02 (5)	07:30	07:28	08:22		
	21:59	18	21:23 (4)	21:21	9	20:50 (3)	20:13	18	19:20 (5)	19:00	16:50
4	05:01	21:05 (4)	05:44	20:42 (3)	06:38	19:00 (5)	07:31	07:30	08:24		
	21:59	18	21:23 (4)	21:19	6	20:48 (3)	20:11	21	19:21 (5)	18:57	16:48
5	05:02	21:06 (4)	05:45	20:42 (3)	06:40	18:59 (5)	07:33	07:32	08:25		
	21:58	17	21:23 (4)	21:17	4	20:46 (3)	20:09	24	19:23 (5)	18:55	16:46
6	05:03	21:07 (4)	05:47	20:43 (3)	06:42	18:58 (5)	07:35	07:34	08:26		
	21:57	15	21:22 (4)	21:15	2	20:45 (3)	20:06	26	19:24 (5)	18:52	16:44
7	05:04	21:07 (4)	05:49		06:43	18:56 (5)	07:37	07:36	08:28		
	21:57	15	21:22 (4)	21:13		20:04	27	19:23 (5)	18:50	16:43	16:06
8	05:05	21:08 (4)	05:51		06:45	18:55 (5)	07:39	07:38	08:29		
	21:56	13	21:21 (4)	21:11		20:01	29	19:24 (5)	18:48	16:41	16:06
9	05:06	21:09 (4)	05:52		06:47	18:55 (5)	07:41	07:40	08:30		
	21:55	12	21:21 (4)	21:09		19:59	29	19:24 (5)	18:45	16:39	16:05
10	05:07	21:09 (4)	05:54		06:49	18:53 (5)	07:42	07:42	08:31		
	21:55	11	21:20 (4)	21:07		19:56	30	19:23 (5)	18:43	16:37	16:05
11	05:08	21:10 (4)	05:56		06:50	18:53 (5)	07:44	07:44	08:33		
	21:54	9	21:19 (4)	21:05		19:54	30	19:23 (5)	18:40	16:36	16:05
12	05:09	21:11 (4)	05:57		06:52	18:53 (5)	07:46	07:45	08:34		
	21:53	7	21:18 (4)	21:03		19:51	30	19:23 (5)	18:38	16:34	16:05
13	05:11	21:12 (4)	05:59		06:54	18:53 (5)	07:48	07:47	08:35		
	21:52	5	21:17 (4)	21:01		19:49	29	19:22 (5)	18:36	16:32	16:05
14	05:12	21:13 (4)	06:01		06:56	18:52 (5)	07:50	07:49	08:36		
	21:51	3	21:16 (4)	20:59		19:47	26	19:18 (5)	18:33	16:31	16:05
15	05:13	21:14 (4)	06:03		06:58	18:53 (5)	07:52	07:51	08:37		
	21:50	1	21:15 (4)	20:57		19:44	23	19:16 (5)	18:31	16:29	16:05
16	05:14	20:48 (3)	06:05		06:59	18:54 (5)	07:54	07:53	08:38		
	21:48	7	20:55 (3)	20:55		19:42	20	19:14 (5)	18:29	16:27	16:05
17	05:16	20:46 (3)	06:06		07:01	18:54 (5)	07:55	07:55	08:38		
	21:47	11	20:57 (3)	20:53		19:39	17	19:11 (5)	18:26	16:26	16:05
18	05:17	20:45 (3)	06:08		07:03	18:55 (5)	07:57	07:57	08:39		
	21:46	13	20:58 (3)	20:50		19:37	13	19:08 (5)	18:24	16:25	16:05
19	05:18	20:44 (3)	06:10		07:05	18:57 (5)	07:59	07:59	08:40		
	21:45	15	20:59 (3)	20:48		19:34	9	19:06 (5)	18:22	16:23	16:05
20	05:20	20:44 (3)	06:12		07:06	18:59 (5)	08:01	08:00	08:41		
	21:44	16	21:00 (3)	20:46		19:32	5	19:04 (5)	18:20	16:22	16:06
21	05:21	20:43 (3)	06:13		07:08		08:03	08:02	08:41		
	21:42	18	21:01 (3)	20:44		19:29		18:17	16:20	16:06	
22	05:23	20:42 (3)	06:15		07:10		08:05	08:04	08:42		
	21:41	19	21:01 (3)	20:42		19:27		18:15	16:19	16:07	
23	05:24	20:42 (3)	06:17		07:12		08:07	08:06	08:42		
	21:39	20	21:02 (3)	20:39		19:24		18:13	16:18	16:07	
24	05:26	20:41 (3)	06:19		07:13		08:09	08:08	08:43		
	21:38	21	21:02 (3)	20:37		19:22		18:11	16:17	16:08	
25	05:27	20:41 (3)	06:20		07:15		07:11	08:09	08:43		
	21:36	22	21:03 (3)	20:35		19:19		17:09	16:16	16:08	
26	05:29	20:40 (3)	06:22		07:17		07:13	08:11	08:43		
	21:35	22	21:02 (3)	20:32		19:17		17:06	16:15	16:09	
27	05:30	20:41 (3)	06:24		07:19		07:14	08:13	08:44		
	21:33	20	21:01 (3)	20:30		19:14		17:04	16:13	16:10	
28	05:32	20:40 (3)	06:26		07:21		07:16	08:14	08:44		
	21:32	19	20:59 (3)	20:28		19:12		17:02	16:13	16:11	
29	05:34	20:40 (3)	06:28		07:22		07:18	08:16	08:44		
	21:30	18	20:58 (3)	20:25		19:09		17:00	16:12	16:11	
30	05:35	20:40 (3)	06:29		07:24		07:20	08:17	08:44		
	21:28	16	20:56 (3)	20:23		19:07		16:58	16:11	16:12	
31	05:37	20:41 (3)	06:31					07:22		08:44	
	21:26	14	20:55 (3)	20:21				16:56		16:13	
Potential sun hours	512		460		382		328	259	233		
Total, worst case		454		45		424					
Sun reduction		0.32		0.34		0.32					
Oper. time red.		1.00		1.00		1.00					
Wind dir. red.		0.62		0.63		0.67					
Total reduction		0.20		0.22		0.22					
Total, real		92		10		92					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LG - H319

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16	07:01	19:01 (5)	05:52	05:03	20:41 (3)	07:01	19:01 (5)	05:52	05:03	20:41 (3)		05:03	20:41 (3)	
	16:15	17:06	18:02	20:00	32	19:33 (5)	20:55	21:45		20:00	32	19:33 (5)	20:55	21:45	12	20:53 (3)	
2	08:44	08:12	07:14	06:59	19:00 (5)	05:50	05:02	20:43 (3)		06:59	19:00 (5)	05:50	05:02	20:43 (3)		20:43 (3)	
	16:16	17:08	18:04	20:02	32	19:32 (5)	20:57	21:46		20:02	32	19:32 (5)	20:57	21:46	9	20:52 (3)	
3	08:43	08:10	07:12	06:56	19:00 (5)	05:48	05:01	20:45 (3)		06:56	19:00 (5)	05:48	05:01	20:45 (3)		20:45 (3)	
	16:17	17:10	18:06	20:04	32	19:32 (5)	20:59	21:48		20:04	32	19:32 (5)	20:59	21:48	6	20:51 (3)	
4	08:43	08:08	07:09	06:54	19:01 (5)	05:46	05:00			06:54	19:01 (5)	05:46	05:00				
	16:18	17:12	18:07	20:06	31	19:32 (5)	21:01	21:49		20:06	31	19:32 (5)	21:01	21:49			
5	08:43	08:07	07:07	06:51	19:00 (5)	05:44	04:59			06:51	19:00 (5)	05:44	04:59				
	16:20	17:14	18:09	20:07	31	19:31 (5)	21:03	21:50		20:07	31	19:31 (5)	21:03	21:50			
6	08:42	08:05	07:04	06:49	19:01 (5)	05:42	04:59			06:49	19:01 (5)	05:42	04:59				
	16:21	17:16	18:11	20:09	30	19:31 (5)	21:04	21:51		20:09	30	19:31 (5)	21:04	21:51			
7	08:42	08:03	07:02	06:47	19:00 (5)	05:40	04:58			06:47	19:00 (5)	05:40	04:58				
	16:22	17:18	18:13	20:11	29	19:29 (5)	21:06	21:52		20:11	29	19:29 (5)	21:06	21:52			
8	08:41	08:01	07:00	06:44	19:01 (5)	05:38	04:57			06:44	19:01 (5)	05:38	04:57			21:16 (4)	
	16:24	17:20	18:15	20:13	27	19:28 (5)	21:08	21:53		20:13	27	19:28 (5)	21:08	21:53	2	21:18 (4)	
9	08:41	07:59	06:57	06:42	19:03 (5)	05:36	04:57			06:42	19:03 (5)	05:36	04:57			21:16 (4)	
	16:25	17:22	18:17	20:15	24	19:27 (5)	21:10	21:54		20:15	24	19:27 (5)	21:10	21:54	3	21:19 (4)	
10	08:40	07:57	06:55	06:39	19:03 (5)	05:34	04:56			06:39	19:03 (5)	05:34	04:56			21:15 (4)	
	16:27	17:24	18:19	20:17	22	19:25 (5)	21:11	21:55		20:17	22	19:25 (5)	21:11	21:55	4	21:19 (4)	
11	08:40	07:55	06:52	06:37	19:05 (5)	05:33	04:56			06:37	19:05 (5)	05:33	04:56			21:15 (4)	
	16:28	17:26	18:21	20:19	18	19:23 (5)	21:13	21:55		20:19	18	19:23 (5)	21:13	21:55	5	21:20 (4)	
12	08:39	07:53	06:50	06:35	19:08 (5)	05:31	04:55			06:35	19:08 (5)	05:31	04:55			21:15 (4)	
	16:30	17:28	18:23	20:20	13	19:21 (5)	21:15	21:56		20:20	13	19:21 (5)	21:15	21:56	6	21:21 (4)	
13	08:38	07:51	06:48	06:32	19:12 (5)	05:29	04:55			06:32	19:12 (5)	05:29	04:55			21:14 (4)	
	16:31	17:30	18:25	20:22	3	19:15 (5)	21:17	21:57		20:22	3	19:15 (5)	21:17	21:57	7	21:21 (4)	
14	08:37	07:49	06:45	06:30	19:15 (5)	05:27	04:55			06:30	19:15 (5)	05:27	04:55			21:14 (4)	
	16:33	17:32	18:27	20:24		21:18	13	20:47 (3)	21:57	20:24		21:18	13	20:47 (3)	8	21:22 (4)	
15	08:36	07:47	06:43	06:28	19:15 (5)	05:26	04:55			06:28	19:15 (5)	05:26	04:55			21:14 (4)	
	16:34	17:34	18:28	20:26		21:20	14	20:48 (3)	21:58	20:26		21:20	14	20:48 (3)	8	21:22 (4)	
16	08:35	07:45	06:40	06:25	19:15 (5)	05:24	04:54			06:25	19:15 (5)	05:24	04:54			21:14 (4)	
	16:36	17:36	18:30	20:28		21:22	16	20:50 (3)	21:59	20:28		21:22	16	20:50 (3)	9	21:23 (4)	
17	08:34	07:43	06:38	06:23	19:15 (5)	05:22	04:54			06:23	19:15 (5)	05:22	04:54			21:14 (4)	
	16:38	17:38	18:32	20:30		21:23	18	20:51 (3)	21:59	20:30		21:23	18	20:51 (3)	9	21:23 (4)	
18	08:33	07:41	06:35	06:21	19:15 (5)	05:21	04:54			06:21	19:15 (5)	05:21	04:54			21:14 (4)	
	16:40	17:40	18:34	20:31		21:25	19	20:53 (3)	22:00	20:31		21:25	19	20:53 (3)	10	21:24 (4)	
19	08:32	07:39	06:33	06:18	19:15 (5)	05:19	04:54			06:18	19:15 (5)	05:19	04:54			21:14 (4)	
	16:41	17:42	18:36	20:33		21:27	20	20:54 (3)	22:00	20:33		21:27	20	20:54 (3)	10	21:24 (4)	
20	08:31	07:36	06:31	06:16	19:15 (5)	05:18	04:54			06:16	19:15 (5)	05:18	04:54			21:15 (4)	
	16:43	17:44	18:38	20:35		21:28	21	20:55 (3)	22:00	20:35		21:28	21	20:55 (3)	9	21:24 (4)	
21	08:30	07:34	06:28	06:14	19:15 (5)	05:16	04:54			06:14	19:15 (5)	05:16	04:54			21:15 (4)	
	16:45	17:46	18:40	20:37		21:30	23	20:57 (3)	22:00	20:37		21:30	23	20:57 (3)	9	21:24 (4)	
22	08:28	07:32	06:26	06:12	19:15 (5)	05:15	04:55			06:12	19:15 (5)	05:15	04:55			21:16 (4)	
	16:47	17:48	18:42	20:39		21:31	23	20:58 (3)	22:01	20:39		21:31	23	20:58 (3)	9	21:25 (4)	
23	08:27	07:30	06:23	06:09	19:15 (5)	05:13	04:55			06:09	19:15 (5)	05:13	04:55			21:15 (4)	
	16:49	17:50	18:43	20:41		21:33	23	20:57 (3)	22:01	20:41		21:33	23	20:57 (3)	10	21:25 (4)	
24	08:26	07:28	06:21	18:13 (5)	06:07	05:12	04:55			06:07	18:13 (5)	05:12	04:55			21:15 (4)	
	16:51	17:52	18:45	20:42		21:34	22	20:57 (3)	22:01	20:42		21:34	22	20:57 (3)	10	21:25 (4)	
25	08:24	07:25	06:18	18:10 (5)	06:05	05:11	04:56			06:05	18:10 (5)	05:11	04:56			21:16 (4)	
	16:52	17:54	18:47	11	18:21 (5)	20:44		21:36	21	20:57 (3)	22:01	21:36	21	20:57 (3)	9	21:25 (4)	
26	08:23	07:23	06:16	18:09 (5)	06:03	05:09	04:56			06:03	18:09 (5)	05:09	04:56			21:16 (4)	
	16:54	17:56	18:49	14	18:23 (5)	20:46		21:37	21	20:57 (3)	22:01	21:37	21	20:57 (3)	9	21:25 (4)	
27	08:22	07:21	06:13	18:06 (5)	06:01	05:08	04:56			06:01	18:06 (5)	05:08	04:56			21:16 (4)	
	16:56	17:58	18:51	18	18:24 (5)	20:48		21:39	19	20:56 (3)	22:01	21:39	19	20:56 (3)	8	21:24 (4)	
28	08:20	07:18	06:11	18:05 (5)	05:58	05:07	04:57			05:58	18:05 (5)	05:07	04:57			21:17 (4)	
	16:58	18:00	18:53	21	18:26 (5)	20:50		21:40	18	20:56 (3)	22:01	21:40	18	20:56 (3)	8	21:25 (4)	
29	08:18		07:09	19:04 (5)	05:56	05:06	04:58			05:56	19:04 (5)	05:06	04:58			21:18 (4)	
	17:00		19:54	24	19:28 (5)	20:52		21:41	16	20:55 (3)	22:01	21:41	16	20:55 (3)	7	21:25 (4)	
30	08:17		07:06	19:03 (5)	05:54	05:05	04:58			05:54	19:03 (5)	05:05	04:58			21:18 (4)	
	17:02		19:56	27	19:30 (5)	20:53		21:43	16	20:55 (3)	22:00	21:43	16	20:55 (3)	6	21:24 (4)	
31	08:15		07:04	19:02 (5)		05:04	20:40 (3)			07:04	19:02 (5)	05:04	20:40 (3)				
	17:04		19:58	29	19:31 (5)		21:44	14	20:54 (3)		19:58	29	19:31 (5)				
Potential sun hours	250	273	367	420		494	510			250	273	367	420		494	510	
Total, worst case				149	324		365	202									
Sun reduction				0.27	0.35		0.38	0.32									
Oper. time red.				1.00	1.00		1.00	1.00									
Wind dir. red.				0.67	0.67		0.63	0.61									
Total reduction				0.18	0.24		0.24	0.20									
Total, real				27	77		88	39									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LG - H319

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July			August			September			October	November	December
1	04:59		21:19 (4)	05:39		20:46 (3)	06:33		19:04 (5)	07:26	07:24	08:19
	22:00	5	21:24 (4)	21:25	7	20:53 (3)	20:18	18	19:22 (5)	19:05	16:54	16:10
2	05:00		21:20 (4)	05:40		20:47 (3)	06:35		19:02 (5)	07:28	07:26	08:21
	22:00	4	21:24 (4)	21:23	5	20:52 (3)	20:16	22	19:24 (5)	19:02	16:52	16:09
3	05:00		21:20 (4)	05:42		20:47 (3)	06:36		19:01 (5)	07:30	07:28	08:22
	21:59	3	21:23 (4)	21:21	3	20:50 (3)	20:13	24	19:25 (5)	19:00	16:50	16:08
4	05:01		21:21 (4)	05:44			06:38		18:58 (5)	07:31	07:30	08:24
	21:59	2	21:23 (4)	21:19			20:11	27	19:25 (5)	18:57	16:48	16:08
5	05:02			05:45			06:40		18:58 (5)	07:33	07:32	08:25
	21:58			21:17			20:09	28	19:26 (5)	18:55	16:46	16:07
6	05:03			05:47			06:42		18:57 (5)	07:35	07:34	08:26
	21:57			21:15			20:06	30	19:27 (5)	18:52	16:44	16:07
7	05:04			05:49			06:43		18:55 (5)	07:37	07:36	08:28
	21:57			21:13			20:04	31	19:26 (5)	18:50	16:43	16:06
8	05:05			05:51			06:45		18:55 (5)	07:39	07:38	08:29
	21:56			21:11			20:01	31	19:26 (5)	18:48	16:41	16:06
9	05:06		20:54 (3)	05:52			06:47		18:55 (5)	07:41	07:40	08:30
	21:55	3	20:57 (3)	21:09			19:59	31	19:26 (5)	18:45	16:39	16:05
10	05:07		20:52 (3)	05:54			06:49		18:54 (5)	07:42	07:42	08:31
	21:55	7	20:59 (3)	21:07			19:56	31	19:25 (5)	18:43	16:37	16:05
11	05:08		20:50 (3)	05:56			06:50		18:54 (5)	07:44	07:44	08:33
	21:54	11	21:01 (3)	21:05			19:54	31	19:25 (5)	18:40	16:36	16:05
12	05:09		20:49 (3)	05:57			06:52		18:54 (5)	07:46	07:45	08:34
	21:53	13	21:02 (3)	21:03			19:51	30	19:24 (5)	18:38	16:34	16:05
13	05:11		20:48 (3)	05:59			06:54		18:54 (5)	07:48	07:47	08:35
	21:52	15	21:03 (3)	21:01			19:49	28	19:22 (5)	18:36	16:32	16:05
14	05:12		20:47 (3)	06:01			06:56		18:54 (5)	07:50	07:49	08:36
	21:51	16	21:03 (3)	20:59			19:47	24	19:18 (5)	18:33	16:31	16:05
15	05:13		20:47 (3)	06:03			06:58		18:54 (5)	07:52	07:51	08:37
	21:50	17	21:04 (3)	20:57			19:44	22	19:16 (5)	18:31	16:29	16:05
16	05:14		20:47 (3)	06:05			06:59		18:55 (5)	07:54	07:53	08:38
	21:48	19	21:06 (3)	20:55			19:42	19	19:14 (5)	18:29	16:27	16:05
17	05:16		20:46 (3)	06:06			07:01		18:56 (5)	07:55	07:55	08:38
	21:47	20	21:06 (3)	20:53			19:39	15	19:11 (5)	18:26	16:26	16:05
18	05:17		20:45 (3)	06:08			07:03		18:57 (5)	07:57	07:57	08:39
	21:46	21	21:06 (3)	20:50			19:37	11	19:08 (5)	18:24	16:25	16:05
19	05:18		20:45 (3)	06:10			07:05		19:00 (5)	07:59	07:59	08:40
	21:45	21	21:06 (3)	20:48			19:34	6	19:06 (5)	18:22	16:23	16:05
20	05:20		20:45 (3)	06:12			07:06			08:01	08:00	08:41
	21:44	23	21:08 (3)	20:46			19:32			18:20	16:22	16:06
21	05:21		20:45 (3)	06:13			07:08			08:03	08:02	08:41
	21:42	23	21:08 (3)	20:44			19:29			18:17	16:20	16:06
22	05:23		20:44 (3)	06:15			07:10			08:05	08:04	08:42
	21:41	23	21:07 (3)	20:42			19:27			18:15	16:19	16:07
23	05:24		20:44 (3)	06:17			07:12			08:07	08:06	08:42
	21:39	23	21:07 (3)	20:39			19:24			18:13	16:18	16:07
24	05:26		20:44 (3)	06:19			07:13			08:09	08:08	08:43
	21:38	21	21:05 (3)	20:37			19:22			18:11	16:17	16:08
25	05:27		20:44 (3)	06:20			07:15			07:11	08:09	08:43
	21:36	20	21:04 (3)	20:35			19:19			17:09	16:16	16:08
26	05:29		20:44 (3)	06:22			07:17			07:13	08:11	08:43
	21:35	18	21:02 (3)	20:32			19:17			17:06	16:15	16:09
27	05:30		20:45 (3)	06:24			07:19			07:14	08:13	08:44
	21:33	16	21:01 (3)	20:30			19:14			17:04	16:13	16:10
28	05:32		20:44 (3)	06:26			07:21			07:16	08:14	08:44
	21:32	15	20:59 (3)	20:28			19:12			17:02	16:13	16:11
29	05:34		20:45 (3)	06:28			07:22			07:18	08:16	08:44
	21:30	13	20:58 (3)	20:25			19:09			17:00	16:12	16:11
30	05:35		20:45 (3)	06:29		19:12 (5)	07:24			07:20	08:17	08:44
	21:28	11	20:56 (3)	20:23	4	19:16 (5)	19:07			16:58	16:11	16:12
31	05:37		20:46 (3)	06:31		19:06 (5)				07:22		08:44
	21:26	9	20:55 (3)	20:21	14	19:20 (5)				16:56		16:13
Potential sun hours	512			460			382			328	259	233
Total, worst case		392			33			459				
Sun reduction		0.32			0.34			0.32				
Oper. time red.		1.00			1.00			1.00				
Wind dir. red.		0.63			0.65			0.67				
Total reduction		0.20			0.22			0.22				
Total, real		80			7			99				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: LH - H320

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LI - H321

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LJ - H322

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LK - H323

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LL - H324

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LM - H325

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June	
1	08:44		08:14	16:23 (5)	07:16	17:06 (4)	07:01		05:52	19:51 (2)	05:03	
	16:15		17:06	11 16:34 (5)	18:02	28 17:34 (4)	20:00		20:55	24 20:15 (2)	21:45	
2	08:44		08:12	16:24 (5)	07:14	17:06 (4)	06:59		05:50	19:52 (2)	05:02	
	16:16		17:08	13 16:37 (5)	18:04	30 17:36 (4)	20:02		20:57	22 20:14 (2)	21:46	
3	08:43		08:10	16:23 (5)	07:11	17:06 (4)	06:56		05:48	19:53 (2)	05:01	
	16:17		17:10	16 16:39 (5)	18:06	32 17:38 (4)	20:04		20:59	20 20:13 (2)	21:48	
4	08:43		08:08	16:24 (5)	07:09	17:06 (4)	06:54		05:46	19:54 (2)	05:00	
	16:18		17:12	17 16:41 (5)	18:07	33 17:39 (4)	20:06		21:01	17 20:11 (2)	21:49	
5	08:43		08:07	16:24 (5)	07:07	17:06 (4)	06:51		05:44	19:56 (2)	04:59	
	16:19		17:14	19 16:43 (5)	18:09	32 17:38 (4)	20:07		21:03	13 20:09 (2)	21:50	
6	08:42		08:05	16:24 (5)	07:04	17:07 (4)	06:49		05:42	19:59 (2)	04:59	
	16:21		17:16	21 16:45 (5)	18:11	30 17:37 (4)	20:09		21:04	7 20:06 (2)	21:51	
7	08:42		08:03	16:25 (5)	07:02	17:07 (4)	06:47		05:40		04:58	
	16:22		17:18	20 16:45 (5)	18:13	29 17:36 (4)	20:11		21:06		21:52	
8	08:42		08:01	16:25 (5)	07:00	17:08 (4)	06:44		05:38		04:57	
	16:24		17:20	19 16:44 (5)	18:15	27 17:35 (4)	20:13		21:08		21:53	
9	08:41		07:59	16:27 (5)	06:57	17:09 (4)	06:42		05:36		04:57	
	16:25		17:22	17 16:44 (5)	18:17	24 17:33 (4)	20:15		21:10		21:54	
10	08:40		07:57	16:28 (5)	06:55	17:11 (4)	06:39		05:34		04:56	
	16:26		17:24	14 16:42 (5)	18:19	20 17:31 (4)	20:17		21:11		21:55	
11	08:40		07:55	16:30 (5)	06:52	17:14 (4)	06:37		05:33		04:56	
	16:28		17:26	11 16:41 (5)	18:21	17 17:55 (3)	20:19		21:13		21:55	
12	08:39		07:53	16:34 (5)	06:50	17:17 (4)	06:35		05:31		04:55	
	16:30		17:28	1 16:35 (5)	18:23	12 17:56 (3)	20:20		21:15		21:56	
13	08:38		07:51		06:48	17:51 (3)	06:32		05:29		04:55	
	16:31		17:30		18:25	7 17:58 (3)	20:22		21:17		21:57	
14	08:37		07:49		06:45	17:49 (3)	06:30		05:27		04:55	
	16:33		17:32		18:27	11 18:00 (3)	20:24		21:18		21:57	
15	08:36		07:47		06:43	17:49 (3)	06:28		05:26		04:54	
	16:34		17:34		18:28	13 18:02 (3)	20:26		21:20		21:58	
16	08:35		07:45		06:40	17:49 (3)	06:25		05:24		04:54	
	16:36		17:36		18:30	15 18:04 (3)	20:28		21:22		21:59	
17	08:34		07:43		06:38	17:49 (3)	06:23	19:57 (2)	05:22		04:54	
	16:38		17:38		18:32	17 18:06 (3)	20:30	4 20:01 (2)	21:23		21:59	
18	08:33		07:41		06:35	17:49 (3)	06:21	19:55 (2)	05:21		04:54	
	16:40		17:40		18:34	18 18:07 (3)	20:31	8 20:03 (2)	21:25		22:00	
19	08:32		07:39		06:33	17:50 (3)	06:18	19:54 (2)	05:19		04:54	
	16:41		17:42		18:36	18 18:08 (3)	20:33	11 20:05 (2)	21:27		22:00	
20	08:31		07:36		06:31	17:50 (3)	06:16	19:53 (2)	05:18		04:54	
	16:43		17:44		18:38	16 18:06 (3)	20:35	14 20:07 (2)	21:28		22:00	
21	08:30		07:34	17:14 (4)	06:28	17:53 (3)	06:14	19:51 (2)	05:16		04:54	
	16:45		17:46	4 17:18 (4)	18:40	11 18:04 (3)	20:37	17 20:08 (2)	21:30		22:01	
22	08:28		07:32	17:12 (4)	06:26	17:56 (3)	06:12	19:51 (2)	05:15		04:55	
	16:47		17:48	7 17:19 (4)	18:41	3 17:59 (3)	20:39	19 20:10 (2)	21:31		22:01	
23	08:27		07:30	17:11 (4)	06:23		06:09	19:50 (2)	05:13		04:55	
	16:49		17:50	11 17:22 (4)	18:43		20:41	22 20:12 (2)	21:33		22:01	
24	08:26		07:28	17:10 (4)	06:21		06:07	19:50 (2)	05:12		04:55	
	16:50		17:52	14 17:24 (4)	18:45		20:42	24 20:14 (2)	21:34		22:01	
25	08:24		07:25	17:08 (4)	06:18		06:05	19:50 (2)	05:11		04:55	
	16:52		17:54	18 17:26 (4)	18:47		20:44	25 20:15 (2)	21:36		22:01	
26	08:23		07:23	17:08 (4)	06:16		06:03	19:50 (2)	05:09		04:56	
	16:54		17:56	20 17:28 (4)	18:49		20:46	27 20:17 (2)	21:37		22:01	
27	08:22		07:21	17:07 (4)	06:13		06:00	19:50 (2)	05:08		04:56	
	16:56		17:58	24 17:31 (4)	18:51		20:48	28 20:18 (2)	21:39		22:01	
28	08:20		07:18	17:06 (4)	06:11		05:58	19:50 (2)	05:07		04:57	
	16:58		18:00	26 17:32 (4)	18:53		20:50	27 20:17 (2)	21:40		22:01	
29	08:18	16:25 (5)			07:08		05:56	19:50 (2)	05:06		04:57	
	17:00	3 16:28 (5)			19:54		20:52	27 20:17 (2)	21:41		22:01	
30	08:17	16:24 (5)			07:06		05:54	19:51 (2)	05:05		04:58	
	17:02	6 16:30 (5)			19:56		20:53	25 20:16 (2)	21:43		22:00	
31	08:15	16:23 (5)			07:04				05:04			
	17:04	9 16:32 (5)			19:58				21:44			
Potential sun hours	250		273		367		420		494		510	
Total, worst case	18		303		443		278		103			
Sun reduction	0.24		0.23		0.27		0.35		0.38			
Oper. time red.	1.00		1.00		1.00		1.00		1.00			
Wind dir. red.	0.66		0.67		0.68		0.65		0.65			
Total reduction	0.16		0.15		0.18		0.23		0.25			
Total, real	3		47		81		64		25			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LM - H325

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:30 (3) 16:54	15:57 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:36 (3) 16:52	15:56 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:50 (4) 16:50	15:55 (5) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:48 (4) 16:48	15:54 (5) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:46 (4) 16:46	15:54 (5) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:45 (4) 16:44	15:53 (5) 16:07
7	05:04 21:57	05:49 21:13	20:08 (2) 20:04	06:43 18:50	07:36 16:43	15:53 (5) 16:06
8	05:05 21:56	05:50 21:11	20:05 (2) 20:01	06:45 18:48	07:38 16:41	15:53 (5) 16:06
9	05:06 21:55	05:52 21:09	20:03 (2) 20:21 (2)	06:47 19:59	07:40 16:39	15:53 (5) 16:05
10	05:07 21:55	05:54 21:07	20:01 (2) 20:21 (2)	06:49 19:56	07:42 18:43	15:55 (5) 16:05
11	05:08 21:54	05:56 21:05	20:00 (2) 20:23 (2)	06:50 19:54	07:44 18:40	15:55 (5) 16:05
12	05:09 21:53	05:57 21:03	19:59 (2) 20:24 (2)	06:52 19:51	07:46 18:38	15:56 (5) 16:05
13	05:10 21:52	05:59 21:01	19:58 (2) 20:24 (2)	06:54 19:49	07:47 18:36	15:57 (5) 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 20:24 (2)	06:56 19:47	07:50 18:33	15:59 (5) 16:04
15	05:13 21:50	06:03 20:57	19:57 (2) 20:25 (2)	06:58 19:44	07:52 18:31	16:00 (5) 16:05
16	05:14 21:49	06:04 20:55	19:56 (2) 20:24 (2)	06:59 19:42	07:54 18:29	16:01 (5) 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 20:23 (2)	07:01 19:39	07:55 18:26	16:02 (5) 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 20:22 (2)	07:03 19:37	07:57 18:24	16:03 (5) 16:05
19	05:18 21:45	06:10 20:48	19:56 (2) 20:19 (2)	07:05 19:34	07:59 18:22	16:04 (5) 16:05
20	05:20 21:44	06:12 20:46	19:56 (2) 20:17 (2)	07:06 19:32	08:01 18:20	16:05 (5) 16:06
21	05:21 21:42	06:13 20:44	19:56 (2) 20:15 (2)	07:08 19:29	08:03 18:17	16:06 (5) 16:06
22	05:23 21:41	06:15 20:42	19:56 (2) 20:12 (2)	07:10 19:27	08:05 18:15	16:07 (5) 16:06
23	05:24 21:39	06:17 20:39	19:57 (2) 20:10 (2)	07:12 19:24	08:07 18:13	16:08 (5) 16:07
24	05:26 21:38	06:19 20:37	19:58 (2) 20:09 (2)	07:13 19:22	08:09 18:11	16:09 (5) 16:08
25	05:27 21:36	06:20 20:35	19:58 (2) 20:06 (2)	07:15 19:19	08:09 18:11	16:10 (5) 16:08
26	05:29 21:35	06:22 20:32	20:00 (2) 20:04 (2)	07:17 19:17	08:11 18:13	16:11 (5) 16:09
27	05:30 21:33	06:24 20:30	19:57 (2) 19:14	07:19 18:46	08:13 17:04	16:12 (5) 16:10
28	05:32 21:32	06:26 20:28	19:56 (2) 19:12	07:21 18:44	08:14 17:02	16:13 (5) 16:11
29	05:34 21:30	06:27 20:25	19:55 (2) 19:09	07:22 18:41	08:16 17:00	16:14 (5) 16:11
30	05:35 21:28	06:29 20:23	19:54 (2) 19:07	07:24 18:38	08:18 16:58	16:15 (5) 16:12
31	05:37 21:26	06:31 20:21	19:53 (2) 19:06	07:25 16:56	08:19 16:10	16:16 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		385	128	459	182	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		85	28	91	32	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LN - H326

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:00 (5) 20:25 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:16 (5) 20:27 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:59 (5) 20:25 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:15 (5) 20:30 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:59 (5) 20:25 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:13 (5) 20:30 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:59 (5) 20:24 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:12 (5) 20:32 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	20:00 (5) 20:24 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:11 (5) 20:32 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:00 (5) 20:23 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:10 (5) 20:33 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:01 (5) 20:23 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:10 (5) 20:34 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:02 (5) 20:22 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:09 (5) 20:33 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:02 (5) 20:21 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:09 (5) 20:34 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:03 (5) 20:19 (5)	04:56 21:54	05:07 21:54	05:54 21:07	20:08 (5) 20:33 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:05 (5) 20:19 (5)	04:56 21:55	05:08 21:54	05:56 21:05	20:08 (5) 20:34 (5)	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:07 (5) 20:16 (5)	04:55 21:56	05:09 21:53	05:57 21:03	20:08 (5) 20:34 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	20:08 (5) 20:31 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	05:12 21:51	06:01 20:59	20:08 (5) 20:29 (5)	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	05:13 21:50	06:03 20:57	20:09 (5) 20:28 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	20:08 (5) 20:25 (5)	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	20:09 (5) 20:23 (5)	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25		04:54 21:59	05:17 21:46	06:08 20:50	20:11 (5) 20:22 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27		04:54 22:00	05:18 21:45	06:10 20:48	20:11 (5) 20:19 (5)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28		04:54 22:00	05:20 21:43	06:12 20:46	20:13 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30		04:54 22:00	05:21 21:42	06:13 20:44		07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31		04:55 22:01	05:23 21:41	06:15 20:42		07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 20:12 (5)		04:55 22:01	05:24 21:39	06:17 20:39		07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 20:13 (5)		04:55 22:01	05:26 21:38	06:19 20:37		07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 20:15 (5)		04:56 22:01	05:27 21:36	06:20 20:35		07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 20:17 (5)		04:56 22:01	05:29 21:35	06:22 20:32		07:17 19:17	07:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 20:19 (5)		04:56 22:01	05:30 21:33	06:24 20:30		07:19 19:14	07:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 20:21 (5)		04:57 22:01	05:32 21:32	06:26 20:28		07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 20:22 (5)		04:58 22:00	05:34 21:30	06:28 20:25		07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 20:24 (5)		04:58 22:00	05:35 21:28	06:29 20:23		07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44			05:37 21:26	20:20 (5) 20:25 (5)		06:31 20:21	07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259		233
Total, worst case				121	249			5		374				
Sun reduction				0.35	0.38			0.32		0.34				
Oper. time red.				1.00	1.00			1.00		1.00				
Wind dir. red.				0.65	0.65			0.65		0.65				
Total reduction				0.23	0.25			0.21		0.22				
Total, real				28	61			1		83				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
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+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LO - H327

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:54 (5) 20:19 (5)	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:55 (5) 20:18 (5)	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:55 (5) 20:17 (5)	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:56 (5) 20:16 (5)	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:56 (5) 20:15 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:10 (5) 20:21 (5)	06:40 20:09	07:33 18:55	07:32 16:46
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:57 (5) 20:14 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:09 (5) 20:23 (5)	06:42 20:06	07:35 18:52	07:34 16:44
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:00 (5) 20:13 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:07 (5) 20:25 (5)	06:43 20:04	07:37 18:50	07:36 16:43
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:02 (5) 20:10 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:06 (5) 20:25 (5)	06:45 20:01	07:39 18:48	07:38 16:41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10		04:57 21:54	05:06 21:55	05:52 21:09	20:05 (5) 20:26 (5)	06:47 19:59	07:41 18:45	07:40 16:39
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11		04:56 21:54	05:07 21:54	05:54 21:07	20:03 (5) 20:26 (5)	06:49 19:56	07:42 18:43	07:42 16:37
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13		04:56 21:55	05:08 21:54	05:56 21:05	20:03 (5) 20:27 (5)	06:50 19:54	07:44 18:40	07:43 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15		04:55 21:56	05:09 21:53	05:57 21:03	20:03 (5) 20:27 (5)	06:52 19:51	07:46 18:38	07:45 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	20:02 (5) 20:27 (5)	06:54 19:49	07:48 18:36	07:47 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	05:12 21:51	06:01 20:59	20:02 (5) 20:27 (5)	06:56 19:47	07:50 18:33	07:49 16:31
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	05:13 21:50	06:03 20:57	20:02 (5) 20:27 (5)	06:58 19:44	07:52 18:31	07:51 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	20:01 (5) 20:25 (5)	06:59 19:42	07:54 18:29	07:53 16:27
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	20:02 (5) 20:23 (5)	07:01 19:39	07:55 18:26	07:55 16:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25		04:54 21:59	05:17 21:46	06:08 20:50	20:02 (5) 20:22 (5)	07:03 19:37	07:57 18:24	07:57 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27		04:54 22:00	05:18 21:45	06:10 20:48	20:02 (5) 20:19 (5)	07:05 19:34	07:59 18:22	07:59 16:23
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:03 (5)	04:54 22:00	05:20 21:43	06:12 20:46	20:03 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:00 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:00 (5)	04:54 22:00	05:21 21:42	06:13 20:44	20:04 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:02 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	19:58 (5)	04:55 22:01	05:23 21:41	06:15 20:42	20:04 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:04 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:09 (5)	04:55 22:01	05:24 21:39	06:17 20:39	20:07 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:06 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	19:56 (5)	04:55 22:01	05:26 21:38	06:19 20:37		07:13 19:22	08:09 18:11	08:07 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	19:55 (5)	04:56 22:01	05:27 21:36	06:20 20:35		07:15 19:19	07:11 17:09	08:09 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	19:55 (5)	04:56 22:01	05:29 21:35	06:22 20:32		07:17 19:17	07:13 17:06	08:11 16:15
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	19:55 (5)	04:56 22:01	05:30 21:33	06:24 20:30		07:19 19:14	07:14 17:04	08:13 16:13
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	19:54 (5)	04:57 22:01	05:32 21:32	06:26 20:28		07:21 19:12	07:16 17:02	08:14 16:13
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	19:54 (5)	04:58 22:00	05:34 21:30	06:28 20:25		07:22 19:09	07:18 17:00	08:16 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	19:54 (5)	04:58 22:00	05:35 21:28	06:29 20:23		07:24 19:07	07:20 16:58	08:17 16:11
31	08:15 17:04		07:04 19:58		05:04 21:44	20:19 (5)		05:37 21:26	06:31 20:21		07:22 16:56	07:22 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233
Total, worst case				199	147					347			
Sun reduction				0.35	0.38					0.34			
Oper. time red.				1.00	1.00					1.00			
Wind dir. red.				0.65	0.65					0.65			
Total reduction				0.23	0.25					0.22			
Total, real				46	36					77			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LP - H328

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	19:53 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:55	20	20:13 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50		19:54 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	18	20:12 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:43	08:10	07:11	06:56	05:48		19:55 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	16	20:11 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08		
4	08:43	08:08	07:09	06:54	05:46		19:57 (5)	05:00	05:01	05:44	06:38	07:31	07:30	08:23		
	16:18	17:12	18:07	20:06	21:01	12	20:09 (5)	21:49	21:59	21:19	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	06:51	05:44		20:00 (5)	04:59	05:02	05:45	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:02	6	20:06 (5)	21:50	21:58	21:17	20:09	18:55	16:46	16:07		
6	08:42	08:05	07:04	06:49	05:42			04:59	05:03	05:47	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04			21:51	21:57	21:15	20:06	18:52	16:44	16:07		
7	08:42	08:03	07:02	06:47	05:40			04:58	05:04	05:49	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06			21:52	21:57	21:13	20:04	18:50	16:43	16:06		
8	08:41	08:01	07:00	06:44	05:38			04:57	05:05	05:51	20:08 (5)	06:45	07:39	08:29		
	16:24	17:20	18:15	20:13	21:08			21:53	21:56	21:11	8	20:16 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36			04:57	05:06	05:52	20:06 (5)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10			21:54	21:55	21:09	13	20:19 (5)	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34			04:56	05:07	05:54	20:03 (5)	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11			21:54	21:54	21:07	16	20:19 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33			04:56	05:08	05:56	20:02 (5)	06:50	07:44	07:43	08:33	
	16:28	17:26	18:21	20:18	21:13			21:55	21:54	21:05	19	20:21 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31			04:55	05:09	05:57	20:02 (5)	06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15			21:56	21:53	21:03	20	20:22 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29			04:55	05:11	05:59	20:00 (5)	06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17			21:57	21:52	21:01	22	20:22 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27			04:55	05:12	06:01	20:00 (5)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18			21:57	21:51	20:59	23	20:23 (5)	19:46	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26			04:55	05:13	06:03	20:00 (5)	06:58	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20			21:58	21:50	20:57	23	20:23 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24			04:54	05:14	06:05	19:59 (5)	06:59	07:54	07:53	08:37	
	16:36	17:36	18:30	20:28	21:22			21:59	21:48	20:55	23	20:22 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	05:22			04:54	05:16	06:06	19:59 (5)	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23			21:59	21:47	20:53	24	20:23 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	20:00 (5) 05:21			04:54	05:17	06:08	19:59 (5)	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	20:03 (5) 21:25			21:59	21:46	20:50	23	20:22 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	19:58 (5) 05:19			04:54	05:18	06:10	19:58 (5)	07:05	07:59	07:59	08:40	
	16:41	17:42	18:36	20:33	20:05 (5) 21:27			22:00	21:45	20:48	21	20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:57 (5) 05:18			04:54	05:20	06:12	19:59 (5)	07:06	08:01	08:00	08:41	
	16:43	17:44	18:38	20:35	20:07 (5) 21:28			22:00	21:43	20:46	18	20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:54 (5) 05:16			04:54	05:21	06:13	19:59 (5)	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	20:08 (5) 21:30			22:00	21:42	20:44	16	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:54 (5) 05:15			04:55	05:23	06:15	19:59 (5)	07:10	08:05	08:04	08:42	
	16:47	17:48	18:41	20:39	20:10 (5) 21:31			22:01	21:41	20:42	13	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:53 (5) 05:13			04:55	05:24	06:17	20:00 (5)	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	20:12 (5) 21:33			22:01	21:39	20:39	10	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:52 (5) 05:12			04:55	05:26	06:19	20:02 (5)	07:13	08:09	08:07	08:43	
	16:51	17:52	18:45	20:42	20:13 (5) 21:34			22:01	21:38	20:37	7	20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:52 (5) 05:11			04:56	05:27	06:20	20:03 (5)	07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	20:15 (5) 21:36			22:01	21:36	20:35	3	20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:52 (5) 05:09			04:56	05:29	06:22		07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	20:16 (5) 21:37			22:01	21:35	20:32		19:17	17:06	16:15	16:09	
27	08:21	07:21	06:13	06:01	19:52 (5) 05:08			04:56	05:30	06:24		07:19	07:14	08:13	08:43	
	16:56	17:58	18:51	20:48	20:16 (5) 21:39			22:01	21:33	20:30		19:14	17:04	16:13	16:10	
28	08:20	07:18	06:11	05:58	19:52 (5) 05:07			04:57	05:32	06:26		07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	20:15 (5) 21:40			22:01	21:32	20:28		19:12	17:02	16:13	16:11	
29	08:18		07:08	05:56	19:52 (5) 05:06			04:58	05:34	06:28		07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	20:15 (5) 21:41			22:00	21:30	20:25		19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	19:53 (5) 05:05			04:58	05:35	06:29		07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	20:14 (5) 21:43			22:00	21:28	20:23		19:07	16:58	16:11	16:12	
31	08:15		07:04		05:04				05:37	06:31			07:22		08:44	
	17:04		19:58		21:44				21:26	20:21			16:56		16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233		
Total, worst case				228	72				302							
Sun reduction				0.35	0.38				0.34							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.65	0.65				0.65							
Total reduction				0.23	0.25				0.22							
Total, real				52	18				67							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LQ - H329

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	10	19:53 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55		20:03 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50		05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57		21:46	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48		05:01	05:00	05:42	06:36	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59		21:48	21:59	21:21	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46		05:00	05:01	05:44	06:38	07:31	07:30	08:23	
	16:18	17:12	18:07	20:06	21:01		21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44		04:59	05:02	05:45	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:02		21:50	21:58	21:17	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04		21:51	21:57	21:15	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:13	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38		04:57	05:05	05:51	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:11	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:04 (5)	06:50	07:44	08:33	
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	5 20:09 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:57	20:01 (5)	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	11 20:12 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:58 (5)	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	15 20:13 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:57 (5)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	18 20:15 (5)	19:46	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	19:57 (5)	05:26	04:55	05:13	06:03	19:56 (5)	06:58	07:52	07:51	08:37
	16:34	17:34	18:28	20:26	1 19:58 (5)	21:20	21:58	21:50	20:57	20 20:16 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	19:54 (5)	05:24	04:54	05:14	06:05	19:55 (5)	06:59	07:54	07:53	08:37
	16:36	17:36	18:30	20:28	6 20:00 (5)	21:22	21:59	21:48	20:55	21 20:16 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	19:52 (5)	05:22	04:54	05:16	06:06	19:54 (5)	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30	9 20:01 (5)	21:23	21:59	21:47	20:53	22 20:16 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	19:51 (5)	05:21	04:54	05:17	06:08	19:54 (5)	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31	12 20:03 (5)	21:25	21:59	21:46	20:50	23 20:17 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	19:50 (5)	05:19	04:54	05:18	06:10	19:53 (5)	07:05	07:59	07:59	08:40
	16:41	17:42	18:36	20:33	15 20:05 (5)	21:27	22:00	21:45	20:48	23 20:16 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:49 (5)	05:18	04:54	05:20	06:12	19:53 (5)	07:06	08:01	08:00	08:41
	16:43	17:44	18:38	20:35	18 20:07 (5)	21:28	22:00	21:43	20:46	23 20:16 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:48 (5)	05:16	04:54	05:21	06:13	19:53 (5)	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	20 20:08 (5)	21:30	22:00	21:42	20:44	22 20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:47 (5)	05:15	04:55	05:23	06:15	19:52 (5)	07:10	08:05	08:04	08:42
	16:47	17:48	18:41	20:39	23 20:10 (5)	21:31	22:01	21:41	20:42	20 20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:47 (5)	05:13	04:55	05:24	06:17	19:53 (5)	07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	24 20:11 (5)	21:33	22:01	21:39	20:39	17 20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:47 (5)	05:12	04:55	05:26	06:19	19:53 (5)	07:13	08:09	08:07	08:43
	16:51	17:52	18:45	20:42	24 20:11 (5)	21:34	22:01	21:38	20:37	16 20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:47 (5)	05:11	04:56	05:27	06:20	19:53 (5)	07:15	07:11	08:09	08:43
	16:52	17:54	18:47	20:44	23 20:10 (5)	21:36	22:01	21:36	20:35	13 20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:48 (5)	05:09	04:56	05:29	06:22	19:55 (5)	07:17	07:13	08:11	08:43
	16:54	17:56	18:49	20:46	22 20:10 (5)	21:37	22:01	21:35	20:32	9 20:04 (5)	19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	19:48 (5)	05:08	04:56	05:30	06:24	19:56 (5)	07:19	07:14	08:13	08:43
	16:56	17:58	18:51	20:48	21 20:09 (5)	21:39	22:01	21:33	20:30	6 20:02 (5)	19:14	17:04	16:13	16:10
28	08:20	07:18	06:11	05:58	19:49 (5)	05:07	04:57	05:32	06:26	19:58 (5)	07:21	07:16	08:14	08:44
	16:58	18:00	18:53	20:50	19 20:08 (5)	21:40	22:01	21:32	20:28	1 19:59 (5)	19:12	17:02	16:13	16:11
29	08:18		07:08	05:56	19:50 (5)	05:06	04:58	05:34	06:28		07:22	07:18	08:16	08:44
	17:00		19:54	20:52	17 20:07 (5)	21:41	22:00	21:30	20:25		19:09	17:00	16:12	16:11
30	08:17		07:06	05:54	19:51 (5)	05:05	04:58	05:35	06:29		07:24	07:20	08:17	08:44
	17:02		19:56	20:53	14 20:05 (5)	21:43	22:00	21:28	20:23		19:07	16:58	16:11	16:12
31	08:15		07:04			05:04		05:37	06:31		07:22			08:44
	17:04		19:58			21:44		21:26	20:21		16:56			16:13
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233	
Total, worst case				268	10				285					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.65	0.65				0.65					
Total reduction				0.23	0.25				0.22					
Total, real				61	2				63					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LR - H330

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:46	21:59	21:23	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:23
	16:18	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07	21:02	21:50	21:58	21:17	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	21:51	21:57	21:15	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:13	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:11	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	21:55	21:09	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11	21:54	21:54	21:07	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:43	08:32
	16:28	17:26	18:21	20:18	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05
12	08:39	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:01	10	20:12 (5)	19:49	18:36
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	20:01 (5)	19:49	18:36	16:32
	16:33	17:32	18:27	20:24	21:18	21:57	21:51	20:59	13	20:14 (5)	19:46	18:33
15	08:36	07:47	06:43	06:28	05:26	04:55	05:13	06:03	20:00 (5)	19:46	18:33	16:31
	16:34	17:34	18:28	20:26	21:20	21:58	21:50	20:57	16	20:16 (5)	19:44	18:31
16	08:35	07:45	06:40	06:25	05:24	04:54	05:14	06:05	19:58 (5)	19:44	18:31	16:29
	16:36	17:36	18:30	20:28	3	19:59 (5)	21:22	21:59	1	21:23 (4)	20:55	18:29
17	08:34	07:43	06:38	06:23	05:22	04:54	05:16	06:06	18	20:16 (5)	19:42	18:29
	16:38	17:38	18:32	20:30	7	20:01 (5)	21:23	21:59	20	19:57 (5)	19:41	18:26
18	08:33	07:41	06:35	06:21	05:21	04:54	05:17	06:08	20	20:17 (5)	19:39	18:26
	16:40	17:40	18:34	20:31	10	20:03 (5)	21:25	21:59	1	21:24 (4)	21:46	20:50
19	08:32	07:39	06:33	06:18	05:19	04:54	05:18	06:10	20	20:17 (5)	19:37	18:24
	16:41	17:42	18:36	20:33	13	20:05 (5)	21:26	22:00	21	20:17 (5)	19:34	18:22
20	08:31	07:36	06:31	06:16	05:18	04:54	05:20	06:12	21	20:17 (5)	19:34	18:22
	16:43	17:44	18:38	20:35	15	20:07 (5)	21:28	22:00	1	21:24 (4)	21:43	20:46
21	08:30	07:34	06:28	06:14	05:16	04:54	05:21	06:13	19	20:15 (5)	19:32	18:20
	16:45	17:46	18:40	20:37	18	20:08 (5)	21:30	22:00	1	21:24 (4)	21:42	20:44
22	08:28	07:32	06:26	06:12	05:15	04:55	05:23	06:15	17	20:12 (5)	19:29	18:17
	16:47	17:48	18:41	20:39	20	20:10 (5)	21:31	22:01	1	21:25 (4)	21:41	20:41
23	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	15	20:10 (5)	19:24	18:13
	16:49	17:50	18:43	20:41	21	20:11 (5)	21:33	22:01	1	21:25 (4)	21:39	20:39
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	13	20:09 (5)	19:22	18:11
	16:51	17:52	18:45	20:42	21	20:11 (5)	21:34	22:01	1	21:25 (4)	21:38	20:37
25	08:24	07:25	06:18	06:05	05:11	04:56	05:27	06:20	10	20:06 (5)	19:19	17:09
	16:52	17:54	18:47	20:44	21	20:11 (5)	21:36	22:01	7	20:04 (5)	19:17	17:06
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	3	20:02 (5)	19:14	17:04
	16:54	17:56	18:49	20:46	19	20:10 (5)	21:37	22:01				
27	08:21	07:21	06:13	06:01	05:08	04:56	05:30	06:24				
	16:56	17:58	18:51	20:48	18	20:09 (5)	21:39	22:01				
28	08:20	07:18	06:11	05:58	05:07	04:57	05:32	06:26				
	16:58	18:00	18:53	20:50	16	20:08 (5)	21:40	22:01				
29	08:18		07:08	05:56	05:06	04:58	05:34	06:27				
	17:00		19:54	20:52	12	20:06 (5)	21:41	22:00				
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29				
	17:02		19:56	20:53	8	20:04 (5)	21:43	22:00				
31	08:15		07:04			05:04	05:37	06:31				
	17:04		19:58			21:44	21:26	20:21				
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				222		8		223				
Sun reduction				0.35		0.32		0.34				
Oper. time red.				1.00		1.00		1.00				
Wind dir. red.				0.65		0.61		0.65				
Total reduction				0.23		0.19		0.22				
Total, real				51		2		49				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LS - H331

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:21 (4) 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:21 (4) 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	21:21 (4) 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	21:22 (4) 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:16 (4) 21:55	05:06 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:16 (4) 21:54	05:07 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:17 (4) 21:54	05:08 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:17 (4) 21:53	05:09 21:03	06:57 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:16 (4) 05:12	05:11 21:01	20:06 (5) 20:08 (5)	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	20:02 (5) 20:12 (5)	07:50 19:46	07:49 18:33	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	20:01 (5) 20:14 (5)	07:52 19:44	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:56 (5) 19:59 (5)	04:54 21:22	05:14 21:59	06:04 20:55	19:59 (5) 20:15 (5)	07:54 19:42	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:54 (5) 20:01 (5)	04:54 21:23	05:16 21:59	06:06 20:53	19:58 (5) 20:16 (5)	07:55 19:39	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:53 (5) 20:03 (5)	04:54 21:25	05:17 21:59	06:08 20:50	19:57 (5) 20:16 (5)	07:57 19:37	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	19:52 (5) 20:05 (5)	04:54 21:26	05:18 22:00	06:10 20:48	19:56 (5) 20:16 (5)	07:59 19:34	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:52 (5) 20:07 (5)	04:54 21:28	05:20 22:00	06:12 20:46	19:56 (5) 20:16 (5)	08:01 19:32	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:50 (5) 20:08 (5)	04:54 21:30	05:21 22:00	06:13 20:44	19:56 (5) 20:15 (5)	08:03 19:29	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:41	06:12 20:39	19:50 (5) 20:10 (5)	04:55 21:31	05:23 22:01	06:15 20:41	19:55 (5) 20:12 (5)	08:05 19:27	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:50 (5) 20:11 (5)	04:55 21:33	05:24 22:01	06:17 20:39	19:55 (5) 20:10 (5)	08:07 19:24	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:50 (5) 20:10 (5)	04:55 21:34	05:26 22:01	06:19 20:37	19:56 (5) 20:09 (5)	08:13 19:22	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19:51 (5) 20:10 (5)	04:56 21:36	05:27 22:01	06:20 20:35	19:56 (5) 20:06 (5)	07:15 19:19	07:11 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:51 (5) 20:09 (5)	04:56 21:37	05:29 22:01	06:22 20:32	19:57 (5) 20:04 (5)	07:17 19:17	07:13 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:52 (5) 20:08 (5)	04:56 21:39	05:30 22:01	06:24 20:30	19:59 (5) 20:02 (5)	07:19 19:14	07:14 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	19:53 (5) 20:06 (5)	04:57 21:40	05:32 22:01	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00	07:08 18:08	06:08 19:08	05:56 20:52	19:55 (5) 20:04 (5)	04:58 21:41	05:34 22:00	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02	07:06 18:17	06:06 19:16	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04	07:04 18:18	06:04 19:18	05:53 20:53	05:04 21:44	04:58 22:00	05:37 21:26	06:31 20:21	07:22 16:56	07:22 16:56	08:11 16:13	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction					0.35		0.32					
Oper. time red.					1.00		1.00					
Wind dir. red.					0.65		0.61					
Total reduction					0.23		0.19					
Total, real					46		24					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LT - H332

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	3 19:30 (5) 20:55	05:52 21:45	05:03 22:00	04:59 21:25	05:39 20:53 (4)	06:33 20:18	8 19:28 (5) 19:05	07:26 16:54 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	7 19:28 (5) 20:57	05:50 21:46	05:00 21:59	05:40 21:23	05:40 20:52 (4)	06:35 20:16	12 19:26 (5) 19:02	07:28 16:52 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	10 19:27 (5) 20:59	05:48 21:48	05:00 21:59	05:42 21:21	05:42 20:50 (4)	06:36 20:13	15 19:23 (5) 19:00	07:30 16:50 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	12 19:27 (5) 21:01	05:46 21:49	05:00 21:59	05:44 21:19	05:44 20:48 (4)	06:38 20:11	17 19:22 (5) 18:57	07:31 16:48 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	15 19:25 (5) 21:02	05:44 21:50	05:02 21:58	05:45 21:17	05:45 20:46 (4)	06:40 20:09	17 19:22 (5) 18:55	07:33 16:46 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	17 19:25 (5) 21:04	05:42 21:51	05:03 21:57	05:47 21:15	05:47 20:45 (4)	06:42 20:06	16 19:22 (5) 18:52	07:34 16:44 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	17 19:25 (5) 21:06	05:40 21:52	05:04 21:57	05:49 21:13	05:49 20:43 (4)	06:43 20:04	15 19:20 (5) 18:50	07:37 16:43 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	17 19:25 (5) 21:08	05:38 21:53	05:05 21:56	05:50 21:11	05:50 20:41 (4)	06:45 20:01	12 19:21 (5) 18:48	07:39 16:41 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	15 19:26 (5) 21:10	05:36 21:54	05:06 21:55	05:52 21:09	05:52 20:42 (4)	06:47 20:01	10 19:21 (5) 18:45	07:41 16:39 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	12 19:27 (5) 21:11	05:34 21:54	05:07 21:54	05:54 21:07	05:54 20:40 (4)	06:49 21:54	10 19:27 (5) 18:43	07:42 16:37 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	8 19:29 (5) 21:13	05:33 21:55	05:08 21:54	05:56 21:05	05:56 20:41 (4)	06:50 20:06	4 19:22 (5) 18:40	07:44 16:35 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	13 19:31 (5) 21:15	05:35 21:56	05:09 21:53	05:57 21:03	05:57 20:43 (4)	06:52 21:56	19 19:21 (5) 18:38	07:46 16:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	16 19:32 (5) 21:17	05:29 21:44 (4)	05:10 21:52	05:59 21:01	05:59 20:44 (4)	06:54 21:57	19 19:20 (5) 18:43	07:48 16:32 16:05
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	20 19:33 (5) 21:18	05:27 21:57	05:12 21:51	06:01 20:59	06:01 20:47 (4)	06:56 21:57	20 19:21 (5) 18:45	07:49 16:31 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	21 19:34 (5) 21:20	05:26 21:58	05:13 21:50	06:03 20:57	06:03 20:48 (4)	06:57 21:58	20 19:22 (5) 18:41	07:51 16:29 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	20 19:35 (5) 21:22	05:24 21:59	05:14 21:48	06:04 20:55	06:04 20:48 (4)	06:59 21:59	20 19:23 (5) 18:42	07:53 16:27 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19 19:36 (5) 21:23	05:22 21:59	05:16 21:47	06:06 20:53	06:06 20:40 (4)	07:01 21:59	20 19:24 (5) 18:43	07:55 16:26 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	18 19:37 (5) 21:25	05:21 21:59	05:17 21:46	06:08 20:50	06:08 20:41 (4)	07:03 21:59	20 19:25 (5) 18:44	07:57 16:24 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	17 19:38 (5) 21:26	05:19 21:59	05:18 21:45	06:10 20:48	06:10 20:30 (4)	07:05 21:54	20 19:26 (5) 18:45	07:58 16:23 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	16 19:39 (5) 21:28	05:20 21:54	05:20 21:43	06:12 20:52 (4)	06:12 20:43 (4)	07:06 21:57	20 19:27 (5) 18:46	08:00 16:22 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	14 19:40 (5) 21:30	05:21 21:55	05:21 21:42	06:13 20:54 (4)	06:13 20:41 (4)	07:08 21:59	20 19:28 (5) 18:47	08:02 16:20 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	13 19:41 (5) 21:31	05:23 21:55	05:23 21:41	06:15 20:55 (4)	06:15 20:42 (4)	07:10 21:57	20 19:29 (5) 18:48	08:04 16:19 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	10 19:42 (5) 21:33	05:24 21:56	05:24 21:39	06:17 20:56 (4)	06:17 20:40 (4)	07:12 21:59	20 19:30 (5) 18:49	08:06 16:18 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	5 19:43 (5) 21:34	05:26 21:58	05:26 21:38	06:19 20:57 (4)	06:19 20:40 (4)	07:13 21:59	20 19:31 (5) 18:50	08:07 16:17 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	21:36 22:01	05:27 21:36	05:27 21:36	06:20 20:58 (4)	06:20 20:41 (4)	07:15 21:59	20 19:32 (5) 18:51	08:09 16:16 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	21:37 22:01	05:29 21:35	05:29 21:35	06:22 20:58 (4)	06:22 20:42 (4)	07:17 21:59	20 19:33 (5) 18:52	08:11 16:14 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:00 20:48	21:37 22:01	05:30 21:33	05:30 21:33	06:24 20:58 (4)	06:24 20:43 (4)	07:19 21:59	20 19:34 (5) 18:53	08:13 16:13 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	21:39 22:01	05:32 21:31	05:32 21:31	06:26 20:59 (4)	06:26 20:44 (4)	07:21 21:59	20 19:35 (5) 18:54	08:14 16:12 16:11
29	08:18 17:00	07:08 18:04	05:56 19:54	05:06 20:52	21:40 22:00	05:07 21:30	05:07 21:30	06:27 20:57 (4)	06:27 20:44 (4)	07:22 21:59	20 19:36 (5) 18:55	08:16 16:12 16:11
30	08:17 17:02	07:06 18:06	05:54 19:56	05:04 20:53	21:41 22:01	05:08 21:31	05:08 21:31	06:29 20:58 (4)	06:29 20:45 (4)	07:24 21:59	20 19:37 (5) 18:56	08:17 16:11 16:12
31	08:15 17:04	07:04 18:04	05:04 19:58	05:04 21:44	21:44 22:01	05:37 21:26	05:37 21:26	06:31 20:55 (4)	06:31 20:42 (4)	07:25 21:59	20 19:38 (5) 18:57	08:18 16:13 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				133	260	197	64	133				
Sun reduction				0.35	0.38	0.32	0.34	0.32				
Oper. time red.				1.00	1.00	1.00	1.00	1.00				
Wind dir. red.				0.67	0.64	0.64	0.64	0.67				
Total reduction				0.24	0.24	0.21	0.22	0.21				
Total, real				31	63	41	14	29				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: LU - H333

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LV - H334

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1 08:44	08:14	16:30 (5) 07:16	17:18 (4) 07:01	05:52	19:58 (2) 05:03	
16:15	17:06	4 16:34 (5) 18:02	16 17:34 (4) 20:00	20:55	28 20:26 (2) 21:45	
2 08:44	08:12	16:30 (5) 07:14	17:16 (4) 06:59	05:50	19:58 (2) 05:02	
16:16	17:08	7 16:37 (5) 18:04	20 17:36 (4) 20:02	20:57	28 20:26 (2) 21:46	
3 08:43	08:10	16:30 (5) 07:11	17:16 (4) 06:56	05:48	19:58 (2) 05:01	
16:17	17:10	9 16:39 (5) 18:06	22 17:38 (4) 20:04	20:59	27 20:25 (2) 21:48	
4 08:43	08:08	16:29 (5) 07:09	17:16 (4) 06:54	05:46	19:58 (2) 05:00	
16:18	17:12	12 16:41 (5) 18:07	25 17:41 (4) 20:06	21:01	26 20:24 (2) 21:49	
5 08:43	08:07	16:29 (5) 07:07	17:15 (4) 06:51	05:44	19:58 (2) 04:59	
16:19	17:14	14 16:43 (5) 18:09	27 17:42 (4) 20:07	21:03	26 20:24 (2) 21:50	
6 08:42	08:05	16:29 (5) 07:04	17:15 (4) 06:49	05:42	19:59 (2) 04:59	
16:21	17:16	16 16:45 (5) 18:11	30 17:45 (4) 20:09	21:04	24 20:23 (2) 21:51	
7 08:42	08:03	16:29 (5) 07:02	17:14 (4) 06:47	05:40	20:00 (2) 04:58	
16:22	17:18	18 16:47 (5) 18:13	32 17:46 (4) 20:11	21:06	23 20:23 (2) 21:52	
8 08:42	08:01	16:29 (5) 07:00	17:14 (4) 06:44	05:38	20:01 (2) 04:57	
16:24	17:20	21 16:50 (5) 18:15	34 17:48 (4) 20:13	21:08	20 20:21 (2) 21:53	
9 08:41	07:59	16:30 (5) 06:57	17:14 (4) 06:42	05:36	20:02 (2) 04:57	
16:25	17:22	21 16:51 (5) 18:17	33 17:47 (4) 20:15	21:10	18 20:20 (2) 21:54	
10 08:40	07:57	16:30 (5) 06:55	17:15 (4) 06:39	05:34	20:03 (2) 04:56	
16:26	17:24	21 16:51 (5) 18:19	32 17:47 (4) 20:17	21:11	15 20:18 (2) 21:55	
11 08:40	07:55	16:31 (5) 06:52	17:15 (4) 06:37	05:33	20:06 (2) 04:56	
16:28	17:26	19 16:50 (5) 18:21	31 17:46 (4) 20:19	21:13	11 20:17 (2) 21:55	
12 08:39	07:53	16:31 (5) 06:50	17:15 (4) 06:35	05:31	20:09 (2) 04:55	
16:30	17:28	18 16:49 (5) 18:23	30 17:45 (4) 20:20	21:15	4 20:13 (2) 21:56	
13 08:38	07:51	16:33 (5) 06:48	17:17 (4) 06:32	05:29	04:55	
16:31	17:30	15 16:48 (5) 18:25	27 17:44 (4) 20:22	21:17	21:57	
14 08:37	07:49	16:35 (5) 06:45	17:17 (4) 06:30	05:27	04:55	
16:33	17:32	11 16:46 (5) 18:27	27 18:00 (3) 20:24	21:18	21:57	
15 08:36	07:47	16:40 (5) 06:43	17:19 (4) 06:28	05:26	04:54	
16:34	17:34	1 16:41 (5) 18:28	26 18:02 (3) 20:26	21:20	21:58	
16 08:35	07:45	06:40	17:21 (4) 06:25	05:24	04:54	
16:36	17:36	18:30	24 18:04 (3) 20:28	21:22	21:59	
17 08:34	07:43	06:38	17:25 (4) 06:23	05:22	04:54	
16:38	17:38	18:32	19 18:06 (3) 20:30	21:23	21:59	
18 08:33	07:41	06:35	17:54 (3) 06:21	05:21	04:54	
16:40	17:40	18:34	13 18:07 (3) 20:31	21:25	22:00	
19 08:32	07:39	06:33	17:54 (3) 06:18	05:19	04:54	
16:41	17:42	18:36	16 18:10 (3) 20:33	21:27	22:00	
20 08:31	07:36	06:31	17:54 (3) 06:16	05:18	04:54	
16:43	17:44	18:38	17 18:11 (3) 20:35	21:28	22:00	
21 08:30	07:34	06:28	17:55 (3) 06:14	05:16	04:54	
16:45	17:46	18:40	18 18:13 (3) 20:37	2 20:08 (2) 21:30	22:01	
22 08:28	07:32	06:26	17:55 (3) 06:12	20:04 (2) 05:15	04:55	
16:47	17:48	18:41	18 18:13 (3) 20:39	6 20:10 (2) 21:31	22:01	
23 08:27	07:30	06:23	17:56 (3) 06:09	20:02 (2) 05:13	04:55	
16:49	17:50	18:43	16 18:12 (3) 20:41	10 20:12 (2) 21:33	22:01	
24 08:26	07:28	06:21	17:57 (3) 06:07	20:01 (2) 05:12	04:55	
16:50	17:52	18:45	13 18:10 (3) 20:42	13 20:14 (2) 21:34	22:01	
25 08:24	07:25	17:24 (4) 06:18	18:00 (3) 06:05	20:00 (2) 05:11	04:55	
16:52	17:54	2 17:26 (4) 18:47	7 18:07 (3) 20:44	15 20:15 (2) 21:36	22:01	
26 08:23	07:23	06:16	06:03	19:59 (2) 05:09	04:56	
16:54	17:56	6 17:28 (4) 18:49	20:46	18 20:17 (2) 21:37	22:01	
27 08:22	07:21	06:13	06:00	19:59 (2) 05:08	04:56	
16:56	17:58	10 17:31 (4) 18:51	20:48	20 20:19 (2) 21:39	22:01	
28 08:20	07:18	06:11	05:58	19:58 (2) 05:07	04:57	
16:58	18:00	13 17:32 (4) 18:53	20:50	23 20:21 (2) 21:40	22:01	
29 08:18	07:08	07:08	05:56	19:58 (2) 05:06	04:57	
17:00	19:54	20:52	24 20:22 (2) 21:41	22:01	22:01	
30 08:17	07:06	07:06	05:54	19:58 (2) 05:05	04:58	
17:02	19:56	20:53	26 20:24 (2) 21:43	22:00	22:00	
31 08:15	16:31 (5) 07:04	05:04	21:44	510		
17:04	1 16:32 (5) 19:58	21:44	510			
Potential sun hours	250	273	367	420	494	510
Total, worst case	1	238	573	157	250	
Sun reduction	0.24	0.23	0.27	0.35	0.38	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.66	0.66	0.68	0.65	0.65	
Total reduction	0.16	0.15	0.18	0.23	0.25	
Total, real	0	36	105	36	62	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LV - H334

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:17 (2) 20:25 (2)	06:33 20:18	07:26 19:05	17:55 (4) 16:21 (5)
2	04:59 22:00	05:40 21:23	20:15 (2) 20:28 (2)	06:35 20:16	07:26 19:02	17:54 (4) 16:21 (5)
3	05:00 21:59	05:42 21:21	20:13 (2) 20:29 (2)	06:36 20:13	07:28 19:00	17:53 (4) 16:20 (5)
4	05:01 21:59	05:44 21:19	20:12 (2) 20:31 (2)	06:38 20:11	07:30 18:57	17:52 (4) 16:17 (5)
5	05:02 21:58	05:45 21:17	20:10 (2) 20:31 (2)	06:40 20:09	07:32 18:55	17:51 (4) 16:15 (5)
6	05:03 21:58	05:47 21:15	20:09 (2) 20:32 (2)	06:42 20:06	07:34 18:52	17:51 (4) 16:12 (5)
7	05:04 21:57	05:49 21:13	20:09 (2) 20:33 (2)	06:43 20:04	07:36 18:50	17:50 (4) 16:10 (5)
8	05:05 21:56	05:50 21:11	20:07 (2) 20:33 (2)	06:45 20:01	07:38 18:48	17:50 (4) 16:08 (5)
9	05:06 21:55	05:52 21:09	20:07 (2) 20:34 (2)	06:47 19:59	07:40 18:45	17:50 (4) 16:06 (5)
10	05:07 21:55	05:54 21:07	20:06 (2) 20:34 (2)	06:49 19:56	07:42 18:43	17:50 (4) 16:05 (5)
11	05:08 21:54	05:56 21:05	20:06 (2) 20:34 (2)	06:50 19:54	07:44 18:40	17:50 (4) 16:05 (5)
12	05:09 21:53	05:57 21:03	20:06 (2) 20:34 (2)	06:52 19:51	07:46 18:38	17:51 (4) 16:04 (5)
13	05:10 21:52	05:59 21:01	20:05 (2) 20:31 (2)	06:54 19:49	07:48 18:36	17:51 (4) 16:03 (5)
14	05:12 21:51	06:01 20:59	20:06 (2) 20:29 (2)	06:56 19:47	07:50 18:33	17:52 (4) 16:02 (5)
15	05:13 21:50	06:03 20:57	20:06 (2) 20:28 (2)	06:58 19:44	07:52 18:31	17:54 (4) 16:01 (5)
16	05:14 21:49	06:04 20:55	20:06 (2) 20:25 (2)	06:59 19:42	07:53 18:29	17:55 (4) 16:00 (5)
17	05:16 21:47	06:06 20:53	20:06 (2) 20:23 (2)	07:01 19:39	07:55 18:26	17:59 (4) 16:00 (5)
18	05:17 21:46	06:08 20:50	20:07 (2) 20:22 (2)	07:03 19:37	07:57 18:24	16:26 16:00 (5)
19	05:18 21:45	06:10 20:48	20:07 (2) 20:19 (2)	07:05 19:34	07:59 18:22	16:26 16:00 (5)
20	05:20 21:44	06:12 20:46	20:08 (2) 20:17 (2)	07:06 19:32	08:01 18:20	16:27 16:00 (5)
21	05:21 21:42	06:13 20:44	20:10 (2) 20:15 (2)	07:08 19:29	08:03 18:17	16:27 16:00 (5)
22	05:23 21:41	06:15 20:42	20:11 (2) 20:12 (2)	07:10 19:27	08:05 18:15	16:28 16:00 (5)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	16:29 16:18	16:00 (5) 16:07 (5)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	16:20 16:17	16:00 (5) 16:08 (5)
25	05:27 21:36	06:20 20:35	07:15 19:19	08:11 18:09	16:19 16:16	16:00 (5) 16:08 (5)
26	05:29 21:35	06:22 20:32	07:17 19:17	08:13 18:07	16:17 16:14	16:00 (5) 16:09 (5)
27	05:30 21:33	06:24 20:30	07:19 19:14	08:14 18:04	16:15 16:13	16:00 (5) 16:10 (5)
28	05:32 21:32	06:26 20:28	07:21 19:12	08:16 18:02	16:14 16:12	16:00 (5) 16:11 (5)
29	05:34 21:30	06:27 20:25	07:22 19:09	08:18 18:00	16:13 16:10	16:00 (5) 16:11 (5)
30	05:35 21:28	06:29 20:23	07:24 19:07	08:19 18:00	16:12 16:09	16:00 (5) 16:12 (5)
31	05:37 21:26	06:31 20:21	07:26 19:05	08:20 18:00	16:11 16:08	16:00 (5) 16:13 (5)
Potential sun hours	512	460	382	328	259	233
Total, worst case		410	226	446	138	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.68	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		91	49	88	24	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LW - H335

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	16:27 (5) 18:02	07:16 17:34 (4)	07:01 20:00	19:55 (2) 20:22 (2)
2	08:44 16:16	08:12 17:08	16:27 (5) 18:04	07:14 17:36 (4)	06:59 20:02	19:55 (2) 20:21 (2)
3	08:43 16:17	08:10 17:10	16:27 (5) 18:06	07:11 17:38 (4)	06:56 20:04	19:55 (2) 20:20 (2)
4	08:43 16:18	08:08 17:12	16:27 (5) 18:07	07:09 17:41 (4)	06:54 20:06	19:56 (2) 20:19 (2)
5	08:43 16:19	08:07 17:14	16:26 (5) 18:09	07:07 17:42 (4)	06:51 20:07	19:56 (2) 20:18 (2)
6	08:42 16:21	08:05 17:16	16:27 (5) 18:11	07:04 17:44 (4)	06:49 20:09	19:57 (2) 20:17 (2)
7	08:42 16:22	08:03 17:18	16:27 (5) 18:13	07:02 17:43 (4)	06:47 20:11	19:59 (2) 20:16 (2)
8	08:42 16:24	08:01 17:20	16:27 (5) 18:15	07:00 17:43 (4)	06:44 20:13	20:01 (2) 20:14 (2)
9	08:41 16:25	07:59 17:22	16:28 (5) 18:17	06:57 17:41 (4)	06:42 20:15	20:03 (2) 20:11 (2)
10	08:40 16:26	07:57 17:24	16:29 (5) 18:19	06:55 17:40 (4)	06:39 20:17	20:11 (2) 21:11
11	08:40 16:28	07:55 17:26	16:30 (5) 18:21	06:52 17:44 (4)	06:37 20:19	21:13
12	08:39 16:30	07:53 17:28	16:31 (5) 18:23	06:50 17:44 (4)	06:35 20:20	21:15
13	08:38 16:31	07:51 17:30	16:34 (5) 18:25	06:48 17:47 (3)	06:32 20:22	21:17
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 18:00 (3)	06:24 20:24	21:18
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 18:02 (3)	06:26 20:26	21:20
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 18:04 (3)	06:23 20:28	21:22
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 18:06 (3)	06:21 20:30	21:23
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 18:07 (3)	06:19 20:31	21:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 18:10 (3)	06:16 20:33	21:27
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 18:11 (3)	06:14 20:35	21:28
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 18:11 (3)	06:12 20:37	21:30
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 18:08 (3)	06:10 20:39	21:31
23	08:27 16:49	07:30 17:50	06:23 17:20 (4) 18:43	06:09 17:56 (3) 20:41	06:07 19:57 (2) 20:12 (2)	21:33
24	08:26 16:50	07:28 17:52	06:21 17:18 (4) 18:45	06:07 20:42	06:05 19:55 (2)	21:34
25	08:24 16:52	07:25 17:54	06:18 17:16 (4) 18:47	06:05 20:44	06:03 20:15 (2)	21:36
26	08:23 16:54	07:23 17:56	06:16 17:15 (4) 18:49	06:03 20:46	06:01 20:17 (2)	21:37
27	08:22 16:56	07:21 17:58	06:13 17:14 (4) 18:51	06:00 20:48	05:58 20:19 (2)	21:39
28	08:20 16:58	07:18 18:00	06:11 17:13 (4) 18:53	05:58 20:50	05:07 19:54 (2)	21:40
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 20:22 (2)	21:41
30	08:17 17:02	16:28 (5) 16:30 (5)	07:06 19:56	05:54 20:53	05:05 20:22 (2)	21:43
31	08:15 17:04	16:27 (5) 16:32 (5)	07:04 19:58		05:04 21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case	7	261	510	213	181	
Sun reduction	0.24	0.23	0.27	0.35	0.38	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.66	0.66	0.68	0.65	0.65	
Total reduction	0.16	0.15	0.18	0.23	0.25	
Total, real	1	40	94	49	45	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LW - H335

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:54 (4) 16:54	15:58 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:52 (4) 16:52	15:58 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:51 (4) 16:50	15:57 (5) 16:08
4	05:01 21:59	05:44 21:19	20:13 (2) 20:11	07:31 18:57	17:50 (4) 16:48	15:57 (5) 16:08
5	05:02 21:58	05:45 21:17	20:10 (2) 20:09	07:33 18:55	17:49 (4) 16:46	15:56 (5) 16:07
6	05:03 21:58	05:47 21:15	20:08 (2) 20:06	07:35 18:52	17:48 (4) 16:44	15:56 (5) 16:07
7	05:04 21:57	05:49 21:13	20:07 (2) 20:04	07:37 18:50	17:46 (4) 16:43	15:56 (5) 16:06
8	05:05 21:56	05:50 21:11	20:06 (2) 20:01	07:39 18:48	17:46 (4) 16:41	15:57 (5) 16:06
9	05:06 21:55	05:52 21:09	20:05 (2) 19:59	07:41 18:45	17:45 (4) 16:39	15:57 (5) 16:05
10	05:07 21:55	05:54 21:07	20:04 (2) 19:56	07:42 18:43	17:45 (4) 16:37	15:58 (5) 16:05
11	05:08 21:54	05:56 21:05	20:03 (2) 19:54	07:44 18:40	17:45 (4) 16:35	15:59 (5) 16:05
12	05:09 21:53	05:57 21:03	20:03 (2) 19:51	07:46 18:38	17:45 (4) 16:34	16:00 (5) 16:05
13	05:10 21:52	05:59 21:01	20:02 (2) 19:49	07:48 18:36	17:46 (4) 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	20:02 (2) 19:47	07:50 18:33	17:46 (4) 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	20:02 (2) 19:44	07:52 18:31	17:47 (4) 16:29	08:37 16:05
16	05:14 21:49	06:04 20:55	20:01 (2) 19:42	07:54 18:29	17:47 (4) 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	20:02 (2) 19:39	07:55 18:26	17:48 (4) 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:02 (2) 19:37	07:57 18:24	17:50 (4) 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	20:02 (2) 19:34	07:59 18:22	17:55 (4) 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	20:02 (2) 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	20:03 (2) 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	20:03 (2) 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	20:05 (2) 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	20:07 (2) 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 18:11	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 18:14	08:11 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	07:14 18:16	08:13 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 18:14	08:14 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 18:13	16:03 (5) 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 18:38 (3)	16:00 (5) 16:11	08:44 16:12
31	05:37 21:26	06:31 20:21		07:22 16:56	15:59 (5) 16:15 (5)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		394	168	459	161	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		87	36	91	28	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LX - H336

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June	
1	08:44		08:14	16:26 (5)	07:16	17:09 (4)	07:01		05:52	19:52 (2)	05:03	
	16:15		17:06	8 16:34 (5)	18:02	25 17:34 (4)	20:00		20:55	22 20:14 (2)	21:45	
2	08:44		08:12	16:27 (5)	07:14	17:09 (4)	06:59		05:50	19:52 (2)	05:02	
	16:16		17:08	10 16:37 (5)	18:04	27 17:36 (4)	20:02		20:57	20 20:12 (2)	21:46	
3	08:43		08:10	16:26 (5)	07:11	17:09 (4)	06:56		05:48	19:54 (2)	05:01	
	16:17		17:10	13 16:39 (5)	18:06	29 17:38 (4)	20:04		20:59	17 20:11 (2)	21:48	
4	08:43		08:08	16:26 (5)	07:09	17:09 (4)	06:54		05:46	19:55 (2)	05:00	
	16:18		17:12	15 16:41 (5)	18:07	32 17:41 (4)	20:06		21:01	14 20:09 (2)	21:49	
5	08:43		08:07	16:26 (5)	07:07	17:09 (4)	06:51		05:44	19:58 (2)	04:59	
	16:19		17:14	17 16:43 (5)	18:09	31 17:40 (4)	20:07		21:03	8 20:06 (2)	21:50	
6	08:42		08:05	16:26 (5)	07:04	17:09 (4)	06:49		05:42		04:59	
	16:21		17:16	19 16:45 (5)	18:11	31 17:40 (4)	20:09		21:04		21:51	
7	08:42		08:03	16:27 (5)	07:02	17:09 (4)	06:47		05:40		04:58	
	16:22		17:18	20 16:47 (5)	18:13	29 17:38 (4)	20:11		21:06		21:52	
8	08:42		08:01	16:27 (5)	07:00	17:10 (4)	06:44		05:38		04:57	
	16:24		17:20	20 16:47 (5)	18:15	28 17:38 (4)	20:13		21:08		21:53	
9	08:41		07:59	16:28 (5)	06:57	17:11 (4)	06:42		05:36		04:57	
	16:25		17:22	19 16:47 (5)	18:17	25 17:36 (4)	20:15		21:10		21:54	
10	08:40		07:57	16:29 (5)	06:55	17:12 (4)	06:39		05:34		04:56	
	16:26		17:24	17 16:46 (5)	18:19	23 17:35 (4)	20:17		21:11		21:55	
11	08:40		07:55	16:31 (5)	06:52	17:15 (4)	06:37		05:33		04:56	
	16:28		17:26	14 16:45 (5)	18:21	18 17:33 (4)	20:19		21:13		21:55	
12	08:39		07:53	16:32 (5)	06:50	17:17 (4)	06:35		05:31		04:55	
	16:30		17:28	10 16:42 (5)	18:23	16 17:56 (3)	20:20		21:15		21:56	
13	08:38		07:51		06:48	17:52 (3)	06:32		05:29		04:55	
	16:31		17:30		18:25	6 17:58 (3)	20:22		21:17		21:57	
14	08:37		07:49		06:45	17:51 (3)	06:30		05:27		04:55	
	16:33		17:32		18:27	9 18:00 (3)	20:24		21:18		21:57	
15	08:36		07:47		06:43	17:50 (3)	06:28		05:26		04:54	
	16:34		17:34		18:28	12 18:02 (3)	20:26		21:20		21:58	
16	08:35		07:45		06:40	17:50 (3)	06:25	19:58 (2)	05:24		04:54	
	16:36		17:36		18:30	14 18:04 (3)	20:28	1 19:59 (2)	21:22		21:59	
17	08:34		07:43		06:38	17:50 (3)	06:23	19:56 (2)	05:22		04:54	
	16:38		17:38		18:32	16 18:06 (3)	20:30	5 20:01 (2)	21:23		21:59	
18	08:33		07:41		06:35	17:50 (3)	06:21	19:54 (2)	05:21		04:54	
	16:40		17:40		18:34	17 18:07 (3)	20:31	9 20:03 (2)	21:25		22:00	
19	08:32		07:39		06:33	17:51 (3)	06:18	19:53 (2)	05:19		04:54	
	16:41		17:42		18:36	18 18:09 (3)	20:33	12 20:05 (2)	21:27		22:00	
20	08:31		07:36		06:31	17:51 (3)	06:16	19:52 (2)	05:18		04:54	
	16:43		17:44		18:38	16 18:07 (3)	20:35	15 20:07 (2)	21:28		22:00	
21	08:30		07:34		06:28	17:53 (3)	06:14	19:51 (2)	05:16		04:54	
	16:45		17:46		18:40	12 18:05 (3)	20:37	17 20:08 (2)	21:30		22:01	
22	08:28		07:32	17:16 (4)	06:26	17:55 (3)	06:12	19:50 (2)	05:15		04:55	
	16:47		17:48	3 17:19 (4)	18:41	6 18:01 (3)	20:39	20 20:10 (2)	21:31		22:01	
23	08:27		07:30	17:15 (4)	06:23		06:09	19:50 (2)	05:13		04:55	
	16:49		17:50	7 17:22 (4)	18:43		20:41	22 20:12 (2)	21:33		22:01	
24	08:26		07:28	17:14 (4)	06:21		06:07	19:50 (2)	05:12		04:55	
	16:50		17:52	10 17:24 (4)	18:45		20:42	24 20:14 (2)	21:34		22:01	
25	08:24		07:25	17:12 (4)	06:18		06:05	19:49 (2)	05:11		04:55	
	16:52		17:54	14 17:26 (4)	18:47		20:44	26 20:15 (2)	21:36		22:01	
26	08:23		07:23	17:11 (4)	06:16		06:03	19:50 (2)	05:09		04:56	
	16:54		17:56	17 17:28 (4)	18:49		20:46	27 20:17 (2)	21:37		22:01	
27	08:22		07:21	17:11 (4)	06:13		06:00	19:50 (2)	05:08		04:56	
	16:56		17:58	20 17:31 (4)	18:51		20:48	27 20:17 (2)	21:39		22:01	
28	08:20		07:18	17:10 (4)	06:11		05:58	19:50 (2)	05:07		04:57	
	16:58		18:00	22 17:32 (4)	18:53		20:50	26 20:16 (2)	21:40		22:01	
29	08:18				07:08		05:56	19:50 (2)	05:06		04:57	
	17:00				19:54		20:52	25 20:15 (2)	21:41		22:01	
30	08:17	16:27 (5)			07:06		05:54	19:51 (2)	05:05		04:58	
	17:02	3 16:30 (5)			19:56		20:53	24 20:15 (2)	21:43		22:00	
31	08:15	16:27 (5)			07:04				05:04			
	17:04	5 16:32 (5)			19:58				21:44			
Potential sun hours	250		273		367		420		494		510	
Total, worst case	8		275		440		280		81			
Sun reduction	0.24		0.23		0.27		0.35		0.38			
Oper. time red.	1.00		1.00		1.00		1.00		1.00			
Wind dir. red.	0.66		0.66		0.68		0.65		0.65			
Total reduction	0.16		0.15		0.18		0.23		0.25			
Total, real	1		42		81		64		20			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LX - H336

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:57 (4) 16:54	15:59 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:54 (4) 16:52	15:58 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:51 (4) 16:50	15:57 (5) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:49 (4) 16:48	15:56 (5) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:48 (4) 16:46	15:56 (5) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:47 (4) 16:44	15:56 (5) 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	17:45 (4) 16:43	15:56 (5) 16:06
8	05:05 21:56	05:50 21:11	20:06 (2) 20:01	07:39 18:48	17:44 (4) 16:41	15:56 (5) 16:06
9	05:06 21:55	05:52 21:09	20:04 (2) 19:59	07:41 18:45	17:43 (4) 16:39	15:56 (5) 16:05
10	05:07 21:55	05:54 21:07	20:02 (2) 19:56	07:42 18:43	17:43 (4) 16:37	15:58 (5) 16:05
11	05:08 21:54	05:56 21:05	20:01 (2) 19:54	07:44 18:40	17:43 (4) 16:35	15:59 (5) 16:05
12	05:09 21:53	05:57 21:03	20:00 (2) 19:51	07:46 18:38	17:43 (4) 16:34	15:59 (5) 16:05
13	05:10 21:52	05:59 21:01	19:58 (2) 19:49	07:48 18:36	17:43 (4) 16:32	16:05 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 19:47	07:50 18:33	17:43 (4) 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	19:57 (2) 19:44	07:52 18:31	17:43 (4) 16:29	08:37 16:05
16	05:14 21:49	06:04 20:55	19:56 (2) 19:42	07:54 18:29	17:44 (4) 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 19:39	07:55 18:26	17:44 (4) 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 19:37	07:57 18:24	17:45 (4) 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	19:55 (2) 19:34	07:59 18:22	17:46 (4) 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	19:56 (2) 19:32	08:01 18:20	17:48 (4) 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	19:56 (2) 19:29	08:03 18:17	17:50 (4) 16:20	16:06 16:06
22	05:23 21:41	06:15 20:42	19:55 (2) 19:27	08:05 18:15	16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	19:56 (2) 19:24	08:07 18:13	16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	19:57 (2) 19:22	08:09 18:11	16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	19:57 (2) 19:19	08:11 18:09	16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	19:59 (2) 19:17	08:13 18:06	16:15	08:43 16:09
27	05:30 21:33	06:24 20:30	20:01 (2) 19:14	08:14 18:04	16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	19:12	08:16 18:02	16:13	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	08:18 18:00	16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	08:20 18:00	16:11	08:44 16:12
31	05:37 21:26	06:31 20:21		08:22 16:56	15:59 (5) 16:14 (5)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		363	125	448	160	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		80	27	89	28	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LY - H337

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	16:31 (5) 18:02	17:15 (4) 20:00	05:52 20:55	19:52 (2) 21:45
2	08:44 16:16	08:12 17:08	16:31 (5) 18:04	17:13 (4) 20:02	05:50 20:57	19:54 (2) 21:46
3	08:43 16:17	08:10 17:10	16:31 (5) 18:06	17:13 (4) 20:04	05:48 20:59	19:55 (2) 21:48
4	08:43 16:18	08:08 17:12	16:30 (5) 18:07	17:13 (4) 20:06	05:46 21:01	19:57 (2) 21:49
5	08:43 16:19	08:07 17:14	16:30 (5) 18:09	17:13 (4) 20:07	05:44 21:03	20:06 (2) 21:50
6	08:42 16:21	08:05 17:16	16:30 (5) 18:11	17:13 (4) 20:09	05:42 21:04	21:51
7	08:42 16:22	08:03 17:18	16:30 (5) 18:13	17:13 (4) 20:11	05:40 21:06	21:52
8	08:42 16:24	08:01 17:20	16:31 (5) 18:15	17:14 (4) 20:13	05:38 21:08	21:53
9	08:41 16:25	07:59 17:22	16:31 (5) 18:17	17:14 (4) 20:15	05:36 21:10	21:54
10	08:40 16:26	07:57 17:24	16:32 (5) 18:19	17:15 (4) 20:17	05:34 21:11	21:55
11	08:40 16:28	07:55 17:26	16:33 (5) 18:21	17:17 (4) 20:19	05:33 21:13	21:55
12	08:39 16:30	07:53 17:28	16:33 (5) 18:23	17:18 (4) 20:20	05:31 21:15	21:56
13	08:38 16:31	07:51 17:30	16:35 (5) 18:25	17:20 (4) 20:22	05:29 21:17	21:57
14	08:37 16:33	07:49 17:32	16:38 (5) 18:27	17:53 (3) 20:24	05:27 21:18	21:57
15	08:36 16:34	07:47 17:34	16:44 (5) 18:28	17:53 (3) 20:26	05:26 21:20	21:58
16	08:35 16:36	07:45 17:36	18:02 (3) 18:30	17:52 (3) 20:28	05:24 21:22	21:59
17	08:34 16:38	07:43 17:38	18:04 (3) 18:32	17:52 (3) 20:30	05:22 21:23	21:59
18	08:33 16:40	07:41 17:40	18:06 (3) 18:34	17:51 (3) 20:31	05:21 21:25	22:00
19	08:32 16:41	07:39 17:42	18:07 (3) 18:36	17:52 (3) 20:33	05:19 21:27	22:00
20	08:31 16:43	07:36 17:44	18:10 (3) 18:38	17:52 (3) 20:35	05:18 21:28	22:01
21	08:30 16:45	07:34 17:46	18:09 (3) 18:40	17:54 (3) 20:37	05:16 21:30	22:01
22	08:28 16:47	07:32 17:48	18:08 (3) 18:41	17:55 (3) 20:39	05:15 21:31	22:01
23	08:27 16:49	07:30 17:50	18:05 (3) 18:43	18:09 (3) 20:41	05:13 21:33	22:01
24	08:26 16:50	07:28 17:52	18:21 (4) 18:45	18:02 (3) 20:42	05:12 21:34	22:01
25	08:24 16:52	07:25 17:54	17:24 (4) 18:47	18:04 (3) 20:44	05:11 21:36	22:01
26	08:23 16:54	07:23 17:56	17:26 (4) 18:49	18:06 (3) 20:46	05:10 21:37	22:01
27	08:22 16:56	07:21 17:58	17:28 (4) 18:51	17:16 (4) 20:48	05:08 21:39	22:01
28	08:20 16:58	07:18 18:00	17:31 (4) 18:53	17:15 (4) 20:50	05:07 21:40	22:01
29	08:18 17:00		17:32 (4) 19:54	18:17 (4) 20:52	05:06 21:41	22:01
30	08:17 17:02		19:56	18:19 (4) 20:54	05:05 21:42	22:01
31	08:15 17:04		19:58	18:20 (4) 20:53	05:04 21:43	22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case		235	441	273	60	
Sun reduction		0.23	0.27	0.35	1.00	
Oper. time red.		1.00	1.00	1.00	0.65	
Wind dir. red.		0.66	0.68	0.65	0.25	
Total reduction		0.15	0.18	0.23	0.25	
Total, real		36	81	62	15	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LY - H337

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September		October		November		December
1	04:59 22:00	05:39 21:25	06:33 20:18		07:26 19:05	17:58 (4) 18:36 (3)	07:24 16:54	16:01 (5) 16:20 (5)	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16		07:28 19:02	17:55 (4) 18:16 (4)	07:26 16:52	16:01 (5) 16:21 (5)	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13		07:30 19:00	17:54 (4) 18:17 (4)	07:28 16:50	16:00 (5) 16:19 (5)	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11		07:31 18:57	17:52 (4) 18:18 (4)	07:30 16:48	16:00 (5) 16:17 (5)	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09		07:33 18:55	17:51 (4) 18:19 (4)	07:32 16:46	16:00 (5) 16:15 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06		07:35 18:52	17:50 (4) 18:20 (4)	07:34 16:44	16:00 (5) 16:12 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04		07:37 18:50	17:48 (4) 18:19 (4)	07:36 16:43	16:00 (5) 16:10 (5)	08:28 16:06
8	05:05 21:56	05:50 21:11	06:45 20:01		07:39 18:48	17:48 (4) 18:18 (4)	07:38 16:41	16:01 (5) 16:08 (5)	08:29 16:06
9	05:06 21:55	05:52 21:09	20:06 (2)	06:47 19:59	07:41 18:45	17:48 (4) 18:16 (4)	07:40 16:39	16:01 (5) 16:06 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	11	20:17 (2) 20:03 (2)	19:59 06:49	07:42 17:47 (4)	07:42 16:37	16:03 (5) 16:05 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	15	20:18 (2) 20:02 (2)	19:56 06:50	18:43 07:44	18:14 (4) 17:47 (4)	2	16:05 (5) 08:33
12	05:09 21:53	05:57 21:03	18	20:20 (2) 20:01 (2)	19:54 06:52	18:40 07:46	18:11 (4) 17:48 (4)	16:35 07:45	16:05 08:34
13	05:10 21:52	05:59 21:01	20	20:21 (2) 19:59 (2)	19:51 06:54	18:38 07:48	18:09 (4) 17:48 (4)	16:34 07:47	16:05 08:35
14	05:12 21:51	06:01 20:59	22	20:21 (2) 19:58 (2)	19:49 06:56	18:36 07:50	18:07 (4) 17:48 (4)	16:32 07:49	16:05 08:36
15	05:13 21:50	06:03 20:57	24	20:22 (2) 19:58 (2)	19:47 06:57	18:33 07:52	18:04 (4) 17:49 (4)	16:31 07:51	16:04 08:37
16	05:14 21:49	06:04 20:55	25	20:23 (2) 19:57 (2)	19:44 06:59	18:31 07:54	18:02 (4) 17:50 (4)	16:29 07:53	16:04 08:38
17	05:16 21:47	06:06 20:53	26	20:23 (2) 19:56 (2)	19:42 07:01	18:29 07:55	17:59 (4) 17:51 (4)	16:27 07:55	16:05 08:38
18	05:17 21:46	06:08 20:50	27	20:23 (2) 19:56 (2)	19:39 07:03	6	17:57 (4) 17:52 (4)	16:26 07:57	16:05 08:39
19	05:18 21:45	06:10 20:48	26	20:22 (2) 19:56 (2)	19:37 07:05	3	17:55 (4) 07:59	16:24 07:59	16:05 08:40
20	05:20 21:44	06:12 20:46	23	20:19 (2) 19:56 (2)	19:34 07:06	18:22 08:01	16:23 08:00		16:05 08:41
21	05:21 21:42	06:13 20:44	21	20:17 (2) 19:56 (2)	19:32 07:08	18:20 08:03	16:22 08:02		16:06 08:41
22	05:23 21:41	06:15 20:42	19	20:15 (2) 19:56 (2)	19:29 07:10	8	18:50 (3) 18:39 (3)	18:17 08:05	16:06 08:42
23	05:24 21:39	06:17 20:39	16	20:12 (2) 19:56 (2)	19:27 07:12	13	18:52 (3) 18:37 (3)	18:15 08:07	16:06 08:42
24	05:26 21:38	06:19 20:37	14	20:10 (2) 19:57 (2)	19:24 07:13	16	18:53 (3) 18:36 (3)	18:13 08:09	16:07 08:43
25	05:27 21:36	06:20 20:35	12	20:09 (2) 19:57 (2)	19:22 07:15	18	18:54 (3) 18:34 (3)	18:11 07:11	16:08 08:43
26	05:29 21:35	06:22 20:32	9	20:06 (2) 20:04 (2)	19:19 19:17	17	18:51 (3) 18:34 (3)	17:09 07:13	16:08 08:43
27	05:30 21:33	06:24 20:30	5	20:01 (2) 20:02 (2)	07:19 19:14	14	18:33 (3) 18:46 (3)	07:14 17:04	16:09 16:10
28	05:32 21:32	06:26 20:28	1	07:21 19:12	11	18:33 (3) 18:44 (3)	07:16 17:02	16:07 (5) 16:14 (5)	08:44 16:11
29	05:34 21:30	06:27 20:25		07:22 19:09	8	18:33 (3) 18:41 (3)	07:18 17:00	16:04 (5) 16:17 (5)	08:44 16:11
30	05:35 21:28	06:29 20:23		07:24 19:07	15	18:01 (4) 18:38 (3)	07:20 16:58	16:02 (5) 16:18 (5)	08:44 16:12
31	05:37 21:26	06:31 20:21					07:22 16:56	16:01 (5) 16:19 (5)	08:44 16:13
Potential sun hours	512	460		382		328		259	233
Total, worst case		334		133		427		126	
Sun reduction		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00	
Wind dir. red.		0.65		0.67		0.67		0.66	
Total reduction		0.22		0.22		0.20		0.17	
Total, real		74		29		84		22	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LZ - H338

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:57 (2) 20:18 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	21 20:57	20:18 (2) 20:17 (2)
3	08:43 16:17	08:10 17:10	07:11 18:05	17:35 (4) 20:04	05:48 20:59	19:59 (2) 20:15 (2)
4	08:43 16:18	08:08 17:12	07:09 18:07	17:34 (4) 20:06	05:46 21:01	20:00 (2) 20:14 (2)
5	08:43 16:19	08:07 17:14	07:07 18:09	17:32 (4) 20:07	05:44 21:03	20:02 (2) 20:11 (2)
6	08:42 16:21	08:05 17:16	07:04 18:11	17:31 (4) 20:09	05:42 21:04	20:11 (2) 21:51
7	08:42 16:22	08:03 17:18	16:46 (5) 18:13	17:29 (4) 20:11	05:40 21:06	21:52
8	08:41 16:24	08:01 17:20	16:46 (5) 18:15	17:29 (4) 20:13	05:38 21:08	04:57
9	08:41 16:25	07:59 17:22	16:45 (5) 18:17	17:28 (4) 20:15	05:36 21:10	04:57
10	08:40 16:26	07:57 17:24	16:44 (5) 18:19	17:28 (4) 20:17	05:34 21:11	21:54
11	08:40 16:28	07:55 17:26	16:44 (5) 18:21	17:28 (4) 20:18	05:33 21:13	04:56
12	08:39 16:30	07:53 17:28	16:43 (5) 18:23	17:28 (4) 20:20	05:31 21:15	21:55
13	08:38 16:31	07:51 17:30	16:43 (5) 18:25	17:28 (4) 20:22	05:29 21:17	04:55
14	08:37 16:33	07:49 17:32	16:44 (5) 18:27	17:28 (4) 20:24	05:27 21:18	21:57
15	08:36 16:34	07:47 17:34	16:44 (5) 18:28	17:29 (4) 20:26	05:26 21:20	04:54
16	08:35 16:36	07:45 17:36	16:45 (5) 18:30	17:29 (4) 20:28	05:24 21:22	21:58
17	08:34 16:38	07:43 17:38	16:47 (5) 18:32	18:04 (3) 20:30	05:22 21:23	04:54
18	08:33 16:40	07:41 17:40	16:47 (5) 18:34	17:32 (4) 20:31	05:21 21:25	21:59
19	08:32 16:41	07:39 17:42	16:50 (5) 18:36	18:07 (3) 20:33	20:02 (2) 20:05 (2)	22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	17:36 (4) 20:35	05:19 20:07 (2)	04:54
21	08:30 16:45	07:34 17:46	06:28 18:40	18:11 (3) 20:37	20:07 (2) 20:08 (2)	22:00
22	08:28 16:47	07:32 17:48	06:26 18:41	17:59 (3) 20:39	05:18 20:10 (2)	04:55
23	08:27 16:49	07:30 17:50	06:23 18:43	18:15 (3) 20:41	20:12 (2) 20:12 (2)	22:01
24	08:26 16:50	07:28 17:52	06:21 18:45	18:00 (3) 20:42	05:15 20:14 (2)	04:55
25	08:24 16:52	07:25 17:54	06:18 18:47	18:02 (3) 20:44	05:11 20:15 (2)	22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	18:13 (3) 20:46	21:36 20:17 (2)	04:56
27	08:22 16:56	07:21 17:58	06:13 18:51	18:05 (3) 20:48	21:37 20:19 (2)	22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	18:09 (3) 20:50	05:08 20:20 (2)	04:56
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 20:19 (2)	04:57
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 20:19 (2)	22:01
31	08:15 17:04		07:04 19:58		05:04 21:44	04:58
Potential sun hours	250	273	367	420	494	510
Total, worst case		156	430	199	79	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.66	0.68	0.65	0.65	
Total reduction		0.15	0.18	0.23	0.25	
Total, real		24	79	46	20	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LZ - H338

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:07 (4) 16:54	08:19 16:23 (5)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:06 (4) 16:52	08:21 16:21 (5)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:06 (4) 16:50	08:22 16:19 (5)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:06 (4) 16:48	08:24 16:17 (5)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:06 (4) 16:46	08:25 16:07
6	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	18:06 (4) 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	20:14 (2) 20:19 (2)	06:43 20:04	07:37 18:50	08:28 16:06
8	05:05 21:56	05:50 21:11	20:10 (2) 20:22 (2)	06:45 20:01	07:39 18:48	08:29 16:06
9	05:06 21:55	05:52 21:09	20:09 (2) 20:24 (2)	06:47 19:59	07:41 18:45	08:30 16:05
10	05:07 21:55	05:54 21:07	20:07 (2) 20:24 (2)	06:49 19:56	07:42 18:43	08:31 16:05
11	05:08 21:54	05:56 21:05	20:06 (2) 20:26 (2)	06:50 19:54	07:44 18:40	08:33 16:05
12	05:09 21:53	05:57 21:03	20:05 (2) 20:27 (2)	06:52 19:51	07:46 18:38	08:34 16:05
13	05:10 21:52	05:59 21:01	20:04 (2) 20:26 (2)	06:54 19:49	07:48 18:36	08:35 16:05
14	05:12 21:51	06:01 20:59	20:03 (2) 20:27 (2)	06:56 19:47	07:50 18:33	08:36 16:04
15	05:13 21:50	06:03 20:57	20:03 (2) 20:27 (2)	06:57 19:44	07:52 18:31	08:37 16:04
16	05:14 21:49	06:04 20:55	20:02 (2) 20:25 (2)	06:59 19:42	07:54 18:29	08:38 16:05
17	05:16 21:47	06:06 20:53	20:02 (2) 20:23 (2)	07:01 19:39	07:55 18:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:03 (2) 20:22 (2)	07:03 19:37	07:57 18:24	08:39 16:05
19	05:18 21:45	06:10 20:48	20:02 (2) 20:19 (2)	07:05 19:34	07:59 18:22	08:40 16:05
20	05:20 21:44	06:12 20:46	20:02 (2) 20:17 (2)	07:06 19:32	08:01 18:20	08:41 16:06
21	05:21 21:42	06:13 20:44	20:03 (2) 20:15 (2)	07:08 19:29	08:03 18:17	08:41 16:06
22	05:23 21:41	06:15 20:42	20:03 (2) 20:12 (2)	07:10 19:27	08:05 18:15	08:42 16:06
23	05:24 21:39	06:17 20:39	20:04 (2) 20:10 (2)	07:12 19:24	08:07 18:13	08:42 16:07
24	05:26 21:38	06:19 20:37	20:06 (2) 20:09 (2)	07:13 19:22	08:09 18:11	08:43 16:08
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 18:16	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 18:13	08:11 16:15	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	07:14 18:12	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 18:10	08:14 16:13	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 18:09	08:16 16:13	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 18:07	08:18 16:13	08:44 16:12
31	05:37 21:26	06:31 20:21	07:25 19:06	07:21 18:06	08:19 16:12	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		286	245	319	20	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.68	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.18	
Total, real		63	53	63	4	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MA - H339

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:58 (5) 20:25 (5)	05:03 21:45	04:59 22:00	21:18 (3) 21:24 (3)	05:39 21:25	20:14 (5) 20:29 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:58 (5) 20:25 (5)	05:02 21:46	05:00 22:00	21:18 (3) 21:24 (3)	05:40 21:23	20:13 (5) 20:30 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:58 (5) 20:25 (5)	05:01 21:48	05:00 21:59	21:18 (3) 21:23 (3)	05:42 21:21	20:11 (5) 20:31 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:58 (5) 20:25 (5)	05:00 21:49	05:01 21:59	21:19 (3) 21:23 (3)	05:44 21:19	20:10 (5) 20:32 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:58 (5) 20:24 (5)	04:59 21:50	21:14 (3) 21:15 (3)	05:02 21:58	21:19 (3) 21:23 (3)	20:09 (5) 20:32 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 18:11	07:04 18:11	06:48 20:09	05:42 21:04	19:58 (5) 20:23 (5)	04:59 21:51	21:14 (3) 21:16 (3)	05:03 21:57	21:20 (3) 21:22 (3)	20:09 (5) 20:33 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:59 (5) 20:23 (5)	04:58 21:52	21:13 (3) 21:16 (3)	05:04 21:57	21:20 (3) 21:22 (3)	20:08 (5) 20:34 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:00 (5) 20:22 (5)	04:57 21:53	21:13 (3) 21:17 (3)	05:05 21:56	05:51 21:11	20:07 (5) 20:34 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:00 (5) 20:21 (5)	04:57 21:54	21:14 (3) 21:19 (3)	05:06 21:55	05:52 21:09	20:07 (5) 20:34 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:01 (5) 20:20 (5)	04:56 21:54	21:13 (3) 21:19 (3)	05:07 21:54	05:09 21:07	20:06 (5) 20:33 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:27	07:55 17:24	06:52 18:19	06:37 20:17	05:33 21:11	20:03 (5) 20:20 (5)	04:56 21:54	21:14 (3) 21:20 (3)	05:08 21:54	05:56 21:05	20:07 (5) 20:34 (5)	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:04 (5) 20:18 (5)	04:55 21:56	21:14 (3) 21:18 (3)	05:09 21:53	05:58 21:03	20:07 (5) 20:34 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:06 (5) 20:15 (5)	04:55 21:57	21:13 (3) 21:14 (3)	05:11 21:52	05:59 21:01	20:06 (5) 20:31 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	21:14 (3) 21:22 (3)	05:12 21:51	06:01 20:59	20:07 (5) 20:29 (5)	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	21:14 (3) 21:22 (3)	05:13 21:50	06:03 20:57	20:07 (5) 20:28 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	21:14 (3) 21:23 (3)	05:14 21:48	06:05 20:55	20:07 (5) 20:25 (5)	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	21:14 (3) 21:23 (3)	05:16 21:47	06:06 20:53	20:08 (5) 20:23 (5)	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25		04:54 21:59	21:15 (3) 21:24 (3)	05:17 21:46	06:08 20:50	20:09 (5) 20:22 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27		04:54 22:00	21:15 (3) 21:24 (3)	05:18 21:45	06:10 20:48	20:10 (5) 20:19 (5)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28		04:54 22:00	21:15 (3) 21:24 (3)	05:20 21:43	06:12 20:46	20:12 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30		04:54 22:00	21:15 (3) 21:24 (3)	05:21 21:42	06:13 20:44	20:17 (5) 20:19	07:08 18:17	08:03 17:10	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	20:09 (5)	04:55	21:16 (3) 21:25 (3)	05:23 21:41	06:15 20:42	20:15 20:20	07:10 18:15	08:05 16:19	08:04 16:07	08:42
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:06 (5)	04:55	21:16 (3) 21:25 (3)	05:24 21:39	06:17 20:39	20:17 20:24	07:12 18:13	08:07 16:18	08:06 16:07	08:42
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 20:43	20:04 (5)	04:55	21:16 (3) 21:25 (3)	05:26 21:38	06:19 20:37	20:19 20:26	07:13 18:11	08:09 16:17	08:07 16:08	08:43
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:02 (5)	04:56	21:17 (3) 21:25 (3)	05:27 21:36	20:37 20:35	20:25 20:30	19:22 17:19	18:11 17:09	16:17 16:16	08:43
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	20:01 (5)	04:56	21:16 (3) 21:25 (3)	05:29 21:35	06:22 20:32	20:19 20:24	07:17 17:06	17:13 16:15	08:11 16:09	08:43
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:00 (5)	04:56	21:16 (3) 21:24 (3)	05:30 21:33	06:24 20:30	20:19 20:24	07:19 17:14	17:08 16:13	08:13 16:10	08:44
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	20:00 (5)	04:57	21:17 (3) 21:25 (3)	05:32 21:32	06:26 20:28	20:20 20:25	07:21 17:02	17:16 16:13	08:14 16:11	08:44
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	19:59 (5)	04:58	21:18 (3) 21:25 (3)	05:34 21:30	06:28 20:25	20:22 20:29	07:22 17:00	17:18 16:12	08:16 16:11	08:44
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	19:59 (5)	04:58	21:17 (3) 21:24 (3)	05:35 21:28	06:29 20:23	20:26 20:31	07:24 16:58	17:20 16:11	08:17 16:12	08:44
31	08:15 17:04		07:04 19:58		05:04 21:44	20:24 (5)	21:43		05:37 21:26	06:31 20:27 (5)	20:31 20:21	07:22 16:56	17:20 16:13	08:17 16:13	08:44
Potential sun hours	250	273	367	420	494		510	512		460		382	328	259	233
Total, worst case				133	285		186	45		410					
Sun reduction				0.35	0.38		0.32	0.32		0.34					
Oper. time red.				1.00	1.00		1.00	1.00		1.00					
Wind dir. red.				0.65	0.65		0.61	0.62		0.65					
Total reduction				0.23	0.25		0.19	0.20		0.22					
Total, real				30	70		36	9		91					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MB - H340

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December							
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:57 (5) 20:24 (5)	05:03 21:45	04:59 22:00	8	21:16 (3) 21:24 (3)	05:39 21:25	8	20:16 (5) 20:24 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10		
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:57 (5) 20:23 (5)	05:02 21:46	05:00 22:00	8	21:16 (3) 21:24 (3)	05:40 21:23	13	20:14 (5) 20:27 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09		
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:57 (5) 20:23 (5)	05:01 21:48	05:00 21:59	2	21:11 (3) 21:13 (3)	05:00 21:59	7	21:16 (3) 21:23 (3)	05:42 21:21	17	20:11 (5) 20:28 (5)	06:36 20:13	07:30 19:00	08:28 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:57 (5) 20:22 (5)	05:00 21:49	05:01 21:59	3	21:11 (3) 21:14 (3)	05:01 21:59	7	21:16 (3) 21:23 (3)	05:44 21:19	19	20:10 (5) 20:29 (5)	06:38 20:11	07:31 18:57	08:23 16:48
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:57 (5) 20:22 (5)	04:59 21:50	05:02 21:58	4	21:11 (3) 21:15 (3)	05:02 21:58	6	21:17 (3) 21:23 (3)	05:45 21:17	20	20:09 (5) 20:29 (5)	06:40 20:09	07:33 18:55	08:25 16:46
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:58 (5) 20:21 (5)	04:59 21:51	05:03 21:57	5	21:11 (3) 21:16 (3)	05:03 21:57	6	21:17 (3) 21:22 (3)	05:47 21:15	23	20:08 (5) 20:31 (5)	06:42 20:06	07:35 18:52	08:26 16:47
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:59 (5) 20:21 (5)	04:58 21:52	05:04 21:57	5	21:18 (3) 21:16 (3)	05:49 21:57	4	21:18 (3) 21:22 (3)	05:49 21:13	24	20:08 (5) 20:32 (5)	06:43 20:04	07:37 18:50	08:28 16:43
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:00 (5) 20:20 (5)	04:57 21:53	05:05 21:57	6	21:11 (3) 21:17 (3)	05:05 21:56	3	21:18 (3) 21:21 (3)	05:51 21:11	24	20:07 (5) 20:31 (5)	06:45 20:01	07:39 18:48	08:29 16:41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:00 (5) 20:18 (5)	04:57 21:54	05:06 21:55	8	21:11 (3) 21:19 (3)	05:06 21:55	2	21:19 (3) 21:21 (3)	05:52 21:09	26	20:06 (5) 20:32 (5)	06:47 19:59	07:41 18:45	08:30 16:39
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:02 (5) 20:17 (5)	04:56 21:54	05:07 21:54	8	21:11 (3) 21:19 (3)	05:07 21:54	2	21:19 (3) 21:20 (3)	05:54 21:07	27	20:05 (5) 20:32 (5)	06:49 19:56	07:42 18:43	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:04 (5) 20:16 (5)	04:56 21:55	05:08 21:54	1	21:11 (3) 21:20 (3)	05:08 21:54	1	21:20 (3) 21:07	05:58 21:05	27	20:05 (5) 20:32 (5)	06:50 19:54	07:44 18:40	08:33 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:07 (5) 20:12 (5)	04:55 21:56	05:09 21:53	9	21:12 (3) 21:21 (3)	05:09 21:53	9	21:12 (3) 21:03	05:58 21:03	26	20:06 (5) 20:32 (5)	06:52 19:51	07:46 18:38	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:05 (5) 21:57	04:55 21:52	05:11 21:52	9	21:11 (3) 21:21 (3)	05:11 21:52	9	21:05 (5) 21:01	05:46 21:01	26	20:05 (5) 20:31 (5)	06:54 19:49	07:47 18:36	08:26 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:04 (5) 21:22 (3)	04:55 21:51	05:12 21:51	10	21:12 (3) 21:22 (3)	05:12 21:51	10	21:12 (3) 21:03	05:13 21:50	22	20:06 (5) 20:28 (5)	06:58 19:44	07:52 18:31	08:37 16:29
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:03 (5) 21:22	04:55 21:59	05:13 21:59	10	21:12 (3) 21:23 (3)	05:13 21:48	10	21:12 (3) 21:05	05:14 21:48	22	20:05 (5) 20:25 (5)	06:59 19:42	07:54 18:29	08:38 16:27
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:02 (5) 21:22	04:54 21:59	05:14 21:59	11	21:12 (3) 21:23 (3)	05:14 21:48	11	21:12 (3) 21:06	05:14 21:48	22	20:05 (5) 20:25 (5)	06:59 19:42	07:54 18:29	08:38 16:27
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:01 (5) 21:23	04:54 21:59	05:16 21:59	11	21:12 (3) 21:23 (3)	05:16 21:47	11	21:12 (3) 21:06	05:16 21:47	22	20:06 (5) 20:23 (5)	07:01 19:39	07:55 18:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	20:00 (5) 21:25	04:54 21:59	05:17 21:59	12	21:12 (3) 21:24 (3)	05:17 21:46	12	21:12 (3) 21:08	05:17 21:46	23	20:07 (5) 20:22 (5)	07:03 19:37	07:57 18:24	08:39 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:00 (5) 21:27	04:54 21:59	05:18 21:59	11	21:13 (3) 21:24 (3)	05:18 21:45	11	21:13 (3) 21:09	05:18 21:45	24	20:07 (5) 20:22 (5)	07:05 19:37	07:59 18:22	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:00 (5) 21:28	04:54 21:59	05:20 21:59	11	21:13 (3) 21:24 (3)	05:20 21:43	11	21:13 (3) 21:09	05:20 21:43	25	20:08 (5) 20:23 (5)	07:06 19:32	08:01 18:20	08:41 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:00 (5) 21:30	04:54 21:59	05:21 21:59	11	21:13 (3) 21:24 (3)	05:21 21:42	11	21:13 (3) 21:09	05:21 21:42	26	20:09 (5) 20:24 (5)	07:08 19:29	08:03 18:17	08:42 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	20:05 (5) 21:31	04:55 21:59	05:23 21:59	11	21:14 (3) 21:25 (3)	05:23 21:41	11	21:14 (3) 21:06	05:23 21:41	27	20:10 (5) 20:25 (5)	07:10 19:34	08:05 18:22	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:03 (5) 21:33	04:55 21:59	05:24 21:59	11	21:14 (3) 21:25 (3)	05:24 21:39	11	21:14 (3) 21:07	05:24 21:39	28	20:11 (5) 20:26 (5)	07:12 19:39	08:07 18:13	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	20:01 (5) 21:34	04:55 21:59	05:26 21:59	11	21:14 (3) 21:25 (3)	05:26 21:38	11	21:14 (3) 21:08	05:26 21:38	29	20:12 (5) 20:27 (5)	07:13 19:40	08:08 18:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:00 (5) 21:36	04:56 21:59	05:27 21:59	11	21:14 (3) 21:25 (3)	05:27 21:36	11	21:14 (3) 21:09	05:27 21:36	30	20:13 (5) 20:28 (5)	07:15 19:41	08:09 18:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	20:00 (5) 21:37	04:56 21:59	05:29 21:59	11	21:14 (3) 21:25 (3)	05:29 21:35	11	21:14 (3) 21:10	05:29 21:35	31	20:14 (5) 20:29 (5)	07:17 19:42	07:09 18:13	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:00 (5) 21:39	04:56 21:59	05:30 21:59	10	21:14 (3) 21:24 (3)	05:30 21:33	10	21:14 (3) 21:10	05:30 21:33	32	20:15 (5) 20:30 (5)	07:19 19:44	07:14 18:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	20:00 (5) 21:40	04:57 21:59	05:32 21:59	10	21:15 (3) 21:25 (3)	05:32 21:32	10	21:15 (3) 21:10	05:32 21:32	33	20:16 (5) 20:31 (5)	07:21 19:45	07:16 18:14	08:44 16:11
29	08:18 17:00	07:08 18:01	05:56 19:54	05:06 20:52	05:06 21:41	20:00 (5) 21:41	04:58 21:59	05:34 21:59	10	21:15 (3) 21:25 (3)	05:34 21:30	10	21:15 (3) 21:10	05:34 21:30	34	20:17 (5) 20:32 (5)	07:22 19:46	07:18 18:16	08:44 16:11
30	08:17 17:02	07:06 18:03	05:54 19:56	05:05 20:53	05:05 21:43	20:00 (5) 21:43	04:58 21:59	05:35 21:59	9	21:15 (3) 21:24 (3)	05:35 21:28	9	21:15 (3) 21:10	05:35 21:28	35	20:18 (5) 20:33 (5)	07:24 19:47	07:20 18:17	08:44 16:12
31	08:15 17:04	07:04 18:05	05:51 19:58	05:04 20:54	05:04 21:44	20:00 (5) 21:44	04:58 21:59	05:37 21:59	9	21:15 (3) 21:24 (3)	05:37 21:28	9	21:15 (3) 21:10	05:37 21:28	36	20:19 (5) 20:34 (5)	07:25 19:48	07:21 18:18	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233							
Total, worst case																			
Sun reduction				0.35	0.38	0.32	0.32	0.32	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34		
Oper. time red.				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Wind dir. red.				0.65	0.65	0.61	0.61	0.61	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65		
Total reduction				0.23	0.25	0.19	0.20	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22		
Total, real				35	60	49	49	10	89	89	89	89	89	89	89	89	89		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MC - H341

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	05:03	21:07 (4)	04:59	21:11 (4)	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:55	21:45	3	21:10 (4)	22:00	21:24 (4)	21:25	20:18	19:05	16:54	
2	08:44	08:12	07:14	06:59	05:50	05:02	21:07 (4)	05:00	21:11 (4)	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	21:46	5	21:12 (4)	21:59	21:24 (4)	21:23	20:16	19:02	16:52	
3	08:43	08:10	07:11	06:56	05:48	05:01	21:07 (4)	05:00	21:11 (4)	05:42	06:36	07:30	07:28	08:22	
	16:17	17:10	18:05	20:04	20:59	21:48	6	21:13 (4)	21:59	21:23 (4)	21:21	20:13	19:00	16:50	
4	08:43	08:08	07:09	06:54	05:46	05:00	21:06 (4)	05:01	21:11 (4)	05:44	06:38	07:31	07:30	08:23	
	16:18	17:12	18:07	20:06	21:01	21:49	8	21:14 (4)	21:59	21:23 (4)	21:19	20:11	18:57	16:48	
5	08:43	08:07	07:07	06:51	05:44	05:00	21:07 (4)	05:02	21:12 (4)	05:46	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:02	21:50	8	21:15 (4)	21:58	21:23 (4)	21:17	20:09	18:55	16:46	
6	08:42	08:05	07:04	06:49	05:42	05:00	21:06 (4)	05:03	21:12 (4)	05:47	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04	21:51	10	21:16 (4)	21:57	21:22 (4)	21:15	20:06	18:52	16:44	
7	08:42	08:03	07:02	06:47	05:40	05:00	21:06 (4)	05:04	21:13 (4)	05:49	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	21:52	10	21:16 (4)	21:57	21:22 (4)	21:13	20:04	18:50	16:43	
8	08:41	08:01	07:00	06:44	05:38	05:00	21:06 (4)	05:05	21:13 (4)	05:51	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	21:53	11	21:17 (4)	21:56	21:21 (4)	21:11	20:01	18:48	16:41	
9	08:41	07:59	06:57	06:42	05:36	05:00	21:06 (4)	05:06	21:14 (4)	05:52	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	21:54	12	21:18 (4)	21:55	21:21 (4)	21:09	19:59	18:45	16:39	
10	08:40	07:57	06:55	06:39	05:34	05:00	21:06 (4)	05:07	21:14 (4)	05:54	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11	21:54	13	21:19 (4)	21:54	21:20 (4)	21:07	19:56	18:43	16:37	
11	08:40	07:55	06:52	06:37	05:33	05:00	21:06 (4)	05:08	21:15 (4)	05:56	06:50	07:44	07:43	08:32	
	16:28	17:26	18:21	20:18	21:13	21:55	14	21:20 (4)	21:54	21:19 (4)	21:05	19:54	18:40	16:35	
12	08:39	07:53	06:50	06:35	05:31	05:00	21:06 (4)	05:09	21:15 (4)	05:57	06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15	21:56	14	21:20 (4)	21:53	21:18 (4)	21:03	19:51	18:38	16:34	
13	08:38	07:51	06:48	06:32	05:29	05:00	21:06 (4)	05:11	21:16 (4)	05:59	06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17	21:57	15	21:21 (4)	21:52	21:17 (4)	21:01	19:49	18:36	16:32	
14	08:37	07:49	06:45	06:30	05:27	05:00	21:07 (4)	05:12	21:17 (4)	06:01	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18	21:57	15	21:22 (4)	21:51	21:18 (4)	21:00	19:46	18:33	16:31	
15	08:36	07:47	06:43	06:28	05:26	05:00	21:07 (4)	05:13	21:17 (4)	06:03	06:57	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20	21:58	15	21:22 (4)	21:50	21:18 (4)	21:01	19:44	18:31	16:29	
16	08:35	07:45	06:40	06:25	05:24	05:00	21:07 (4)	05:14	21:17 (4)	06:04	06:59	07:54	07:53	08:37	
	16:36	17:36	18:30	20:28	21:22	21:59	16	21:23 (4)	21:48	21:18 (4)	21:02	19:42	18:29	16:27	
17	08:34	07:43	06:38	06:23	05:22	05:00	21:07 (4)	05:16	21:17 (4)	06:06	06:59	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23	21:59	16	21:23 (4)	21:47	21:18 (4)	21:03	20:05 (5)	19:39	18:26	
18	08:33	07:41	06:35	06:21	05:21	05:00	21:07 (4)	05:17	21:17 (4)	06:08	06:59	07:55	07:57	08:39	
	16:40	17:40	18:34	20:31	21:25	21:59	17	21:24 (4)	21:46	21:18 (4)	21:04	20:50	19:49	18:24	
19	08:32	07:39	06:33	06:18	05:19	05:00	21:08 (4)	05:18	21:17 (4)	06:10	06:59	07:55	07:59	08:40	
	16:41	17:42	18:36	20:33	21:26	22:00	16	21:24 (4)	21:45	21:18 (4)	21:04	20:48	19:49	18:22	
20	08:31	07:36	06:31	06:16	05:18	05:00	21:08 (4)	05:20	21:17 (4)	06:12	06:59	07:55	08:01	08:40	
	16:43	17:44	18:38	20:35	21:28	22:00	16	21:24 (4)	21:43	21:18 (4)	21:04	20:46	19:49	18:20	
21	08:30	07:34	06:28	06:14	05:16	05:00	21:08 (4)	05:21	21:17 (4)	06:13	06:59	07:55	08:03	08:41	
	16:45	17:46	18:40	20:37	21:30	22:00	16	21:24 (4)	21:42	21:18 (4)	21:04	20:44	19:49	18:17	
22	08:28	07:32	06:26	06:12	05:15	05:00	21:09 (4)	05:23	21:17 (4)	06:15	06:59	07:55	08:05	08:42	
	16:47	17:48	18:41	20:39	21:31	22:01	16	21:25 (4)	21:41	21:18 (4)	21:04	20:41	19:49	18:15	
23	08:27	07:30	06:23	06:09	05:13	05:00	21:09 (4)	05:24	21:17 (4)	06:17	06:59	07:55	08:07	08:42	
	16:49	17:50	18:43	20:41	21:33	22:01	16	21:25 (4)	21:39	21:18 (4)	21:04	20:39	19:49	18:13	
24	08:26	07:28	06:21	06:07	05:12	05:00	21:09 (4)	05:26	21:17 (4)	06:19	06:59	07:55	08:09	08:43	
	16:50	17:52	18:45	20:42	21:34	22:01	16	21:25 (4)	21:38	21:18 (4)	21:04	20:37	19:49	18:11	
25	08:24	07:25	06:18	06:05	05:11	05:00	21:09 (4)	05:27	21:17 (4)	06:20	06:59	07:55	08:11	08:43	
	16:52	17:54	18:47	20:44	21:36	22:01	16	21:25 (4)	21:36	21:18 (4)	21:04	20:35	19:49	18:09	
26	08:23	07:23	06:16	06:03	05:09	05:00	21:09 (4)	05:29	21:17 (4)	06:22	06:59	07:55	08:13	08:43	
	16:54	17:56	18:49	20:46	21:37	22:01	16	21:25 (4)	21:35	21:18 (4)	21:04	20:32	19:50 (4)	18:07	
27	08:21	07:21	06:13	06:01	05:08	05:00	21:09 (4)	05:30	21:17 (4)	06:24	06:59	07:55	08:14	08:43	
	16:56	17:58	18:51	20:48	21:39	22:01	15	21:24 (4)	21:33	21:18 (4)	21:04	20:30	19:50 (5)	18:04	
28	08:20	07:18	06:11	05:58	05:07	05:00	21:10 (4)	05:32	21:17 (4)	06:26	06:59	07:55	08:14	08:44	
	16:58	18:00	18:53	20:50	21:40	22:01	15	21:25 (4)	21:32	21:18 (4)	21:04	20:28	19:50 (5)	18:02	
29	08:18		07:08	05:56	05:06	05:00	21:10 (4)	05:34	21:17 (4)	06:27	06:59	07:55	08:16	08:44	
	17:00		19:54	20:52	21:41	22:00	15	21:25 (4)	21:30	21:18 (4)	21:04	20:25	19:50 (5)	18:00	
30	08:17		07:06	05:54	05:05	05:00	21:10 (4)	05:35	21:17 (4)	06:29	06:59	07:55	08:17	08:44	
	17:02		19:56	20:53	21:43	22:00	14	21:24 (4)	21:28	21:18 (4)	21:04	20:23	19:50 (5)	18:00	
31	08:15		07:04	05:54	05:04	05:00		05:37	21:17 (4)	06:31	06:59	07:55	08:17	08:44	
	17:04		19:58	21:44	21:44	2	21:07 (4)	21:26	21:18 (4)	20:21	06:59	07:55	08:17	16:13	
Potential sun hours	250	273	367	420	494	510		512		460		382	328	259	233
Total, worst case				187		2		395		109		190			
Sun reduction				0.35		0.38		0.32		0.32		0.34			
Oper. time red.				1.00		1.00		1.00		1.00		1.00			
Wind dir. red.				0.65		0.61		0.61		0.61		0.65			
Total reduction				0.23		0.23		0.19		0.20		0.22			
Total, real				43		0		77		21		42			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MD - H342

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: ME - H343

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
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11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MF - H344

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MG - H345

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MH - H346

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MI - H347

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MJ - H348

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	05:03 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:54	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MK - H349
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: ML - H350

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:44 (4) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:44 (4) 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:46 (4) 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:49 (4) 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	18:52 (4) 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	19:18 (3) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	16:52 (5) 18:21	06:52 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	16:50 (5) 18:23	06:50 20:20	05:31 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	16:49 (5) 18:25	06:48 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	16:48 (5) 18:27	17:56 (4) 18:00 (4)	06:30 20:24	04:55 21:57
15	08:36 16:34	07:47 17:34	16:48 (5) 18:28	17:53 (4) 18:02 (4)	06:28 20:26	04:55 21:58
16	08:35 16:36	07:45 17:36	16:47 (5) 18:30	17:50 (4) 18:04 (4)	06:25 20:28	04:54 21:59
17	08:34 16:38	07:43 17:38	16:47 (5) 18:32	17:49 (4) 18:06 (4)	06:23 20:30	04:54 21:59
18	08:33 16:40	07:41 17:40	16:47 (5) 18:34	17:47 (4) 18:07 (4)	06:21 20:31	04:54 22:00
19	08:32 16:41	07:39 17:42	16:47 (5) 18:36	17:46 (4) 18:10 (4)	06:18 20:33	04:54 22:00
20	08:31 16:43	07:36 17:44	16:47 (5) 18:38	17:44 (4) 18:11 (4)	06:16 20:35	04:54 22:00
21	08:30 16:45	07:34 17:46	16:48 (5) 18:40	17:44 (4) 18:13 (4)	06:14 20:37	04:54 22:01
22	08:28 16:47	07:32 17:48	16:48 (5) 18:41	17:43 (4) 18:15 (4)	06:12 20:39	04:55 22:01
23	08:27 16:49	07:30 17:50	16:50 (5) 18:43	17:42 (4) 18:17 (4)	06:09 20:41	04:55 22:01
24	08:26 16:50	07:28 17:52	16:51 (5) 18:45	17:41 (4) 18:18 (4)	06:07 20:42	04:55 22:01
25	08:24 16:52	07:25 17:54	16:53 (5) 18:47	17:42 (4) 18:21 (3)	06:05 20:44	04:55 22:01
26	08:23 16:54	07:23 17:56	17:03 (5) 18:49	17:41 (4) 18:22 (3)	20:44 20:46	22:01 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:41 (4) 18:24 (3)	06:01 20:48	04:56 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	17:42 (4) 18:26 (3)	05:58 20:50	04:57 22:01
29	08:18 17:00		07:08 19:54	18:42 (4) 19:28 (3)	05:56 20:52	20:46 (2) 22:01
30	08:17 17:02		07:06 19:56	18:42 (4) 19:30 (3)	05:54 20:53	20:44 (2) 22:00
31	08:15 17:04		07:04 19:58	18:42 (4) 19:31 (3)	05:04 21:44	20:30 (2) 20:53 (2)
Potential sun hours	250	273	367	420	494	510
Total, worst case		253		558		202
Sun reduction		0.23		0.27		0.32
Oper. time red.		1.00		1.00		1.00
Wind dir. red.		0.67		0.67		0.63
Total reduction		0.15		0.18		0.20
Total, real		39		102		41

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: ML - H350

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July			August			September			October			November		December	
1	04:59	20:44 (2)	05:39	20:40 (2)	06:33		07:26		07:24	08:19						
	22:00	8	20:52 (2)	21:25	13	20:53 (2)	20:18	19:05	16:54	16:10						
2	04:59	20:44 (2)	05:40	20:41 (2)	06:35		07:28		07:26	08:21						
	22:00	10	20:54 (2)	21:23	11	20:52 (2)	20:16	19:02	16:52	16:09						
3	05:00	20:42 (2)	05:42	20:41 (2)	06:36		07:30		07:28	08:22						
	21:59	12	20:54 (2)	21:21	9	20:50 (2)	20:13	19:00	16:50	16:08						
4	05:01	20:42 (2)	05:44	20:43 (2)	06:38		07:31		07:30	08:24						
	21:59	13	20:55 (2)	21:19	5	20:48 (2)	20:11	18:57	16:48	16:08						
5	05:02	20:42 (2)	05:45	20:44 (2)	06:40		07:33		07:32	08:25						
	21:58	14	20:56 (2)	21:17	2	20:46 (2)	20:09	18:55	16:46	16:07						
6	05:03	20:41 (2)	05:47	06:42		19:14 (3)	07:35		07:34	08:26						
	21:58	16	20:57 (2)	21:15		20:06	8	19:22 (3)	18:52	16:44	16:07					
7	05:04	20:41 (2)	05:49	06:43		18:47 (4)	07:37		07:36	08:28						
	21:57	17	20:58 (2)	21:13		20:04	23	19:24 (3)	18:50	16:43	16:06					
8	05:05	20:41 (2)	05:51	06:45		18:43 (4)	07:39		07:38	08:29						
	21:56	18	20:59 (2)	21:11		20:01	33	19:25 (3)	18:48	16:41	16:06					
9	05:06	20:40 (2)	05:52	06:47		18:41 (4)	07:41		07:40	08:30						
	21:55	19	20:59 (2)	21:09		19:59	40	19:26 (3)	18:45	16:39	16:05					
10	05:07	20:40 (2)	05:54	06:49		18:38 (4)	07:42		07:42	08:31						
	21:55	20	21:00 (2)	21:07		19:56	45	19:26 (3)	18:43	16:37	16:05					
11	05:08	20:39 (2)	05:56	06:50		18:36 (4)	07:44		07:44	08:33						
	21:54	22	21:01 (2)	21:05		19:54	49	19:26 (3)	18:40	16:35	16:05					
12	05:09	20:39 (2)	05:57	06:52		18:35 (4)	07:46		07:45	08:34						
	21:53	22	21:01 (2)	21:03		19:51	49	19:24 (3)	18:38	16:34	16:05					
13	05:10	20:38 (2)	05:59	06:54		18:34 (4)	07:48		07:47	08:35						
	21:52	24	21:02 (2)	21:01		19:49	48	19:22 (3)	18:36	16:32	16:05					
14	05:12	20:38 (2)	06:01	06:56		18:32 (4)	07:50		07:49	08:36						
	21:51	24	21:02 (2)	20:59		19:47	46	19:18 (3)	18:33	16:31	16:04					
15	05:13	20:38 (2)	06:03	06:58		18:31 (4)	07:52		07:51	08:37						
	21:50	24	21:02 (2)	20:57		19:44	45	19:16 (3)	18:31	16:29	16:05					
16	05:14	20:37 (2)	06:04	06:59		18:31 (4)	07:54		17:28 (5)	07:53	08:38					
	21:49	26	21:03 (2)	20:55		19:42	43	19:14 (3)	18:29	5	17:33 (5)	16:27	16:05			
17	05:16	20:38 (2)	06:06	07:01		18:29 (4)	07:55		17:24 (5)	07:55	08:38					
	21:47	26	21:04 (2)	20:53		19:39	42	19:11 (3)	18:26	12	17:36 (5)	16:26	16:05			
18	05:17	20:37 (2)	06:08	07:03		18:29 (4)	07:57		17:22 (5)	07:57	08:39					
	21:46	27	21:04 (2)	20:50		19:37	39	19:08 (3)	18:24	16	17:38 (5)	16:24	16:05			
19	05:18	20:37 (2)	06:10	07:05		18:29 (4)	07:59		17:20 (5)	07:59	08:40					
	21:45	27	21:04 (2)	20:48		19:34	36	19:05 (4)	18:22	19	17:39 (5)	16:23	16:05			
20	05:20	20:37 (2)	06:12	07:06		18:29 (4)	08:01		17:19 (5)	08:00	08:41					
	21:44	28	21:05 (2)	20:46		19:32	35	19:04 (4)	18:20	21	17:40 (5)	16:22	16:06			
21	05:21	20:37 (2)	06:13	07:08		18:28 (4)	08:03		17:18 (5)	08:02	08:41					
	21:42	28	21:05 (2)	20:44		19:29	33	19:01 (4)	18:17	23	17:41 (5)	16:20	16:06			
22	05:23	20:36 (2)	06:15	07:10		18:28 (4)	08:05		17:18 (5)	08:04	08:42					
	21:41	28	21:04 (2)	20:42		19:27	30	18:58 (4)	18:15	23	17:41 (5)	16:19	16:06			
23	05:24	20:37 (2)	06:17	07:12		18:29 (4)	08:07		17:17 (5)	08:06	08:42					
	21:39	28	21:05 (2)	20:39		19:24	27	18:56 (4)	18:13	24	17:41 (5)	16:18	16:07			
24	05:26	20:37 (2)	06:19	07:13		18:29 (4)	08:09		17:17 (5)	08:08	08:43					
	21:38	28	21:05 (2)	20:37		19:22	25	18:54 (4)	18:11	24	17:41 (5)	16:17	16:08			
25	05:27	20:37 (2)	06:20	07:15		18:29 (4)	07:11		16:17 (5)	08:09	08:43					
	21:36	27	21:04 (2)	20:35		19:19	22	18:51 (4)	17:09	21	16:38 (5)	16:16	16:08			
26	05:29	20:37 (2)	06:22	07:17		18:30 (4)	07:13		16:17 (5)	08:11	08:43					
	21:35	25	21:02 (2)	20:32		19:17	18	18:48 (4)	17:06	19	16:36 (5)	16:14	16:09			
27	05:30	20:37 (2)	06:24	07:19		18:31 (4)	07:14		16:17 (5)	08:13	08:44					
	21:33	23	21:00 (2)	20:30		19:14	15	18:46 (4)	17:04	17	16:34 (5)	16:13	16:10			
28	05:32	20:38 (2)	06:26	07:21		18:33 (4)	07:16		16:18 (5)	08:14	08:44					
	21:32	21	20:59 (2)	20:28		19:12	11	18:44 (4)	17:02	13	16:31 (5)	16:12	16:11			
29	05:34	20:38 (2)	06:27	07:22		18:36 (4)	07:18		16:18 (5)	08:16	08:44					
	21:30	19	20:57 (2)	20:25		19:09	5	18:41 (4)	17:00	11	16:29 (5)	16:12	16:11			
30	05:35	20:38 (2)	06:29	07:24		18:37 (4)	07:20		16:19 (5)	08:18	08:44					
	21:28	18	20:56 (2)	20:23		19:07		16:58	8	16:27 (5)	16:11	16:12				
31	05:37	20:40 (2)	06:31					07:22	16:21 (5)		08:44					
	21:26	15	20:55 (2)	20:21				16:56	4	16:25 (5)		16:13				
Potential sun hours	512		460		382		328		259		233					
Total, worst case	657		40		767		260									
Sun reduction	0.32		0.34		0.32		0.29									
Oper. time red.	1.00		1.00		1.00		1.00									
Wind dir. red.	0.63		0.63		0.67		0.67									
Total reduction	0.20		0.22		0.22		0.19									
Total, real	135		9		166		51									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MM - H351

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MN - H352

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MO - H353

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MP - H354

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15 13	09:42 (1) 09:44 (1) 17:06	08:14 18:02 17:14	07:16 18:02 20:00	05:52 20:56 21:46	05:03 21:46 22:00	04:59 22:00 21:25	05:39 21:25 20:18	06:33 20:18 19:05	07:26 19:05 16:54	07:24 16:54 16:10	08:19 16:10 16:10
2	08:44 16:16 11	09:45 (1) 09:45 (1) 17:08	08:10 18:04 20:02	07:12 18:04 20:02	05:48 20:57 21:47	05:01 21:47 22:00	05:00 22:00 21:23	05:42 21:23 20:16	06:37 20:16 19:02	07:30 19:02 16:52	07:28 16:52 16:09	08:22 16:09 16:08
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15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:26 17:54	06:18 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00	07:09 19:55	05:56 20:52	05:06 21:42	05:06 22:01	04:58 21:30	05:34 20:26	06:28 19:10	07:23 17:00	07:19 16:12	08:16 16:12	08:44 15:55
30	08:17 17:02	07:06 19:57	05:54 20:54	05:05 21:43	05:05 22:01	04:58 21:30	05:35 20:23	06:29 19:07	07:24 16:58	07:21 16:11	08:18 16:12	08:44 15:55
31	08:16 17:04	07:04 19:58	05:04 21:44	05:04 21:44	05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	07:22 16:56	07:22 16:56	08:44 16:13	09:42 (1) 09:55 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	45											354
Sun reduction	0.24											0.21
Oper. time red.	1.00											1.00
Wind dir. red.	0.59											0.59
Total reduction	0.14											0.12
Total, real	6											43

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MQ - H355

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:09 (1)	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	9	06:18 (1)	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:41		06:11 (1)	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	7	06:18 (1)	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	06:57	05:48	05:01	05:01	05:42		06:12 (1)	06:37	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	5	06:17 (1)	20:14	19:00	16:50	16:09		
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44		06:14 (1)	06:38	07:32	07:30	08:24		
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	2	06:16 (1)	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	06:52	05:44	05:00	05:02	05:46			06:40	07:33	07:32	08:25		
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18			20:09	18:55	16:47	16:07		
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47			06:42	07:35	07:34	08:27		
	16:21	17:16	18:12	20:09	21:05	21:51	21:58	21:16			20:06	18:53	16:45	16:07		
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49			06:44	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14			20:04	18:50	16:43	16:06		
8	08:42	08:01	07:00	06:44	05:38	06:05 (1)	04:57	05:05			06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	1	06:06 (1)	21:53			20:01	18:48	16:41	16:06		
9	08:41	07:59	06:58	06:42	05:36	06:03 (1)	04:57	05:06			06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	3	06:06 (1)	21:54			21:10	19:59	18:45	16:39	16:06	
10	08:41	07:57	06:55	06:40	05:35	06:02 (1)	04:56	05:07			06:49	07:43	07:42	08:32		
	16:27	17:24	18:19	20:17	21:12	5	06:07 (1)	21:55			21:08	19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33	06:00 (1)	04:56	05:08			06:51	07:44	07:44	08:33		
	16:28	17:26	18:21	20:19	21:13	7	06:07 (1)	21:56			21:06	19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31	05:58 (1)	04:56	05:10			06:52	07:46	07:46	08:34		
	16:30	17:28	18:23	20:21	21:15	9	06:07 (1)	21:56			21:04	19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:33	05:29	05:57 (1)	04:55	05:11			06:54	07:48	07:48	08:35		
	16:31	17:30	18:25	20:22	21:17	11	06:08 (1)	21:57			21:01	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27	05:55 (1)	04:55	05:12			06:01	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:19	13	06:08 (1)	21:58			20:59	19:47	18:34	16:31	16:05	
15	08:37	07:47	06:43	06:28	05:26	05:54 (1)	04:55	05:13			06:03	06:58	07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	21:20	14	06:08 (1)	21:58			20:57	19:44	18:31	16:29	16:05	
16	08:36	07:45	06:41	06:25	05:24	05:52 (1)	04:55	05:15			06:05	07:00	07:54	07:53	08:38	
	16:36	17:36	18:31	20:28	21:22	15	06:07 (1)	21:59			20:55	19:42	18:29	16:28	16:05	
17	08:35	07:43	06:38	06:23	05:22	05:51 (1)	04:55	05:16			06:06	07:01	07:56	07:55	08:39	
	16:38	17:38	18:32	20:30	21:24	17	06:08 (1)	21:59			20:53	19:39	18:27	16:26	16:05	
18	08:33	07:41	06:36	06:21	05:21	05:49 (1)	04:54	05:17			06:08	07:03	07:58	07:57	08:39	
	16:40	17:40	18:34	20:32	21:25	18	06:07 (1)	22:00			20:51	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:19	05:19	05:49 (1)	04:54	05:19			06:10	07:05	07:59	07:59	08:40	
	16:42	17:42	18:36	20:34	21:27	18	06:07 (1)	22:00			21:45	7	06:11 (1)	20:49	16:05	
20	08:31	07:37	06:31	06:16	05:18	05:49 (1)	04:55	05:20			06:02 (1)	06:12	07:07	08:01	08:41	
	16:43	17:44	18:38	20:35	21:28	16	06:05 (1)	22:00			21:44	11	06:13 (1)	20:46	16:06	
21	08:30	07:34	06:28	06:14	05:16	05:50 (1)	04:55	05:22			06:01 (1)	06:14	07:08	08:03	08:42	
	16:45	17:46	18:40	20:37	21:30	15	06:05 (1)	22:01			21:42	13	06:14 (1)	20:44	16:06	
22	08:29	07:32	06:26	06:12	05:15	05:51 (1)	04:55	05:23			06:01 (1)	06:15	07:10	08:05	08:44	
	16:47	17:48	18:42	20:39	21:31	13	06:04 (1)	22:01			21:41	14	06:15 (1)	20:42	16:07	
23	08:27	07:30	06:23	06:10	05:13	05:52 (1)	04:55	05:24			06:00 (1)	06:17	07:12	08:07	08:42	
	16:49	17:50	18:44	20:41	21:33	12	06:04 (1)	22:01			21:40	16	06:16 (1)	20:39	16:07	
24	08:26	07:28	06:21	06:07	05:12	05:53 (1)	04:55	05:26			05:59 (1)	06:19	07:14	08:09	08:43	
	16:51	17:52	18:45	20:43	21:35	8	06:01 (1)	22:01			21:38	17	06:16 (1)	20:37	16:08	
25	08:25	07:26	06:19	06:05	05:11	05:55 (1)	04:56	05:28			05:59 (1)	06:21	07:15	08:11	08:43	
	16:53	17:54	18:47	20:45	21:36	4	05:59 (1)	22:01			21:37	18	06:17 (1)	20:35	16:08	
26	08:23	07:23	06:16	06:03	05:10		04:56	05:29			06:00 (1)	06:22	07:17	07:13	08:44	
	16:55	17:56	18:49	20:46	21:37		22:01	21:35			06:17 (1)	20:33	19:17	17:07	16:09	
27	08:22	07:21	06:14	06:01	05:08		04:57	05:31			06:02 (1)	06:24	07:19	07:15	08:13	08:44
	16:56	17:58	18:51	20:48	21:39		22:01	21:33			06:18 (1)	20:30	19:15	17:05	16:14	16:10
28	08:20	07:19	06:11	05:59	05:07		04:57	05:32			06:03 (1)	06:26	07:21	07:17	08:15	08:44
	16:58	18:00	18:53	20:50	21:40		22:01	21:32			06:18 (1)	20:28	19:12	17:02	16:13	16:11
29	08:19		07:09	05:56	05:06		04:58	05:34			06:05 (1)	06:28	07:23	07:19	08:16	08:44
	17:00		19:55	20:52	21:42		22:01	21:30			06:18 (1)	20:26	19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05		04:58	05:36			06:06 (1)	06:30	07:24	07:21	08:18	08:44
	17:02		19:57	20:54	21:43		22:00	21:28			06:18 (1)	20:23	19:07	16:58	16:11	16:13
31	08:15		07:04		05:04			05:37			06:08 (1)	06:31		07:22		08:44
	17:04		19:58		21:44			21:27			06:18 (1)	20:21		16:56		16:14
Potential sun hours	250	273	367	420	494	510	512	460			382	328		259		233
Total, worst case					199			179								
Sun reduction					0.38			0.32								
Oper. time red.					1.00			1.00								
Wind dir. red.					0.66			0.66								
Total reduction					0.25			0.21								
Total, real					50			38								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MR - H356

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	08:14	16:04 (5)	07:16	16:43 (4)	07:01	05:52	19:48 (2)	05:03		
	16:15	17:06	19	16:23 (5)	18:02	32	17:15 (4)	20:00	20:55	33	20:21 (2)
2	08:44	08:12	16:05 (5)	07:14	16:43 (4)	06:59	05:50	19:48 (2)	05:02		
	16:16	17:08	17	16:22 (5)	18:04	30	17:13 (4)	20:02	20:57	33	20:21 (2)
3	08:44	08:10	16:07 (5)	07:12	16:45 (4)	06:56	05:48	19:48 (2)	05:01		
	16:17	17:10	13	16:20 (5)	18:06	26	17:11 (4)	20:04	20:59	32	20:20 (2)
4	08:43	08:08	16:10 (5)	07:09	16:47 (4)	06:54	05:46	19:48 (2)	05:00		
	16:18	17:12	8	16:18 (5)	18:07	23	17:10 (4)	20:06	21:01	32	20:20 (2)
5	08:43	08:07		07:07	16:49 (4)	06:51	05:44	19:49 (2)	04:59		
	16:19	17:14		18:09	17	17:06 (4)	20:07	21:03	30	20:19 (2)	21:50
6	08:42	08:05		07:04	16:54 (4)	06:49	05:42	19:49 (2)	04:59		
	16:21	17:16		18:11	8	17:45 (3)	20:09	21:04	29	20:18 (2)	21:51
7	08:42	08:03		07:02	17:42 (3)	06:47	05:40	19:51 (2)	04:58		
	16:22	17:18		18:13	4	17:46 (3)	20:11	21:06	27	20:18 (2)	21:52
8	08:42	08:01		07:00	17:41 (3)	06:44	05:38	19:51 (2)	04:57		
	16:24	17:20		18:15	7	17:48 (3)	20:13	21:08	26	20:17 (2)	21:53
9	08:41	07:59		06:57	17:40 (3)	06:42	05:36	19:52 (2)	04:57		
	16:25	17:22	3	16:52 (4)	18:17	10	17:50 (3)	20:15	21:10	23	20:15 (2)
10	08:40	07:57		06:55	17:40 (3)	06:39	05:34	19:53 (2)	04:56		
	16:26	17:24	7	16:54 (4)	18:19	12	17:52 (3)	20:17	21:11	21	20:14 (2)
11	08:40	07:55		06:52	17:39 (3)	06:37	05:33	19:55 (2)	04:56		
	16:28	17:26	10	16:56 (4)	18:21	16	17:55 (3)	20:19	21:13	18	20:13 (2)
12	08:39	07:53		06:50	17:39 (3)	06:35	05:31	19:57 (2)	04:55		
	16:30	17:28	14	16:58 (4)	18:23	17	17:56 (3)	20:20	21:15	13	20:10 (2)
13	08:38	07:51		06:48	17:39 (3)	06:32	05:29	20:00 (2)	04:55		
	16:31	17:30	17	17:00 (4)	18:25	19	17:58 (3)	20:22	21:17	7	20:07 (2)
14	08:37	07:49		06:45	17:38 (3)	06:30	05:27	20:07 (2)	04:55		
	16:33	17:32	20	17:02 (4)	18:27	22	18:00 (3)	20:24	21:18		21:58
15	08:36	07:47		06:43	17:39 (3)	06:28	05:26	20:06	04:54		
	16:34	17:34	23	17:05 (4)	18:28	23	18:02 (3)	20:26	21:20		21:58
16	08:35	07:45		06:40	17:39 (3)	06:25	05:24	20:04	04:54		
	16:36	17:36	26	17:07 (4)	18:30	21	18:00 (3)	20:28	21:22		21:59
17	08:34	07:43		06:38	17:41 (3)	06:23	05:22	20:02	04:54		
	16:38	16:03 (5)	17:38	17:09 (4)	18:32	18	17:59 (3)	20:30	21:23		21:59
18	08:33	07:41		06:35	17:42 (3)	06:21	19:58 (2)	05:21	04:54		
	16:40	16:05 (5)	17:40	17:11 (4)	18:34	15	17:57 (3)	20:31	21:25		22:00
19	08:32	07:39		06:33	17:45 (3)	06:18	19:56 (2)	05:19	04:54		
	16:41	16:07 (5)	17:42	17:13 (4)	18:36	9	17:54 (3)	20:33	21:27		22:00
20	08:31	07:36		06:31	16:16	06:16	19:55 (2)	05:18	04:54		
	16:43	16:08 (5)	17:44	17:16 (4)	18:38	20:35	12	20:07 (2)	21:28		22:00
21	08:30	07:34		06:28	16:14	06:14	19:52 (2)	05:16	04:54		
	16:45	16:11 (5)	17:46	17:18 (4)	18:40	20:37	16	20:08 (2)	21:30		22:01
22	08:29	07:32		06:26	16:12	06:12	19:51 (2)	05:15	04:55		
	16:47	16:12 (5)	17:48	17:19 (4)	18:42	20:39	19	20:10 (2)	21:31		22:01
23	08:27	07:30		06:23	16:09	06:09	19:51 (2)	05:13	04:55		
	16:49	16:15 (5)	17:50	17:19 (4)	18:43	20:41	21	20:12 (2)	21:33		22:01
24	08:26	07:28		06:21	16:07	06:07	19:50 (2)	05:12	04:55		
	16:50	16:17 (5)	17:52	17:19 (4)	18:45	20:43	24	20:14 (2)	21:34		22:01
25	08:24	07:25		06:18	16:05	06:05	19:49 (2)	05:11	04:55		
	16:52	16:19 (5)	17:54	17:18 (4)	18:47	20:44	26	20:15 (2)	21:36		22:01
26	08:23	07:23		06:16	16:03	06:03	19:49 (2)	05:09	04:56		
	16:54	16:21 (5)	17:56	17:18 (4)	18:49	20:46	28	20:17 (2)	21:37		22:01
27	08:22	07:21		06:13	16:01	06:01	19:48 (2)	05:08	04:56		
	16:56	16:23 (5)	17:58	17:17 (4)	18:51	20:48	31	20:19 (2)	21:39		22:01
28	08:20	07:18		06:11	16:41 (4)	06:11	19:48 (2)	05:07	04:57		
	16:58	16:24 (5)	18:00	17:15 (4)	18:53	20:50	33	20:21 (2)	21:40		22:01
29	08:18	07:16		06:08	16:41 (4)	06:08	19:48 (2)	05:06	04:57		
	17:00	16:24 (5)		19:54	20:52	34	20:22 (2)	21:41	22:01		
30	08:17	07:14		06:06	16:41 (4)	06:06	19:48 (2)	05:05	04:58		
	17:02	16:23 (5)		19:56	20:54	34	20:22 (2)	21:43	22:00		
31	08:15	07:12		06:04	16:41 (4)	06:04	19:48 (2)	05:04			
	17:04	16:23 (5)		19:58				21:44			
Potential sun hours	250		273		367		420		494		510
Total, worst case		234		610		329		292		324	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.67		0.67		0.65		0.65	
Total reduction		0.16		0.16		0.18		0.23		0.25	
Total, real		38		95		60		67		80	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MR - H356

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25 15	20:07 (2) 20:22 (2) 20:18	07:26 19:05 18	18:18 (3) 18:36 (3) 16:54	07:24 16:17 (4) 16:10
2	04:59 22:00	05:40 21:23 19	20:05 (2) 20:24 (2) 20:16	07:28 19:02 16	18:17 (3) 18:33 (3) 16:52	07:26 16:19 (4) 16:09
3	05:00 21:59	05:42 21:21 22	20:03 (2) 20:25 (2) 20:13	07:30 19:00 14	18:17 (3) 18:31 (3) 16:50	07:28 16:08
4	05:01 21:59	05:44 21:19 24	20:02 (2) 20:26 (2) 20:11	07:31 18:57 11	18:18 (3) 18:29 (3) 16:48	07:30 16:08
5	05:02 21:58	05:45 21:17 27	20:00 (2) 20:27 (2) 20:09	07:33 18:55 8	18:18 (3) 18:26 (3) 16:46	07:32 16:07
6	05:03 21:58	05:47 21:15 28	20:00 (2) 20:28 (2) 20:06	07:35 18:52 5	18:19 (3) 18:24 (3) 16:44	07:34 16:07
7	05:04 21:57	05:49 21:13 30	19:59 (2) 20:29 (2) 20:04	07:37 18:50 2	18:19 (3) 18:21 (3) 16:43	07:36 15:39 (5) 16:06
8	05:05 21:56	05:51 21:12 31	19:58 (2) 20:29 (2) 20:01	07:39 18:48 13	17:26 (4) 17:39 (4) 16:41	07:38 15:50 (5) 16:06
9	05:06 21:55	05:52 21:10 31	19:58 (2) 20:29 (2) 19:59	07:41 18:45 19	17:23 (4) 17:42 (4) 16:39	07:40 15:52 (5) 16:05
10	05:07 21:55	05:54 21:07 32	19:57 (2) 20:29 (2) 19:56	07:42 18:43 24	17:20 (4) 17:44 (4) 16:37	07:42 15:54 (5) 16:05
11	05:08 21:54	05:56 21:05 34	19:56 (2) 20:30 (2) 19:54	07:44 18:40 28	17:18 (4) 17:46 (4) 16:35	07:44 15:55 (5) 16:05
12	05:09 21:53	05:57 21:03 34	19:56 (2) 20:30 (2) 19:51	07:46 18:38 30	17:17 (4) 17:47 (4) 16:34	07:45 15:55 (5) 16:05
13	05:10 21:52	05:59 21:01 34	19:55 (2) 20:29 (2) 19:49	07:48 18:36 33	17:15 (4) 17:48 (4) 16:32	07:47 15:56 (5) 16:05
14	05:12 21:51	06:01 20:59 33	19:56 (2) 20:29 (2) 19:47	07:50 18:33 35	17:14 (4) 17:49 (4) 16:31	07:49 15:56 (5) 16:04
15	05:13 21:50	06:03 20:57 32	19:56 (2) 20:28 (2) 19:44	07:52 18:31 36	17:13 (4) 17:49 (4) 16:29	07:51 15:56 (5) 16:05
16	05:14 21:49	06:04 20:55 30	19:55 (2) 20:25 (2) 19:42	07:54 18:29 38	17:12 (4) 17:50 (4) 16:27	07:53 15:54 (5) 16:05
17	05:16 21:47	06:06 20:53 28	19:55 (2) 20:23 (2) 19:39	07:55 18:26 39	17:11 (4) 17:50 (4) 16:26	07:55 15:53 (5) 16:05
18	05:17 21:46	06:08 20:51 26	19:56 (2) 20:22 (2) 19:37	07:57 18:24 39	17:11 (4) 17:50 (4) 16:24	07:57 15:51 (5) 16:05
19	05:18 21:45	06:10 20:48 23	19:56 (2) 20:19 (2) 19:34	07:59 18:22 39	17:11 (4) 17:50 (4) 16:23	07:59 15:53 (5) 16:05
20	05:20 21:44	06:12 20:46 21	19:56 (2) 20:17 (2) 19:32	08:01 18:20 40	17:10 (4) 17:50 (4) 16:22	08:00 15:54 (5) 16:06
21	05:21 21:42	06:13 20:44 18	19:57 (2) 20:15 (2) 19:29	08:03 18:17 38	17:10 (4) 17:48 (4) 16:20	08:02 15:46 (5) 16:06
22	05:23 21:41	06:15 20:42 15	19:57 (2) 20:12 (2) 19:27	08:05 18:15 35	17:10 (4) 17:45 (4) 16:19	08:04 15:53 (5) 16:06
23	05:24 21:39	06:17 20:39 11	19:59 (2) 20:10 (2) 19:24	08:07 18:13 33	17:10 (4) 17:43 (4) 16:18	08:06 15:43 (5) 16:07
24	05:26 21:38	06:19 20:37 9	20:00 (2) 20:09 (2) 19:22	08:09 18:30 (3) 18:11	17:10 (4) 17:41 (4) 16:17	08:08 15:37 (5) 16:08
25	05:27 21:36	06:20 20:35 5	20:01 (2) 20:06 (2) 19:19	07:11 18:25 (3) 17:09	08:09 16:10 (4) 16:16	08:43 15:38 (5) 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 18:23 (3) 17:06	08:11 16:11 (4) 16:14	08:43 15:39 (5) 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 18:21 (3) 17:04	08:13 16:11 (4) 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 18:20 (3) 17:02	08:14 16:12 (4) 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 18:20 (3) 17:00	08:16 16:13 (4) 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 18:18 (3) 18:38 (3)	08:18 16:13 (4) 16:27 (4)	08:44 16:11
31	05:37 21:26	20:10 (2) 20:20 (2) 20:21	06:31 20:21	07:22 16:56	16:15 (4) 16:25 (4)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case	10	612	120	759	302	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.65	0.65	0.67	0.67	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.18	
Total, real	2	135	26	148	53	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MS - H357

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December						
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	21:15 (4)	05:39	06:33	07:26	07:24	08:19					
	16:15	17:06	18:02	20:00	20:55	21:45	22:00	21:24 (4)	21:25	20:18	19:05	16:54	16:10					
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	21:16 (4)	05:40	06:35	07:28	07:26	08:21					
	16:16	17:08	18:04	20:02	20:57	21:46	21:59	21:24 (4)	21:23	20:16	19:02	16:52	16:09					
3	08:43	08:10	07:11	06:56	05:48	05:01	21:12 (4)	05:00	21:15 (4)	05:42	06:36	07:30	07:28	08:22				
	16:17	17:10	18:05	20:04	20:59	21:47	21:13 (4)	21:59	8	21:23 (4)	21:21	20:13	19:00	16:50	16:08			
4	08:43	08:08	07:09	06:54	05:46	05:00	21:11 (4)	05:01	21:16 (4)	05:44	06:38	07:31	07:30	08:23				
	16:18	17:12	18:07	20:06	21:01	21:49	21:14 (4)	21:59	7	21:23 (4)	21:19	20:11	18:57	16:48	16:08			
5	08:43	08:07	07:07	06:51	05:44	04:59	21:12 (4)	05:02	21:17 (4)	05:45	06:40	07:33	07:32	08:25				
	16:20	17:14	18:09	20:07	21:02	21:50	21:15 (4)	21:58	6	21:23 (4)	21:17	20:09	18:55	16:46	16:07			
6	08:42	08:05	07:04	06:49	05:42	04:59	21:11 (4)	05:03	21:17 (4)	05:47	06:42	07:35	07:34	08:26				
	16:21	17:16	18:11	20:09	21:04	21:51	21:16 (4)	21:57	5	21:22 (4)	21:15	20:06	18:52	16:44	16:07			
7	08:42	08:03	07:02	06:47	05:40	04:58	21:10 (4)	05:04	21:18 (4)	05:49	06:43	07:37	07:36	08:28				
	16:22	17:18	18:13	20:11	21:06	21:52	21:16 (4)	21:57	4	21:22 (4)	21:13	20:04	18:50	16:43	16:06			
8	08:41	08:01	07:00	06:44	05:38	04:57	21:11 (4)	05:05	21:18 (4)	05:51	06:45	07:39	07:38	08:29				
	16:24	17:20	18:15	20:13	21:08	21:53	21:17 (4)	21:56	3	21:21 (4)	21:11	20:01	18:48	16:41	16:06			
9	08:41	07:59	06:57	06:42	05:36	04:57	21:10 (4)	05:06	21:19 (4)	05:52	06:47	07:41	07:40	08:30				
	16:25	17:22	18:17	20:15	21:10	21:54	21:18 (4)	21:55	2	21:21 (4)	21:09	19:59	18:45	16:39	16:05			
10	08:40	07:57	06:55	06:39	05:34	04:56	21:11 (4)	05:07		05:54	06:49	07:42	07:42	08:31				
	16:27	17:24	18:19	20:17	21:11	21:54	21:19 (4)	21:54	8	21:19 (4)	21:07	19:56	18:43	16:37	16:05			
11	08:40	07:55	06:52	06:37	05:33	04:56	21:11 (4)	05:08		05:56	06:50	07:44	07:43	08:32				
	16:28	17:26	18:21	20:18	21:13	21:55	21:20 (4)	21:54		21:05	19:54	18:40	16:35	16:05				
12	08:39	07:53	06:50	06:35	05:31	04:55	21:10 (4)	05:09		05:57	06:52	07:46	07:45	08:34				
	16:30	17:28	18:23	20:20	21:15	21:56	21:20 (4)	21:53	10	21:03	19:51	18:38	16:34	16:05				
13	08:38	07:51	06:48	06:32	05:29	04:55	21:11 (4)	05:11		05:59	06:54	07:48	07:47	08:35				
	16:31	17:30	18:25	20:22	21:17	21:57	21:21 (4)	21:52	10	21:01	19:49	18:36	16:32	16:05				
14	08:37	07:49	06:45	06:30	05:27	04:55	21:11 (4)	05:12		06:01	06:56	07:50	07:49	08:36				
	16:33	17:32	18:27	20:24	21:18	21:57	21:22 (4)	21:51	11	20:59	19:46	18:33	16:31	16:05				
15	08:36	07:47	06:43	06:28	05:26	04:55	21:11 (4)	05:13		06:03	20:02 (5)	06:57	07:52	07:51	08:37			
	16:34	17:34	18:28	20:26	21:20	21:58	21:22 (4)	21:50		20:57	10	20:12 (5)	19:44	18:31	16:29	16:05		
16	08:35	07:45	06:40	06:25	19:55 (5)	05:24	21:11 (4)	05:14		06:04	20:00 (5)	06:59	07:54	07:53	08:37			
	16:36	17:36	18:30	20:28	4	19:59 (5)	21:22	21:59	12	21:23 (4)	21:48	20:55	13	20:13 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	19:53 (5)	05:22	21:12 (4)	05:16		06:06	19:58 (5)	07:01	07:55	07:55	08:38			
	16:38	17:38	18:32	20:30	8	20:01 (5)	21:23	21:59	11	21:23 (4)	21:47	20:53	16	20:14 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	19:52 (5)	05:21	21:12 (4)	05:17		06:08	19:58 (5)	07:03	07:57	07:57	08:39			
	16:40	17:40	18:34	20:31	11	20:03 (5)	21:25	21:59	12	21:24 (4)	21:46	20:50	17	20:15 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	19:52 (5)	05:19	21:12 (4)	05:18		06:10	19:56 (5)	07:05	07:59	07:58	08:40			
	16:41	17:42	18:36	20:33	13	20:05 (5)	21:26	22:00	12	21:24 (4)	21:45	20:48	19	20:15 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:51 (5)	05:18	21:12 (4)	05:20		06:12	19:56 (5)	07:06	08:01	08:00	08:40			
	16:43	17:44	18:38	20:35	16	20:07 (5)	21:28	22:00	12	21:24 (4)	21:43	20:46	19	20:15 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:50 (5)	05:16	21:12 (4)	05:21		06:13	19:56 (5)	07:08	08:03	08:02	08:41			
	16:45	17:46	18:40	20:37	18	20:08 (5)	21:30	22:00	12	21:24 (4)	21:42	20:44	19	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:50 (5)	05:15	21:13 (4)	05:23		06:15	19:55 (5)	07:10	08:05	08:04	08:42			
	16:47	17:48	18:41	20:39	20	20:10 (5)	21:31	22:01	12	21:25 (4)	21:41	20:41	17	20:12 (5)	19:27	18:15	16:19	16:06
23	08:27	07:30	06:23	06:09	19:50 (5)	05:13	21:13 (4)	05:24		06:17	19:55 (5)	07:12	08:07	08:06	08:42			
	16:49	17:50	18:43	20:41	20	20:10 (5)	21:33	22:01	12	21:25 (4)	21:39	20:39	15	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:51 (5)	05:12	21:13 (4)	05:26		06:19	19:56 (5)	07:13	08:09	08:07	08:43			
	16:50	17:52	18:45	20:42	18	20:09 (5)	21:34	22:01	12	21:25 (4)	21:38	20:37	13	20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:51 (5)	05:11	21:14 (4)	05:27		06:20	19:55 (5)	07:15	07:11	08:09	08:43			
	16:52	17:54	18:47	20:44	17	20:08 (5)	21:36	22:01	11	21:25 (4)	21:36	20:35	11	20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:52 (5)	05:09	21:13 (4)	05:29		06:22	19:56 (5)	07:17	07:13	08:11	08:43			
	16:54	17:56	18:49	20:46	15	20:07 (5)	21:37	22:01	12	21:25 (4)	21:35	20:32	8	20:04 (5)	19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	19:53 (5)	05:08	21:13 (4)	05:30		06:24	19:58 (5)	07:19	07:14	08:13	08:43			
	16:56	17:58	18:51	20:48	13	20:06 (5)	21:39	22:01	11	21:24 (4)	21:33	20:30	4	20:02 (5)	19:14	17:04	16:13	16:10
28	08:20	07:18	06:11	05:58	19:55 (5)	05:07	21:14 (4)	05:32		06:26	07:21	07:16	08:14	08:44				
	16:58	18:00	18:53	20:50	9	20:04 (5)	21:40	22:01	11	21:25 (4)	21:31	20:28		19:12	17:02	16:12	16:11	
29	08:18		07:08	05:56		05:06	04:58			06:27		07:22	07:18	08:16	08:44			
	17:00		19:54	20:52		21:41	22:00			20:25		19:09	17:00	16:12	16:11			
30	08:17		07:06	05:54		05:05	04:58			06:29		07:24	07:20	08:17	08:44			
	17:02		19:56	20:53		21:43	22:00			20:23		19:07	16:58	16:11	16:12			
31	08:15		07:04			05:04				06:31		07:22		08:17	08:44			
	17:04		19:58			21:44				20:21		16:56		16:13				
Potential sun hours	250	273	367	420	494	510	512	460		382		328		259	233			
Total, worst case				182		263		52		181								
Sun reduction				0.35		0.32		0.32		0.34								
Oper. time red.				1.00		1.00		1.00		1.00								
Wind dir. red.				0.65		0.61		0.61		0.65								
Total reduction				0.23		0.19		0.20		0.22								
Total, real				42		51		10		40								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MT - H358

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:36 (5)	08:14	16:12 (4)	07:16	17:28 (3)	07:01	05:52		19:33 (2)	05:03
	16:15	1	15:37 (5)	17:06	23	16:35 (4)	18:02	20:00	33	20:06 (2)	21:45
2	08:44	15:36 (5)	08:12	16:11 (4)	07:14	17:26 (3)	06:59	05:50		19:34 (2)	05:02
	16:16	3	15:39 (5)	17:08	26	16:37 (4)	18:04	20:02	31	20:05 (2)	21:46
3	08:44	15:36 (5)	08:10	16:11 (4)	07:12	17:25 (3)	06:56	05:48		19:35 (2)	05:01
	16:17	3	15:39 (5)	17:10	28	16:39 (4)	18:06	20:04	29	20:04 (2)	21:48
4	08:43	15:36 (5)	08:08	16:10 (4)	07:09	17:25 (3)	06:54	05:46		19:36 (2)	05:00
	16:18	5	15:41 (5)	17:12	31	16:41 (4)	18:07	20:06	21:01	20:02 (2)	21:49
5	08:43	15:36 (5)	08:07	16:10 (4)	07:07	17:24 (3)	06:51	05:44		19:37 (2)	04:59
	16:19	6	15:42 (5)	17:14	33	16:43 (4)	18:09	20:07	21:03	20:01 (2)	21:50
6	08:43	15:37 (5)	08:05	16:10 (4)	07:04	17:24 (3)	06:49	05:42		19:38 (2)	04:59
	16:21	7	15:44 (5)	17:16	35	16:45 (4)	18:11	20:09	21:04	19:59 (2)	21:51
7	08:42	15:37 (5)	08:03	16:09 (4)	07:02	17:23 (3)	06:47	05:40		19:41 (2)	04:58
	16:22	8	15:45 (5)	17:18	38	16:47 (4)	18:13	20:11	21:06	19:58 (2)	21:52
8	08:42	15:36 (5)	08:01	16:09 (4)	07:00	17:24 (3)	06:44	05:38		19:43 (2)	04:57
	16:24	10	15:46 (5)	17:20	41	16:50 (4)	18:15	20:13	21:08	19:55 (2)	21:53
9	08:41	15:37 (5)	07:59	16:09 (4)	06:57	17:24 (3)	06:42	05:36			04:57
	16:25	12	15:49 (5)	17:22	42	16:51 (4)	18:17	20:15	21:10		21:54
10	08:40	15:37 (5)	07:57	16:09 (4)	06:55	17:25 (3)	06:39	05:34			04:56
	16:26	13	15:50 (5)	17:24	42	16:51 (4)	18:19	20:17	21:11		21:55
11	08:40	15:37 (5)	07:55	16:10 (4)	06:52	17:26 (3)	06:37	19:50 (2)	05:33		04:56
	16:28	15	15:52 (5)	17:26	42	16:52 (4)	18:21	20:19	1	19:51 (2)	21:13
12	08:39	15:37 (5)	07:53	16:09 (4)	06:50	17:27 (3)	06:35	19:46 (2)	05:31		04:55
	16:30	17	15:54 (5)	17:28	42	16:51 (4)	18:23	20:20	7	19:53 (2)	21:15
13	08:38	15:38 (5)	07:51	16:09 (4)	06:48	17:29 (3)	06:32	19:42 (2)	05:29		04:55
	16:31	17	15:55 (5)	17:30	41	16:50 (4)	18:25	20:22	12	19:54 (2)	21:17
14	08:37	15:38 (5)	07:49	16:10 (4)	06:45	17:33 (3)	06:30	19:40 (2)	05:27		04:55
	16:33	19	15:57 (5)	17:32	40	16:50 (4)	18:27	20:24	16	19:56 (2)	21:18
15	08:36	15:38 (5)	07:47	16:11 (4)	06:43		06:28	19:39 (2)	05:26		04:54
	16:34	21	15:59 (5)	17:34	39	16:50 (4)	18:28	20:26	19	19:58 (2)	21:20
16	08:35	15:38 (5)	07:45	16:11 (4)	06:40		06:25	19:38 (2)	05:24		04:54
	16:36	22	16:00 (5)	17:36	39	16:50 (4)	18:30	20:28	22	20:00 (2)	21:22
17	08:34	15:39 (5)	07:43	16:12 (4)	06:38		06:23	19:36 (2)	05:22		04:54
	16:38	24	16:03 (5)	17:38	37	16:49 (4)	18:32	20:30	25	20:01 (2)	21:23
18	08:33	15:39 (5)	07:41	16:12 (4)	06:35		06:21	19:35 (2)	05:21		04:54
	16:40	25	16:04 (5)	17:40	36	16:48 (4)	18:34	20:31	28	20:03 (2)	21:25
19	08:32	15:40 (5)	07:39	16:14 (4)	06:33		06:18	19:34 (2)	05:19		04:54
	16:41	24	16:04 (5)	17:42	33	16:47 (4)	18:36	20:33	31	20:05 (2)	21:27
20	08:31	15:40 (5)	07:36	16:15 (4)	06:31		06:16	19:34 (2)	05:18		04:54
	16:43	24	16:04 (5)	17:44	31	16:46 (4)	18:38	20:35	33	20:07 (2)	21:28
21	08:30	15:41 (5)	07:34	16:17 (4)	06:28		06:14	19:32 (2)	05:16		04:54
	16:45	23	16:04 (5)	17:46	28	16:45 (4)	18:40	20:37	36	20:08 (2)	21:30
22	08:29	15:41 (5)	07:32	16:18 (4)	06:26		06:12	19:32 (2)	05:15		04:55
	16:47	22	16:03 (5)	17:48	24	16:42 (4)	18:42	20:39	37	20:09 (2)	21:31
23	08:27	15:43 (5)	07:30	16:21 (4)	06:23		06:09	19:32 (2)	05:13		04:55
	16:49	20	16:03 (5)	17:50	19	16:40 (4)	18:43	20:41	37	20:09 (2)	21:33
24	08:26	15:43 (5)	07:28	16:25 (4)	06:21		06:07	19:32 (2)	05:12		04:55
	16:50	20	16:03 (5)	17:52	11	16:36 (4)	18:45	20:43	37	20:09 (2)	21:34
25	08:24	15:45 (5)	07:25		06:18		06:05	19:32 (2)	05:11		04:55
	16:52	18	16:03 (5)	17:54			06:04	19:32 (2)	05:10		04:56
26	08:23	15:46 (5)	07:23		06:16		06:03	19:32 (2)	05:09		04:56
	16:54	18	16:21 (4)	17:56			06:01	19:32 (2)	05:08		04:56
27	08:22	15:47 (5)	07:21		06:13		06:01	19:32 (2)	05:08		04:56
	16:56	20	16:23 (4)	17:58			06:01	19:32 (2)	05:08		04:56
28	08:20	15:51 (5)	07:18	17:29 (3)	06:11		05:58	19:32 (2)	05:07		04:57
	16:58	18	16:26 (4)	18:00	3	17:32 (3)	18:53	20:50	36	20:08 (2)	21:40
29	08:18	16:14 (4)			07:08		05:56	19:32 (2)	05:06		04:57
	17:00	14	16:28 (4)		19:54		05:54	20:07 (2)	21:41		22:01
30	08:17	16:13 (4)			07:06		05:54	19:33 (2)	05:05		04:58
	17:02	17	16:30 (4)		19:56		05:54	20:07 (2)	21:43		22:00
31	08:15	16:12 (4)			07:04			05:04			
	17:04	19	16:31 (4)		19:58			21:44			
Potential sun hours	250		273		367		420		494		510
Total, worst case	485		804		230		556		193		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.66		0.68		0.65		0.65		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	78		123		42		127		48		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MT - H358

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December				
1	04:59 22:00	05:39 21:25	06:33 20:18	19:49 (2) 19:50 (2)	07:26 19:05	18:06 (3) 18:22 (3)	07:24 16:54	15:39 (4) 16:21 (4)	08:19 16:10	15:19 (5) 15:34 (5)
2	04:59 22:00	05:40 21:23	06:35 20:16		07:28 19:02	18:04 (3) 18:23 (3)	07:26 16:52	15:39 (4) 16:21 (4)	08:21 16:09	15:19 (5) 15:33 (5)
3	05:00 21:59	05:42 21:21	06:36 20:13		07:30 19:00	18:03 (3) 18:24 (3)	07:28 16:50	15:39 (4) 16:19 (4)	08:22 16:08	15:20 (5) 15:32 (5)
4	05:01 21:59	05:44 21:19	19:56 (2) 20:03 (2)	06:38 20:11	07:31 18:57	18:02 (3) 18:25 (3)	07:30 16:48	15:39 (4) 16:17 (4)	08:24 16:08	15:21 (5) 15:32 (5)
5	05:02 21:58	05:45 21:17	19:51 (2) 20:06 (2)	06:40 20:09	07:33 18:55	18:01 (3) 18:26 (3)	07:32 16:46	15:39 (4) 16:15 (4)	08:25 16:07	15:22 (5) 15:30 (5)
6	05:03 21:58	05:47 21:15	19:49 (2) 20:08 (2)	06:42 20:06	07:35 18:52	18:01 (3) 18:24 (3)	07:34 16:44	15:40 (4) 16:12 (4)	08:26 16:07	15:23 (5) 15:30 (5)
7	05:04 21:57	05:49 21:13	19:48 (2) 20:10 (2)	06:43 20:04	07:37 18:50	17:59 (3) 18:21 (3)	07:36 16:43	15:40 (4) 16:10 (4)	08:28 16:06	15:23 (5) 15:29 (5)
8	05:05 21:56	05:51 21:12	19:46 (2) 20:11 (2)	06:45 20:01	07:39 18:48	17:59 (3) 18:18 (3)	07:38 16:41	15:41 (4) 16:08 (4)	08:29 16:06	15:24 (5) 15:28 (5)
9	05:06 21:55	05:52 21:10	19:45 (2) 20:12 (2)	06:47 19:59	07:41 18:45	17:59 (3) 18:16 (3)	07:40 16:39	15:41 (4) 16:06 (4)	08:30 16:05	15:25 (5) 15:28 (5)
10	05:07 21:55	05:54 21:07	19:43 (2) 20:12 (2)	06:49 19:56	07:42 18:43	17:59 (3) 18:14 (3)	07:42 16:37	15:43 (4) 16:05 (4)	08:31 16:05	15:26 (5) 15:28 (5)
11	05:08 21:54	05:56 21:05	19:42 (2) 20:13 (2)	06:50 19:54	07:44 18:40	18:00 (3) 18:11 (3)	07:44 16:35	15:44 (4) 16:03 (4)	08:33 16:05	15:26 (5) 15:27 (5)
12	05:09 21:53	05:57 21:03	19:42 (2) 20:14 (2)	06:52 19:51	07:46 18:38	18:00 (3) 18:09 (3)	07:45 16:34	15:45 (4) 16:01 (4)	08:34 16:05	
13	05:10 21:52	05:59 21:01	19:40 (2) 20:14 (2)	06:54 19:49	07:48 18:36	18:01 (3) 18:07 (3)	07:47 16:32	15:46 (4) 15:59 (4)	08:35 16:05	
14	05:12 21:51	06:01 20:59	19:40 (2) 20:15 (2)	06:56 19:47	07:50 18:33	18:02 (3) 18:04 (3)	07:49 16:31	15:23 (5) 15:58 (4)	08:36 16:04	
15	05:13 21:50	06:03 20:57	19:40 (2) 20:15 (2)	06:58 19:44	07:52 18:31		07:51 16:29	15:20 (5) 15:56 (4)	08:37 16:05	
16	05:14 21:49	06:04 20:55	19:38 (2) 20:15 (2)	06:59 19:42	07:54 18:29	18:03 (3)	07:53 16:27	15:19 (5) 15:54 (4)	08:38 16:05	
17	05:16 21:47	06:06 20:53	19:38 (2) 20:15 (2)	07:01 19:39	07:55 18:26		07:55 16:26	15:18 (5) 15:36 (5)	08:38 16:05	
18	05:17 21:46	06:08 20:51	19:38 (2) 20:16 (2)	07:03 19:37	07:57 18:24	16:54 (4)	07:57 16:24	15:17 (5) 15:37 (5)	08:39 16:05	
19	05:18 21:45	06:10 20:48	19:37 (2) 20:15 (2)	07:05 19:34	07:59 18:22	16:51 (4)	07:59 16:23	15:17 (5) 15:37 (5)	08:40 16:05	
20	05:20 21:44	06:12 20:46	19:37 (2) 20:15 (2)	07:06 19:32	08:01 18:20	16:49 (4)	08:00 16:22	15:16 (5) 15:38 (5)	08:41 16:06	
21	05:21 21:42	06:13 20:44	19:38 (2) 20:15 (2)	07:08 19:29	08:03 18:17	16:47 (4)	08:02 16:20	15:16 (5) 15:39 (5)	08:41 16:06	
22	05:23 21:41	06:15 20:42	19:37 (2) 20:12 (2)	07:10 19:27	08:05 18:15	16:45 (4)	08:04 16:19	15:16 (5) 15:40 (5)	08:42 16:06	
23	05:24 21:39	06:17 20:39	19:37 (2) 20:10 (2)	07:12 19:24	08:07 18:13	16:44 (4)	08:06 16:18	15:16 (5) 15:40 (5)	08:42 16:07	
24	05:26 21:38	06:19 20:37	19:38 (2) 20:09 (2)	07:13 19:22	08:09 18:11	16:42 (4)	08:08 16:17	15:16 (5) 15:41 (5)	08:43 16:08	
25	05:27 21:36	06:20 20:35	19:38 (2) 20:06 (2)	07:15 19:19	07:11 17:09	15:41 (4)	08:09 16:16	15:17 (5) 15:41 (5)	08:43 16:08	
26	05:29 21:35	06:22 20:32	19:39 (2) 20:04 (2)	07:17 19:17	07:13 17:06	15:41 (4)	08:11 16:14	15:17 (5) 15:40 (5)	08:43 16:09	
27	05:30 21:33	06:24 20:30	19:40 (2) 20:02 (2)	07:19 19:14	07:15 17:04	15:40 (4)	08:13 16:13	15:18 (5) 15:38 (5)	08:44 16:10	
28	05:32 21:32	06:26 20:28	19:40 (2) 19:59 (2)	07:21 19:12	07:16 17:02	15:39 (4)	08:14 16:12	15:18 (5) 15:37 (5)	08:44 16:11	
29	05:34 21:30	06:27 20:25	19:41 (2) 19:57 (2)	07:22 19:09	07:18 17:00	15:39 (4)	08:16 16:12	15:18 (5) 15:36 (5)	08:44 16:11	
30	05:35 21:28	06:29 20:23	19:43 (2) 19:55 (2)	07:24 19:07	07:20 16:58	15:38 (4)	08:18 16:11	15:19 (5) 15:35 (5)	08:44 16:12	
31	05:37 21:27	06:31 20:21	19:45 (2) 19:52 (2)		07:22 16:56	15:38 (4)			08:44 16:13	
Potential sun hours	512	460	382		328		259		233	
Total, worst case		764		12	700		734		83	
Sun reduction		0.34		0.32	0.29		0.27		0.21	
Oper. time red.		1.00		1.00	1.00		1.00		1.00	
Wind dir. red.		0.65		0.67	0.66		0.66		0.66	
Total reduction		0.22		0.22	0.19		0.17		0.14	
Total, real		169		3	136		128		11	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MU - H359

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	21:01 (5) 22:00	04:59 18	21:06 (5) 21:25	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	21:02 (5) 21:59	05:00 17	21:07 (5) 21:24	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	21:01 (5) 21:59	05:00 17	21:06 (5) 21:23	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:01 (5) 21:59	05:01 16	21:05 (5) 21:23	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	21:01 (5) 21:58	05:02 16	21:07 (5) 21:23	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:01 (5) 21:57	05:03 15	21:07 (5) 21:22	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:01 (5) 21:57	05:04 14	21:08 (5) 21:22	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:01 (5) 21:56	05:05 13	21:08 (5) 21:21	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:02 (5) 21:55	05:06 12	21:09 (5) 21:21	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
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11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:02 (5) 21:54	05:08 10	21:09 (5) 21:19	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:02 (5) 21:53	05:09 8	21:10 (5) 21:18	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:02 (5) 21:52	05:11 7	21:10 (5) 21:17	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:03 (5) 21:47	05:16 20	21:05 (5) 21:23	06:06 21:47	07:01 20:53	07:55 18:26	07:55 16:26	08:38 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:03 (5) 21:45	05:18 21	21:05 (5) 21:24	06:08 21:45	07:05 20:48	07:59 18:24	07:58 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	21:03 (5) 21:42	05:21 21	21:05 (5) 21:24	06:13 21:42	07:08 20:44	08:03 18:17	08:02 16:20	08:41 16:06
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31	08:15 17:04	07:04 19:58	05:04 19:58	05:04 21:44	05:04 21:44	05:04 21:09	21:01 (5) (5)	05:37 (5)	05:37 (5)	06:31 (5)	07:22 (5)	07:22 (5)	08:44 (5)	08:44 (5)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case					22	538	185							
Sun reduction					0.38	0.32	0.32							
Oper. time red.					1.00	1.00	1.00							
Wind dir. red.					0.61	0.61	0.61							
Total reduction					0.23	0.20	0.20							
Total, real					5	105	37							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MV - H360

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MW - H361
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MX - H362

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MY - H363

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
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29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MZ - H364
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:24 (4) 18:36 (4)	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:24 (4) 18:33 (4)	07:26 16:52	08:21 16:09
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5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07	
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06	
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06	
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05	
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05	
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:33 16:05	
12	08:39 16:30	07:53 17:28	06:53 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:39	07:45 16:34	08:34 16:06	
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04	
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:30	08:36 16:04	
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:04	
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:04 20:55	06:59 20:02 (2)	07:54 18:29	07:53 16:27	08:38 16:05	
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	06:59 20:02 (2)	07:55 18:26	07:55 16:26	08:38 16:05	
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:22 21:25	04:54 22:00	05:17 21:46	06:08 20:50	06:59 20:00 (2)	07:57 18:24	07:57 16:24	08:39 16:05	
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:22 21:27	04:54 22:00	05:18 21:45	06:10 20:48	06:59 20:14 (2)	07:59 18:22	07:59 16:23	08:40 16:05	
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:21 21:28	04:54 22:00	05:20 21:44	06:12 20:46	06:59 20:15 (2)	07:06 18:20	08:01 16:22	08:41 16:06	
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	06:59 20:15 (2)	07:08 18:17	08:03 16:20	08:41 16:06	
22	08:28 16:47	07:32 17:48	06:26 18:41	06:11 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	06:59 20:12 (2)	07:10 18:15	08:05 16:19	08:42 16:06	
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	06:59 20:10 (2)	07:12 18:24	08:07 16:18	08:42 16:07	
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	06:59 20:09 (2)	07:13 18:22	08:09 16:16	08:43 16:08	
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	06:59 20:06 (2)	07:15 18:19	08:11 16:16	08:43 16:08	
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	06:59 20:04 (2)	07:17 18:17	08:11 16:17	08:43 16:09	
27	08:21 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	06:59 20:02 (2)	07:19 18:14	08:25 (4) 18:46 (4)	07:14 17:04	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	06:59 19:57 (2)	07:21 18:12	18:25 (4) 18:44 (4)	07:16 17:02	08:44 16:10
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	18:25 (4) 18:41 (4)	07:18 17:00	08:44 16:11	
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	18:24 (4) 18:38 (4)	07:20 16:58	08:44 16:12	
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13	
Potential sun hours	250	273	367	420	494	510	512	460	382	328		259	233
Total, worst case									152	142		30	
Sun reduction			0.27		0.35			0.34		0.32		0.29	
Oper. time red.			1.00		1.00			1.00		1.00		1.00	
Wind dir. red.			0.67		0.65			0.65		0.67		0.67	
Total reduction			0.18		0.23			0.22		0.22		0.20	
Total, real			31		34			34		31		6	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NA - H365

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	21:09 (4)	04:59	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	21:45	21:10 (4)	22:00	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02	21:09 (4)	05:00	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:46	21:12 (4)	21:59	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48	05:01	21:08 (4)	05:00	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48	21:13 (4)	21:59	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	05:00	21:08 (4)	05:01	06:38	07:31	07:30	08:23
	16:18	17:12	18:07	20:06	21:01	21:49	21:14 (4)	21:59	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	04:59	21:08 (4)	05:02	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07	21:02	21:50	21:15 (4)	21:58	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	04:59	21:08 (4)	05:03	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	21:51	21:16 (4)	21:57	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58	21:07 (4)	05:04	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	21:16 (4)	21:57	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	04:57	21:08 (4)	05:05	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	21:17 (4)	21:56	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	04:57	21:07 (4)	05:06	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	21:18 (4)	21:55	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34	04:56	21:07 (4)	05:07	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11	21:54	21:19 (4)	21:54	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33	04:56	21:08 (4)	05:08	06:50	07:44	07:43	08:32
	16:28	17:26	18:21	20:18	21:13	21:55	21:20 (4)	21:54	19:54	18:40	16:35	16:05
12	08:39	07:53	06:50	06:35	05:31	04:55	21:07 (4)	05:09	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15	21:56	21:20 (4)	21:53	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	19:51 (5)	05:29	21:08 (4)	05:11	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	3	19:54 (5)	21:17	21:57	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	19:49 (5)	05:27	21:08 (4)	05:12	06:01	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	7	19:56 (5)	21:18	21:57	19:46	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	19:48 (5)	05:26	21:08 (4)	05:13	06:03	07:52	07:51	08:37
	16:34	17:34	18:29	20:26	10	19:58 (5)	21:20	21:58	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	19:46 (5)	05:24	21:08 (4)	05:14	06:04	07:54	07:53	08:37
	16:36	17:36	18:30	20:28	13	19:59 (5)	21:22	21:59	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	19:45 (5)	05:22	21:09 (4)	05:16	06:06	19:56 (5)	07:01	07:55
	16:38	17:38	18:32	20:30	16	20:01 (5)	21:23	21:59	20:53	19:39	18:26	16:26
18	08:33	07:41	06:35	06:21	19:45 (5)	05:21	21:09 (4)	05:17	06:08	19:54 (5)	07:03	07:57
	16:40	17:40	18:34	20:31	18	20:03 (5)	21:25	21:59	20:50	19:37	18:24	16:25
19	08:32	07:39	06:33	06:18	19:45 (5)	05:19	21:09 (4)	05:18	06:10	19:52 (5)	07:05	07:59
	16:41	17:42	18:36	20:33	20	20:05 (5)	21:26	22:00	20:48	19:34	18:22	16:23
20	08:31	07:36	06:31	06:16	19:45 (5)	05:18	21:09 (4)	05:20	06:12	19:51 (5)	07:06	08:01
	16:43	17:44	18:38	20:35	21	20:06 (5)	21:28	22:00	20:46	19:32	18:20	16:22
21	08:30	07:34	06:28	06:14	19:44 (5)	05:16	21:09 (4)	05:21	06:13	19:50 (5)	07:08	08:03
	16:45	17:46	18:40	20:37	20	20:04 (5)	21:30	22:00	20:44	19:29	18:17	16:20
22	08:29	07:32	06:26	06:12	19:45 (5)	05:15	21:10 (4)	05:23	06:15	19:49 (5)	07:10	08:05
	16:47	17:48	18:41	20:39	19	20:04 (5)	21:31	22:01	20:41	19:27	18:15	16:19
23	08:27	07:30	06:23	06:09	19:46 (5)	05:13	21:10 (4)	05:24	06:17	19:49 (5)	07:12	08:07
	16:49	17:50	18:43	20:41	17	20:03 (5)	21:33	22:01	20:39	19:24	18:13	16:18
24	08:26	07:28	06:21	06:07	19:47 (5)	05:12	21:10 (4)	05:26	06:19	19:49 (5)	07:13	08:09
	16:51	17:52	18:45	20:42	15	20:02 (5)	21:34	22:01	20:37	19:22	18:11	16:17
25	08:24	07:25	06:18	06:05	19:48 (5)	05:11	21:11 (4)	05:27	06:20	19:48 (5)	07:15	07:11
	16:52	17:54	18:47	20:44	12	20:00 (5)	21:36	22:01	20:35	19:20	17:09	16:16
26	08:23	07:23	06:16	06:03	19:51 (5)	05:09	21:10 (4)	05:29	06:22	19:48 (5)	07:17	07:13
	16:54	17:56	18:49	20:46	7	19:58 (5)	21:37	22:01	20:32	19:17	17:06	16:15
27	08:21	07:21	06:13	06:01	05:08	04:56	21:10 (4)	05:30	06:24	19:49 (5)	07:19	07:14
	16:56	17:58	18:51	20:48	21:39	22:01	21:24 (4)	21:33	20:30	19:14	17:04	16:13
28	08:20	07:18	06:11	05:58	05:07	04:57	21:11 (4)	05:32	06:26	19:49 (5)	07:21	07:16
	16:58	18:00	18:53	20:50	21:40	22:01	21:25 (4)	21:32	20:28	19:12	17:02	16:12
29	08:18	07:08	06:05	05:56	05:06	04:58	21:12 (4)	05:34	06:27	19:50 (5)	07:22	07:18
	17:00	19:54	20:52	21:41	22:00	21:30	21:25 (4)	21:30	20:25	19:57 (5)	19:09	17:00
30	08:17	07:06	05:54	05:44	05:05	04:58	21:11 (4)	05:35	06:29	19:52 (5)	07:24	07:20
	17:02	19:56	20:53	21:43	22:00	21:30	21:24 (4)	21:28	20:23	19:55 (5)	19:07	16:58
31	08:15	07:04	05:50	05:40	05:04	04:56	21:10 (4)	05:37	06:31	19:55 (5)	19:07	16:58
	17:04	19:58	20:54	21:44	22:00	21:30	21:24 (4)	21:28	20:23	19:55 (5)	19:07	16:58
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				198		354		88		202		
Sun reduction				0.35		0.32		0.32		0.34		
Oper. time red.				1.00		1.00		1.00		1.00		
Wind dir. red.				0.65		0.61		0.61		0.65		
Total reduction				0.23		0.19		0.22		0.22		
Total, real				45		69		17		45		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NB - H366
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:54	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NC - H367

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	15:21 (3) 08:14	15:41 (2) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:09 (3)	
2	16:15	15:37 (3) 17:06	16:09 (2) 18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	15:34 (2)	
	08:44	15:22 (3) 08:12	15:41 (2) 07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	15:08 (3)	
3	16:16	15:38 (3) 17:08	16:08 (2) 18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	15:32 (2)	
	08:44	15:21 (3) 08:10	15:42 (2) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	15:08 (3)	
4	16:17	15:39 (3) 17:10	16:07 (2) 18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	15:28 (2) 16:08	24	15:32 (2)
	08:43	15:22 (3) 08:08	15:43 (2) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	15:18 (2) 08:24	24	15:09 (3)
5	16:18	15:41 (3) 17:12	16:06 (2) 18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	15:32 (2) 16:08	23	15:32 (2)
	08:43	15:22 (3) 08:07	15:45 (2) 07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	15:16 (2) 08:25	23	15:09 (3)
6	16:19	15:42 (3) 17:14	16:05 (2) 18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	15:34 (2) 16:07	20	15:29 (3)
	08:43	15:23 (3) 08:05	15:47 (2) 07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	15:14 (2) 08:26	20	15:10 (3)
7	16:21	15:43 (3) 17:16	16:04 (2) 18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	15:35 (2) 16:07	20	15:30 (3)
	08:42	15:24 (3) 08:03	15:49 (2) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	15:13 (2) 08:28	20	15:09 (3)
8	16:22	15:43 (3) 17:18	16:01 (2) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	15:36 (2) 16:06	20	15:29 (3)
	08:42	15:24 (3) 08:01	16:01 (2) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	15:36 (2) 16:06	20	15:29 (3)
9	16:24	15:46 (2) 17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	15:37 (2) 16:06	19	15:28 (3)
	08:41	15:25 (3) 07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	15:12 (2) 08:30	19	15:11 (3)
10	16:25	15:49 (2) 17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	15:39 (2) 16:05	17	15:28 (3)
	08:40	15:26 (3) 07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	15:11 (2) 08:32	17	15:11 (3)
11	16:26	15:50 (2) 17:24	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	15:39 (2) 16:05	17	15:28 (3)
	08:40	15:26 (3) 07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	15:11 (2) 08:33	17	15:11 (3)
12	16:28	15:52 (2) 17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	15:40 (2) 16:05	16	15:27 (3)
	08:39	15:27 (3) 07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	15:11 (2) 08:34	16	15:11 (3)
13	16:29	15:54 (2) 17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	15:40 (2) 16:05	16	15:27 (3)
	08:38	15:28 (3) 07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	15:10 (2) 08:35	15	15:12 (3)
14	16:31	15:55 (2) 17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	15:41 (2) 16:04	14	15:26 (3)
	08:37	15:29 (3) 07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	15:10 (2) 08:36	14	15:12 (3)
15	16:33	15:57 (2) 17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	15:41 (2) 16:04	14	15:26 (3)
	08:36	15:30 (3) 07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	15:10 (2) 08:37	13	15:13 (3)
16	16:34	15:59 (2) 17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	15:41 (2) 16:04	13	15:26 (3)
	08:35	15:31 (3) 07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	15:10 (2) 08:38	13	15:13 (3)
17	16:36	16:00 (2) 17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	15:41 (2) 16:05	13	15:26 (3)
	08:34	15:33 (3) 07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	15:10 (2) 08:38	13	15:14 (3)
18	16:38	16:02 (2) 17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	15:41 (2) 16:05	13	15:27 (3)
	08:33	15:37 (2) 07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	15:11 (2) 08:39	13	15:15 (3)
19	16:40	16:04 (2) 17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	15:41 (2) 16:05	12	15:27 (3)
	08:32	15:38 (2) 07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	15:11 (2) 08:40	12	15:15 (3)
20	16:41	16:05 (2) 17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	15:41 (2) 16:05	13	15:28 (3)
	08:31	15:37 (2) 07:36	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	15:12 (2) 08:41	13	15:15 (3)
21	16:43	16:05 (2) 17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	15:41 (2) 16:06	12	15:27 (3)
	08:30	15:37 (2) 07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	15:12 (2) 08:41	12	15:16 (3)
22	16:45	16:06 (2) 17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	15:41 (2) 16:06	12	15:28 (3)
	08:29	15:37 (2) 07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	15:13 (2) 08:42	12	15:16 (3)
23	16:47	16:06 (2) 17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	15:41 (2) 16:06	12	15:28 (3)
	08:27	15:37 (2) 07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	15:14 (2) 08:42	12	15:17 (3)
24	16:49	16:07 (2) 17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	15:41 (2) 16:07	12	15:29 (3)
	08:26	15:37 (2) 07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	15:14 (2) 08:43	12	15:17 (3)
25	16:50	16:07 (2) 17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	15:41 (2) 16:08	12	15:29 (3)
	08:25	15:37 (2) 07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09	15:11 (3) 08:43	12	15:18 (3)
26	16:52	16:08 (2) 17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	15:41 (2) 16:08	12	15:30 (3)
	08:23	15:37 (2) 07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	15:10 (3) 08:43	12	15:18 (3)
27	16:54	16:08 (2) 17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	15:39 (2) 16:09	12	15:30 (3)
	08:22	15:37 (2) 07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	15:10 (3) 08:44	12	15:19 (3)
28	16:56	16:08 (2) 17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	15:38 (2) 16:10	13	15:32 (3)
	08:20	15:38 (2) 07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	15:09 (3) 08:44	13	15:19 (3)
29	16:58	16:09 (2) 18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	15:37 (2) 16:10	14	15:33 (3)
	08:19	15:38 (2)	07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	15:08 (3) 08:44	14	15:20 (3)
30	17:00	16:09 (2)	19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	15:35 (2) 16:11	14	15:34 (3)
	08:17	15:39 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	15:08 (3) 08:44	14	15:20 (3)
31	17:02	16:08 (2)	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	15:35 (2) 16:12	15	15:35 (3)
	08:15	15:39 (2)	07:04		05:04		05:37	06:31		07:22		08:44	15	15:20 (3)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	15	15:35 (3)
Total, worst case	806	152										743	488	
Sun reduction	0.24	0.23									0.27	0.21	0.21	
Oper. time red.	1.00	1.00									1.00	1.00	1.00	
Wind dir. red.	0.66	0.66									0.66	0.66	0.66	
Total reduction	0.16	0.15									0.18	0.18	0.14	
Total, real	129	23									130	66	66	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: ND - H368

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NE - H369

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44 16:15	08:14 17:06	22	16:31 (5) 18:02	36	17:25 (4) 20:00		05:52 20:55	32	19:50 (2) 20:22 (2)	05:03 21:45
2	08:44 16:16	08:12 17:08	21	16:09 (5) 18:04	34	16:49 (4) 20:02		05:50 20:57		19:50 (2) 20:22 (2)	05:02 21:46
3	08:44 16:17	08:10 17:10	19	16:10 (5) 18:06	33	16:50 (4) 20:04		05:56 20:59	30	19:51 (2) 20:21 (2)	05:01 21:48
4	08:43 16:18	08:08 17:12	18	16:29 (5) 18:07	30	17:23 (4) 20:06		05:54 21:01	30	19:51 (2) 20:21 (2)	05:00 21:49
5	08:43 16:19	08:07 17:14	14	16:13 (5) 18:09	28	16:52 (4) 20:07		05:51 21:03	29	19:51 (2) 20:20 (2)	04:59 21:50
6	08:42 16:21	08:05 17:16	10	16:27 (5) 18:11	24	16:54 (4) 20:09		05:42 21:04	27	19:52 (2) 20:19 (2)	04:59 21:51
7	08:42 16:22	08:03 17:18		16:25 (5) 18:13	19	17:18 (4) 20:11		05:40 21:06	26	19:53 (2) 20:19 (2)	04:58 21:52
8	08:42 16:24	08:01 17:20		07:00 18:15	13	17:00 (4) 20:13		05:38 21:08	23	19:54 (2) 20:17 (2)	04:57 21:53
9	08:41 16:25	07:59 17:22		06:57 18:17	5	17:45 (3) 20:15		05:36 21:10	21	19:55 (2) 20:16 (2)	04:57 21:54
10	08:40 16:26	07:57 17:24		06:55 18:19	7	17:50 (3) 20:17		05:34 21:11	18	19:56 (2) 20:14 (2)	04:56 21:55
11	08:40 16:28	07:55 17:26		06:52 18:21	11	17:52 (3) 20:19		05:33 21:13	14	19:59 (2) 20:13 (2)	04:56 21:55
12	08:39 16:30	07:53 17:28		06:50 18:23	13	17:43 (3) 20:20		05:31 21:15	9	20:01 (2) 20:10 (2)	04:55 21:56
13	08:38 16:31	07:51 17:30	3	16:57 (4) 17:00 (4)	15	17:43 (3) 20:22		05:29 21:17			04:55 21:57
14	08:37 16:33	07:49 17:32	7	16:55 (4) 17:02 (4)	18	17:58 (3) 20:24		05:27 21:18			04:55 21:58
15	08:36 16:34	07:47 17:34	11	16:54 (4) 17:05 (4)	19	18:00 (3) 20:26		05:26 21:20			04:54 21:58
16	08:35 16:36	07:45 17:36	14	16:53 (4) 17:07 (4)	22	18:02 (3) 20:28		05:24 21:22			04:54 21:59
17	08:34 16:38	07:43 17:38	17	16:52 (4) 17:09 (4)	21	18:04 (3) 20:30		05:22 21:23			04:54 21:59
18	08:33 16:40	07:41 17:40	20	16:51 (4) 17:11 (4)	18	18:02 (3) 20:31	2	05:21 20:03 (2)			04:54 22:00
19	08:32 16:41	07:39 17:42	23	16:50 (4) 17:13 (4)	16	18:03 (3) 20:33	6	05:19 20:05 (2)			04:54 22:00
20	08:31 16:43	16:07 (5) 17:44	26	16:50 (4) 17:16 (4)	11	17:47 (3) 20:35	10	05:18 20:07 (2)			04:54 22:00
21	08:30 16:45	16:07 (5) 17:46	29	16:49 (4) 17:18 (4)		06:14 20:37	13	05:16 20:08 (2)			04:54 22:01
22	08:29 16:47	16:07 (5) 17:48	31	16:48 (4) 17:19 (4)		06:12 20:39	16	05:15 20:10 (2)			04:55 22:01
23	08:27 16:49	16:07 (5) 17:50	34	16:48 (4) 17:22 (4)		06:09 20:41	19	05:13 20:12 (2)			04:55 22:01
24	08:26 16:50	16:06 (5) 17:52	35	16:49 (4) 17:24 (4)		06:07 20:42	22	05:12 20:14 (2)			04:55 22:01
25	08:24 16:52	16:07 (5) 17:54	38	16:48 (4) 17:26 (4)		06:05 20:44	23	05:11 20:15 (2)			04:55 22:01
26	08:23 16:54	16:06 (5) 17:56	38	16:48 (4) 17:26 (4)		06:03 20:46	26	05:09 20:17 (2)			04:56 22:01
27	08:22 16:56	16:06 (5) 17:58	37	16:49 (4) 17:26 (4)		06:01 20:48	28	05:07 20:19 (2)			04:56 22:01
28	08:20 16:58	16:07 (5) 18:00	37	16:48 (4) 17:25 (4)		05:58 20:50	31	05:07 20:21 (2)			04:57 22:01
29	08:18 17:00	16:07 (5) 18:02		07:08 19:54		05:56 20:52	32	05:06 20:22 (2)			04:57 22:01
30	08:17 17:02	16:07 (5) 18:03		07:06 19:56		05:54 20:53	33	05:05 20:23 (2)			04:58 22:00
31	08:15 17:04	16:07 (5) 18:04		07:04 19:58				05:04 21:44			
Potential sun hours	250		273		367		420		494		510
Total, worst case	159		504		393		261		291		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.67		0.67		0.65		0.65		
Total reduction	0.16		0.16		0.18		0.23		0.25		
Total, real	26		78		72		60		72		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NE - H369

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September		October		November		December	
1	04:59 22:00	05:39 21:25	20:10 (2)	06:33	07:26	18:22 (3)	07:24		08:19	
2	04:59 22:00	05:40 21:23	20:08 (2)	06:35	07:28	18:22 (3)	07:26		08:21	
			20:24 (2)	20:16	19:02	11	18:33 (3)	16:52	16:09	
3	05:00 21:59	05:42 21:21	20:06 (2)	06:36	07:30	18:22 (3)	07:28		08:22	
			20:25 (2)	20:13	19:00	9	18:31 (3)	16:50	16:08	
4	05:01 21:59	05:44 21:19	20:05 (2)	06:38	07:31	18:23 (3)	07:30	15:49 (5)	08:24	
			20:27 (2)	20:11	18:57	6	18:29 (3)	16:48	15:51 (5)	16:08
5	05:02 21:58	05:45 21:17	20:03 (2)	06:40	07:33	17:40 (4)	07:32	15:44 (5)	08:25	
			20:27 (2)	20:09	18:55	8	18:26 (3)	16:46	11	15:55 (5)
6	05:03 21:58	05:47 21:15	20:02 (2)	06:42	07:35	17:35 (4)	07:34	15:42 (5)	08:26	
			20:28 (2)	20:06	18:52	16	17:51 (4)	16:44	15	15:57 (5)
7	05:04 21:57	05:49 21:13	20:02 (2)	06:43	07:37	17:31 (4)	07:36	15:41 (5)	08:28	
			20:29 (2)	20:04	18:50	21	17:52 (4)	16:43	17	15:58 (5)
8	05:05 21:56	05:50 21:12	20:00 (2)	06:45	07:39	17:28 (4)	07:38	15:40 (5)	08:29	
			20:29 (2)	20:01	18:48	26	17:54 (4)	16:41	19	15:59 (5)
9	05:06 21:55	05:52 21:10	20:00 (2)	06:47	07:41	17:27 (4)	07:40	15:39 (5)	08:30	
			20:30 (2)	19:59	18:45	28	17:55 (4)	16:39	21	16:00 (5)
10	05:07 21:55	05:54 21:07	19:59 (2)	06:49	07:42	17:25 (4)	07:42	15:39 (5)	08:31	
			20:30 (2)	19:56	18:43	31	17:56 (4)	16:37	23	16:02 (5)
11	05:08 21:54	05:56 21:05	19:59 (2)	06:50	07:44	17:24 (4)	07:44	15:39 (5)	08:33	
			20:30 (2)	19:54	18:40	33	17:57 (4)	16:35	23	16:02 (5)
12	05:09 21:53	05:57 21:03	19:59 (2)	06:52	07:46	17:23 (4)	07:45	15:39 (5)	08:34	
			20:31 (2)	19:51	18:38	35	17:58 (4)	16:34	22	16:01 (5)
13	05:10 21:52	05:59 21:01	19:58 (2)	06:54	07:48	17:22 (4)	07:47	15:39 (5)	08:35	
			20:30 (2)	19:49	18:36	36	17:58 (4)	16:32	20	15:59 (5)
14	05:12 21:51	06:01 20:59	19:58 (2)	06:56	07:50	17:21 (4)	07:49	15:39 (5)	08:36	
			20:29 (2)	19:47	18:33	37	17:58 (4)	16:31	19	15:58 (5)
15	05:13 21:50	06:03 20:57	19:58 (2)	06:58	07:52	17:21 (4)	07:51	15:39 (5)	08:37	
			20:28 (2)	19:44	18:31	38	17:59 (4)	16:29	17	15:56 (5)
16	05:14 21:49	06:04 20:55	19:57 (2)	06:59	07:54	17:20 (4)	07:53	15:39 (5)	08:38	
			20:25 (2)	19:42	18:29	39	17:59 (4)	16:27	15	15:54 (5)
17	05:16 21:47	06:06 20:53	19:58 (2)	07:01	07:55	17:20 (4)	07:55	15:40 (5)	08:38	
			20:23 (2)	19:39	18:26	37	17:57 (4)	16:26	12	15:52 (5)
18	05:17 21:46	06:08 20:51	19:58 (2)	07:03	07:57	17:20 (4)	07:57	15:40 (5)	08:39	
			20:22 (2)	19:37	18:24	35	17:55 (4)	16:24	11	15:51 (5)
19	05:18 21:45	06:10 20:48	19:58 (2)	07:05	07:59	17:20 (4)	07:59	15:41 (5)	08:40	
			20:19 (2)	19:34	18:22	32	17:52 (4)	16:23	8	15:49 (5)
20	05:20 21:44	06:12 20:46	19:59 (2)	07:06	08:01	17:20 (4)	08:00	15:42 (5)	08:41	
			20:17 (2)	19:32	18:20	30	17:50 (4)	16:22	5	15:47 (5)
21	05:21 21:42	06:13 20:44	20:00 (2)	07:08	08:03	17:20 (4)	08:02	15:42 (5)	08:41	
			20:15 (2)	19:29	18:17	28	17:48 (4)	16:20	4	15:46 (5)
22	05:23 21:41	06:15 20:42	20:00 (2)	07:10	08:05	17:20 (4)	08:04		08:42	
			20:12 (2)	19:27	18:15	25	17:45 (4)	16:19		16:06
23	05:24 21:39	06:17 20:39	20:01 (2)	07:12	08:07	17:21 (4)	08:06		08:42	
			20:10 (2)	19:24	8	18:41 (3)	18:13	22	17:43 (4)	16:18
24	05:26 21:38	06:19 20:37	20:03 (2)	07:13	08:09	18:30 (3)	08:08		08:43	
			20:09 (2)	19:22	14	18:44 (3)	18:11	20	17:41 (4)	16:17
25	05:27 21:36	06:20 20:35	20:04 (2)	07:15	17	18:27 (3)	07:11	16	16:22 (4)	08:09
			20:06 (2)	19:19	17	18:44 (3)	17:09	16	16:38 (4)	16:16
26	05:29 21:35	06:22 20:32		07:17	18:25 (3)	07:13	16:23 (4)	08:11		08:43
				19:17	20	18:45 (3)	17:06	13	16:36 (4)	16:14
27	05:30 21:33	06:24 20:30		07:19	18:24 (3)	07:15	16:24 (4)	08:13		08:44
				19:14	22	18:46 (3)	17:04	10	16:34 (4)	16:13
28	05:32 21:32	06:26 20:28		07:21	18:24 (3)	07:16	16:25 (4)	08:14		08:44
				19:12	20	18:44 (3)	17:02	6	16:31 (4)	16:12
29	05:34 21:30	06:27 20:25		07:22	18:23 (3)	07:18	16:27 (4)	08:16		08:44
				19:09	18	18:41 (3)	17:00	2	16:29 (4)	16:12
30	05:35 21:28	06:29 20:23		07:24	18:22 (3)	07:20	08:18		08:44	
				19:07	16	18:38 (3)	16:58		16:12	
31	05:37 21:26	06:31 20:21				07:22			08:44	
						16:56			16:13	
Potential sun hours	512	460		382		328		259		233
Total, worst case		551		135		664		264		
Sun reduction		0.34		0.32		0.29		0.27		
Oper. time red.		1.00		1.00		1.00		1.00		
Wind dir. red.		0.65		0.67		0.67		0.66		
Total reduction		0.22		0.22		0.20		0.18		
Total, real		122		29		130		46		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NF - H370

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NG - H371

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NH - H372

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: NI - H373

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: NJ - SAINT PATRICK'S NATIONAL SCHOOL

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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Total, worst case												
Sun reduction												
Oper. time red.												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NK - H374
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

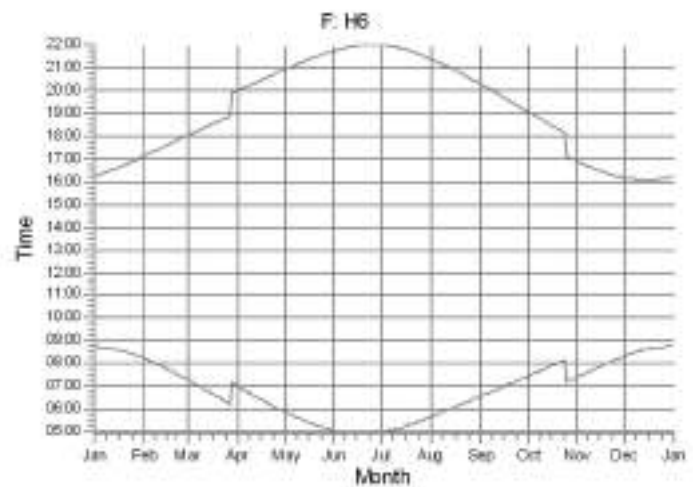
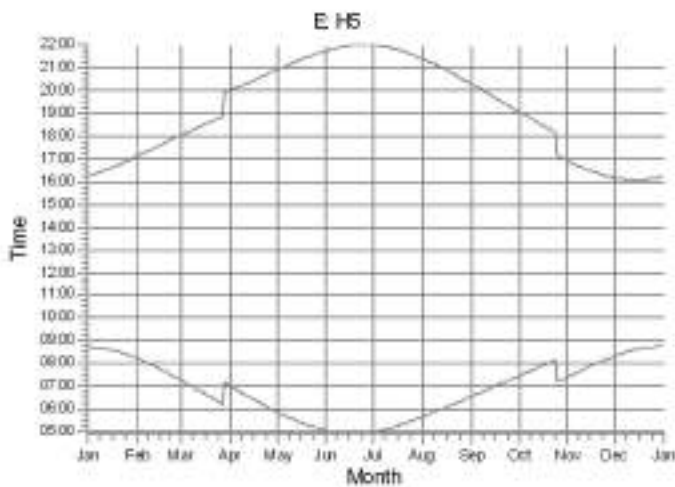
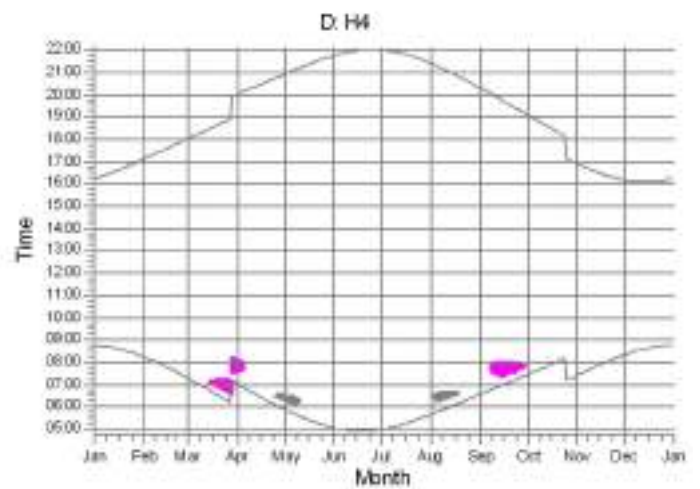
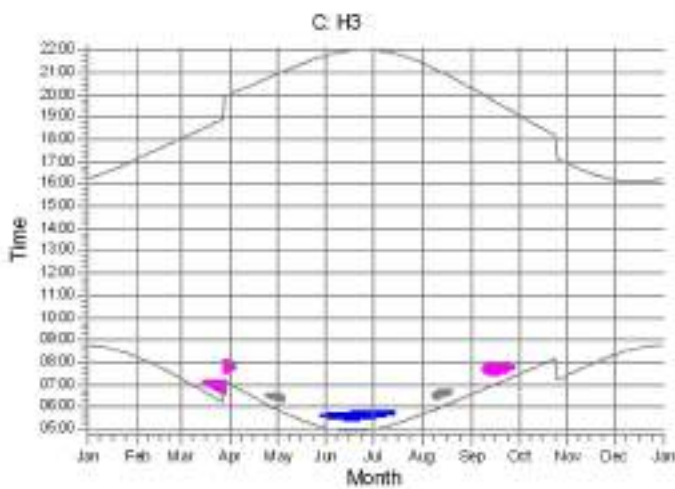
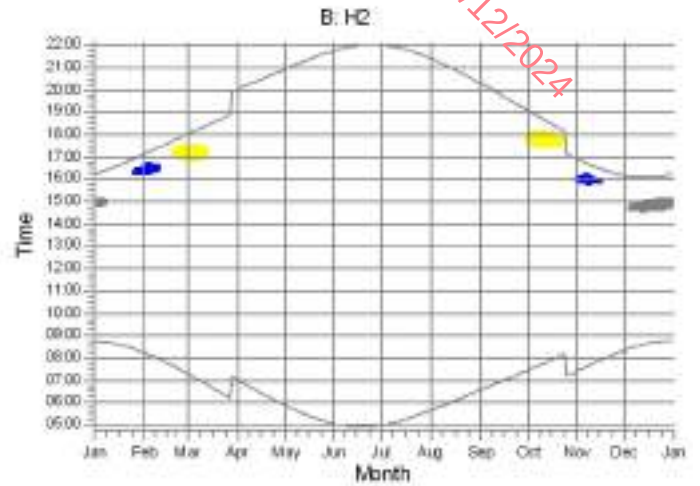
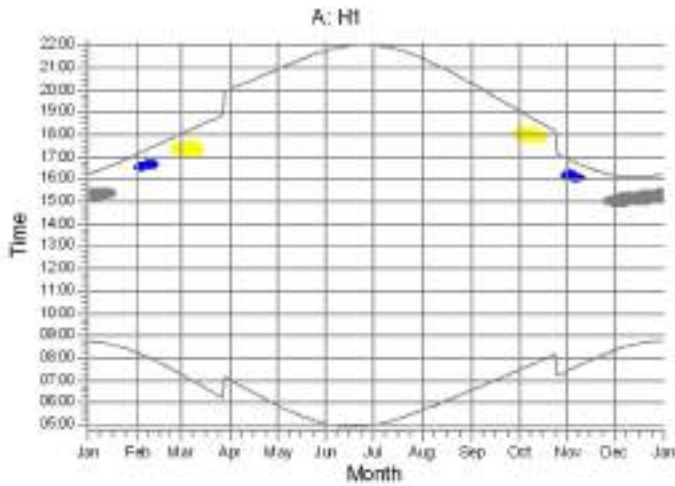
	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	20:28 (5) 22:00	04:59 22:24 (5)	20:30 (5) 21:24 (5)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	20:28 (5) 22:00	05:00 21:24 (5)	20:31 (5) 21:23	05:40 21:22	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	20:28 (5) 21:59	05:00 21:23 (5)	20:31 (5) 21:21	05:42 21:23	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	20:27 (5) 21:59	05:01 21:23 (5)	20:32 (5) 21:19	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	20:27 (5) 21:58	05:02 21:58	20:32 (5) 21:23 (5)	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	20:27 (5) 21:58	05:03 21:58	20:33 (5) 21:22 (5)	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	20:26 (5) 21:57	05:04 21:57	20:34 (5) 21:22 (5)	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	20:26 (5) 21:56	05:05 21:56	20:34 (5) 21:21 (5)	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	20:27 (5) 21:55	05:06 21:55	20:35 (5) 21:21 (5)	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	20:26 (5) 21:55	05:07 21:55	20:36 (5) 21:20 (5)	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	20:26 (5) 21:54	05:08 21:54	20:36 (5) 21:19 (5)	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:03
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	20:27 (5) 21:53	05:09 21:53	20:37 (5) 21:18 (5)	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	20:26 (5) 21:52	05:11 21:52	20:38 (5) 21:17 (5)	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	20:26 (5) 21:51	05:12 21:51	20:38 (5) 21:16 (5)	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	20:26 (5) 21:50	05:13 21:50	20:39 (5) 21:15 (5)	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	20:26 (5) 21:23 (5)	05:16 21:47	20:42 (5) 21:14 (5)	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	20:27 (5) 21:24 (5)	05:17 21:46	20:43 (5) 21:12 (5)	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	20:27 (5) 21:24 (5)	05:19 21:45	20:44 (5) 21:11 (5)	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	20:27 (5) 21:24 (5)	05:20 21:44	20:47 (5) 21:10 (5)	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	20:27 (5) 21:24 (5)	05:21 21:42	20:48 (5) 21:09 (5)	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	20:28 (5) 21:25 (5)	05:23 21:41	20:50 (5) 21:07 (5)	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	20:28 (5) 21:25 (5)	05:24 21:39	20:54 (5) 21:07 (5)	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	20:28 (5) 21:25 (5)	05:26 21:38	21:07 (5) 21:07 (5)	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	20:29 (5) 21:25 (5)	05:27 21:36	21:09 (5) 21:09 (5)	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	20:29 (5) 21:25 (5)	05:31 21:33	21:11 (5) 21:11 (5)	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	20:29 (5) 21:25 (5)	05:32 21:32	21:12 (5) 21:12 (5)	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00	07:09 19:55	05:56 20:52	05:06 21:41	05:06 21:41	04:58 22:01	20:30 (5) 21:25 (5)	04:58 21:30	20:30 (5) 21:07 (5)	05:34 21:28	06:28 20:25	07:22 19:09	08:18 17:00	08:44 16:12
30	08:17 17:02	07:06 19:56	05:54 20:54	05:05 21:43	05:05 21:43	04:58 22:00	20:30 (5) 21:24 (5)	04:58 21:28	20:30 (5) 21:24 (5)	05:35 21:28	06:29 20:23	07:24 19:07	08:18 16:58	08:44 16:12
31	08:15 17:04	07:04 19:58	05:54 20:58	05:04 21:44	05:04 21:44	04:58 22:00	20:29 (5) 21:09 (5)	05:37 21:26	20:29 (5) 20:21	06:31 20:21	07:22 16:56	07:22 16:56	08:44 16:13	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case					331	1603	888							
Sun reduction					0.38	0.32	0.32							
Oper. time red.					1.00	1.00	1.00							
Wind dir. red.					0.61	0.61	0.61							
Total reduction					0.23	0.20	0.20							
Total, real					77	314	176							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

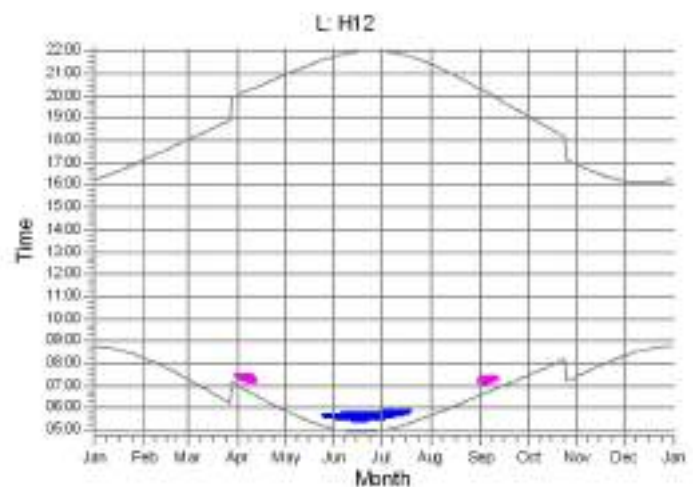
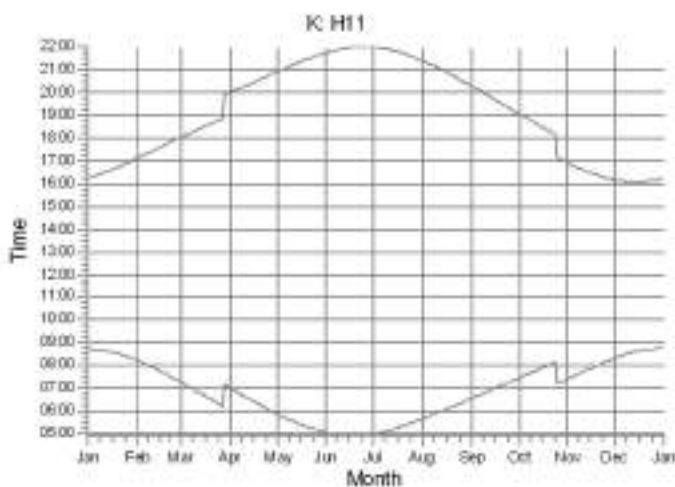
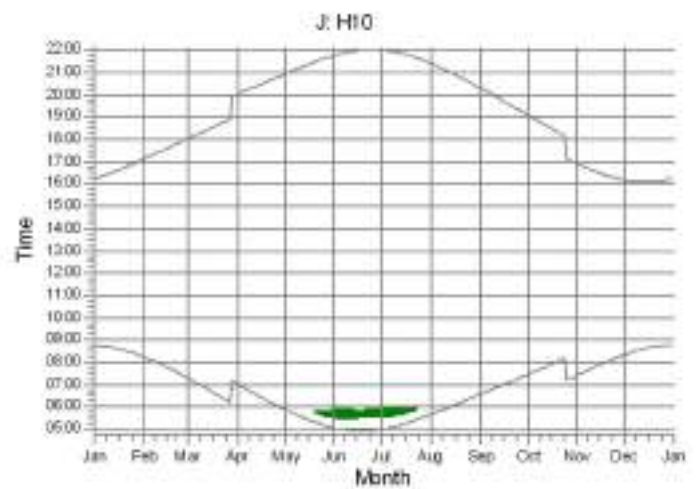
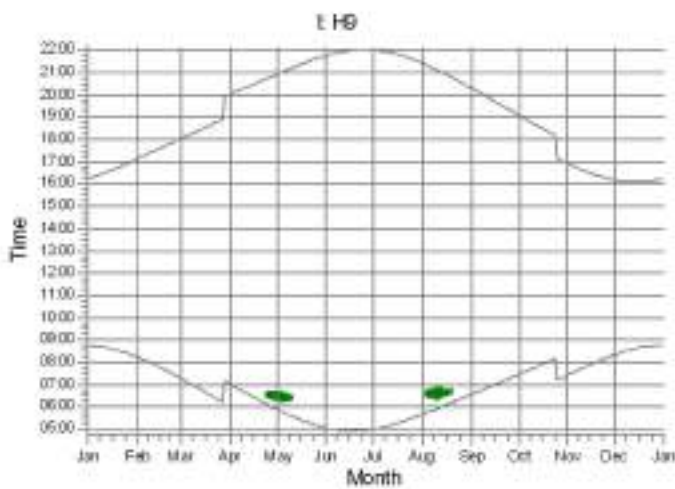
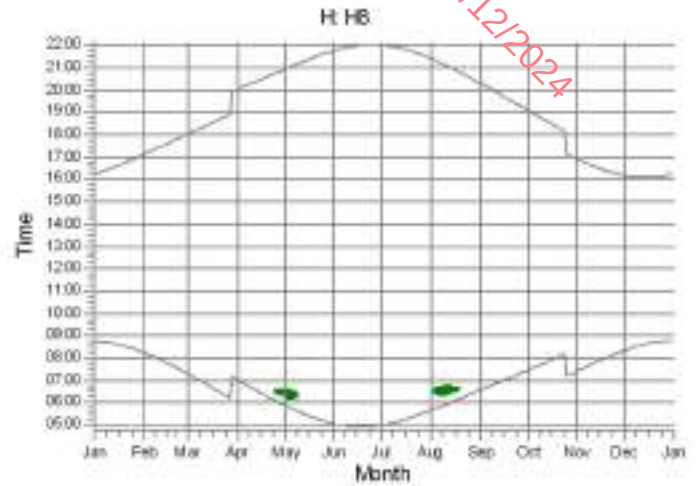
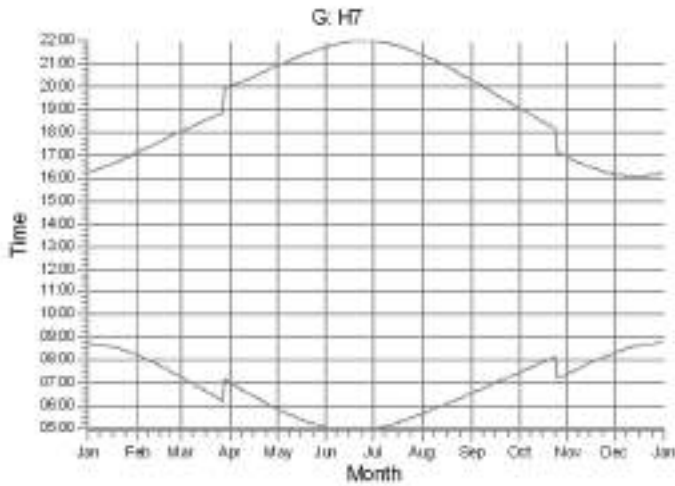


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

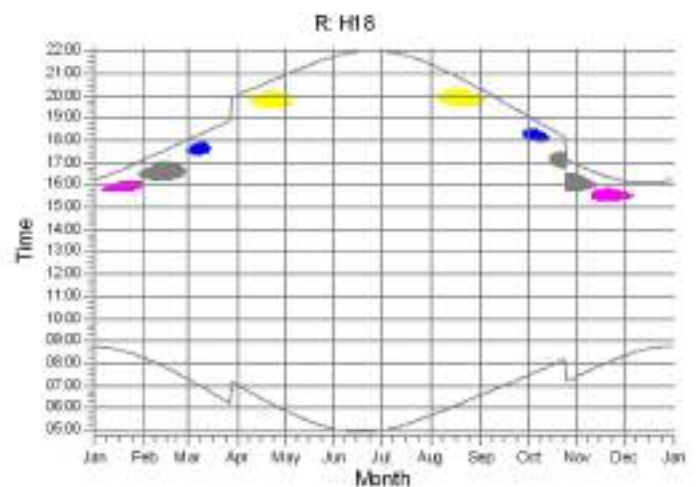
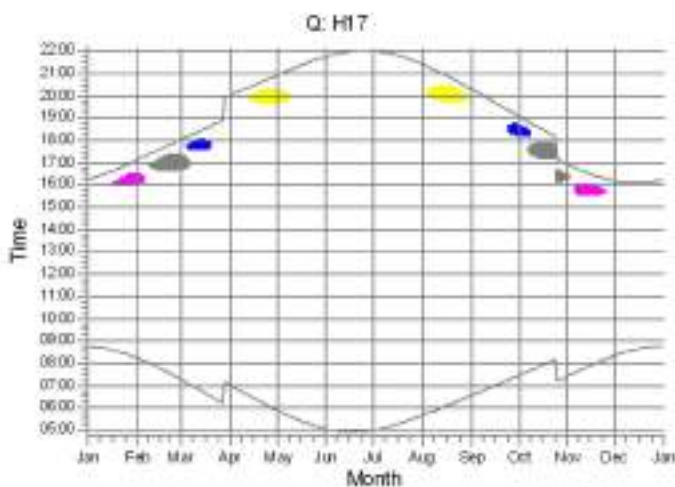
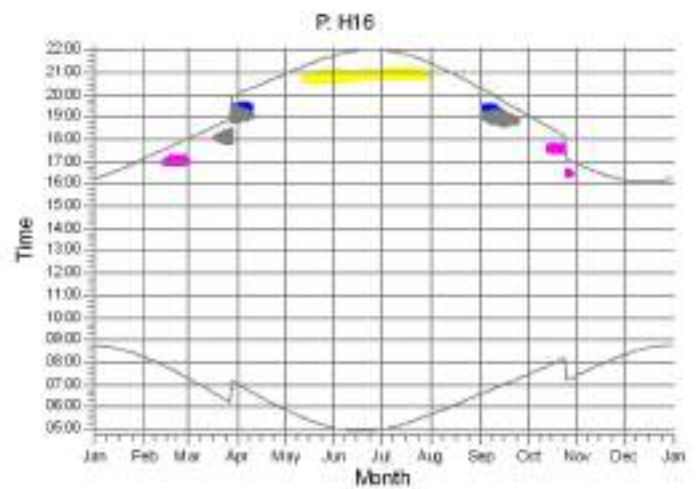
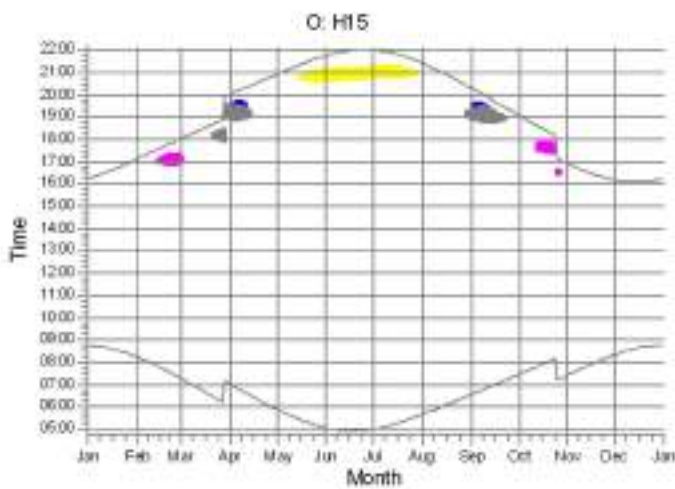
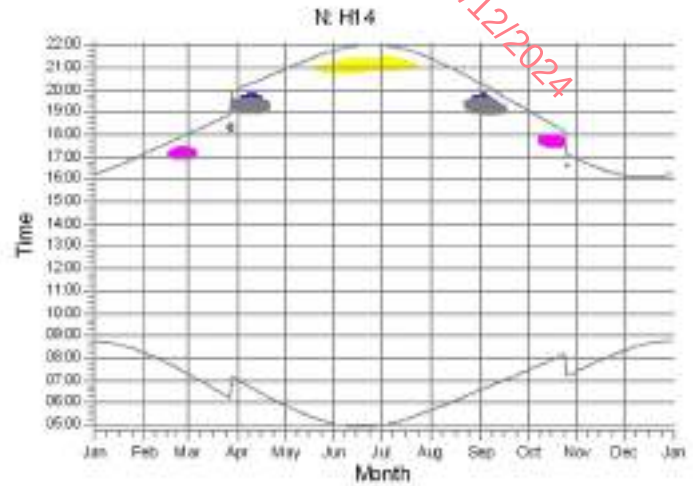
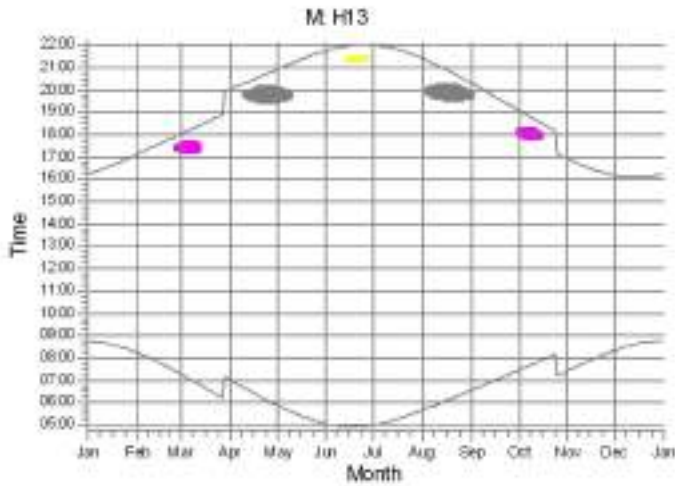


WTGs

1: T01 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

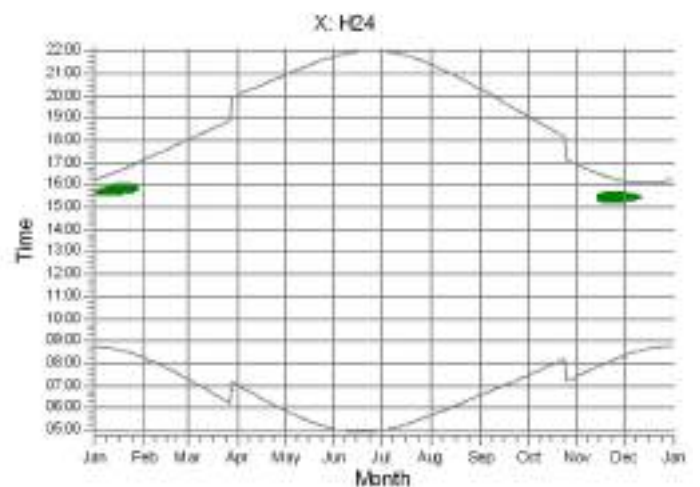
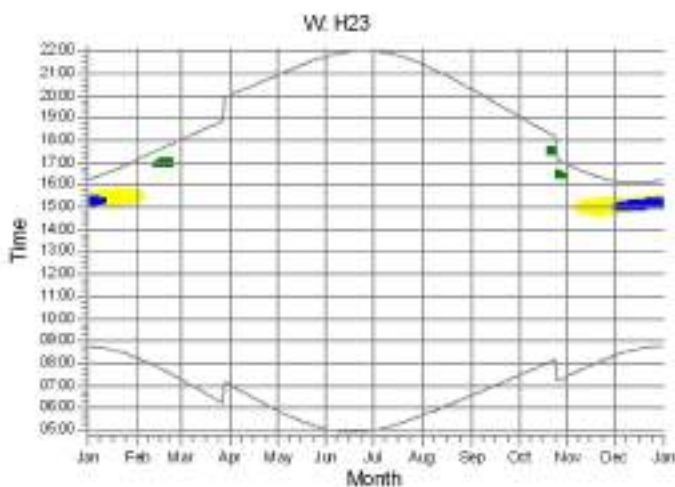
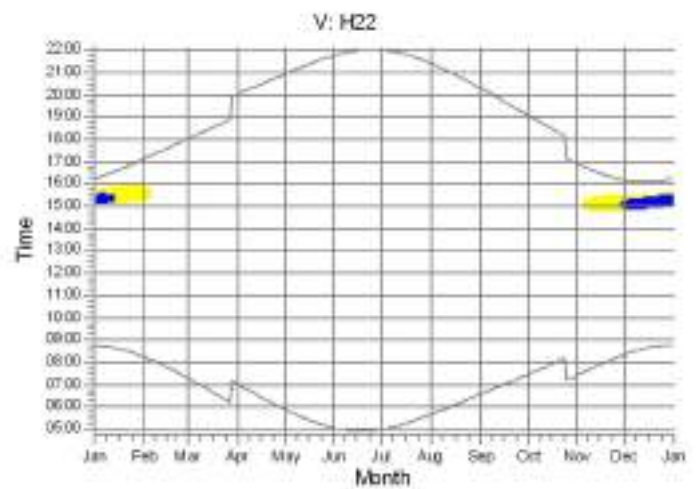
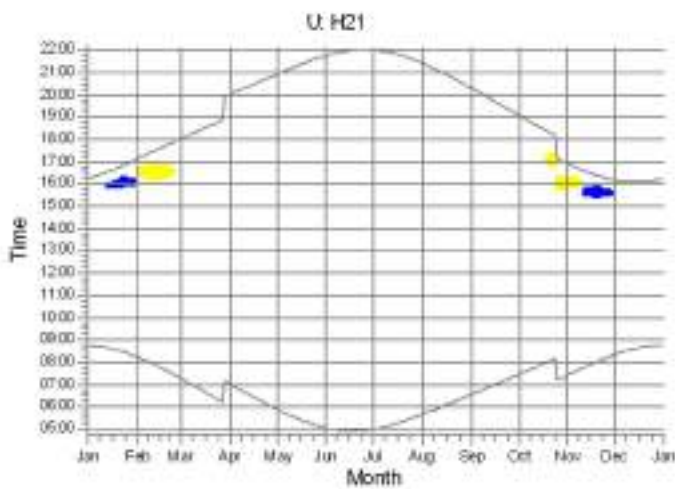
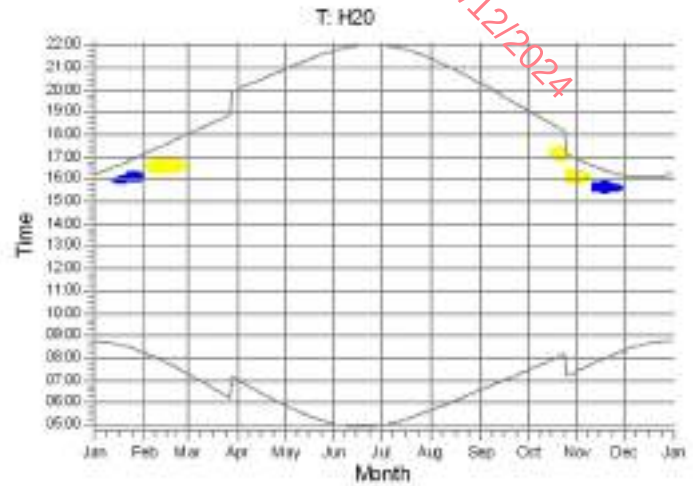
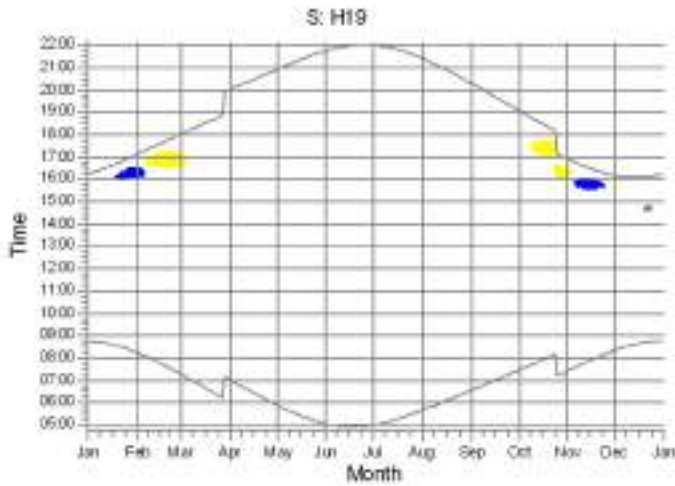


WTGs

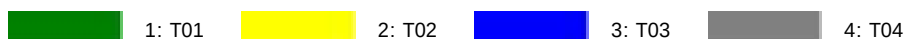
2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

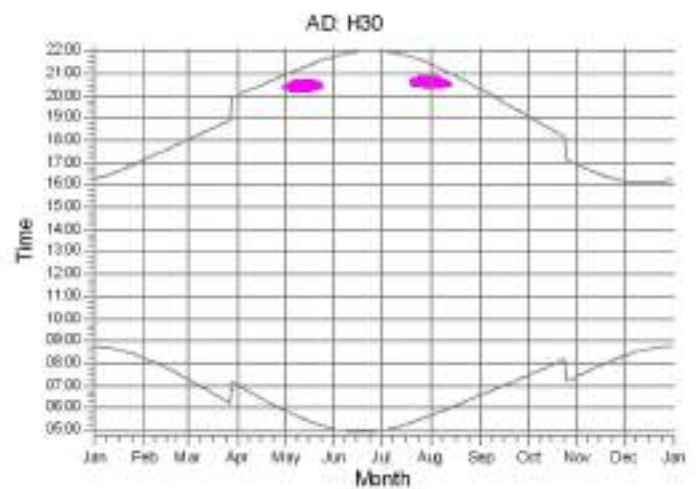
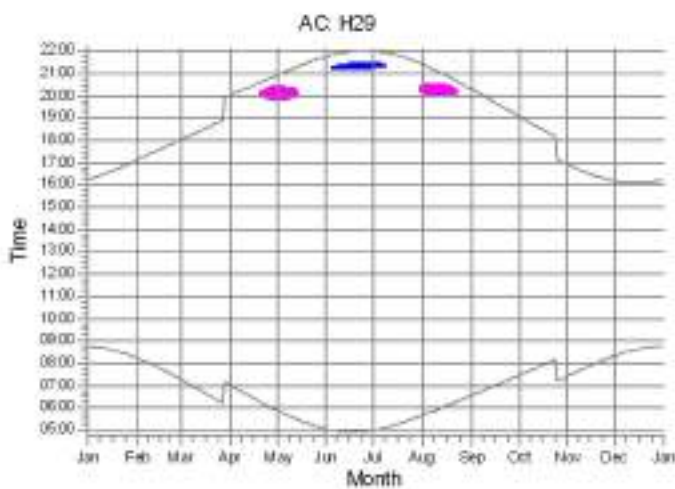
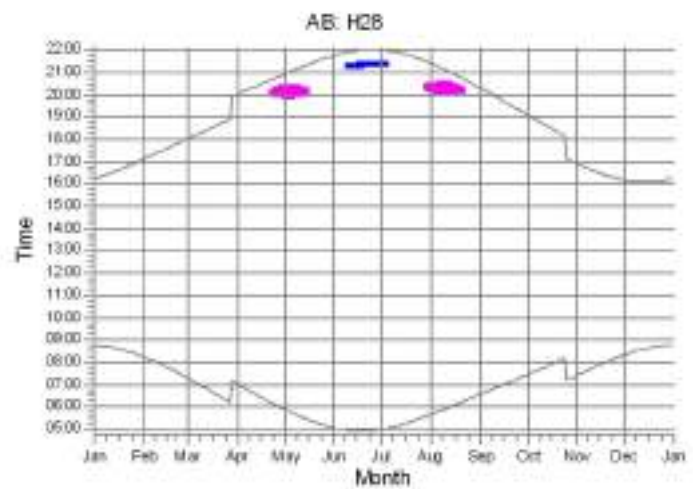
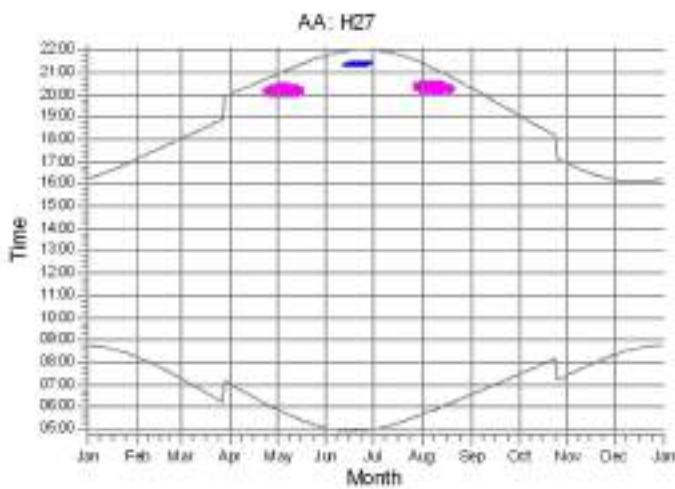
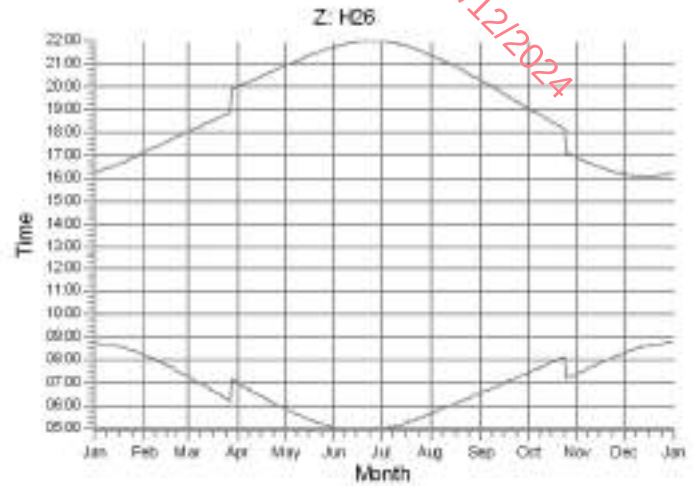
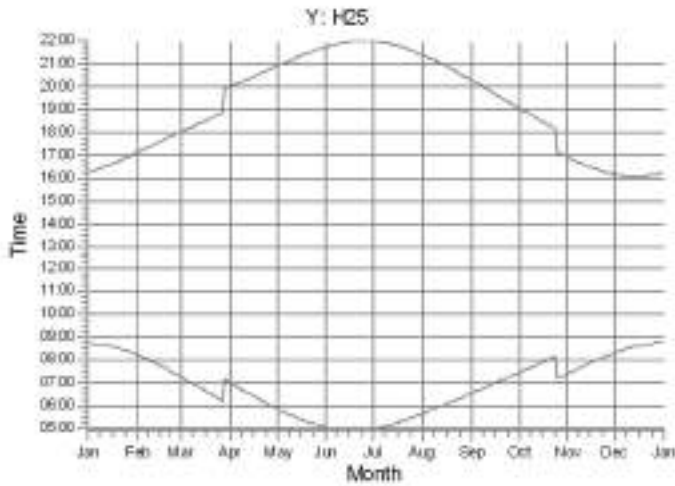


WTGs



SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



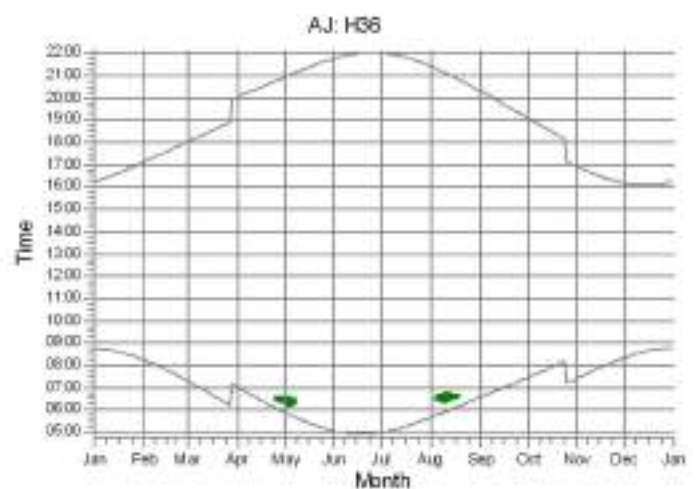
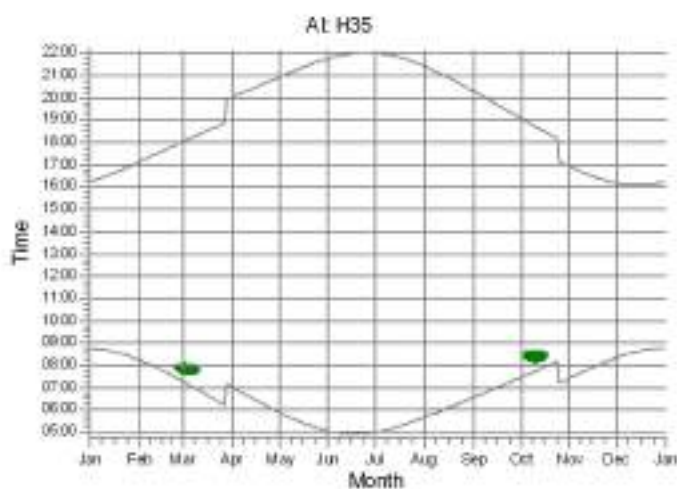
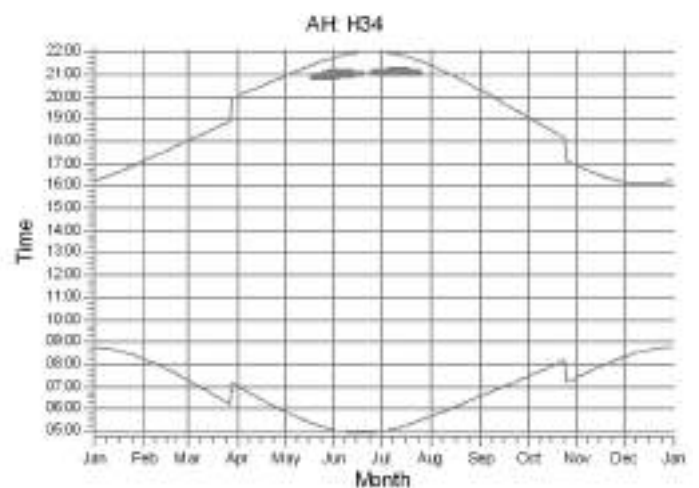
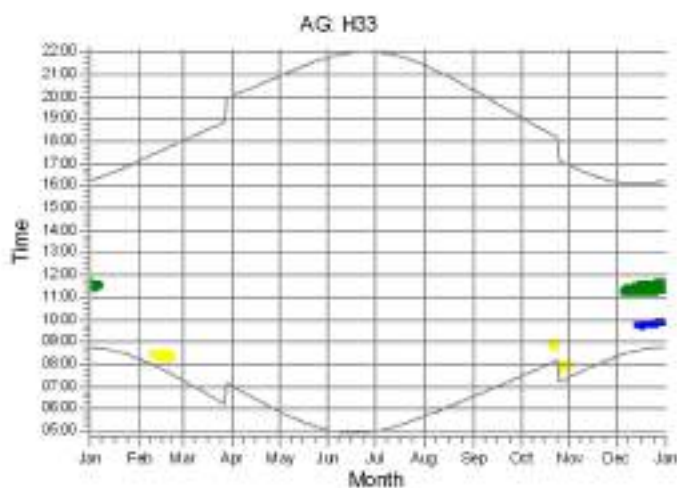
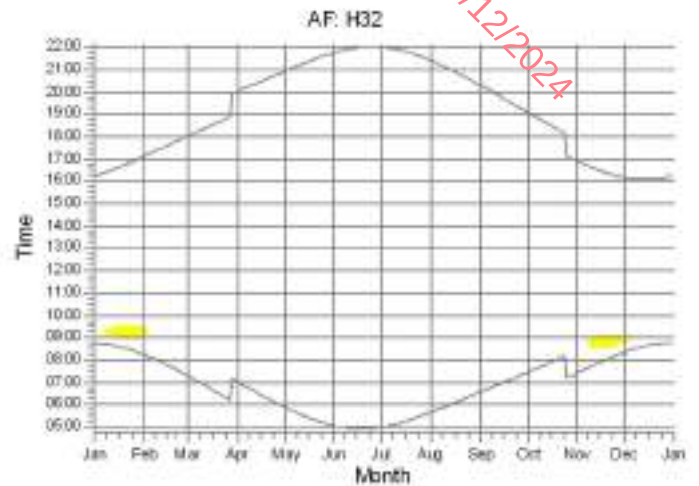
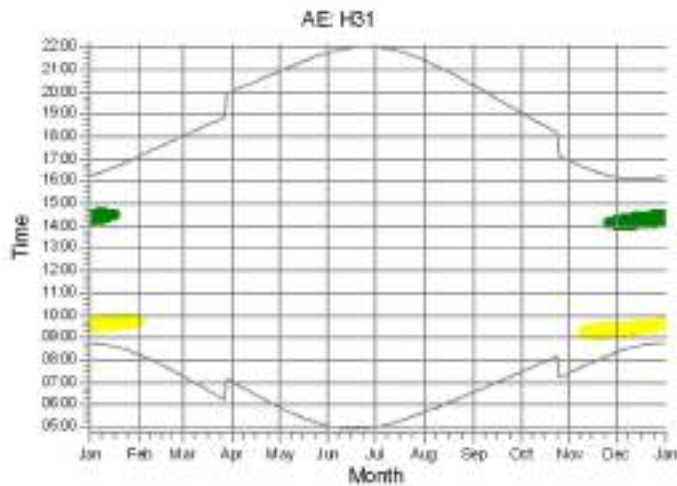
WTGs

3: T03 5: T05

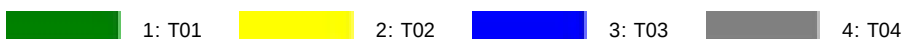
SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

RECEIVED: 04/12/2024



WTGs

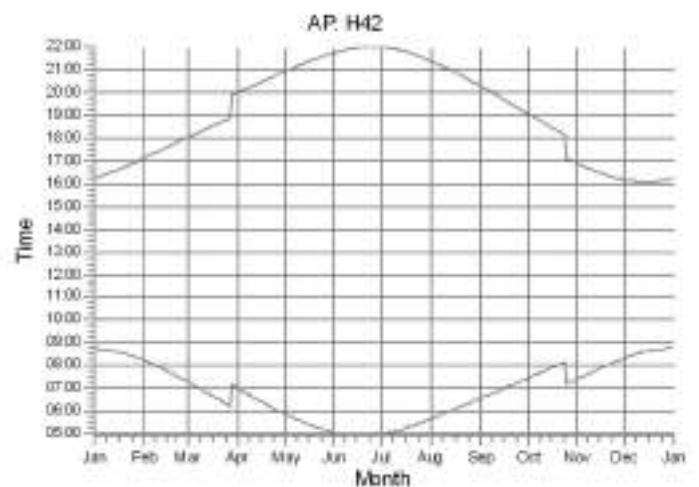
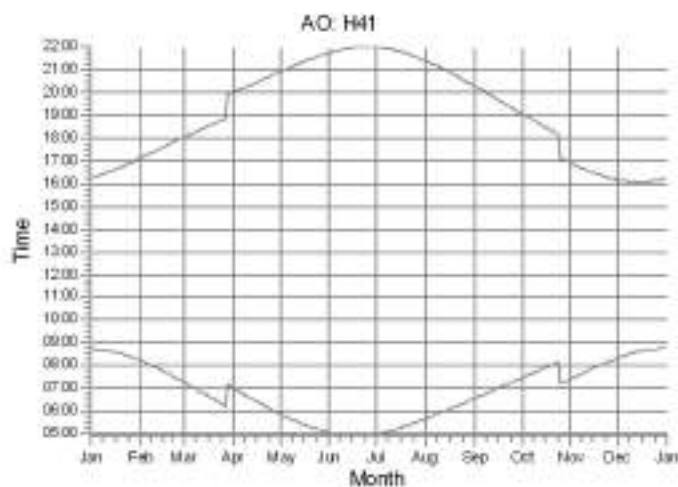
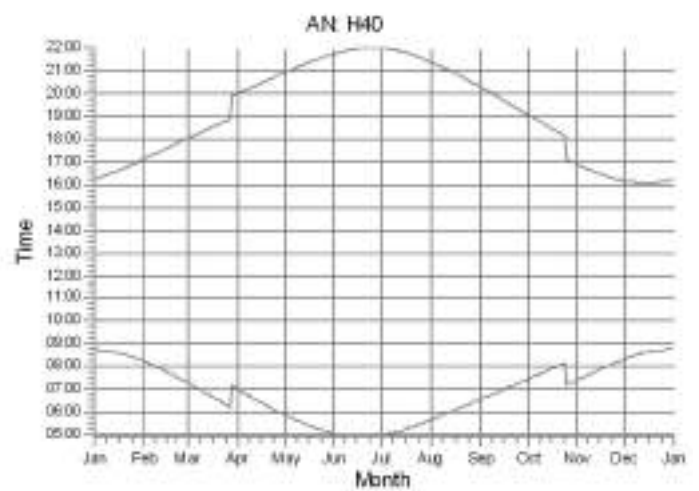
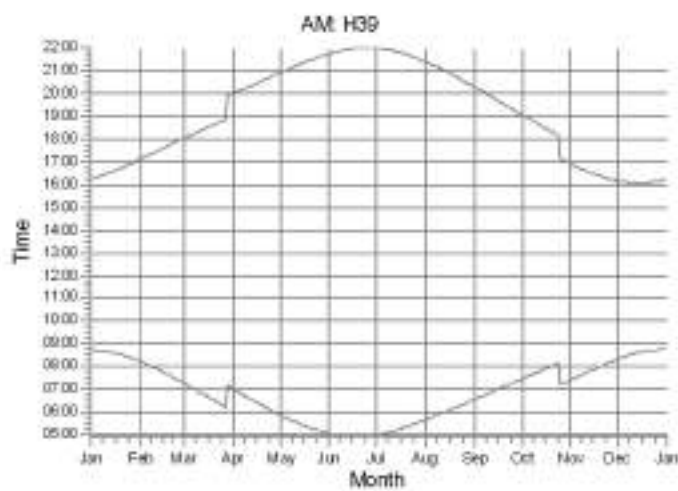
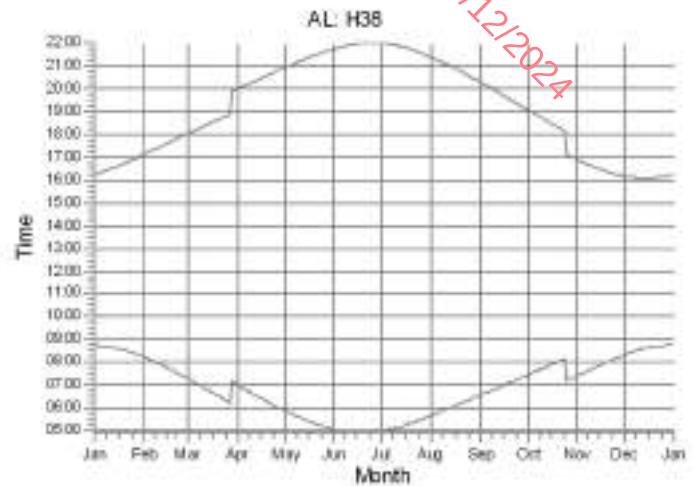
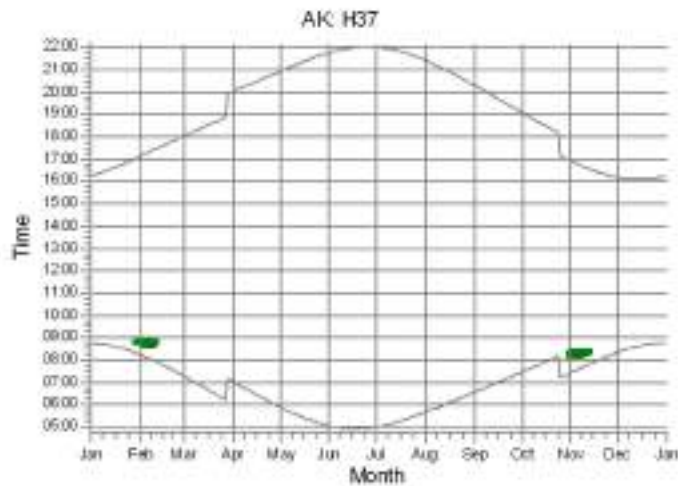


Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

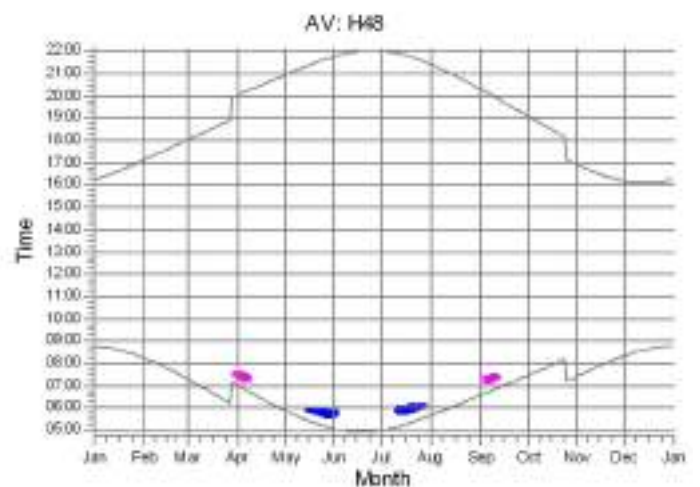
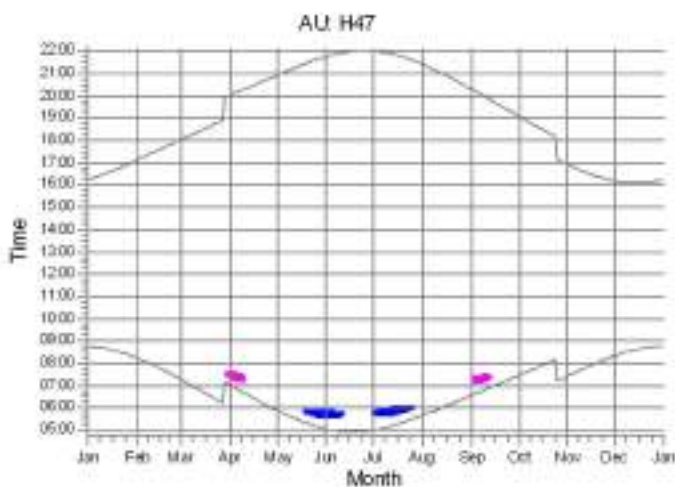
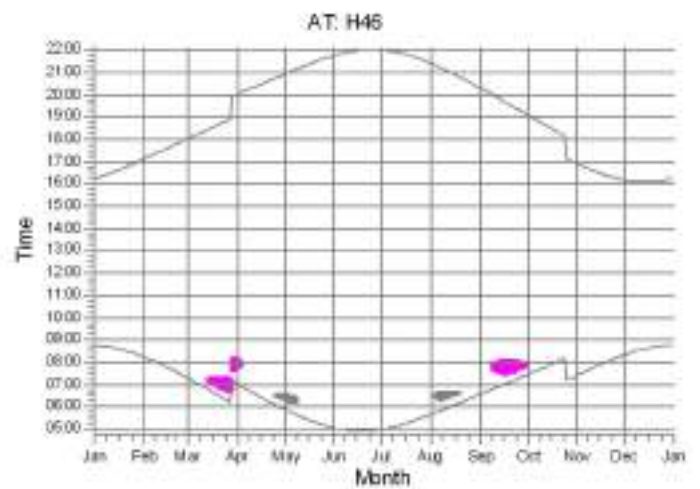
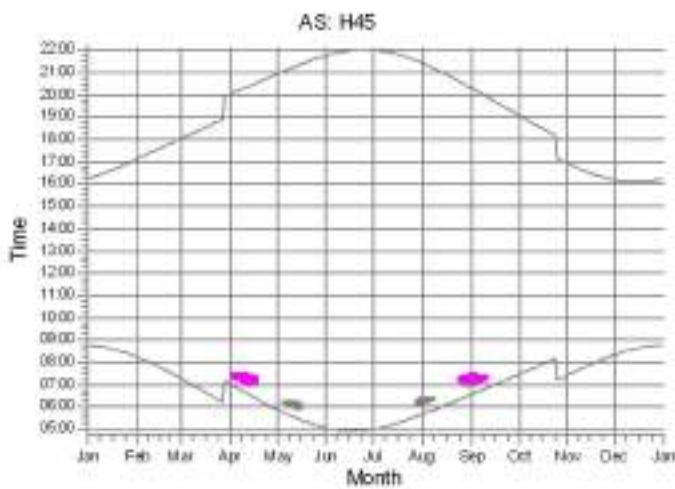
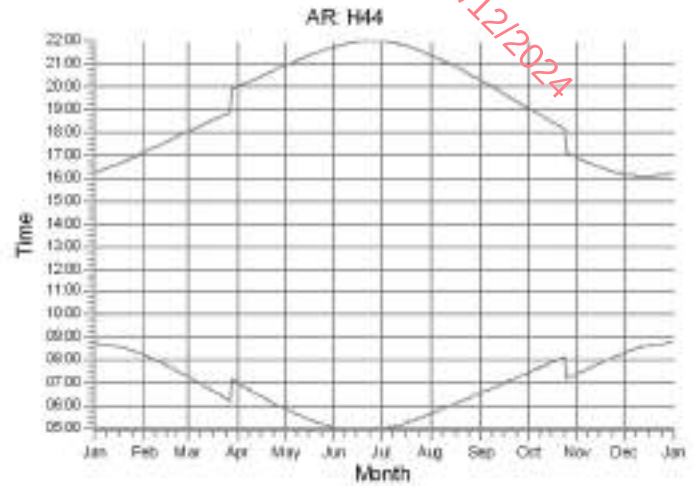
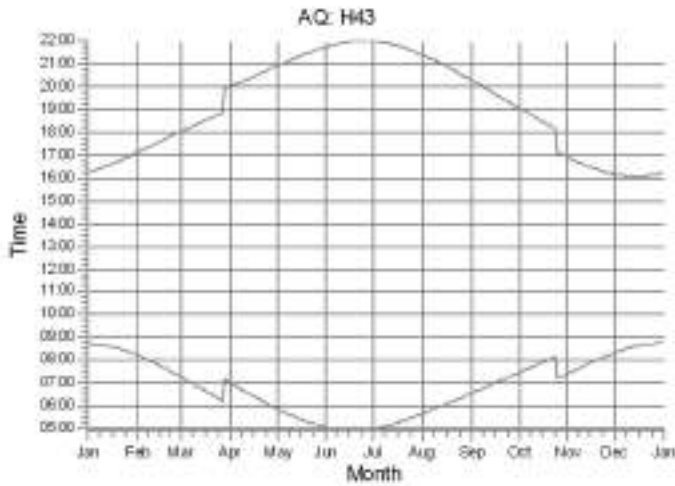


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

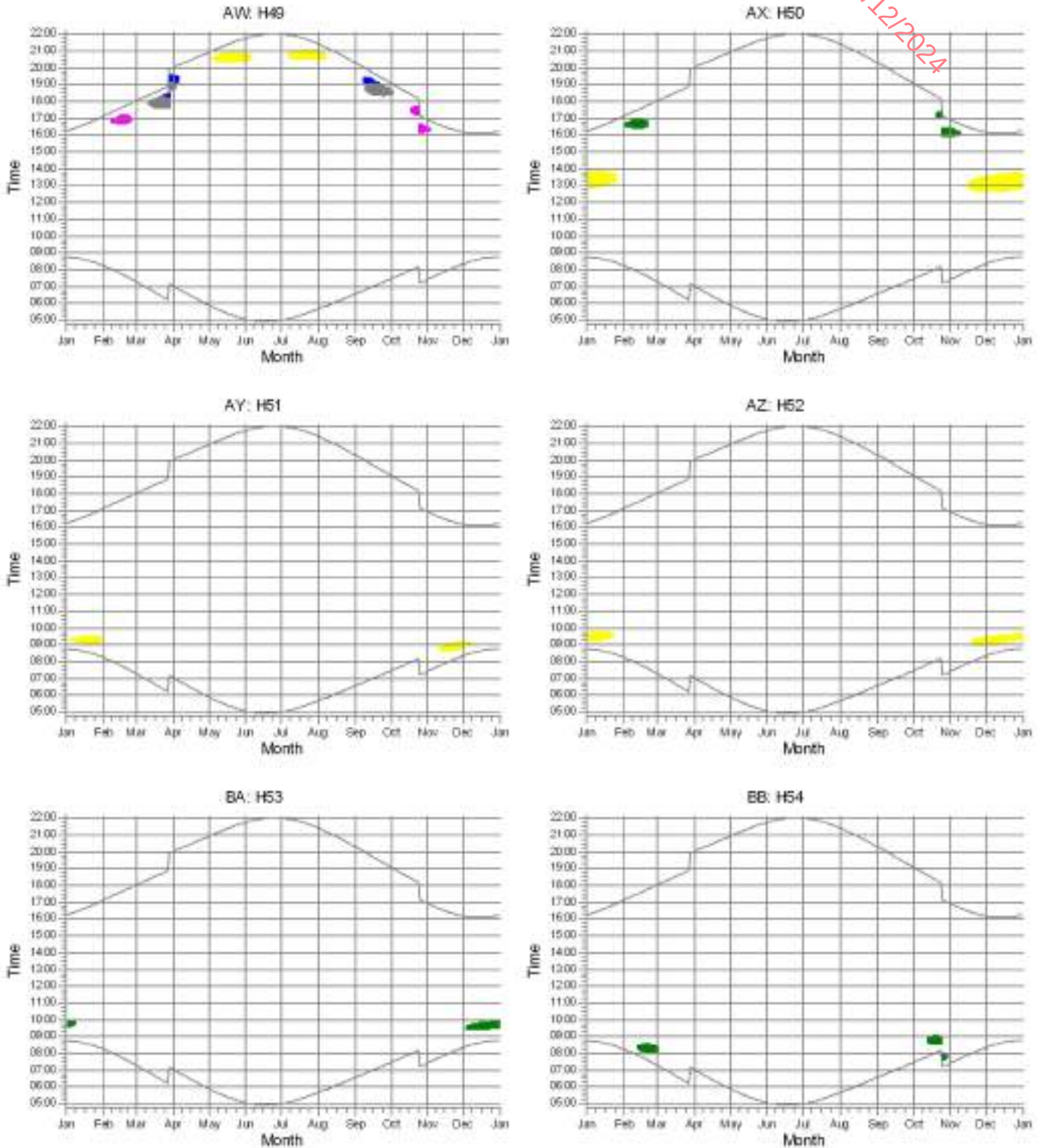


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

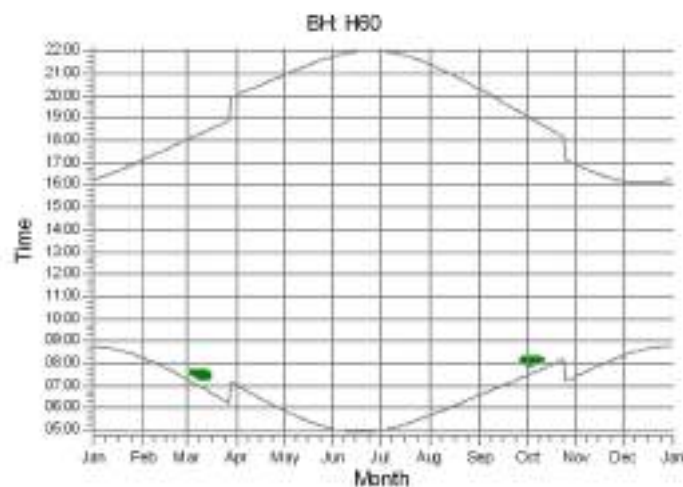
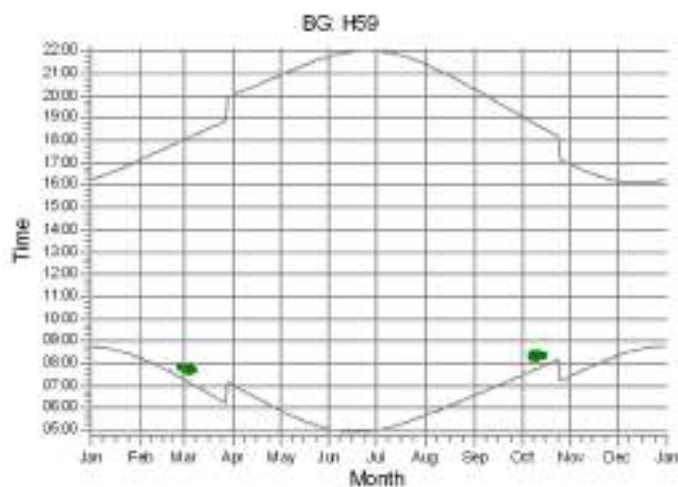
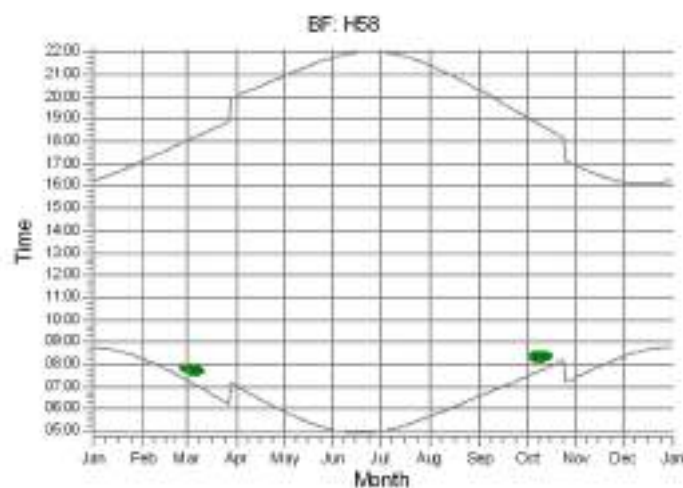
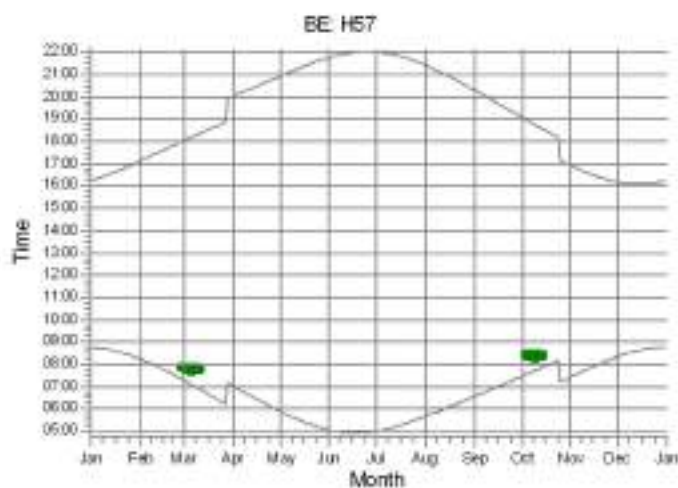
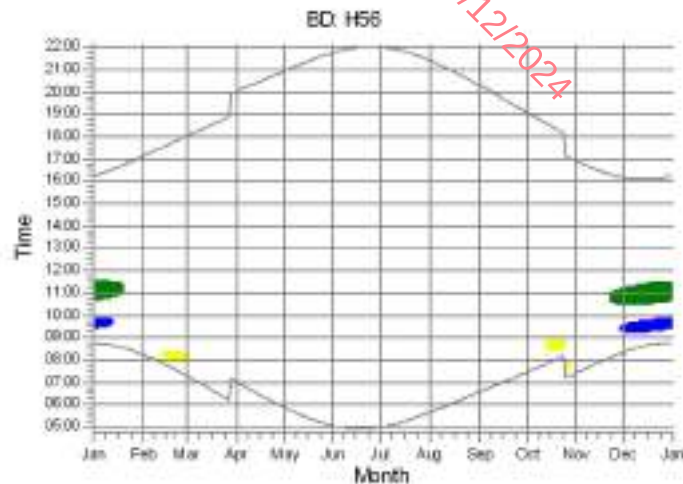
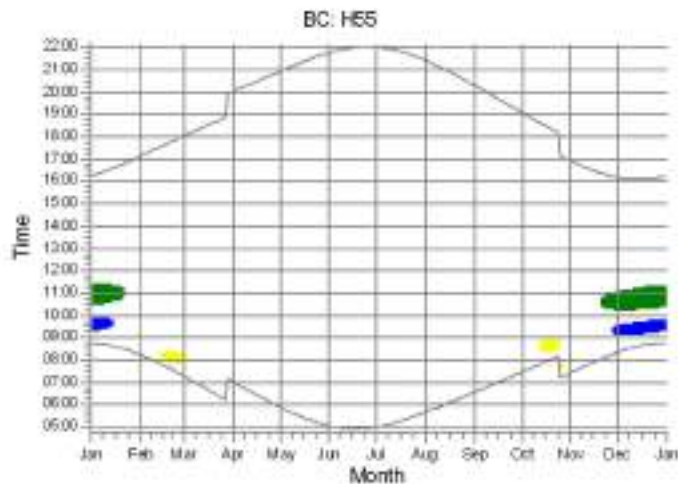


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

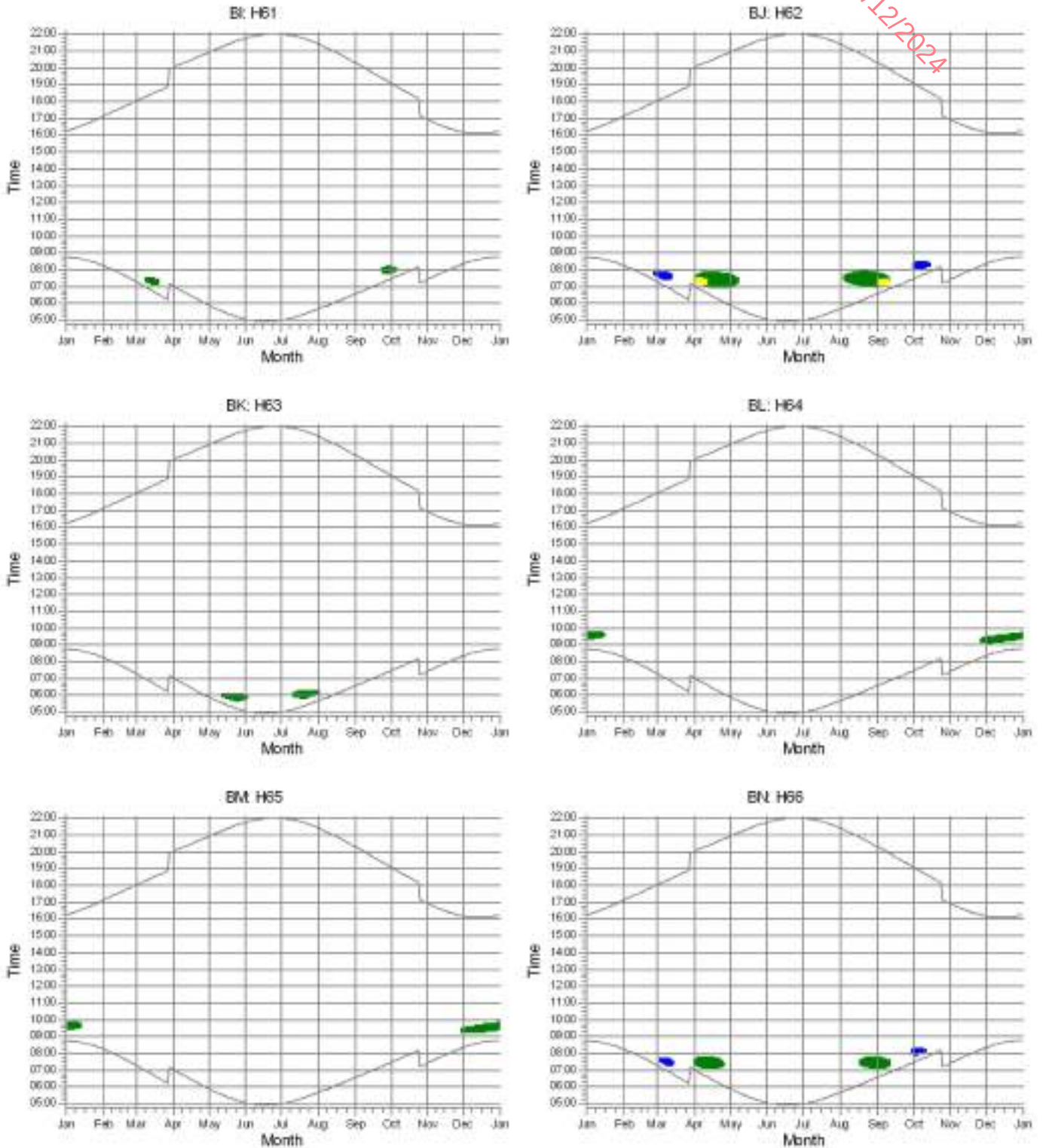


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

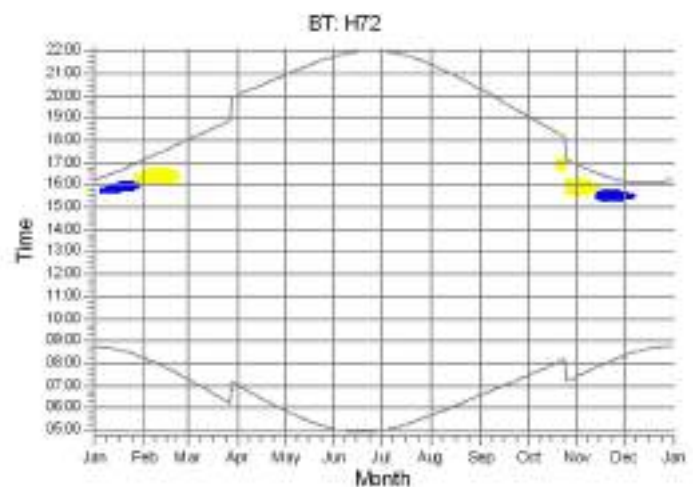
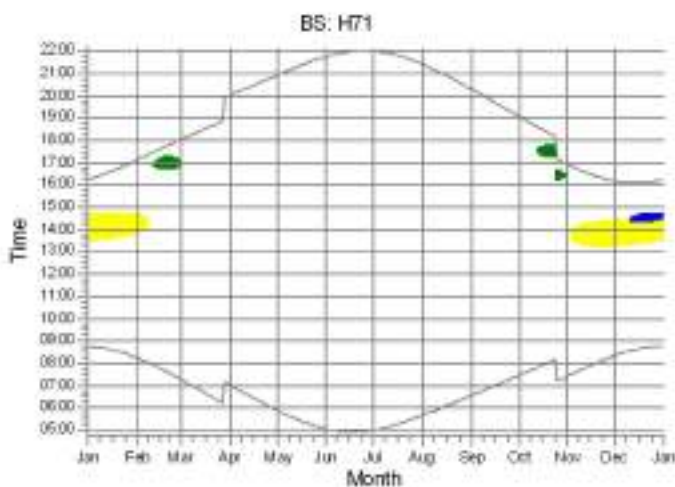
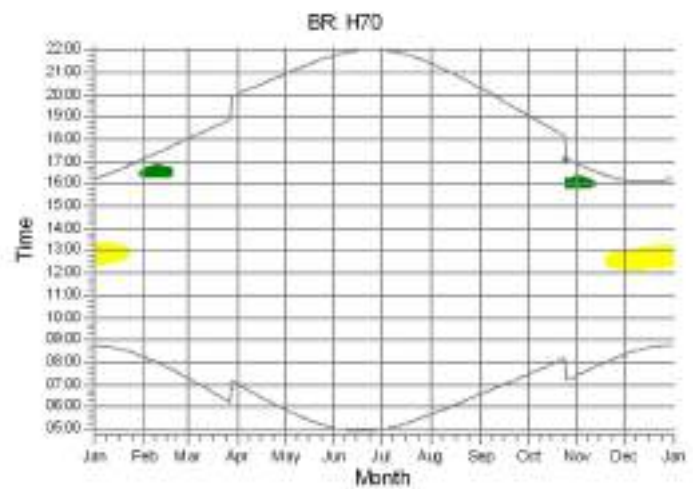
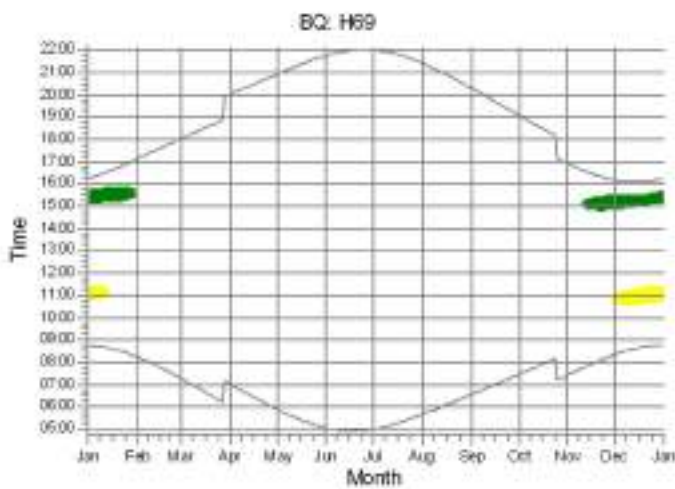
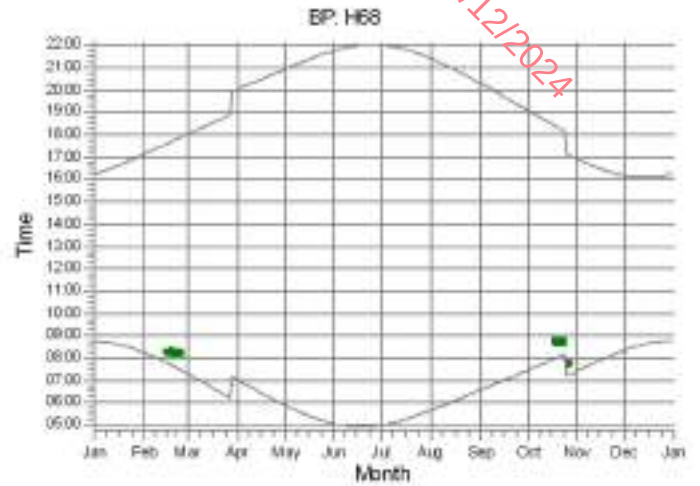
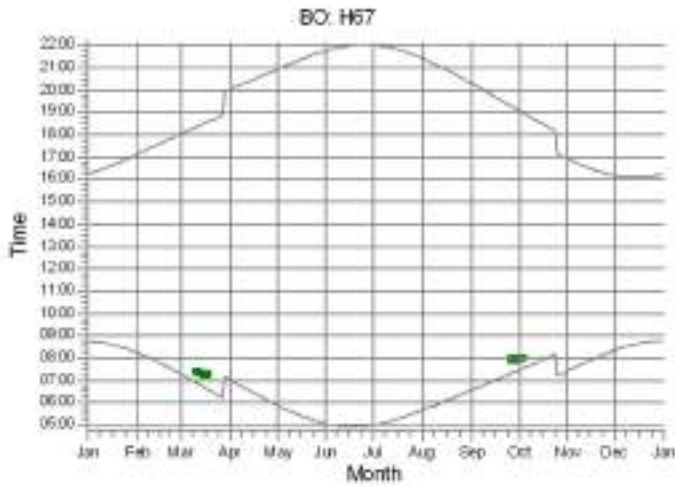


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

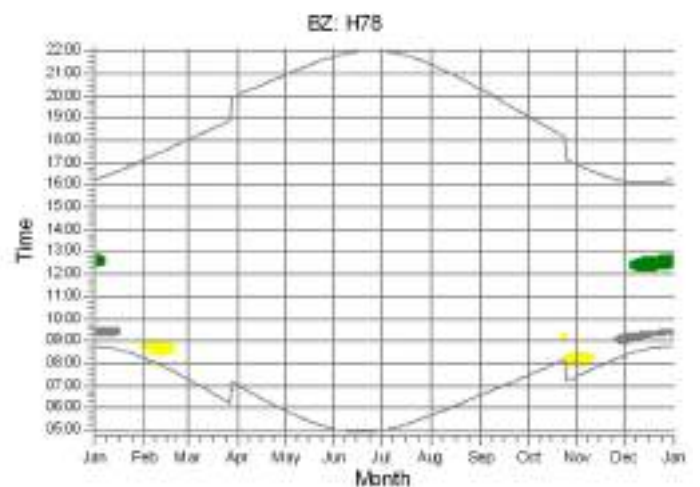
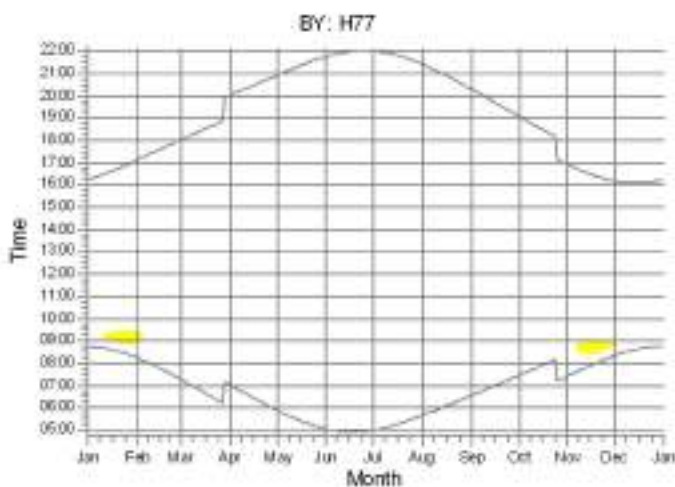
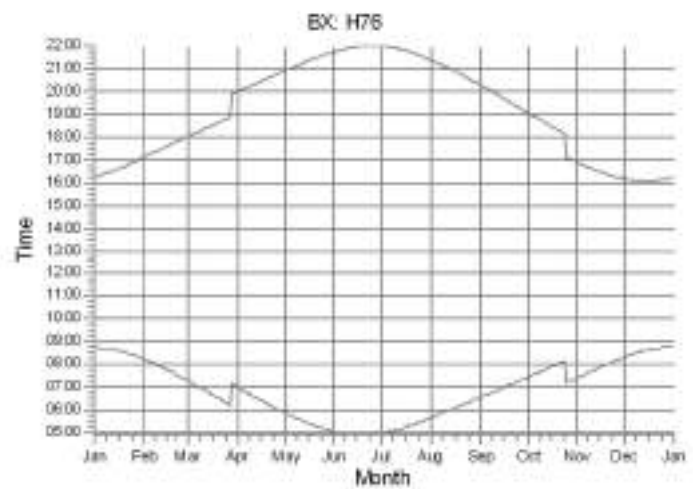
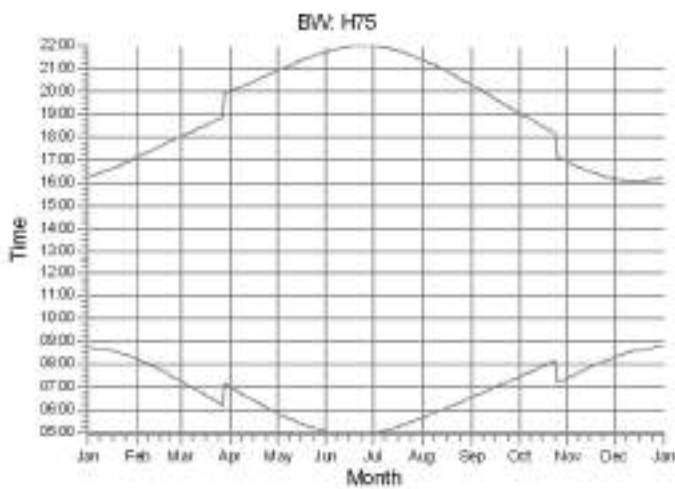
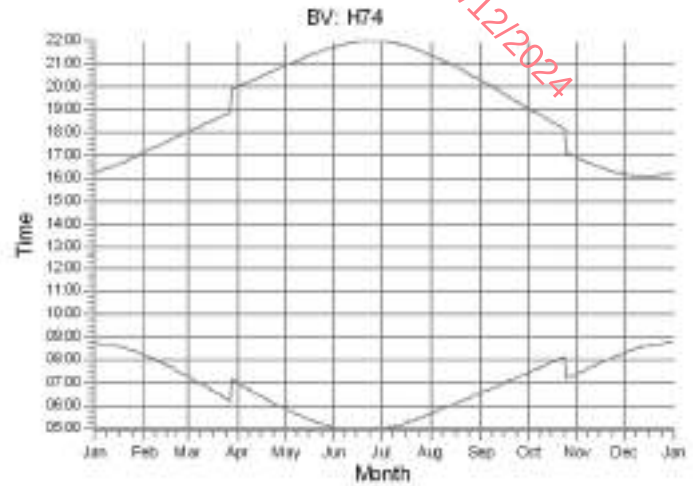
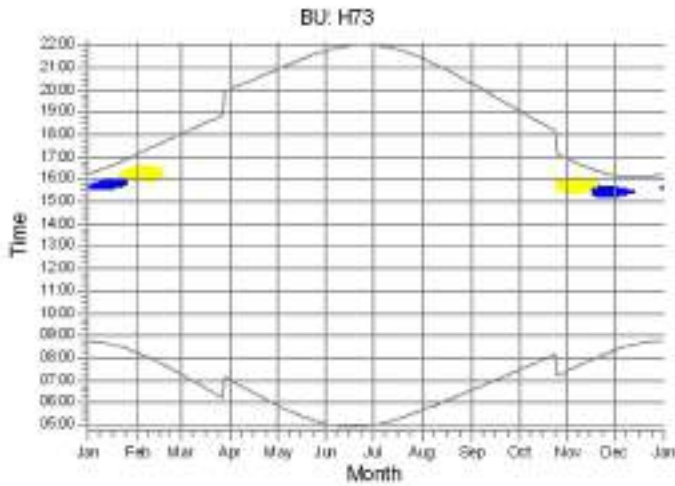


WTGs

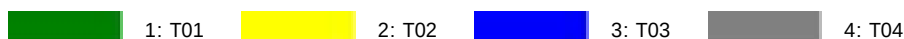
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SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

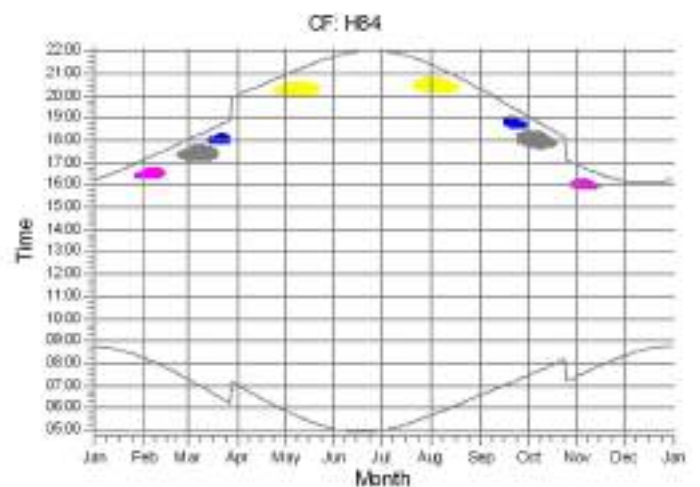
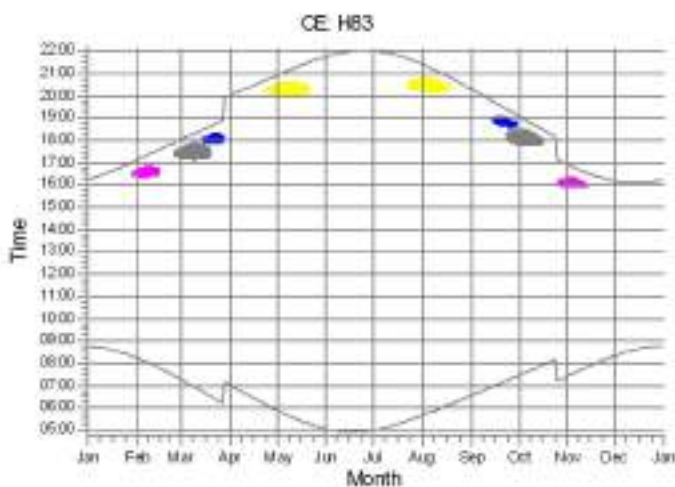
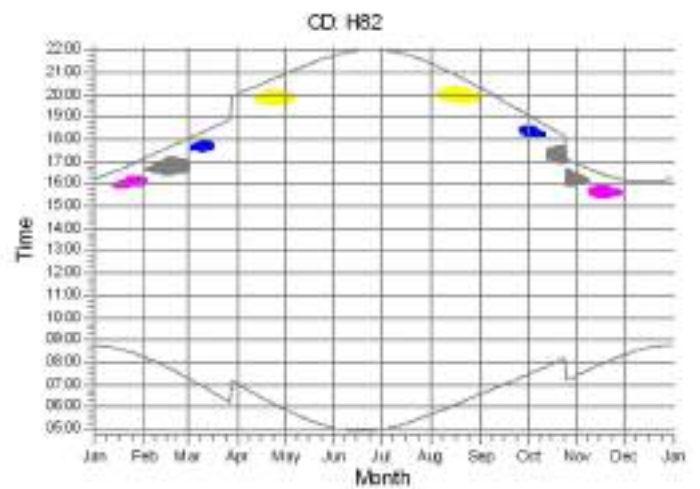
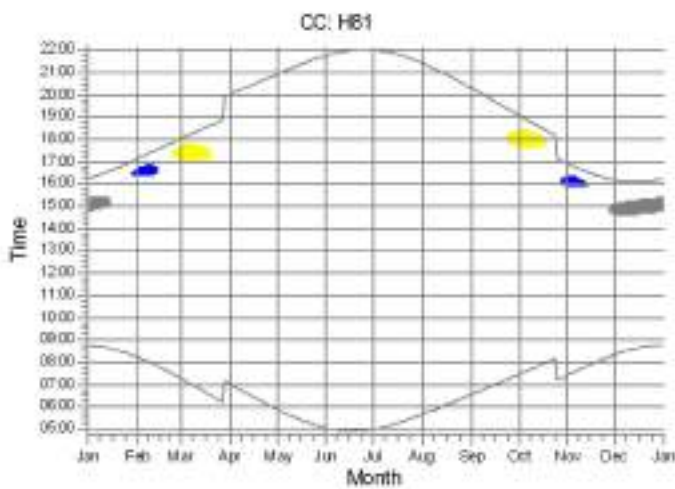
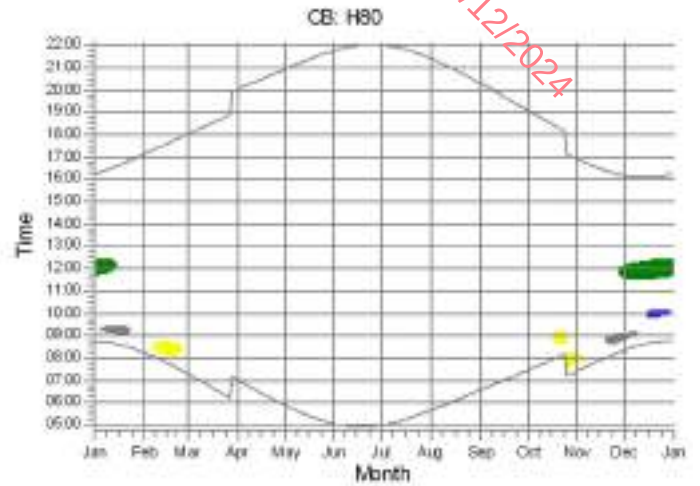
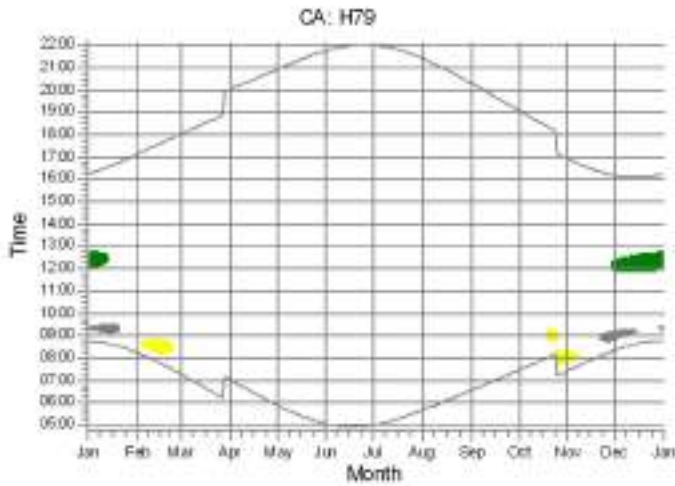


WTGs



SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

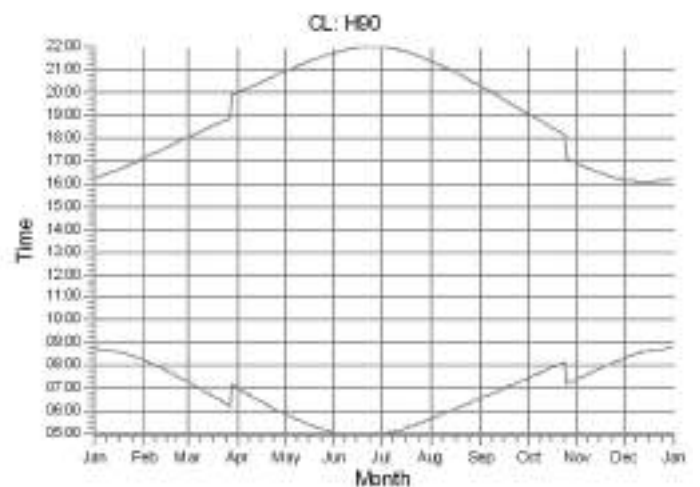
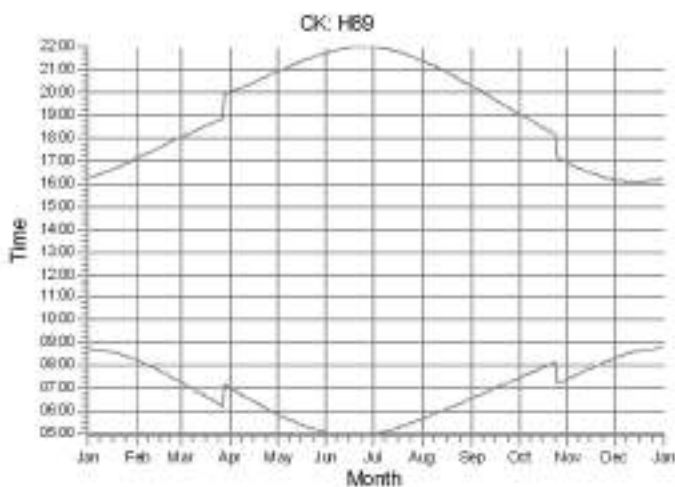
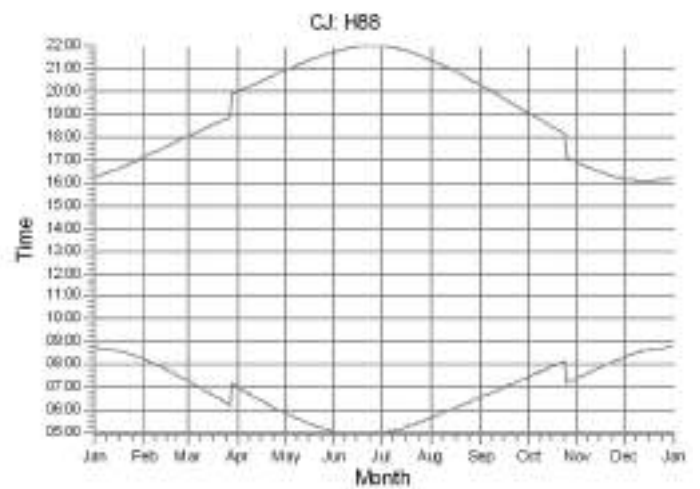
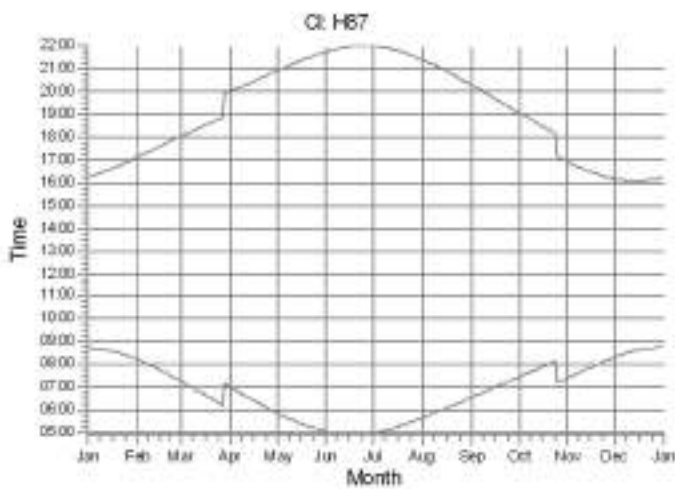
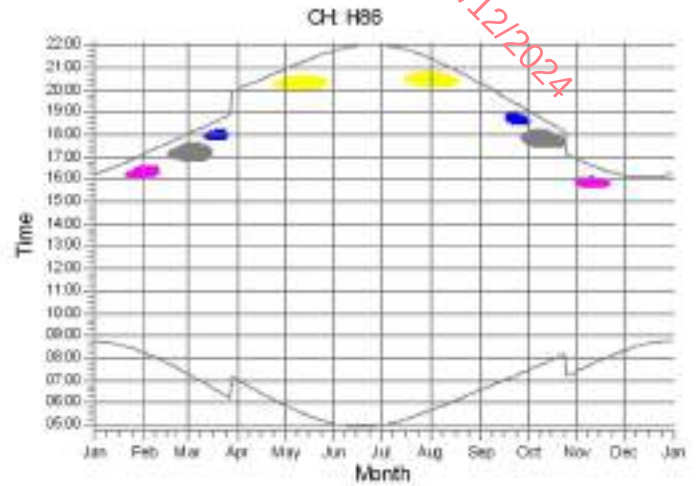
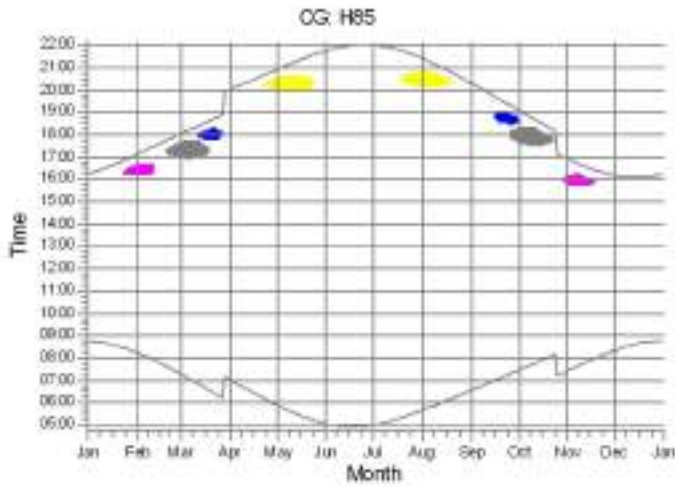


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



WTGs

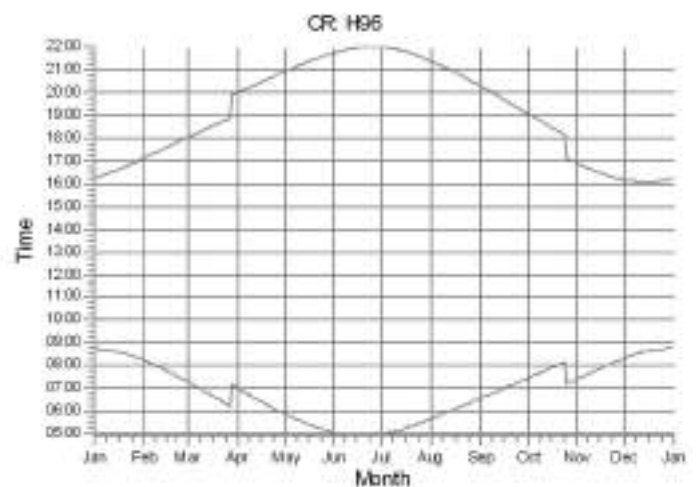
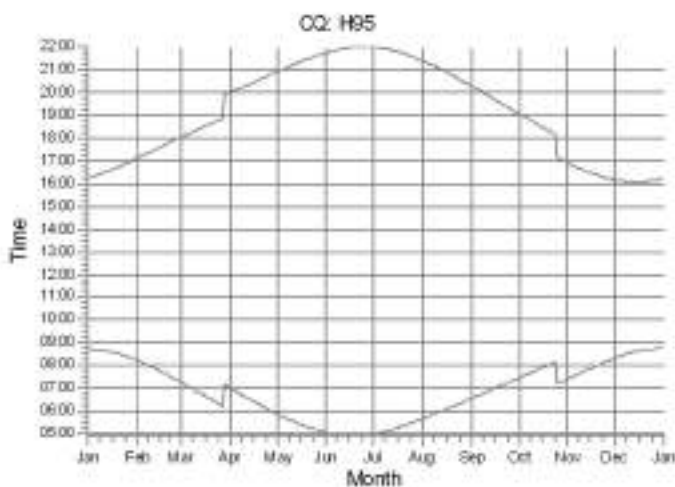
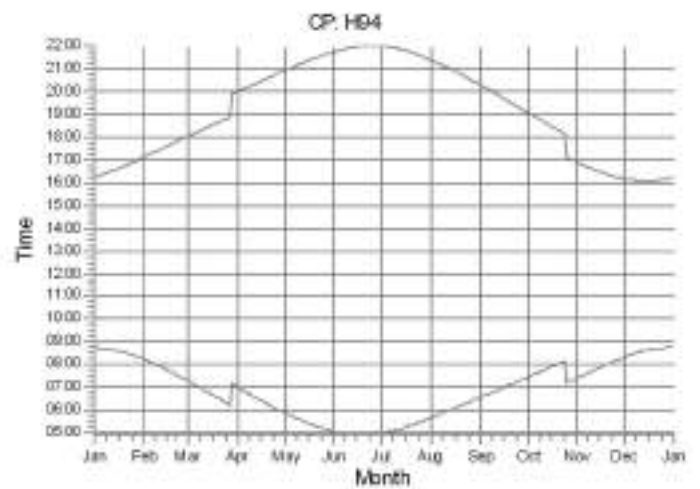
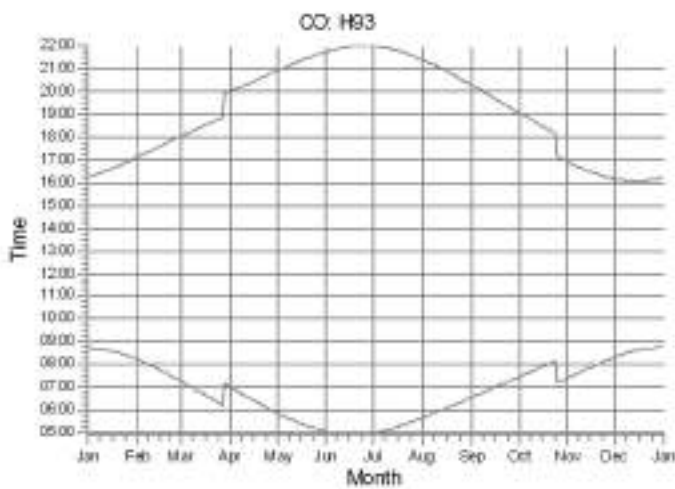
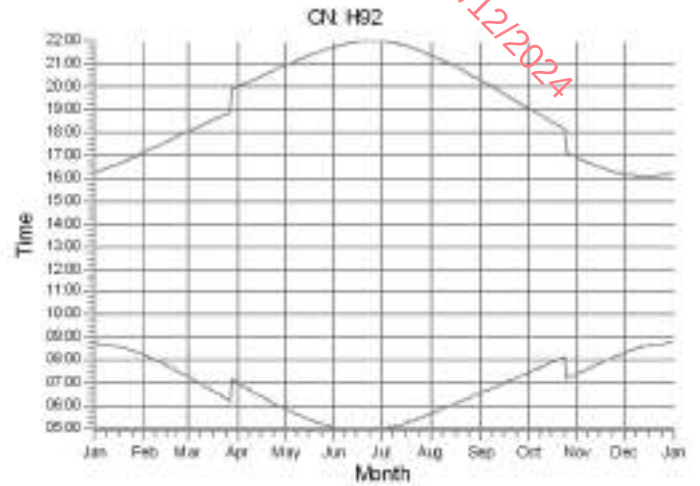
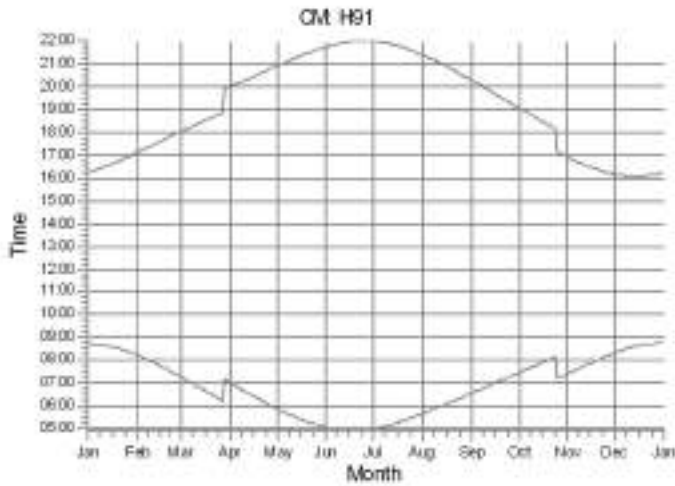
2: T02 3: T03 4: T04 5: T05

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
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Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar, graphical

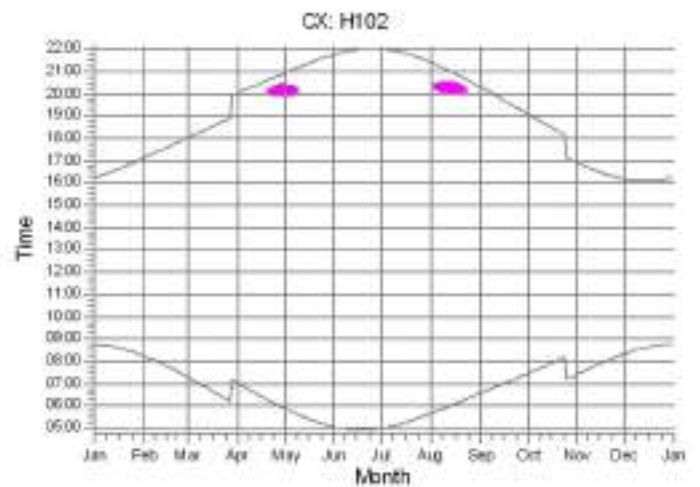
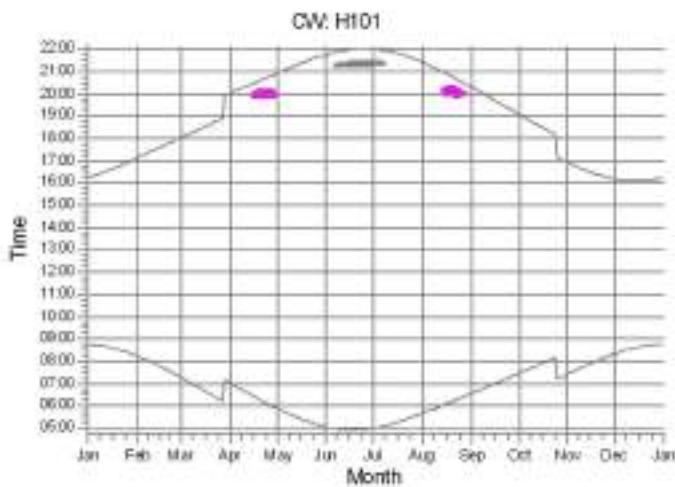
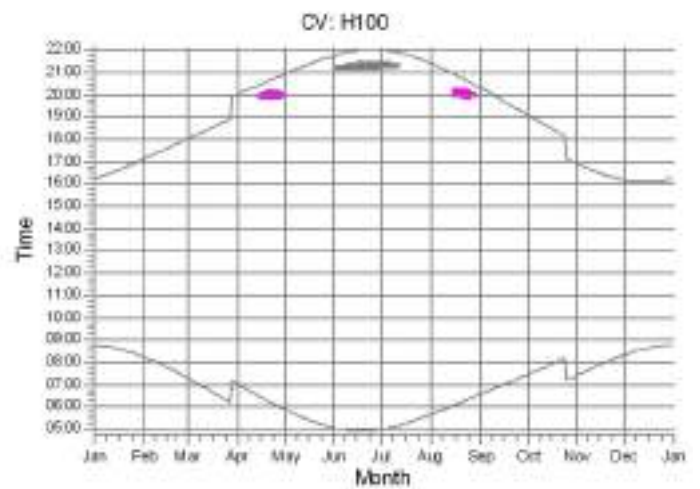
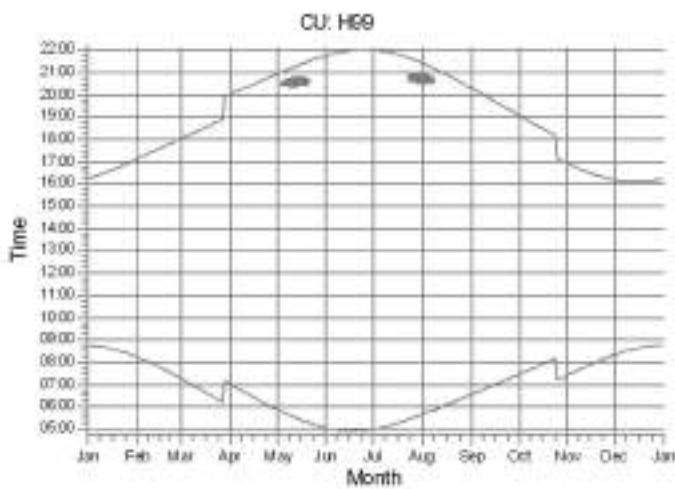
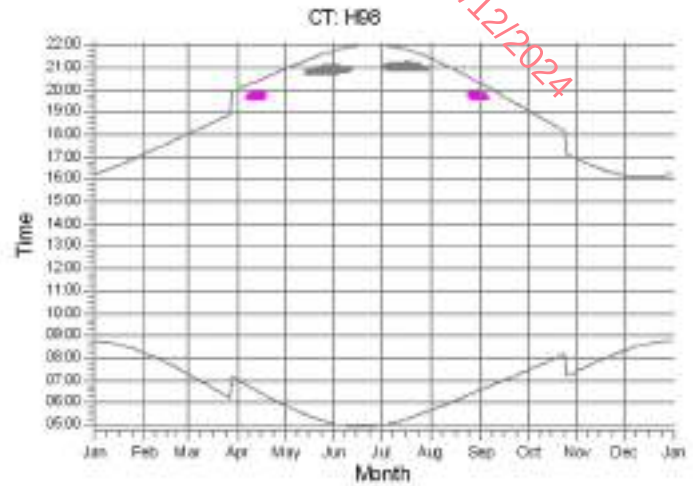
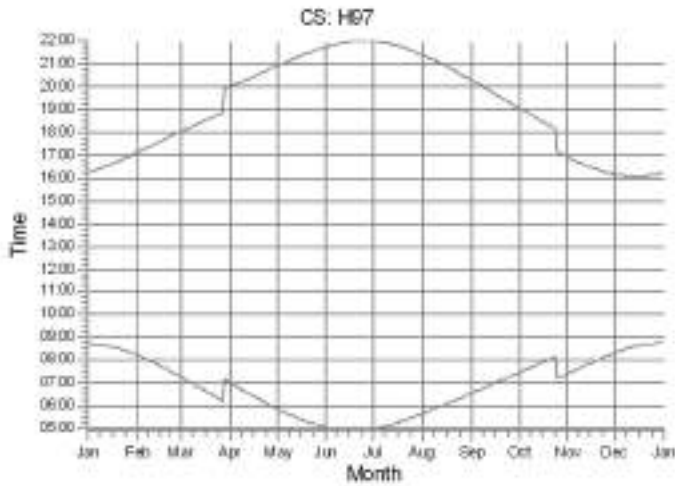
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

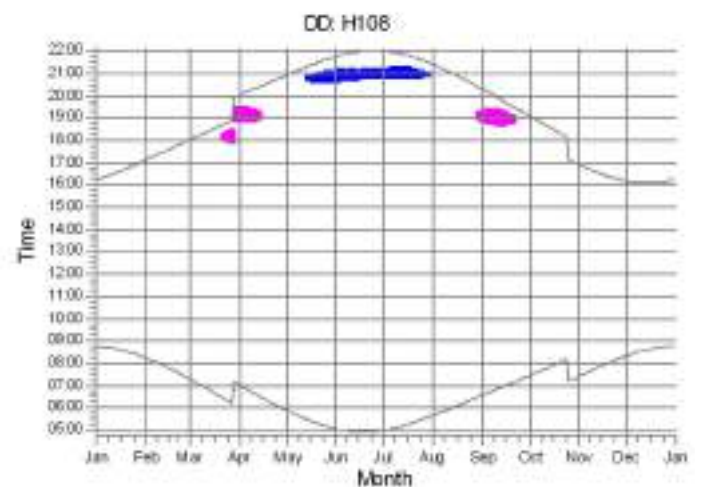
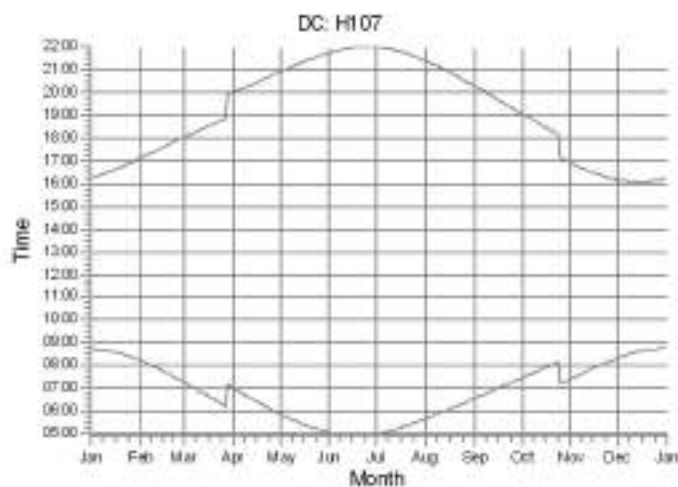
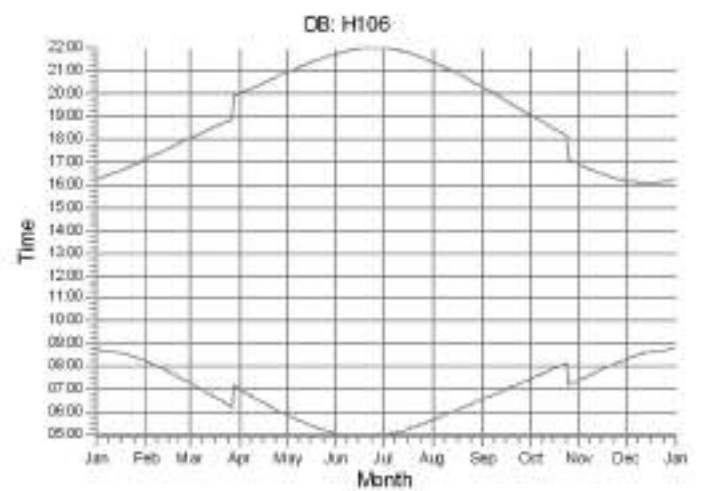
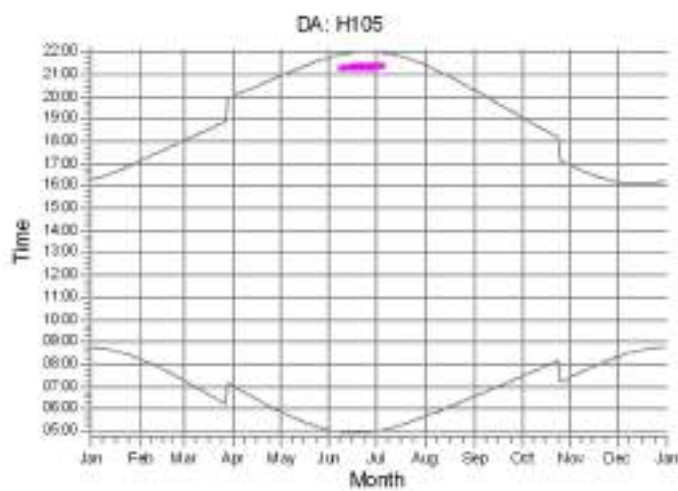
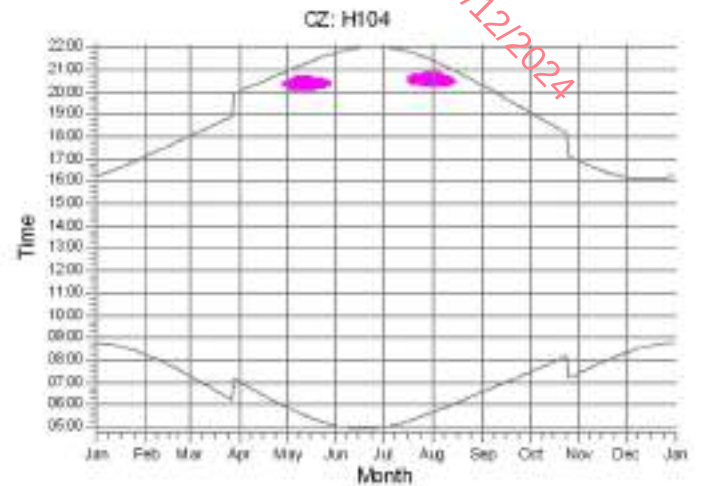
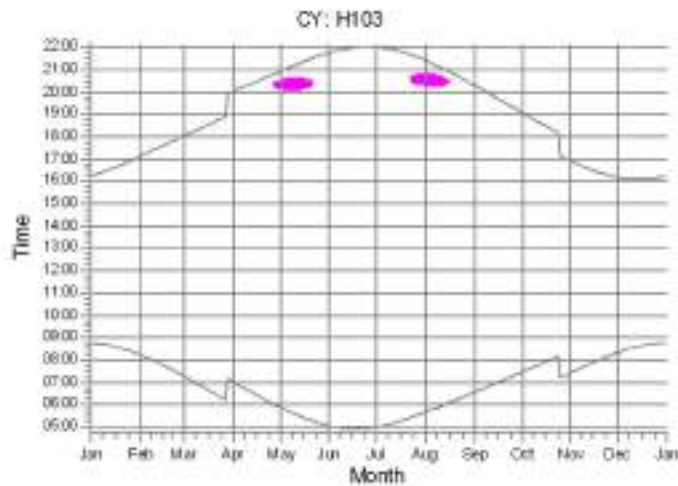


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

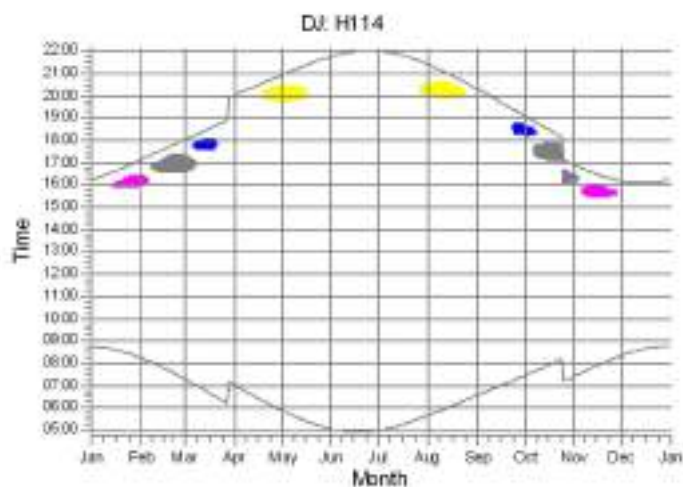
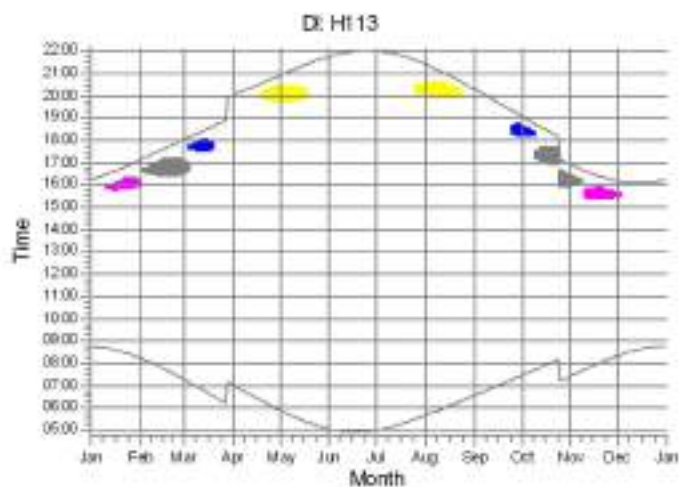
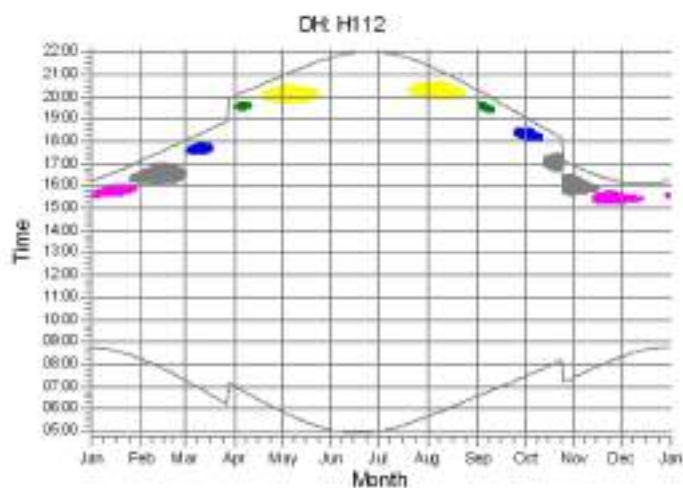
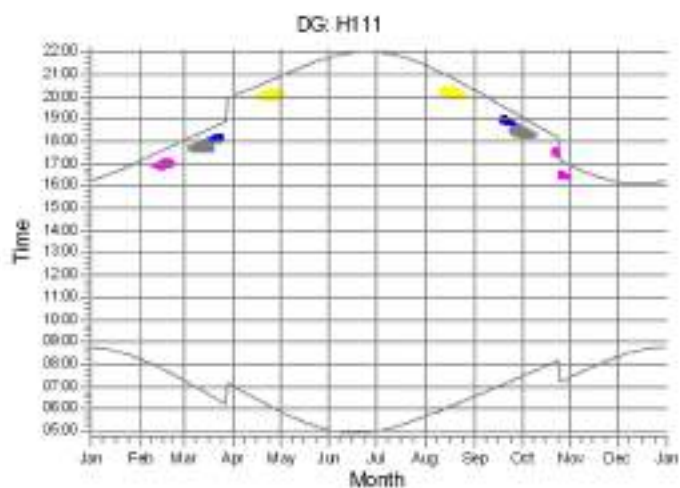
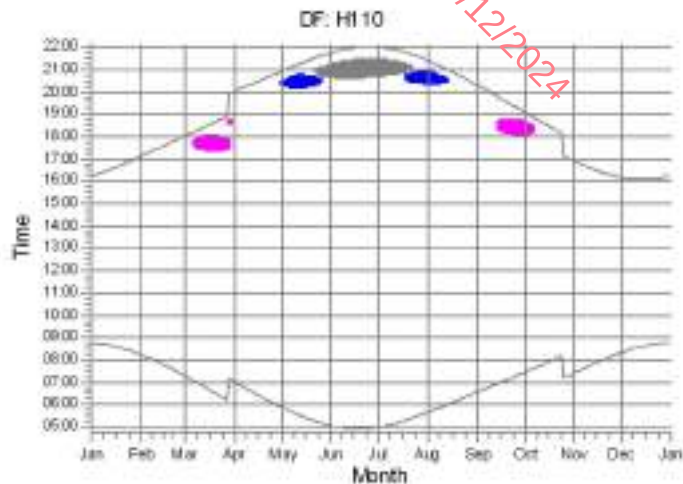
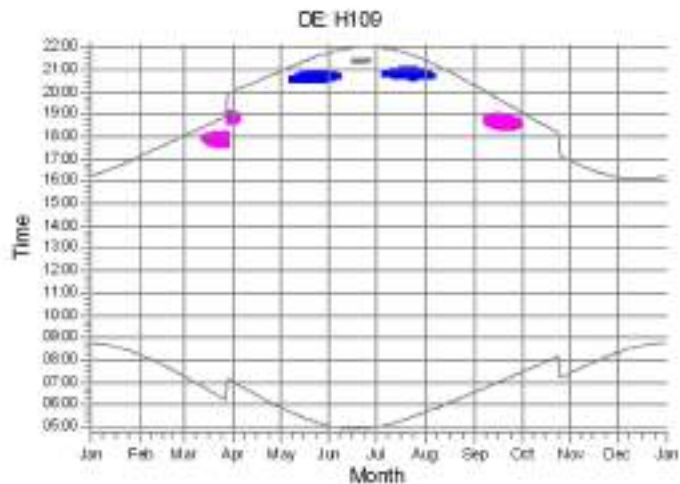


WTGs

3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

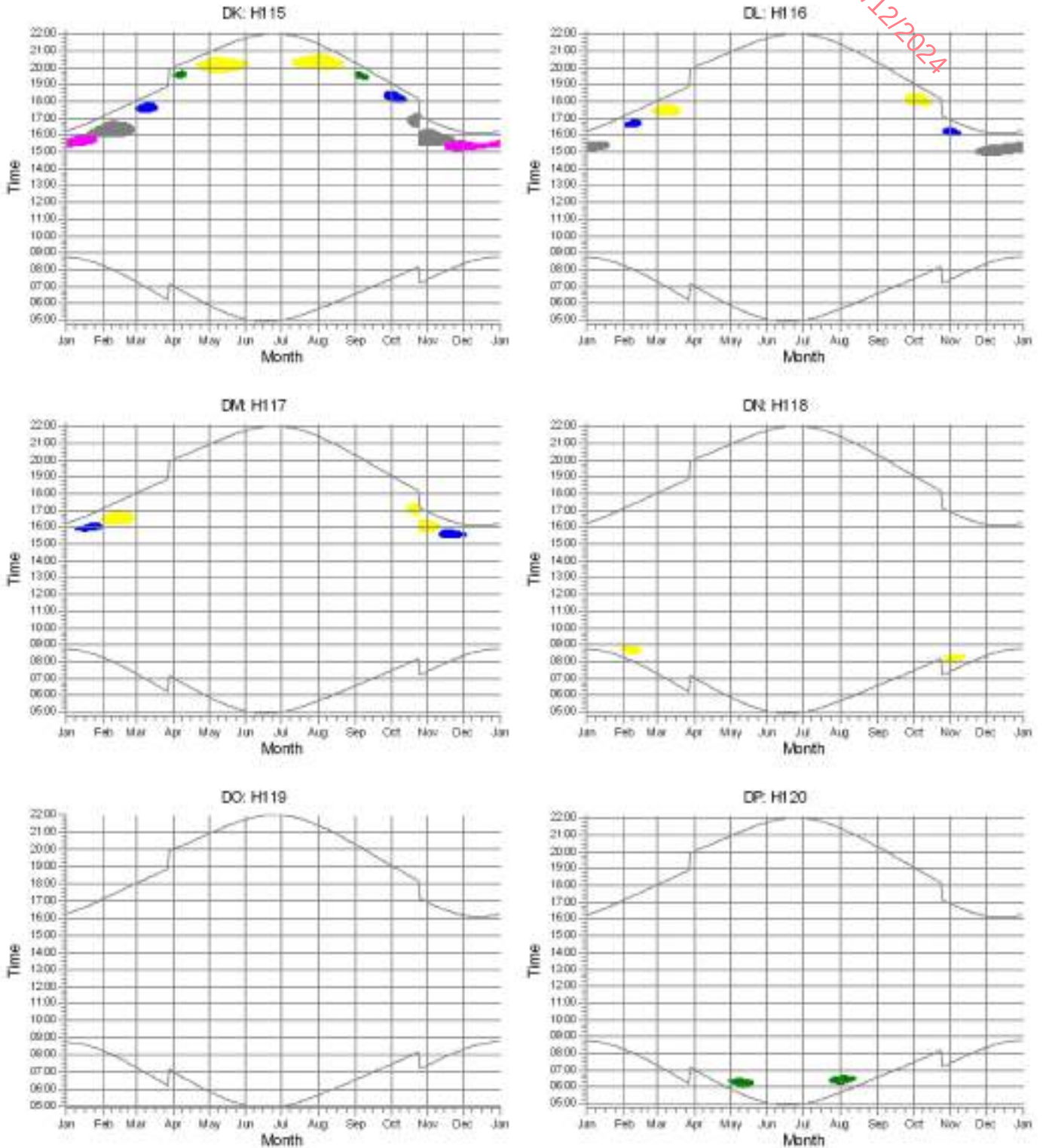


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

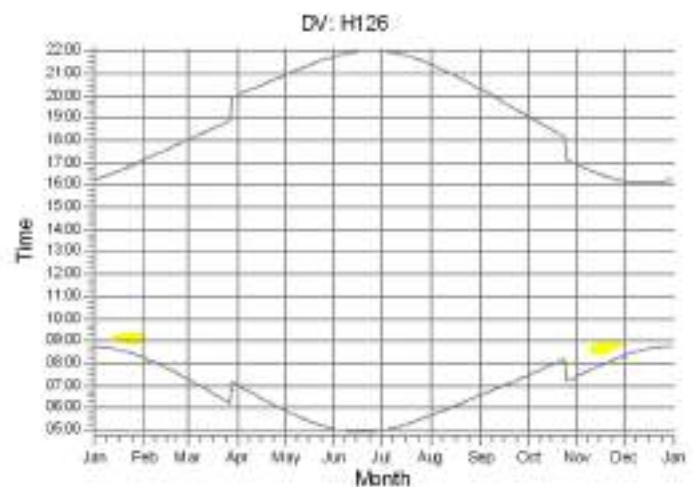
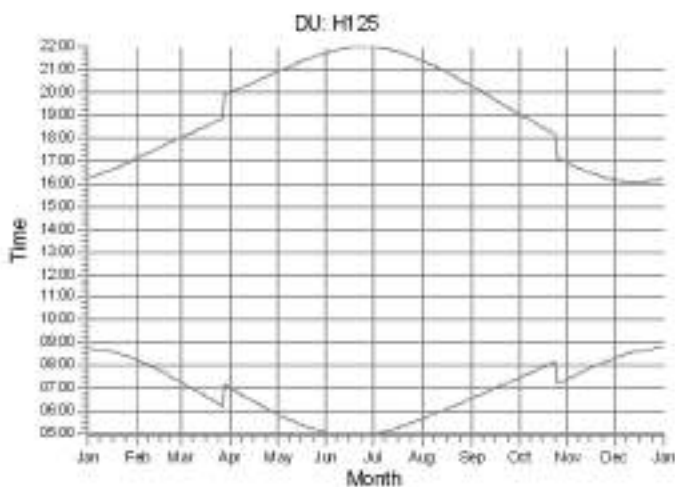
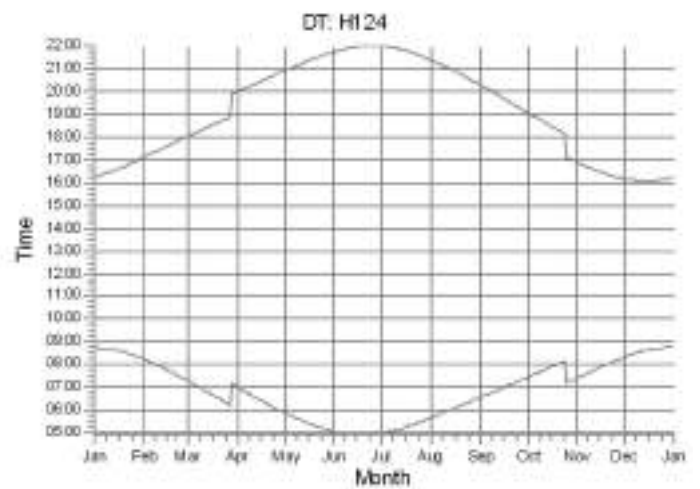
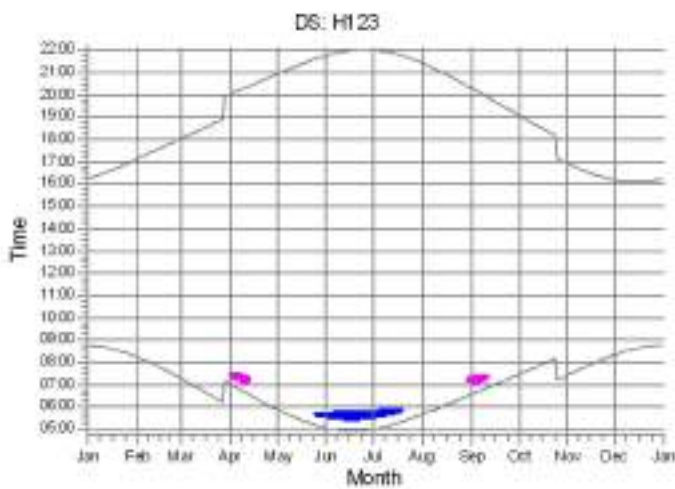
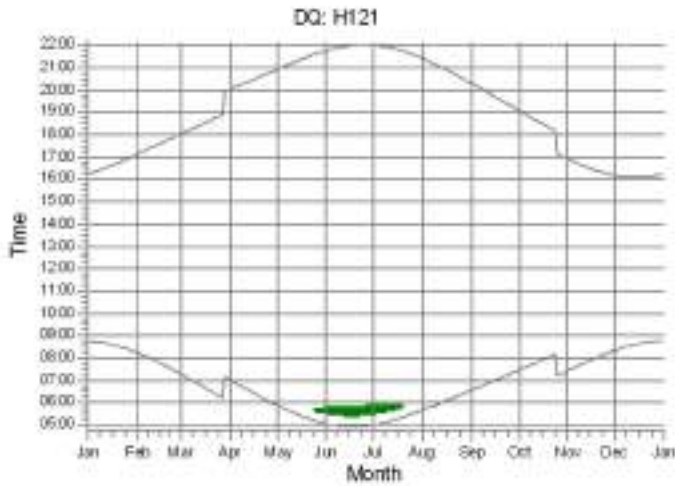
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

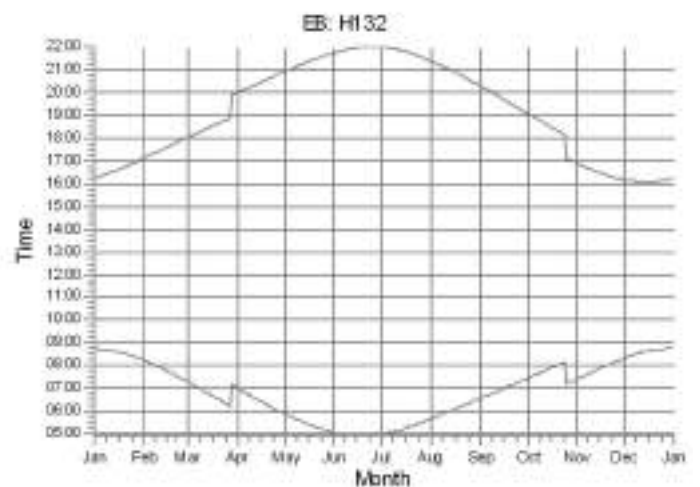
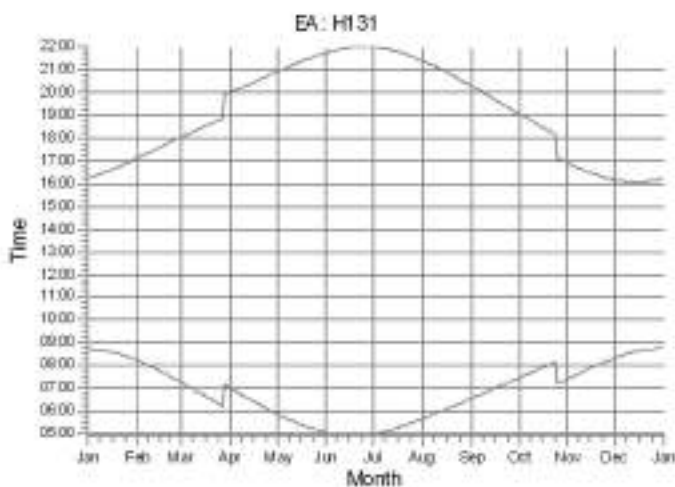
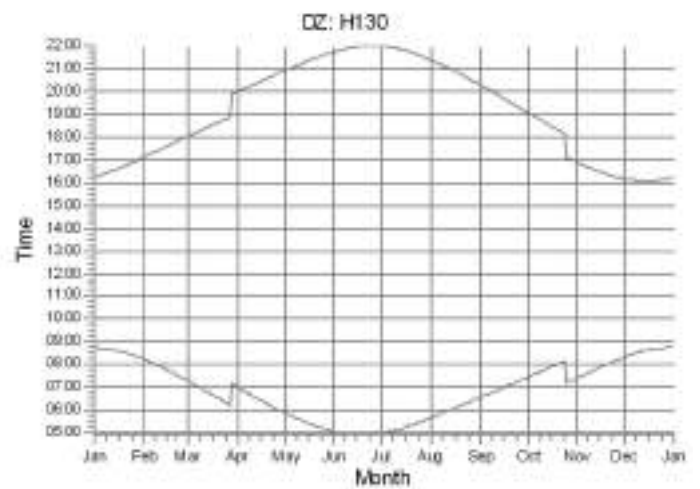
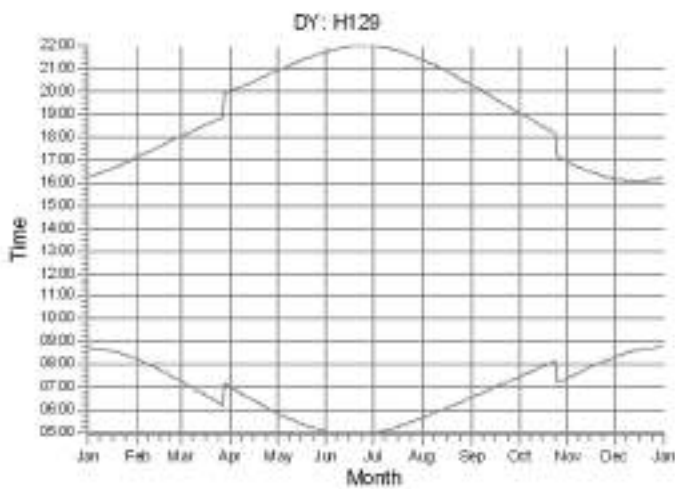
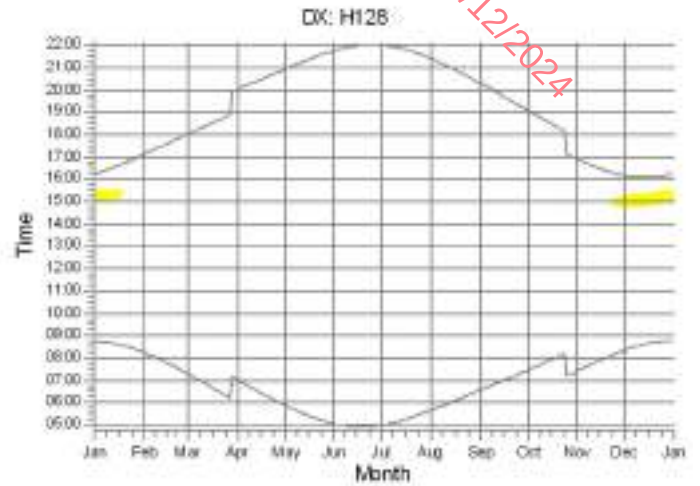
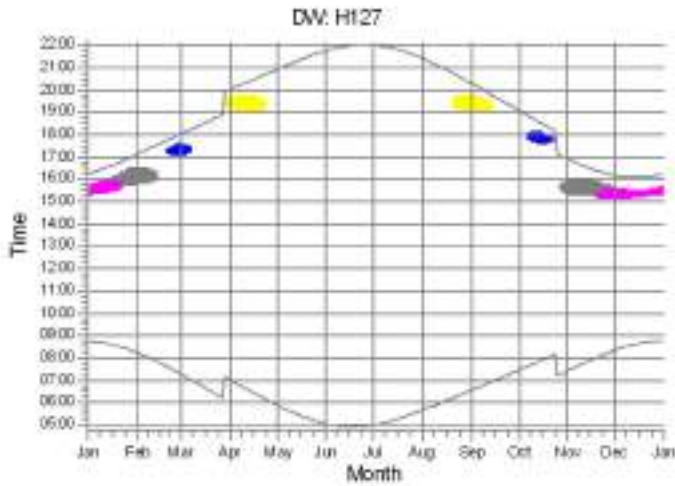


WTGs

1: T01 2: T02 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



WTGs

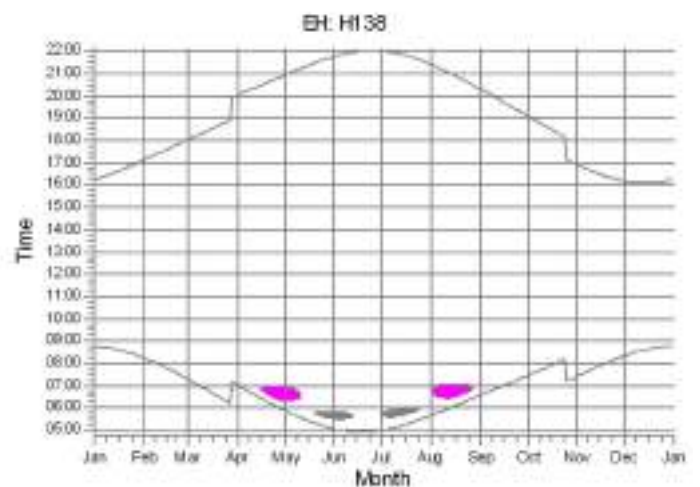
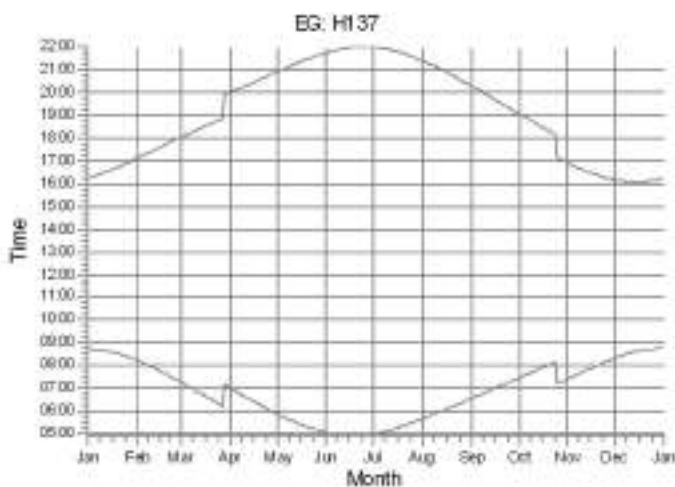
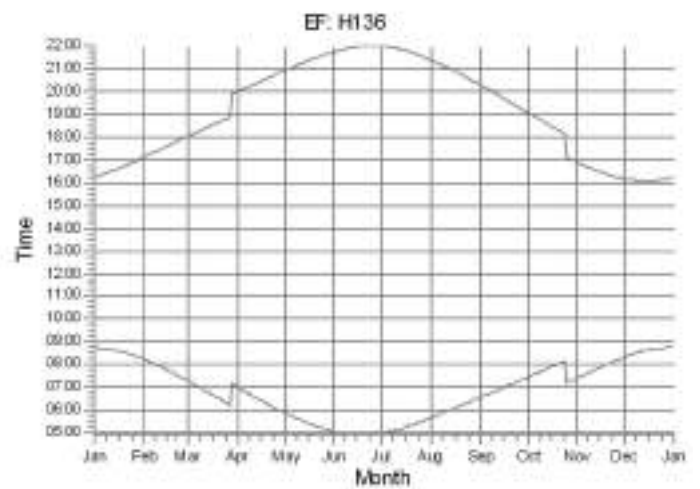
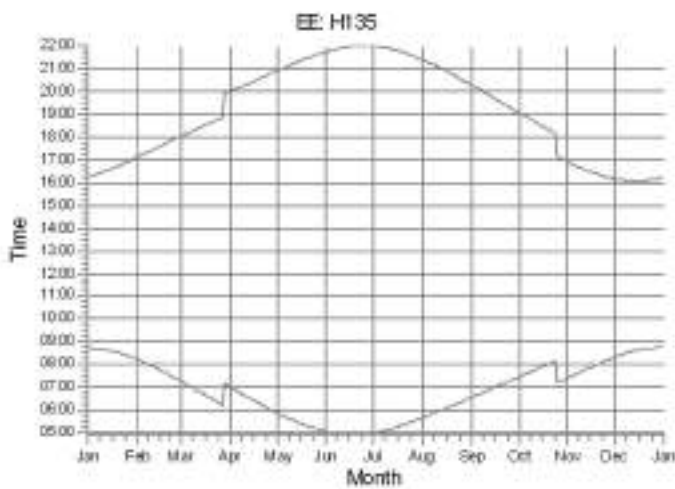
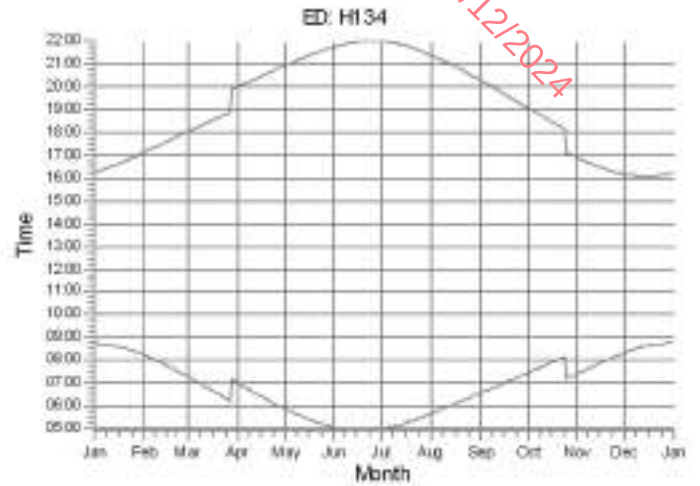
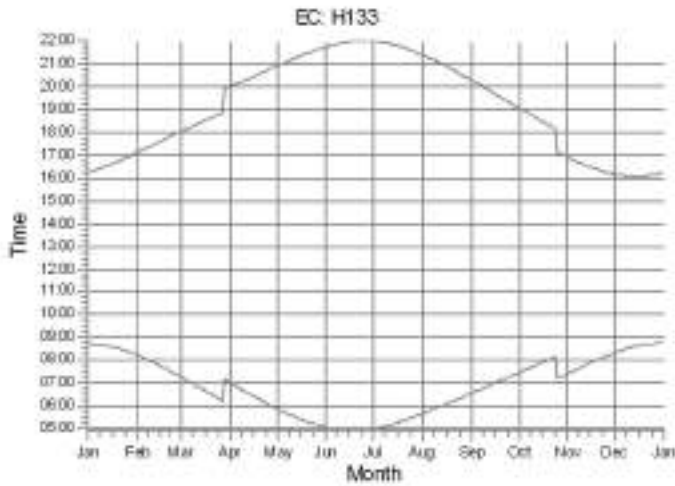
2: T02 3: T03 4: T04 5: T05

Project: 6918 Kellystown
 Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
 Jennings O'Donovan
 Finisklin Business Park
 IE-F91 RHH9 Sligo
 +353719161416
 abyryne / abyryne@jodireland.com
 Calculated:
 11/07/2024 09:39/4.0.547

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

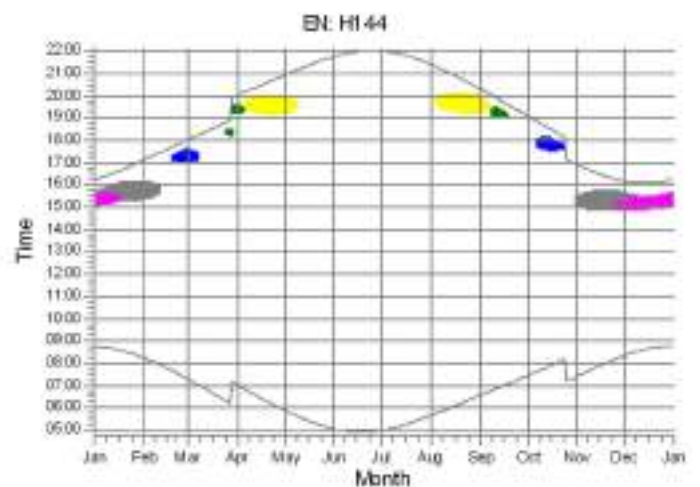
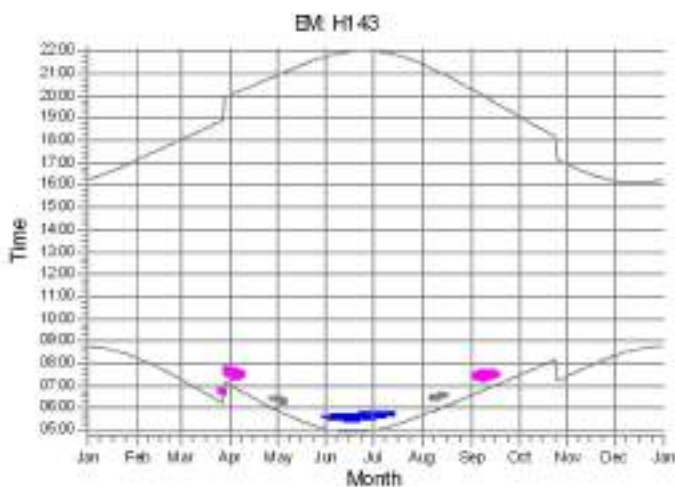
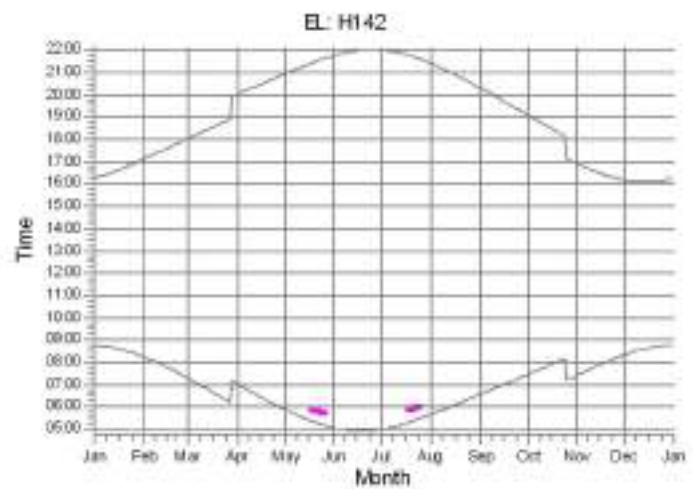
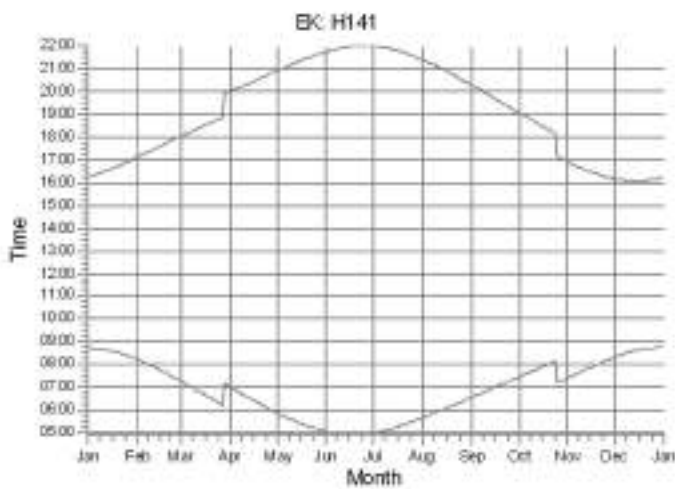
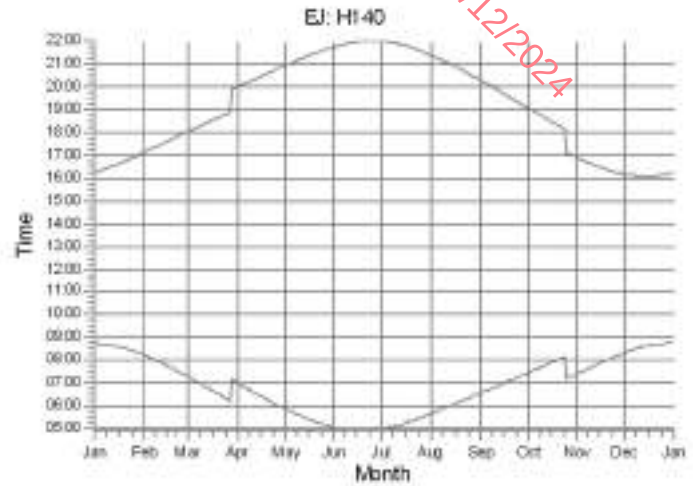
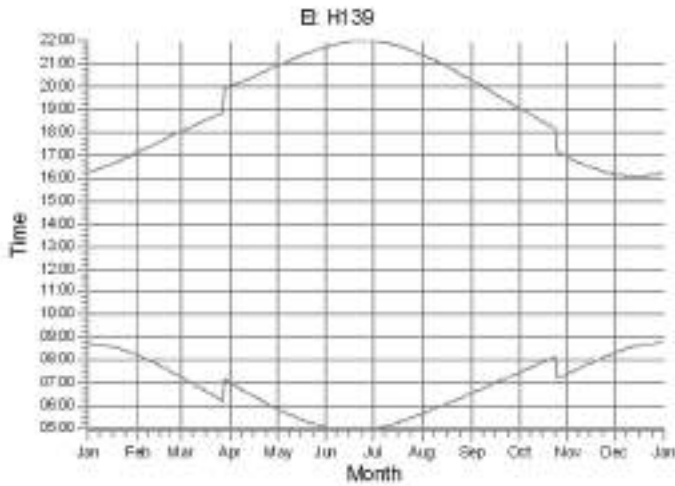


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

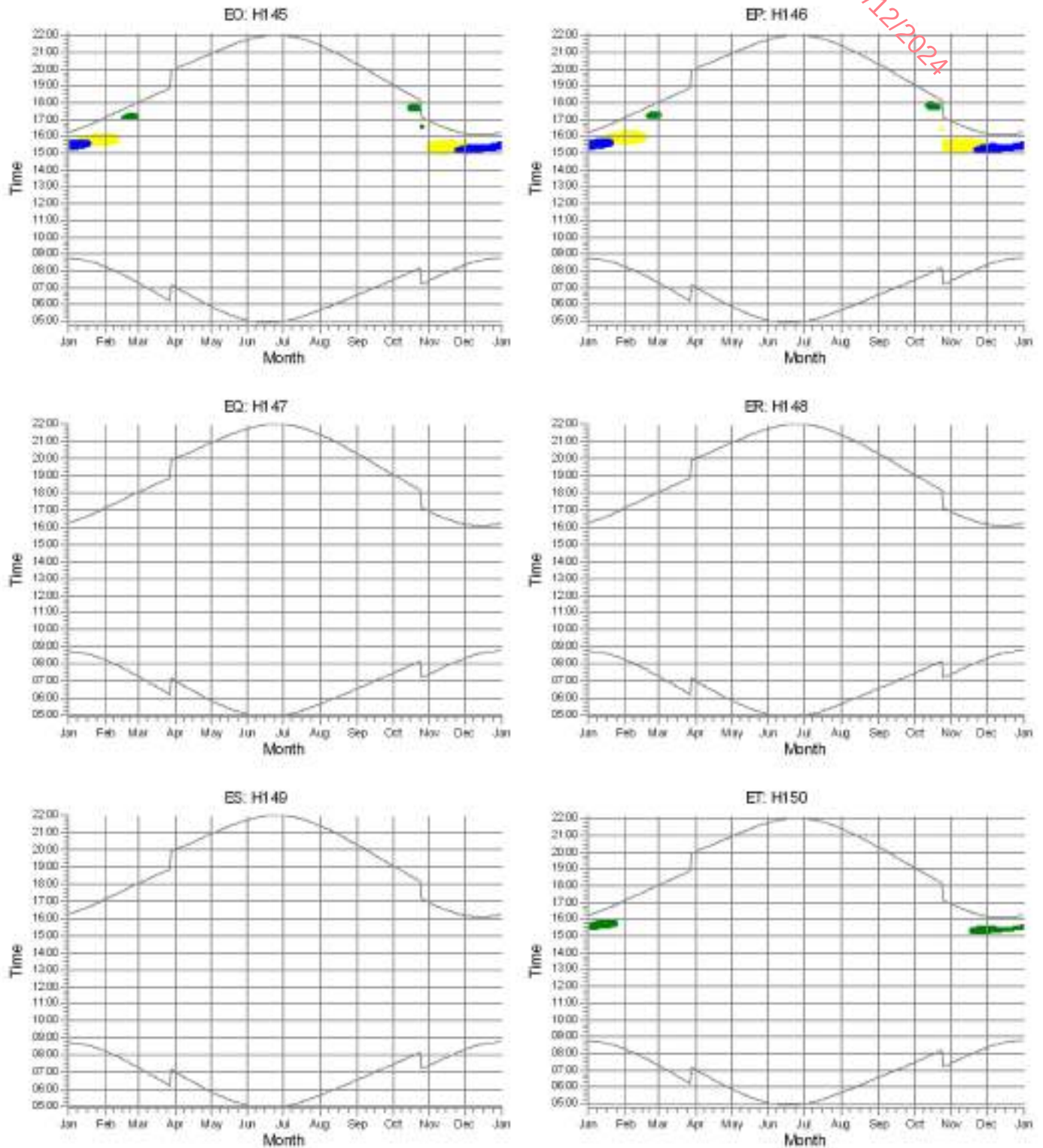


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

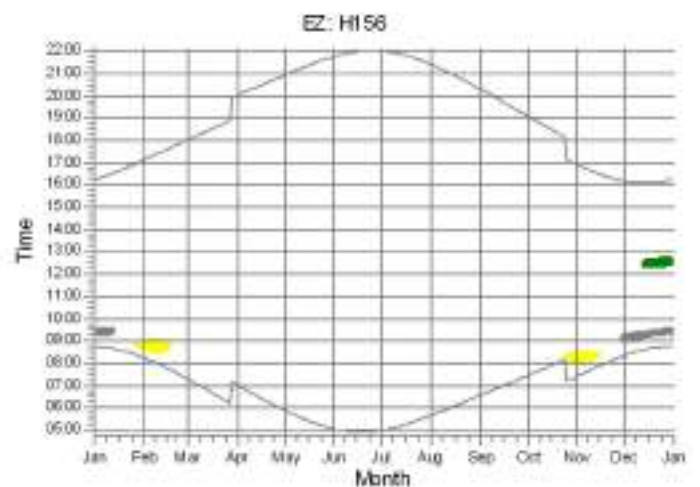
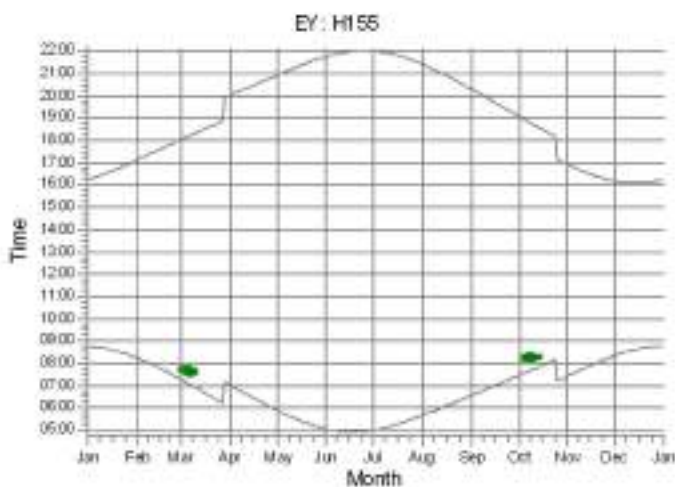
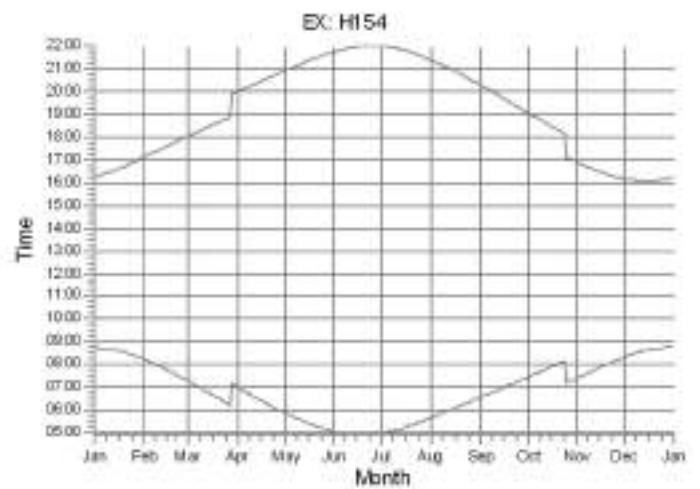
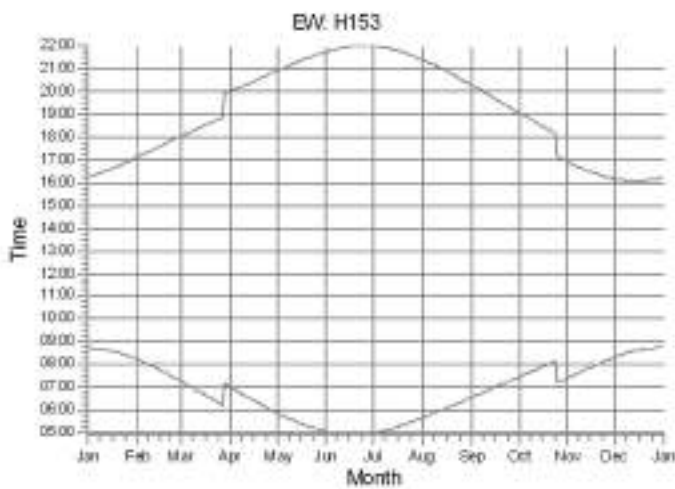
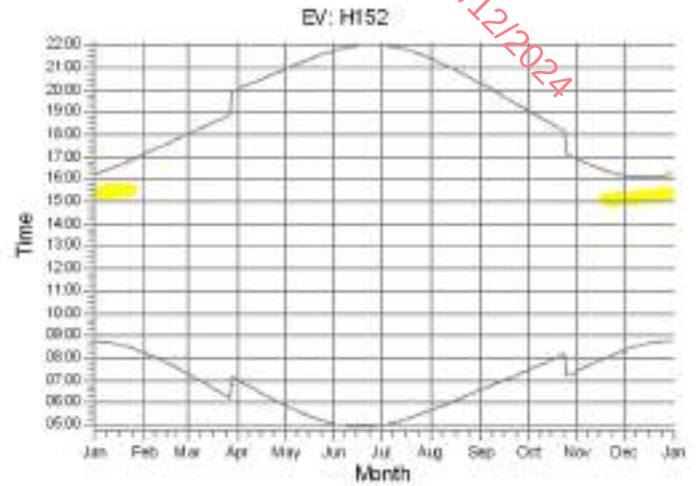
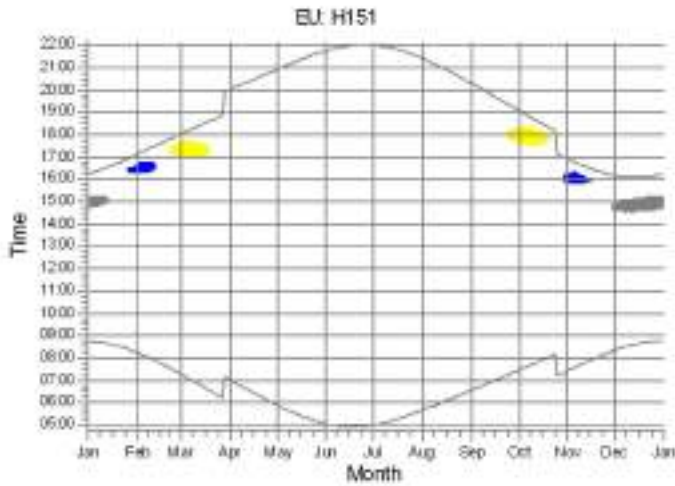


WTGs

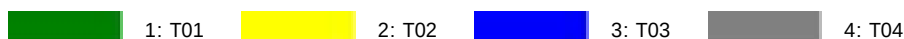
1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

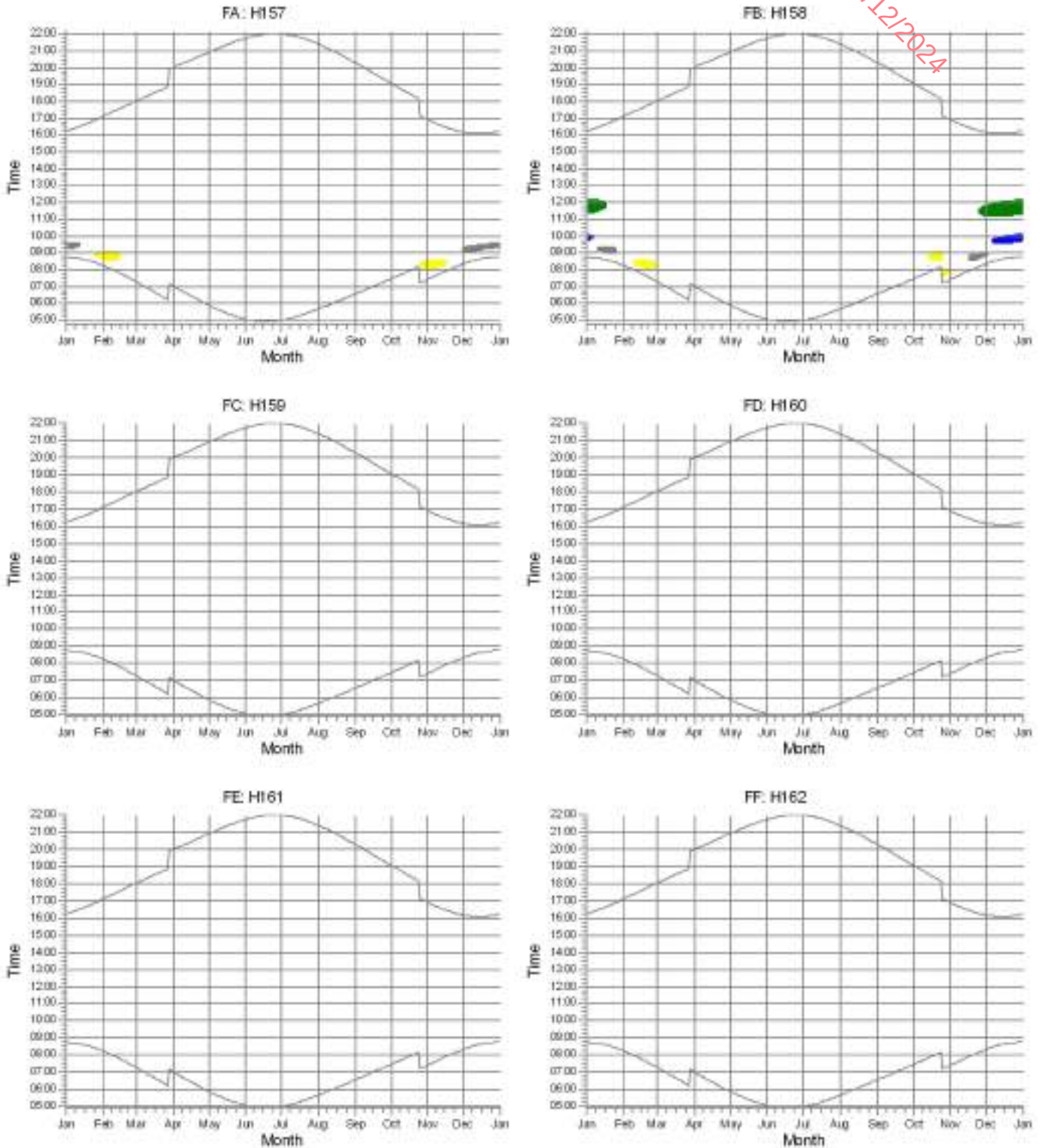


WTGs



SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

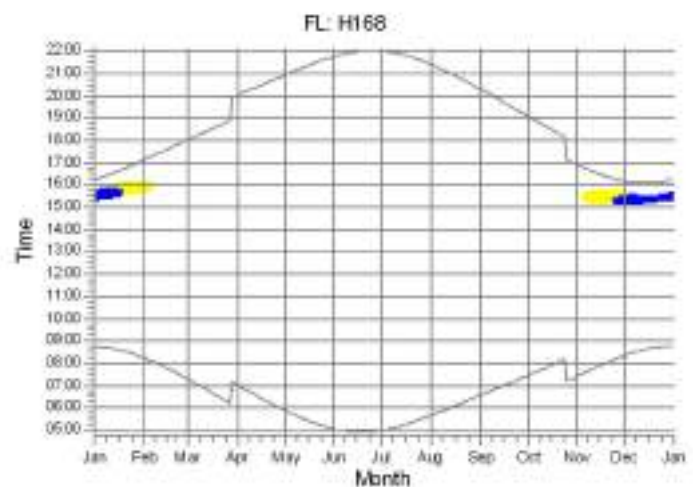
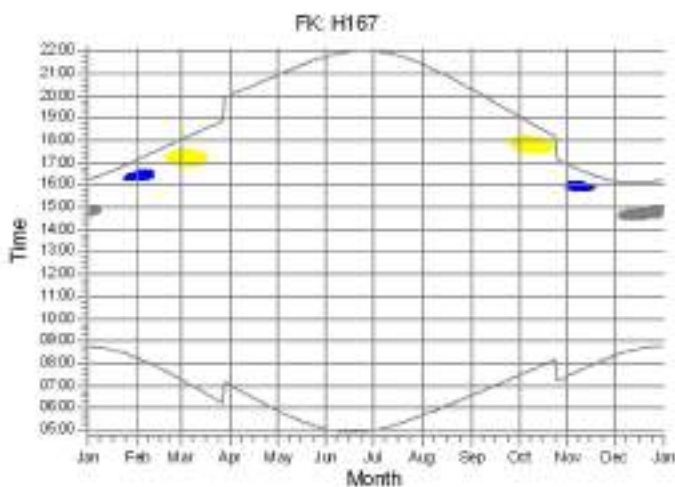
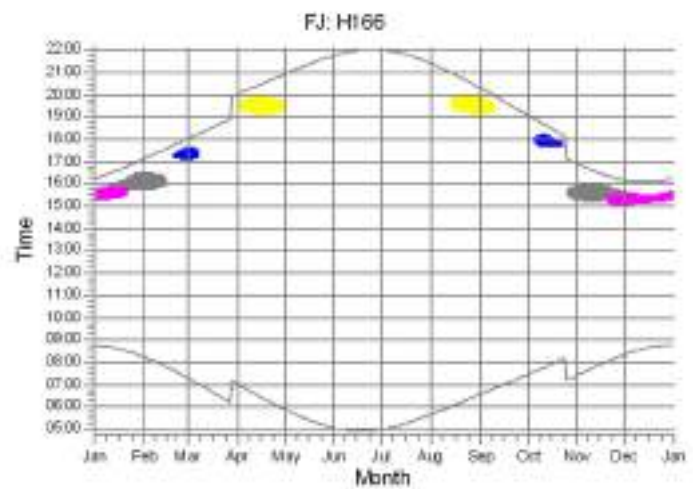
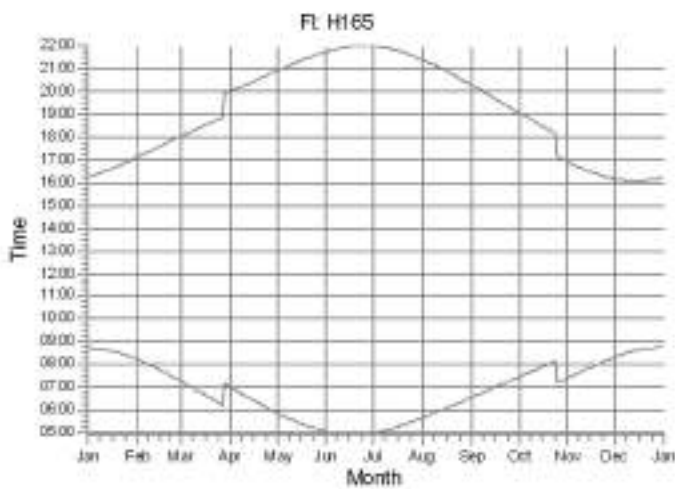
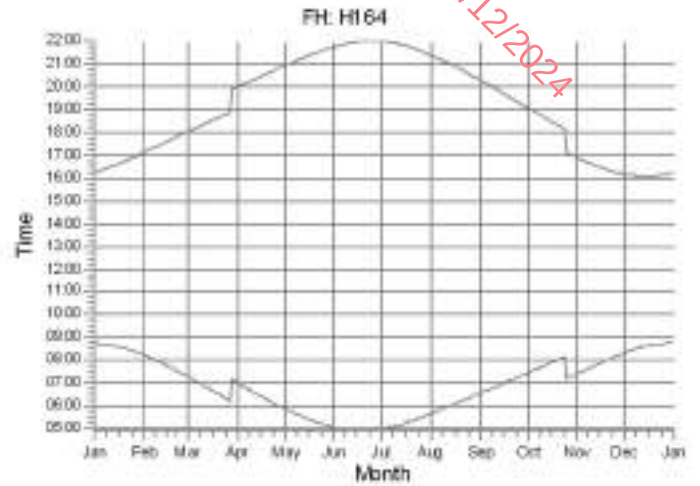
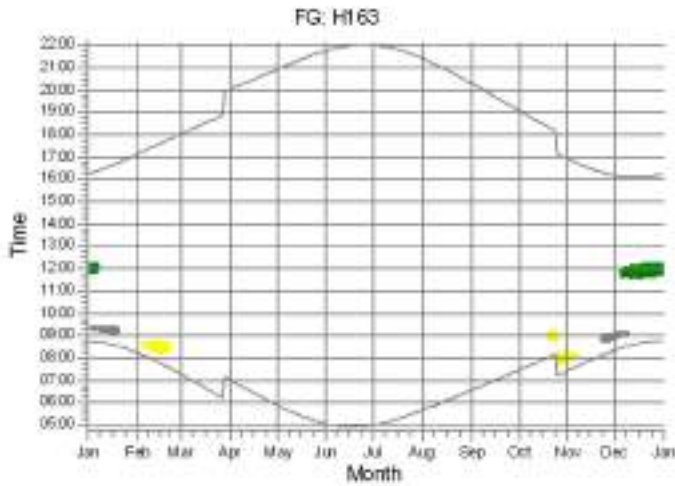


WTGs

1: T01 2: T02 3: T03 4: T04

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

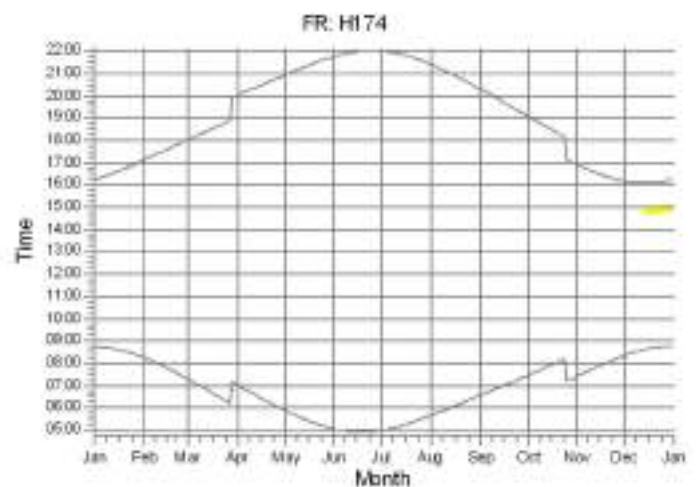
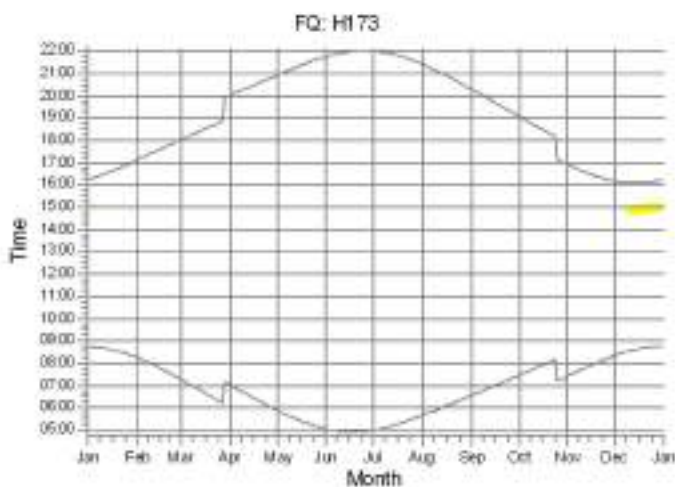
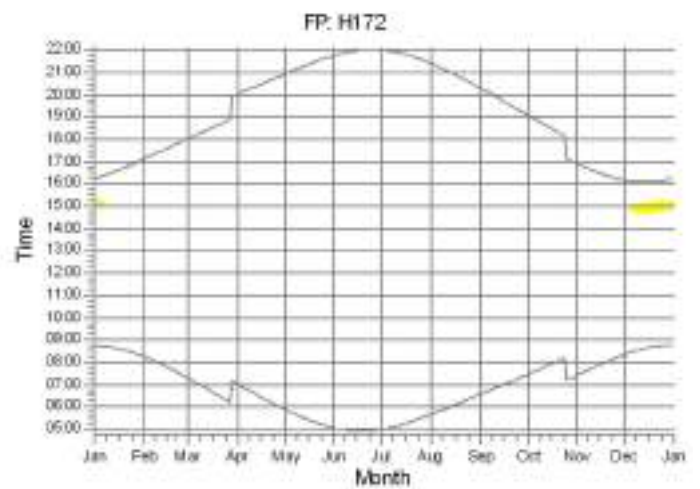
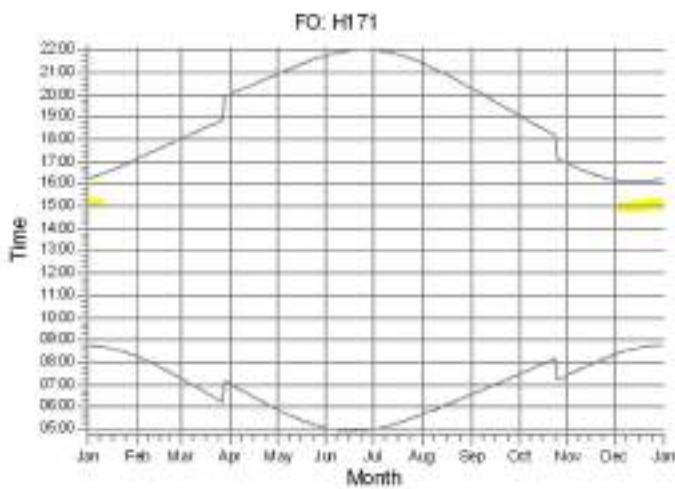
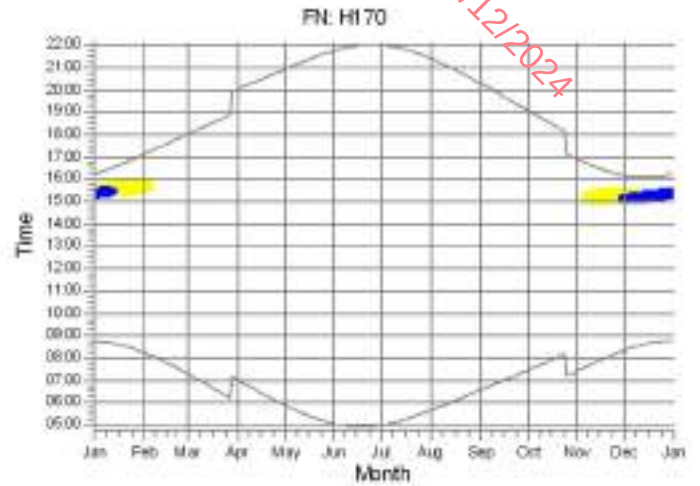
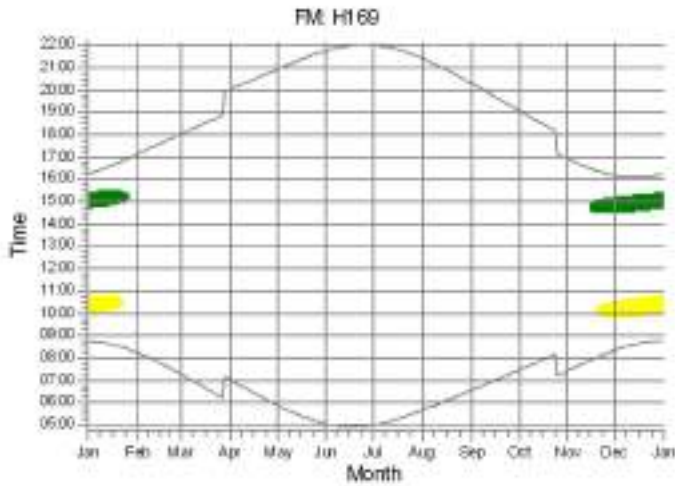


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

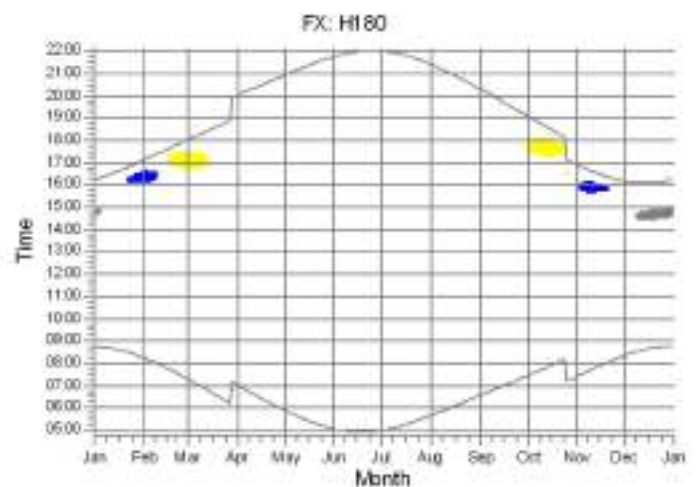
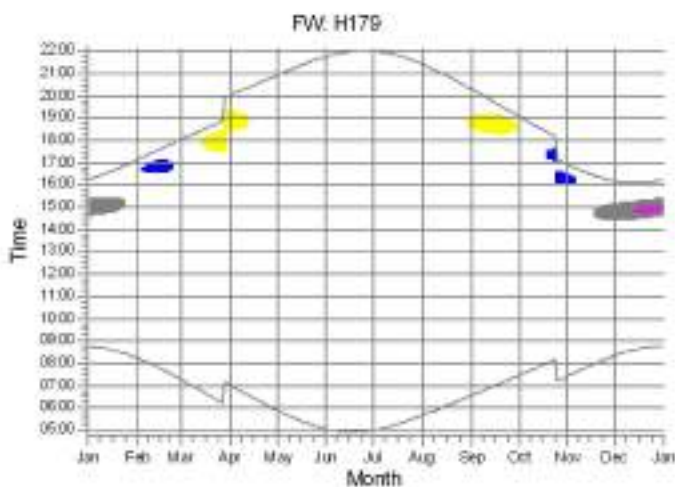
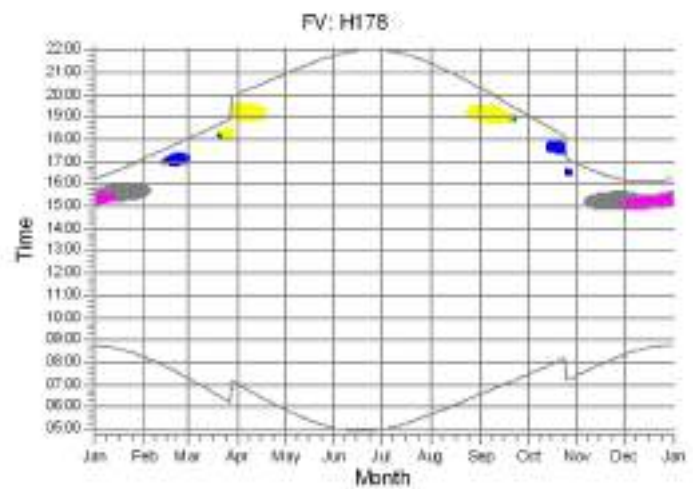
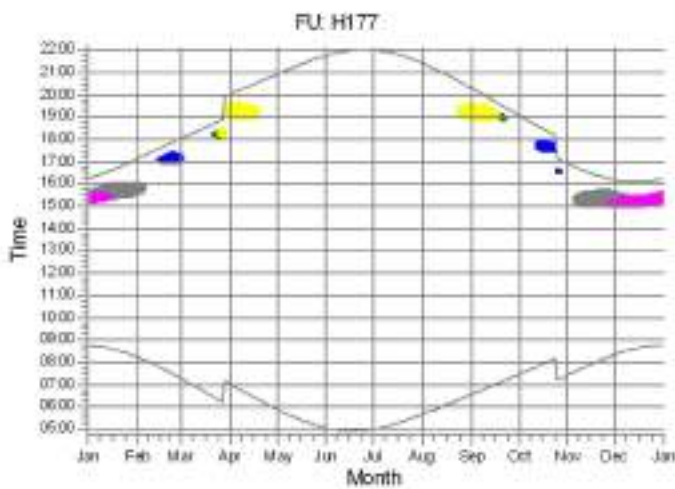
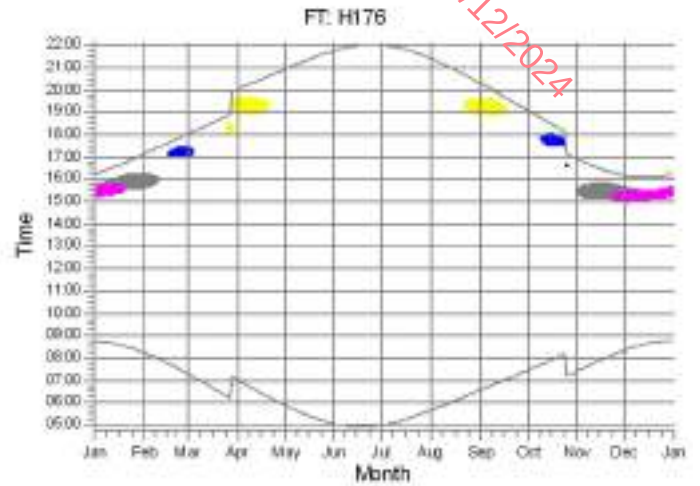
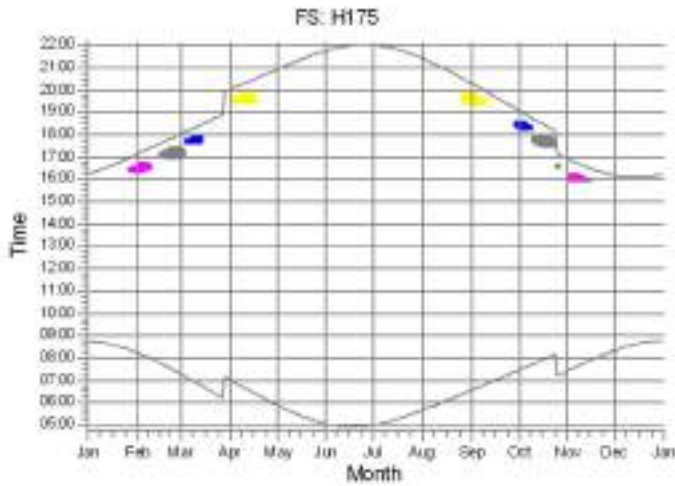


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

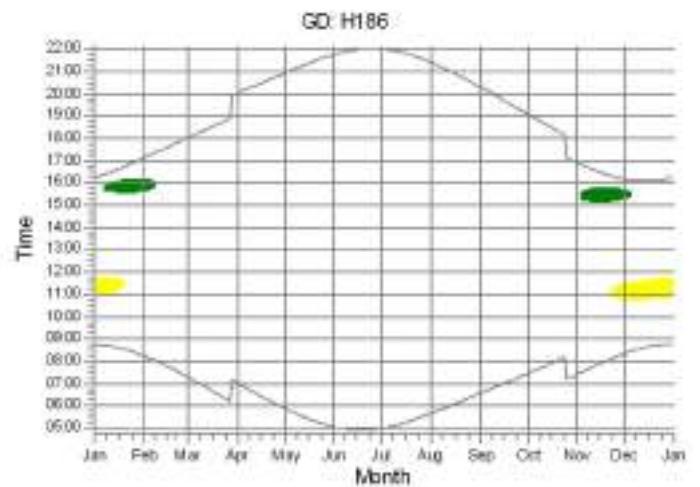
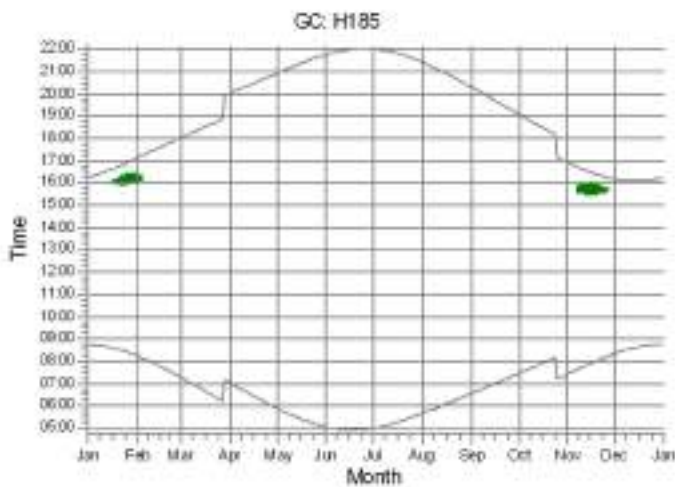
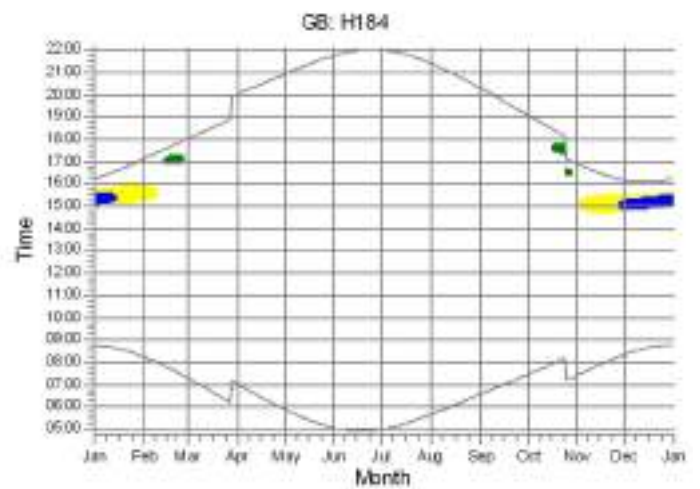
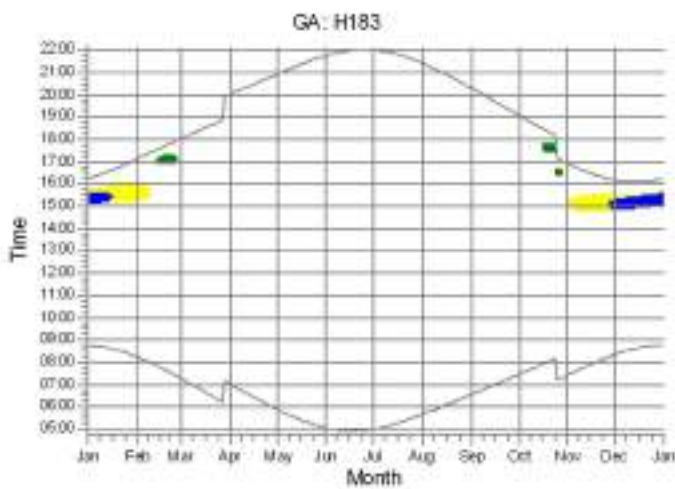
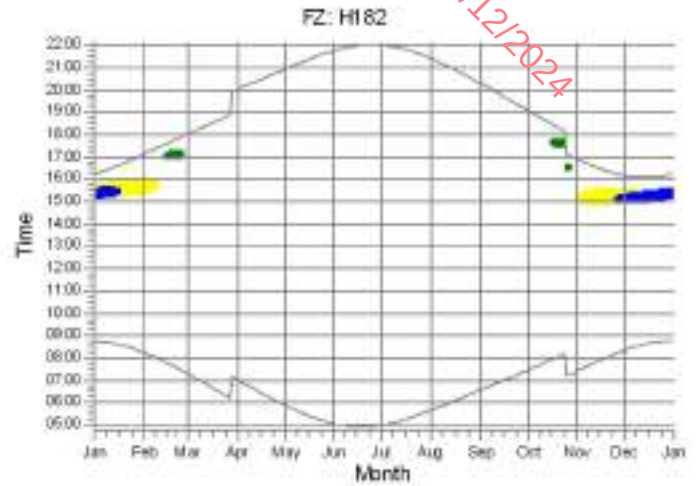
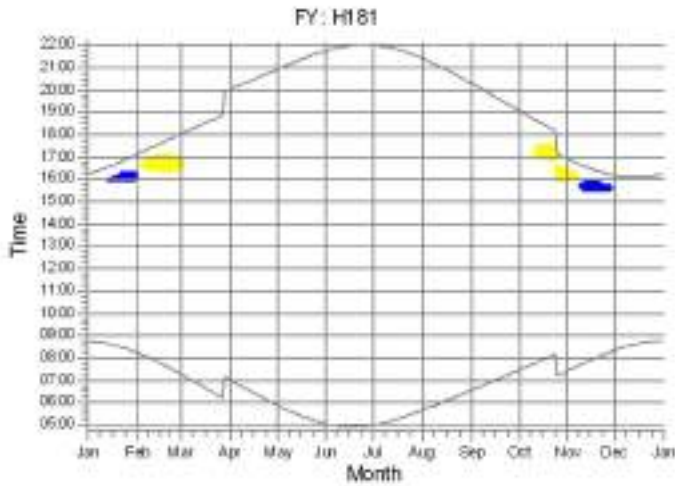


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

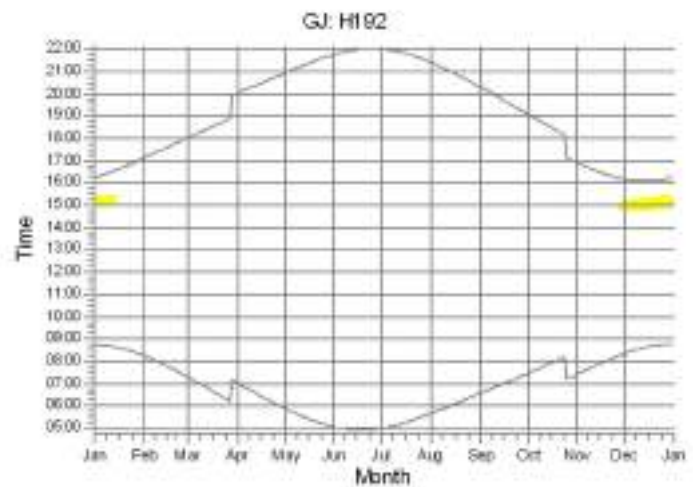
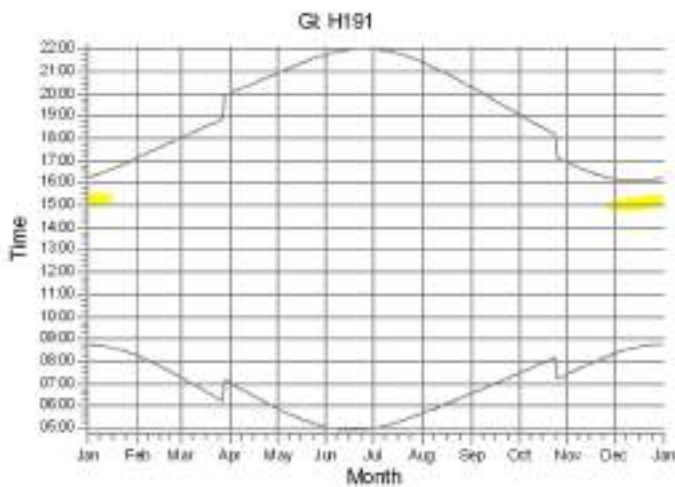
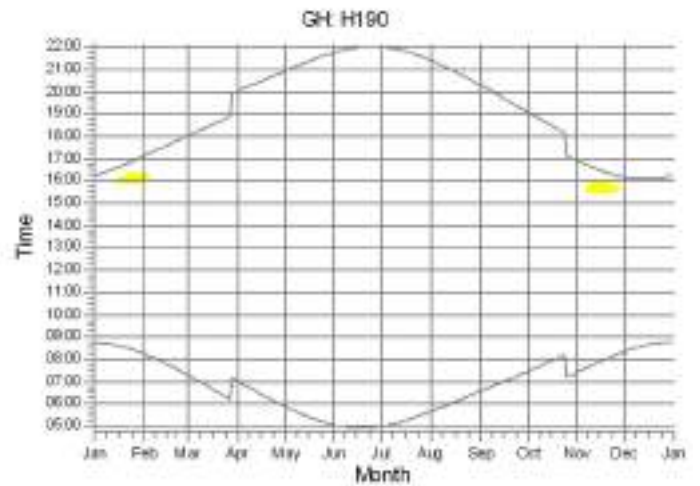
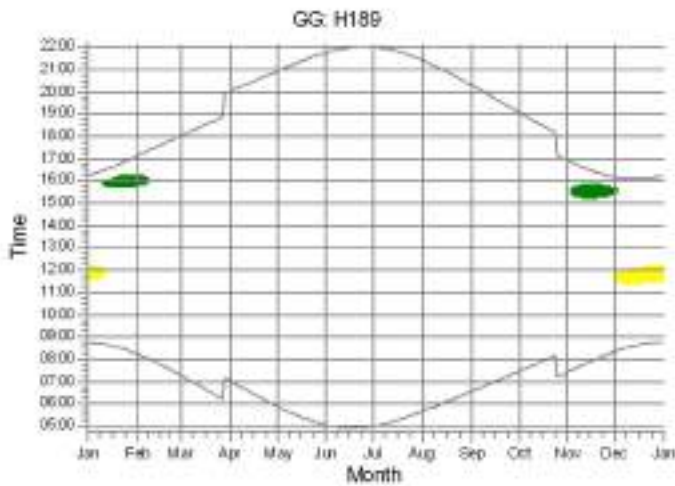
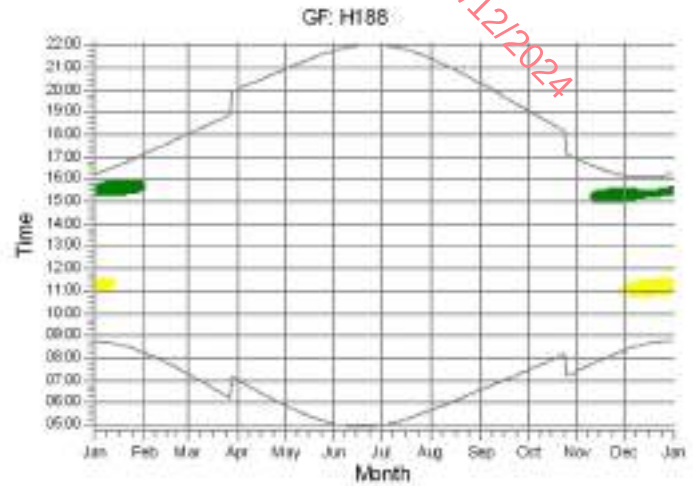
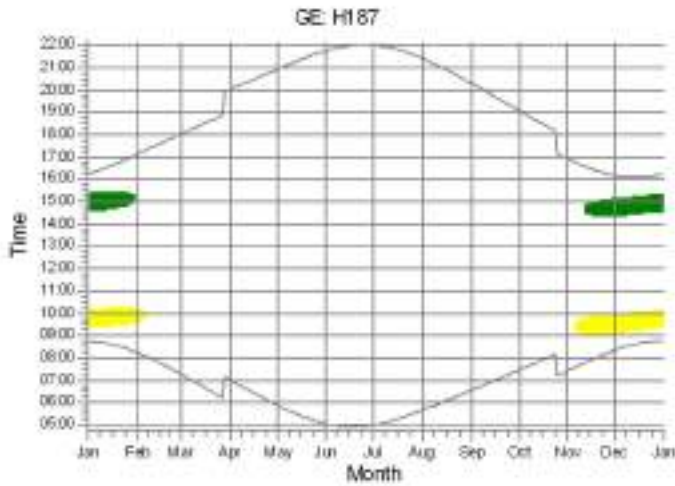


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

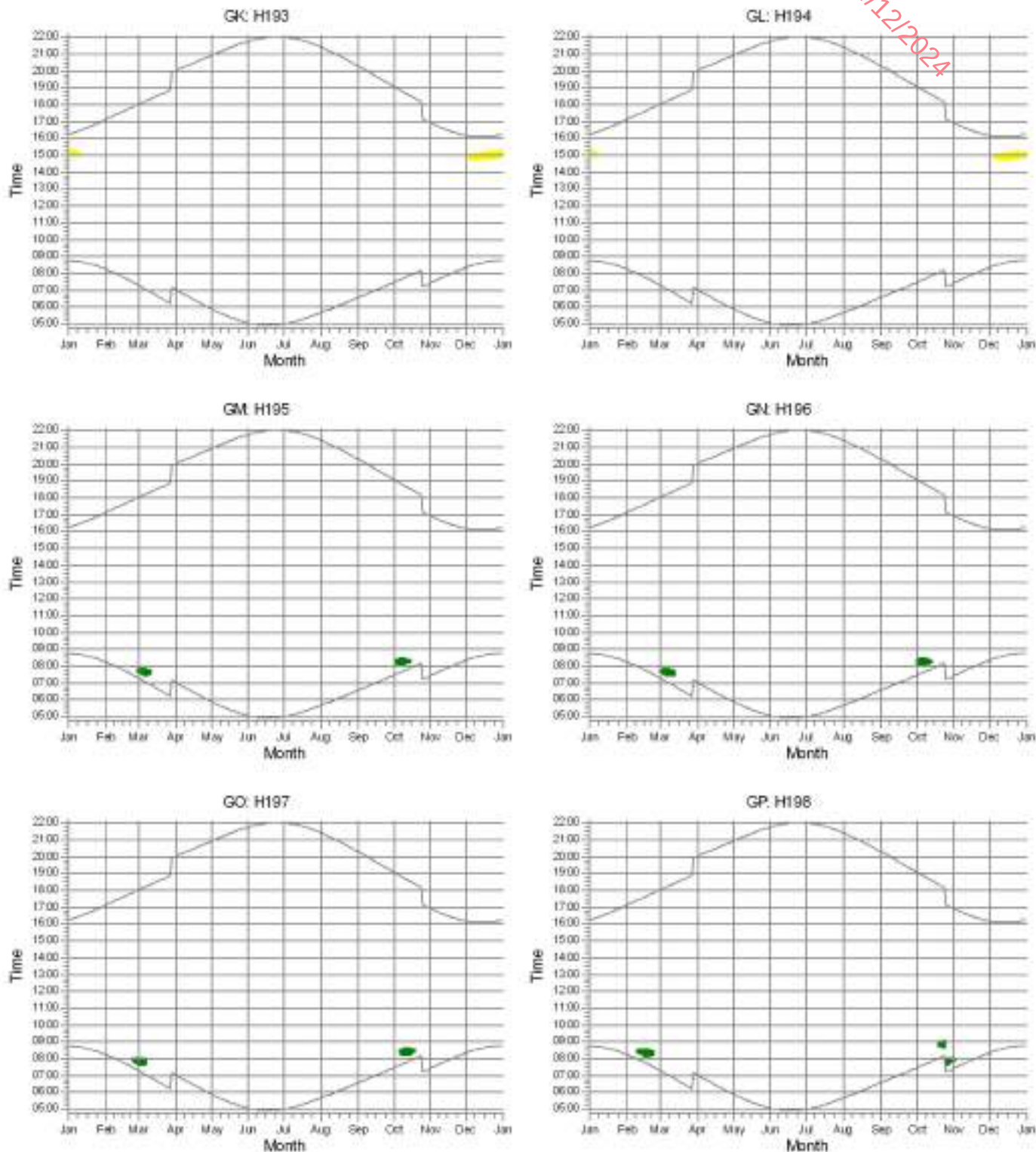


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

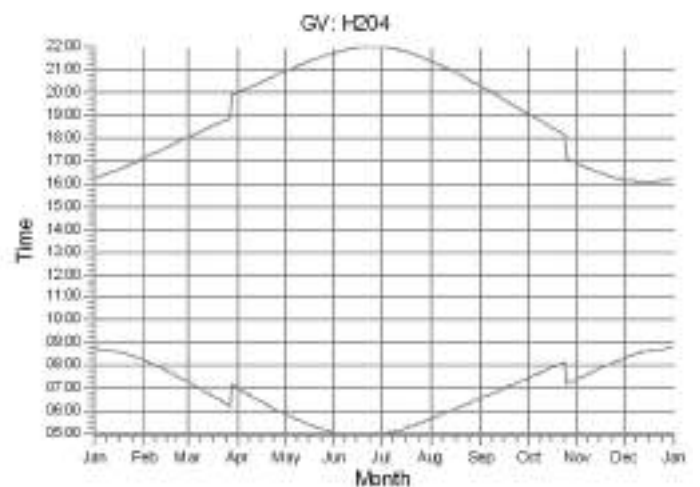
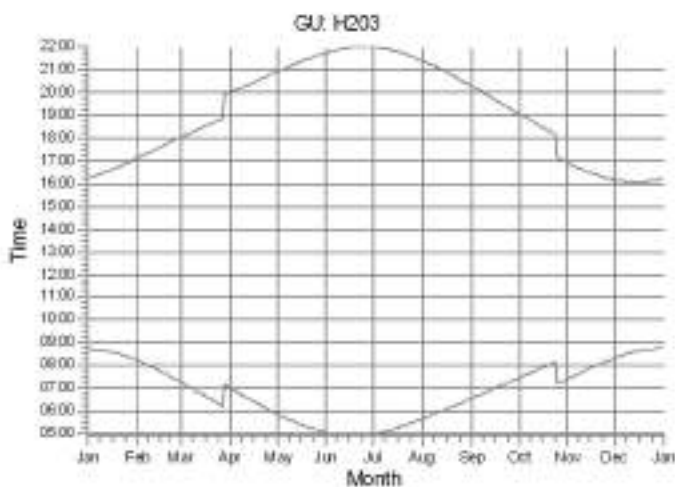
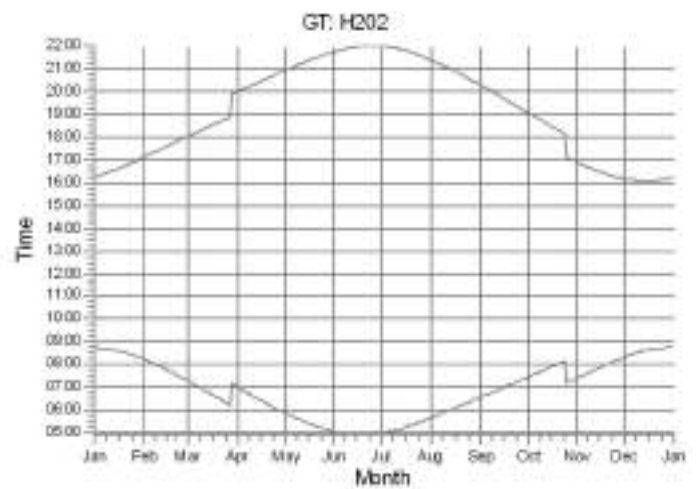
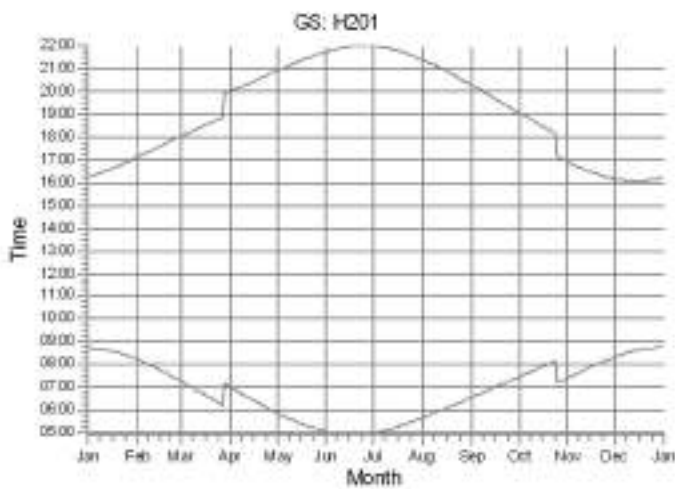
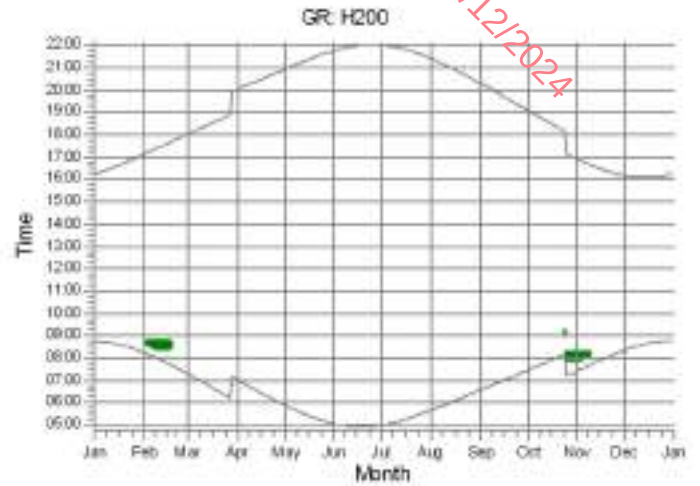
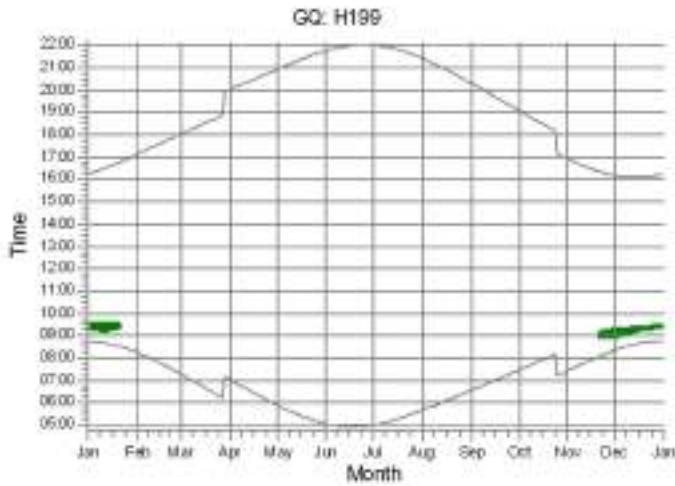


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



WTGs

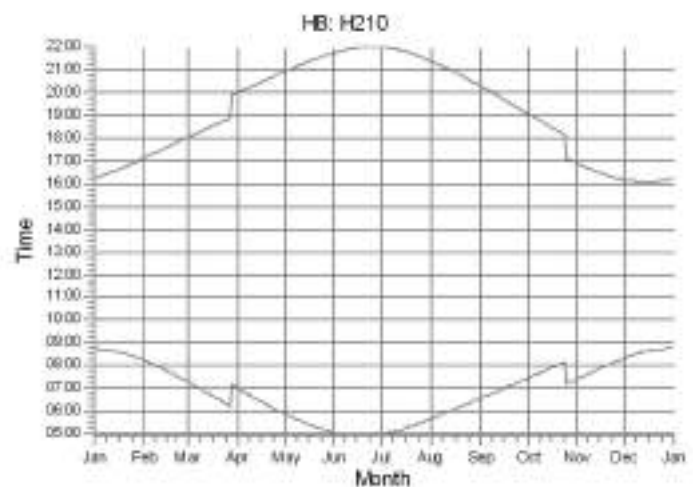
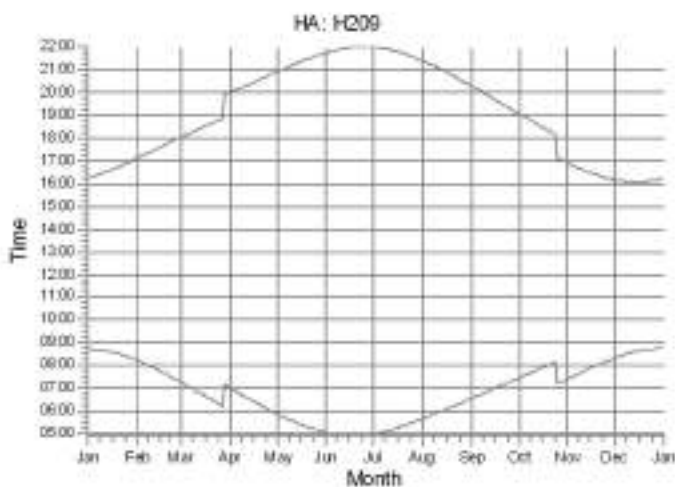
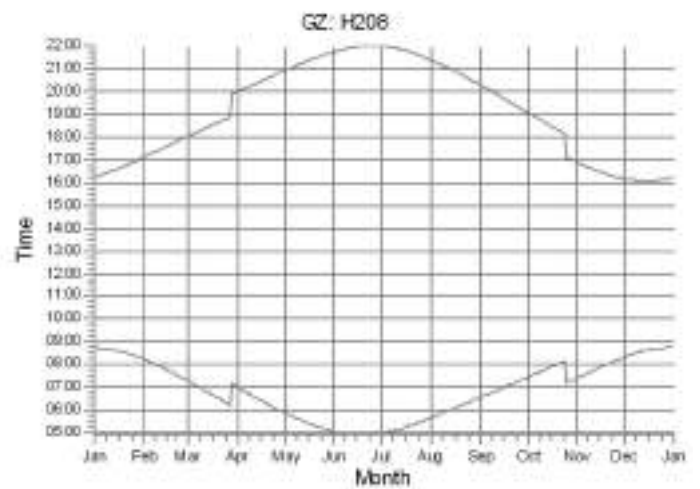
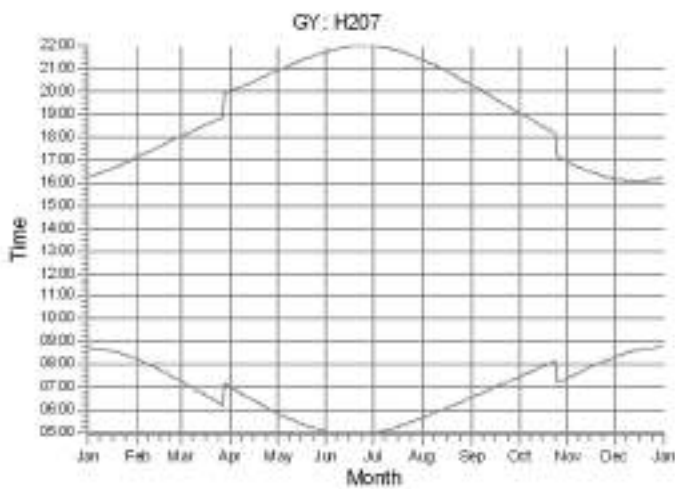
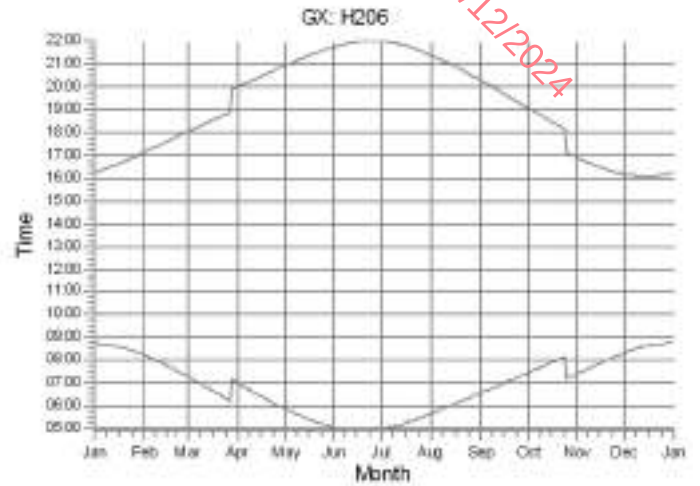
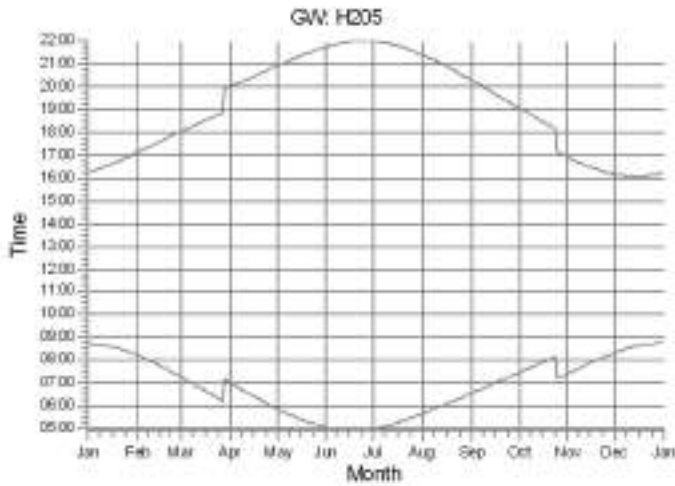
1: T01

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



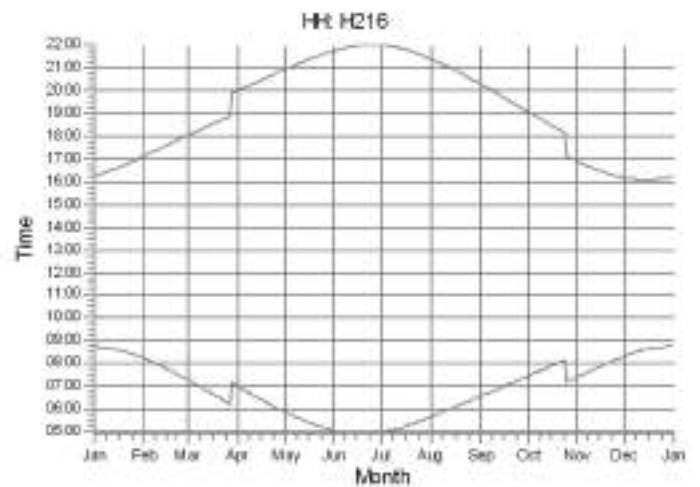
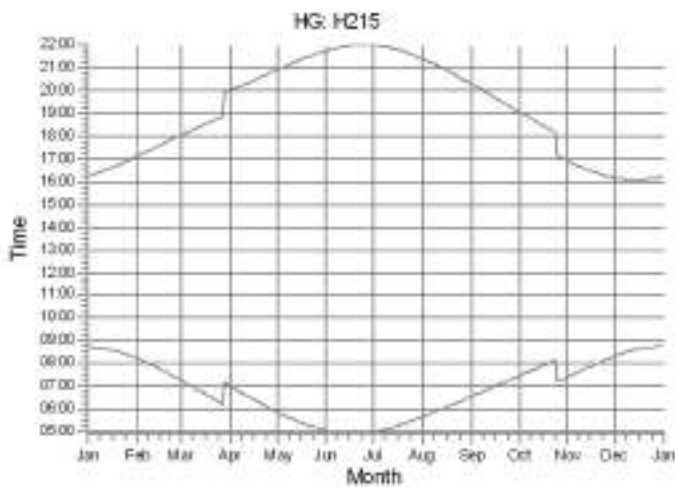
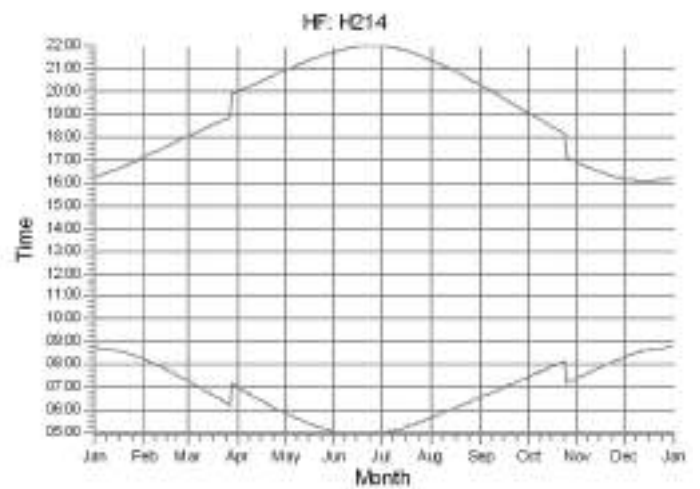
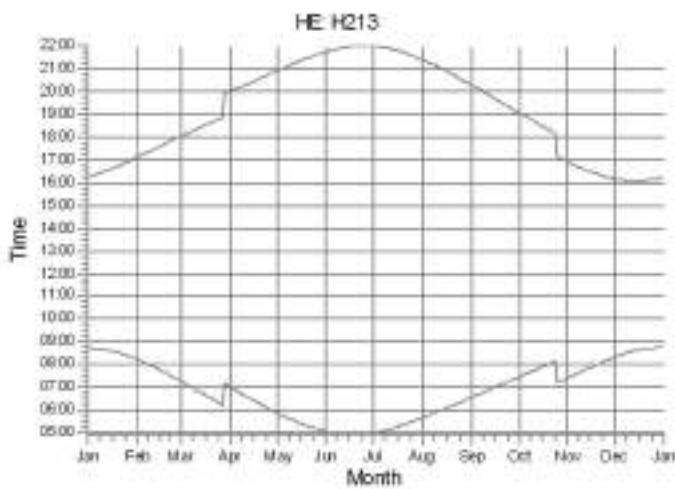
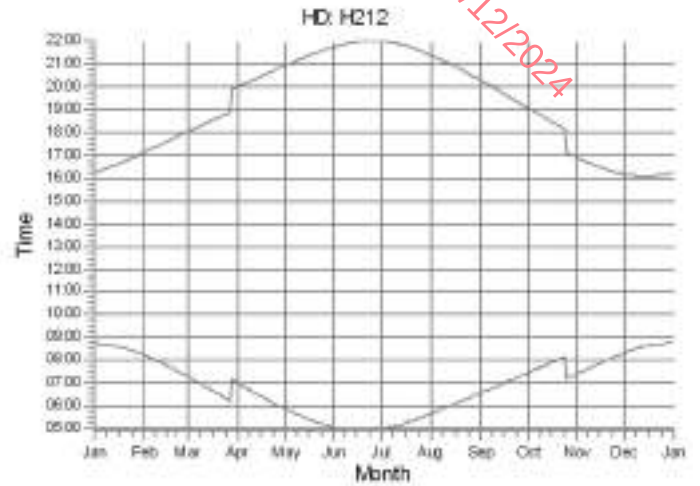
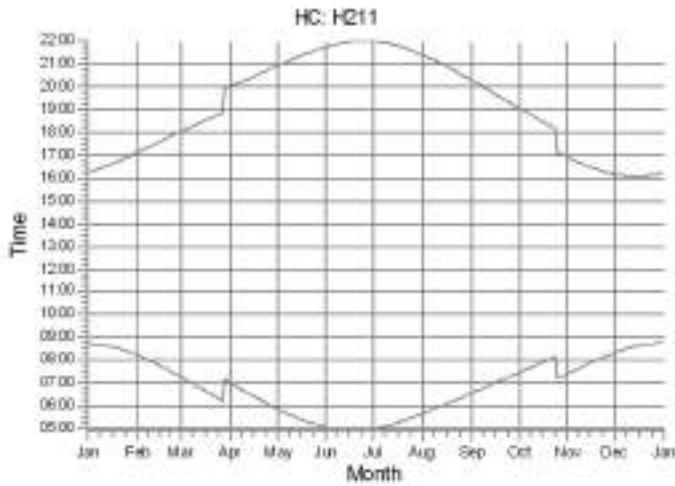
WTGs

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

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SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



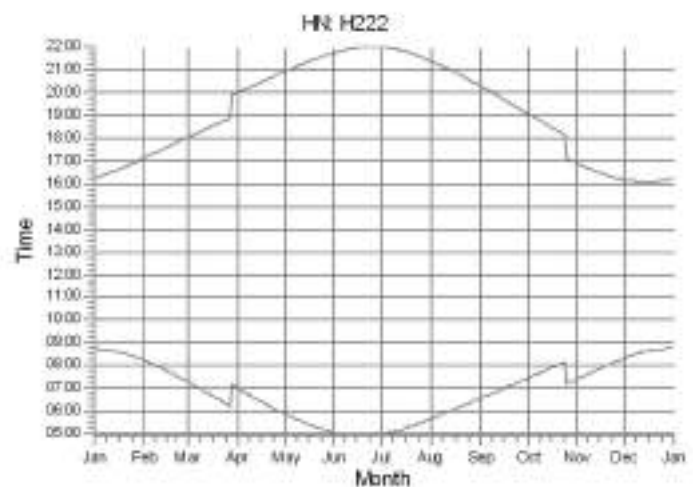
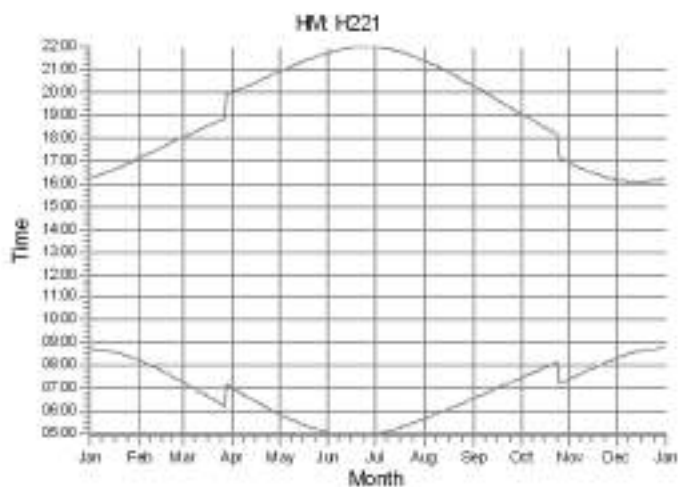
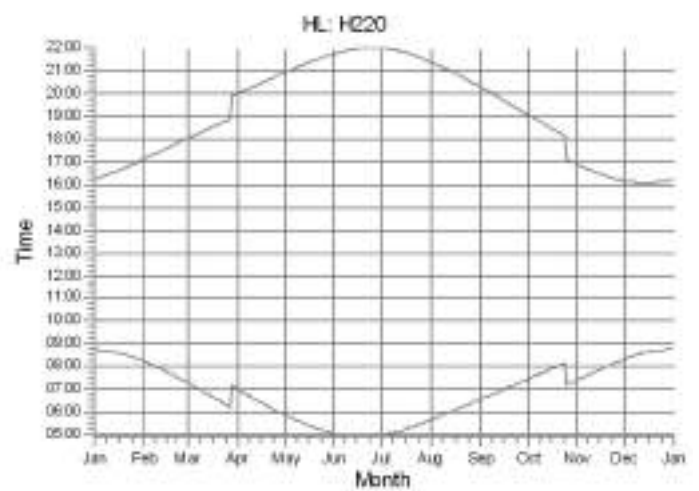
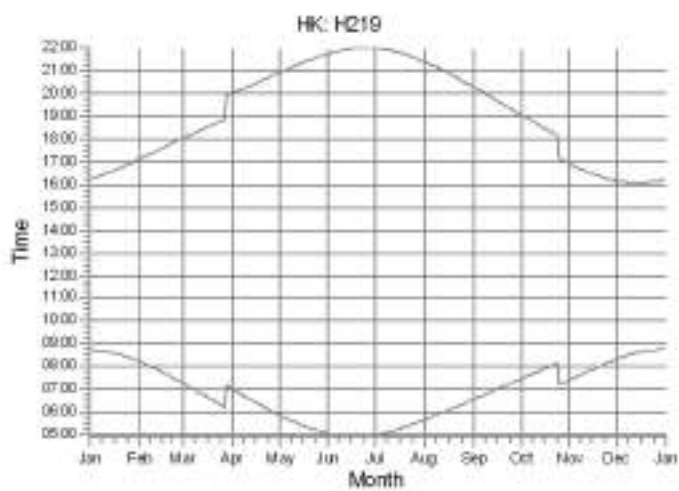
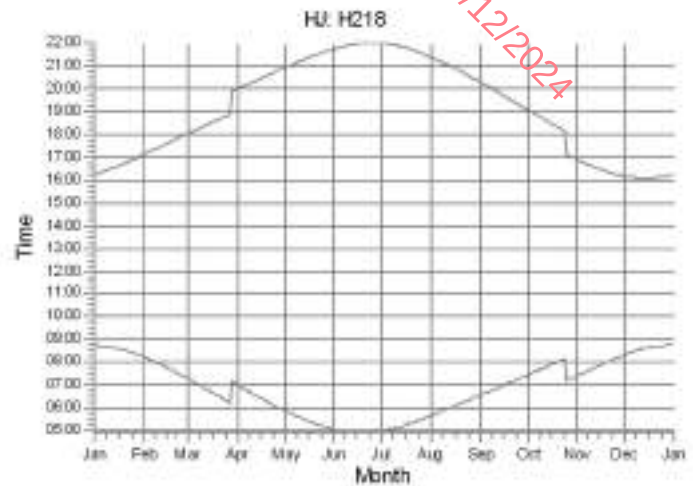
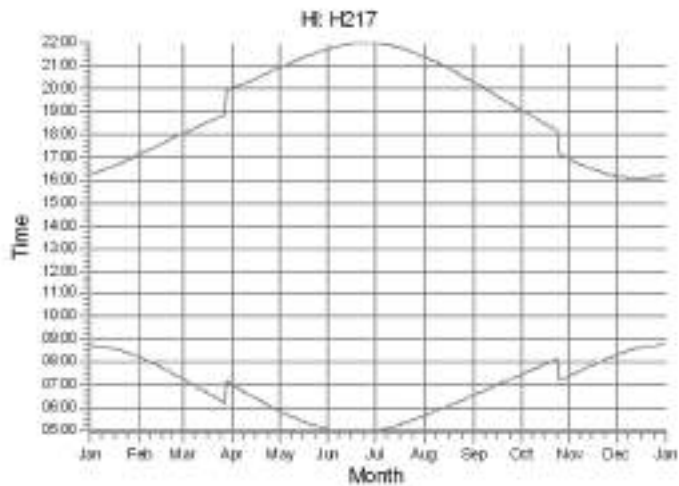
WTGs

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

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Finisklin Business Park
IE-F91 RHH9 Sligo
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Calculated:
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SHADOW - Calendar, graphical

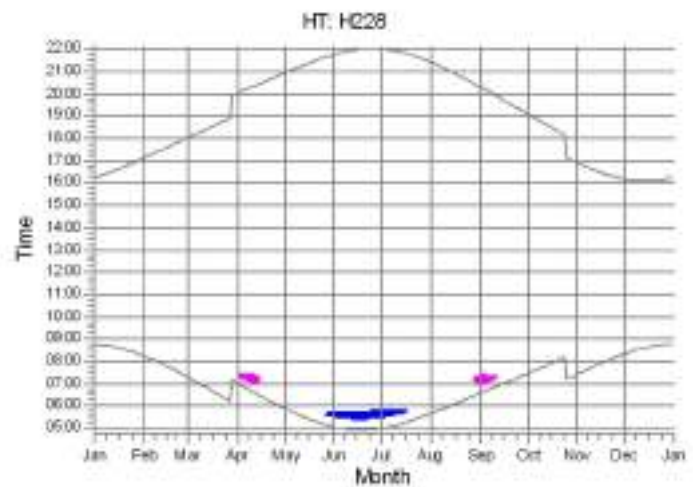
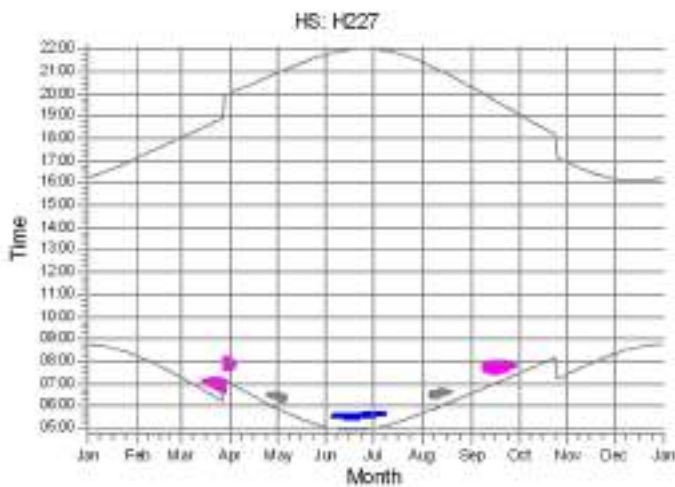
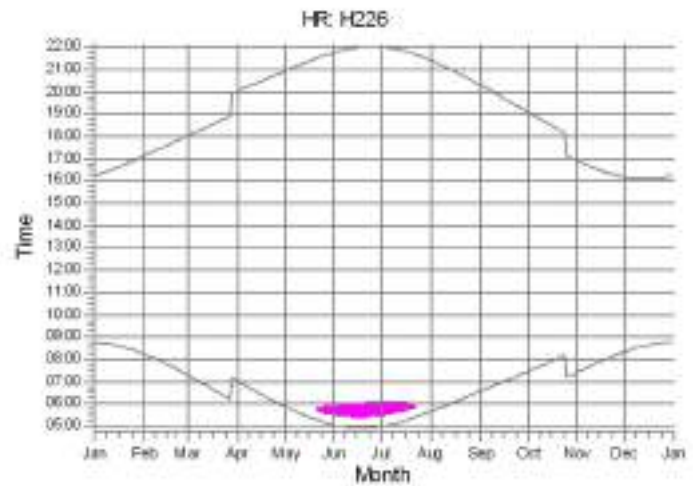
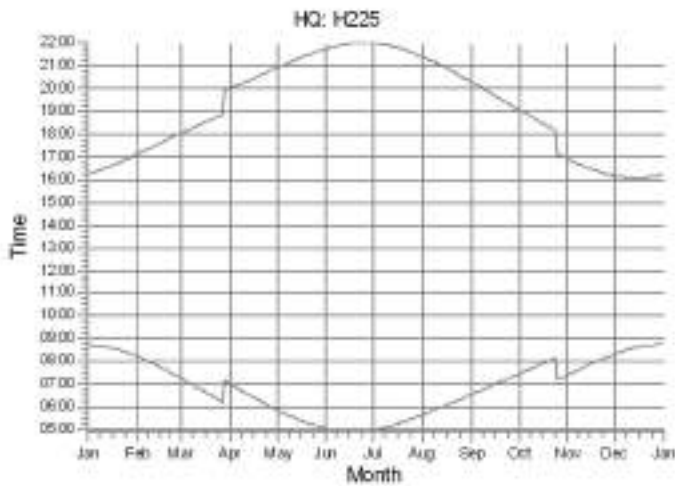
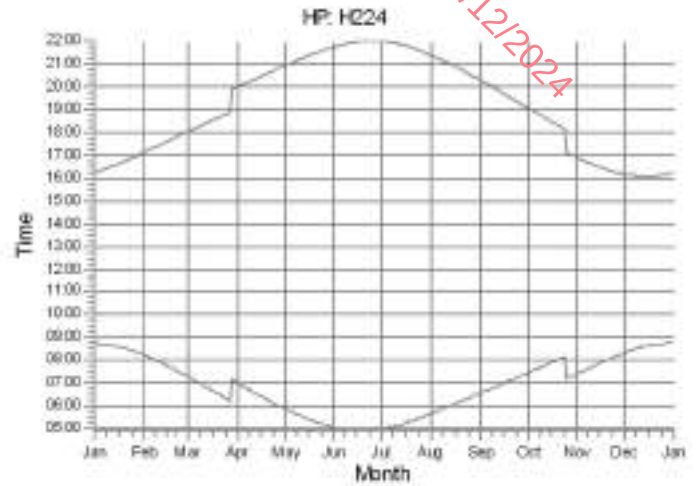
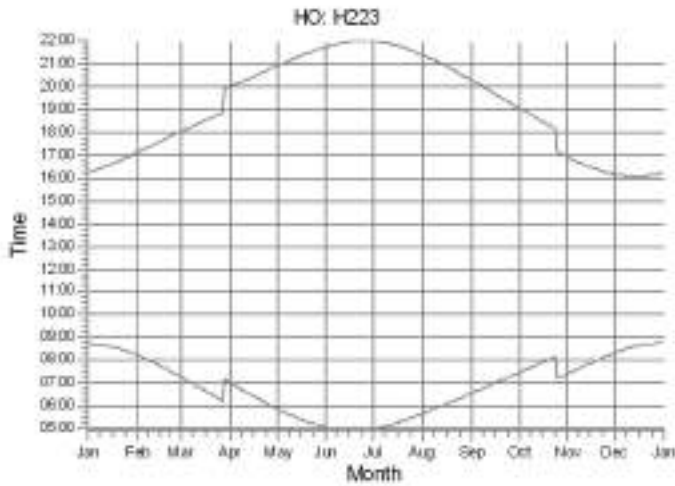
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

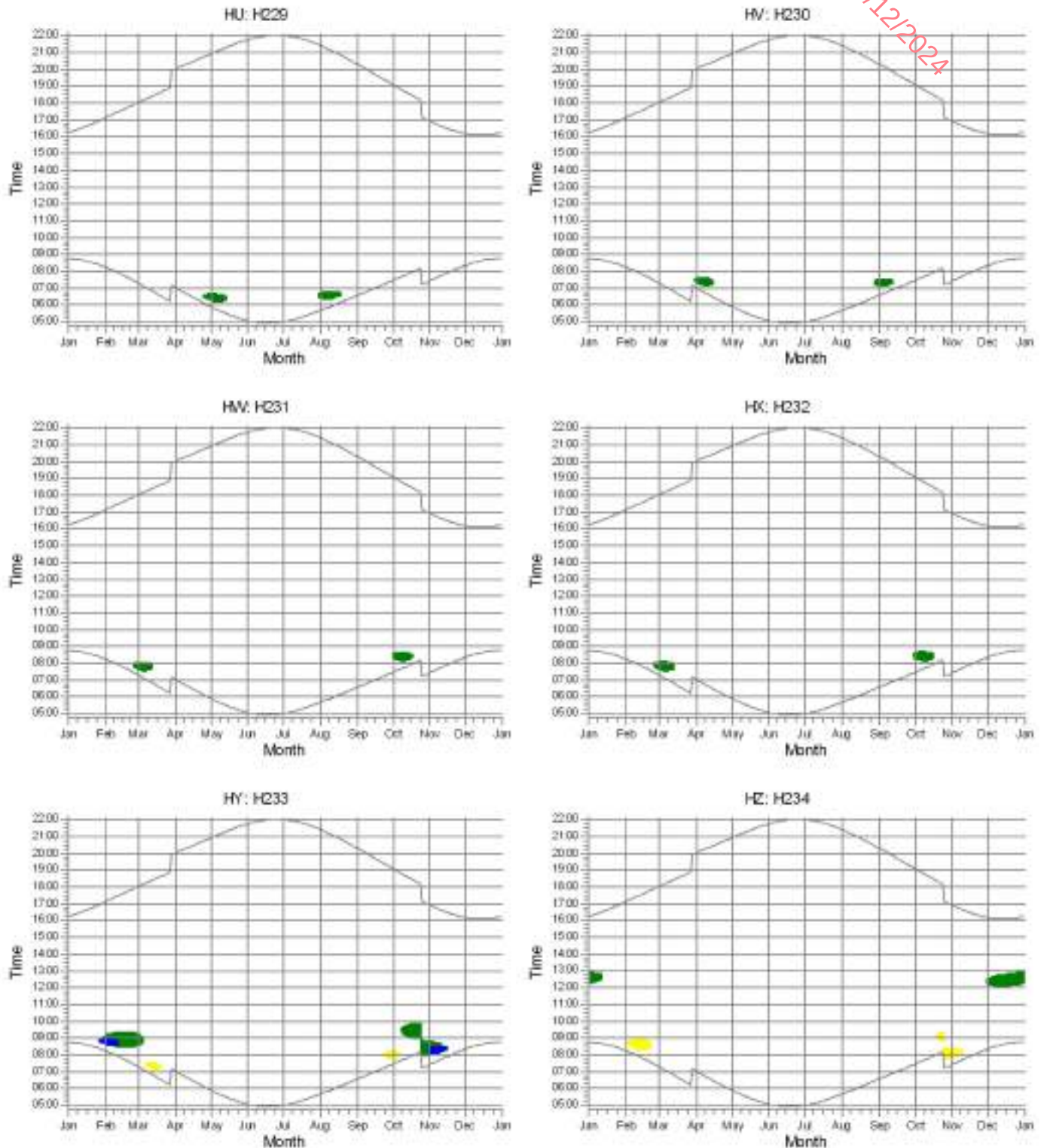


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

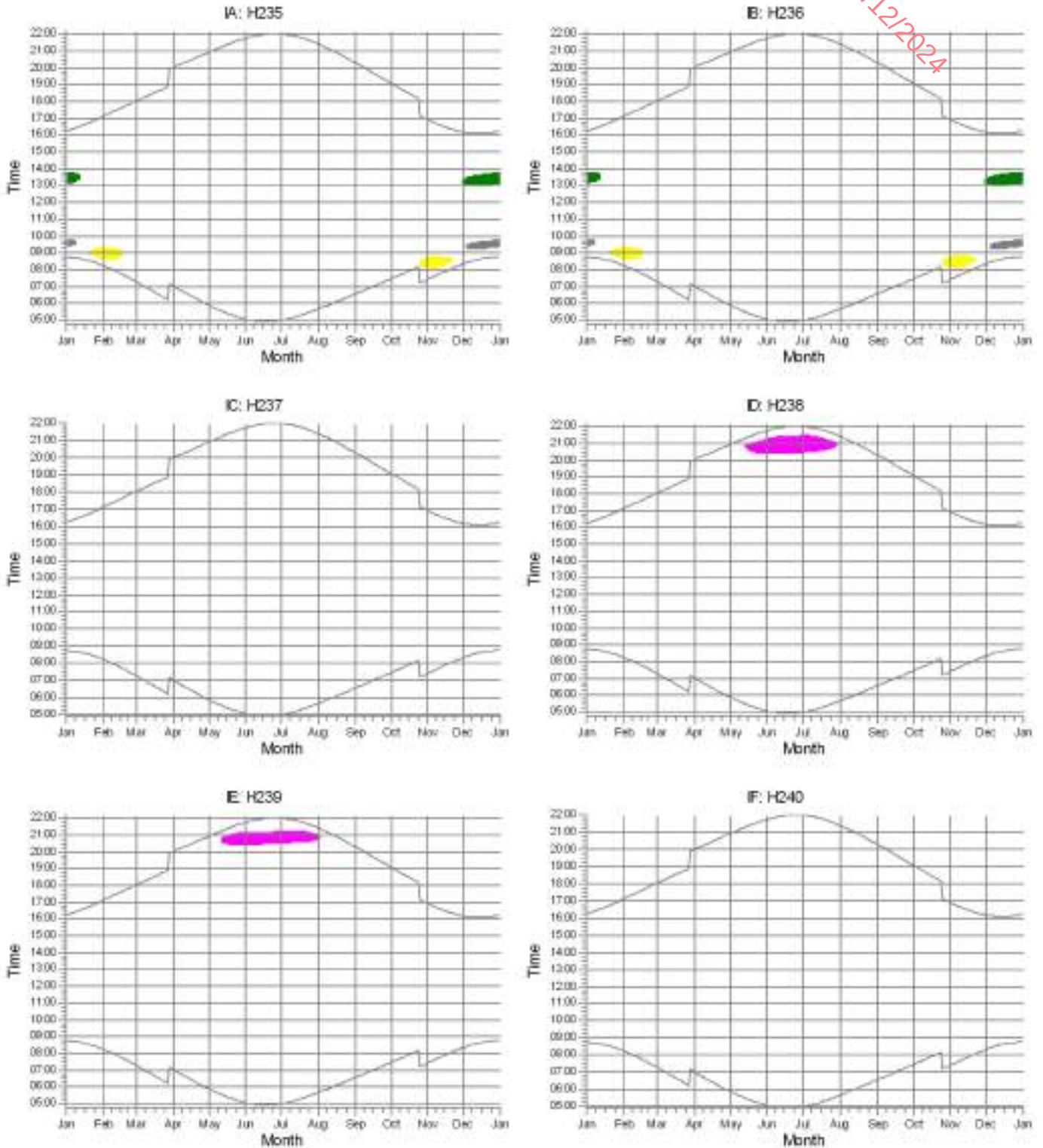


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

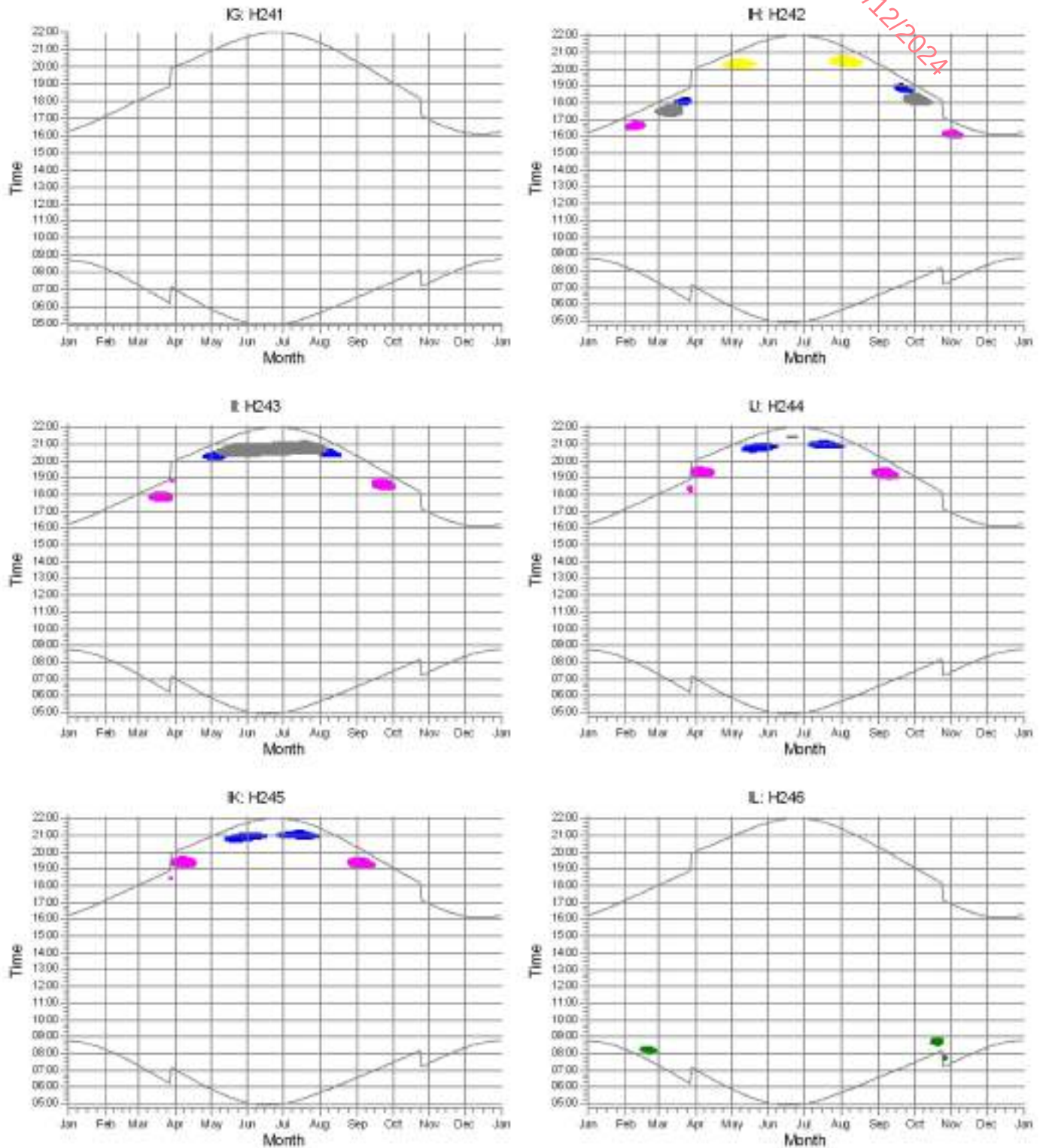


WTGs

1: T01 2: T02 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

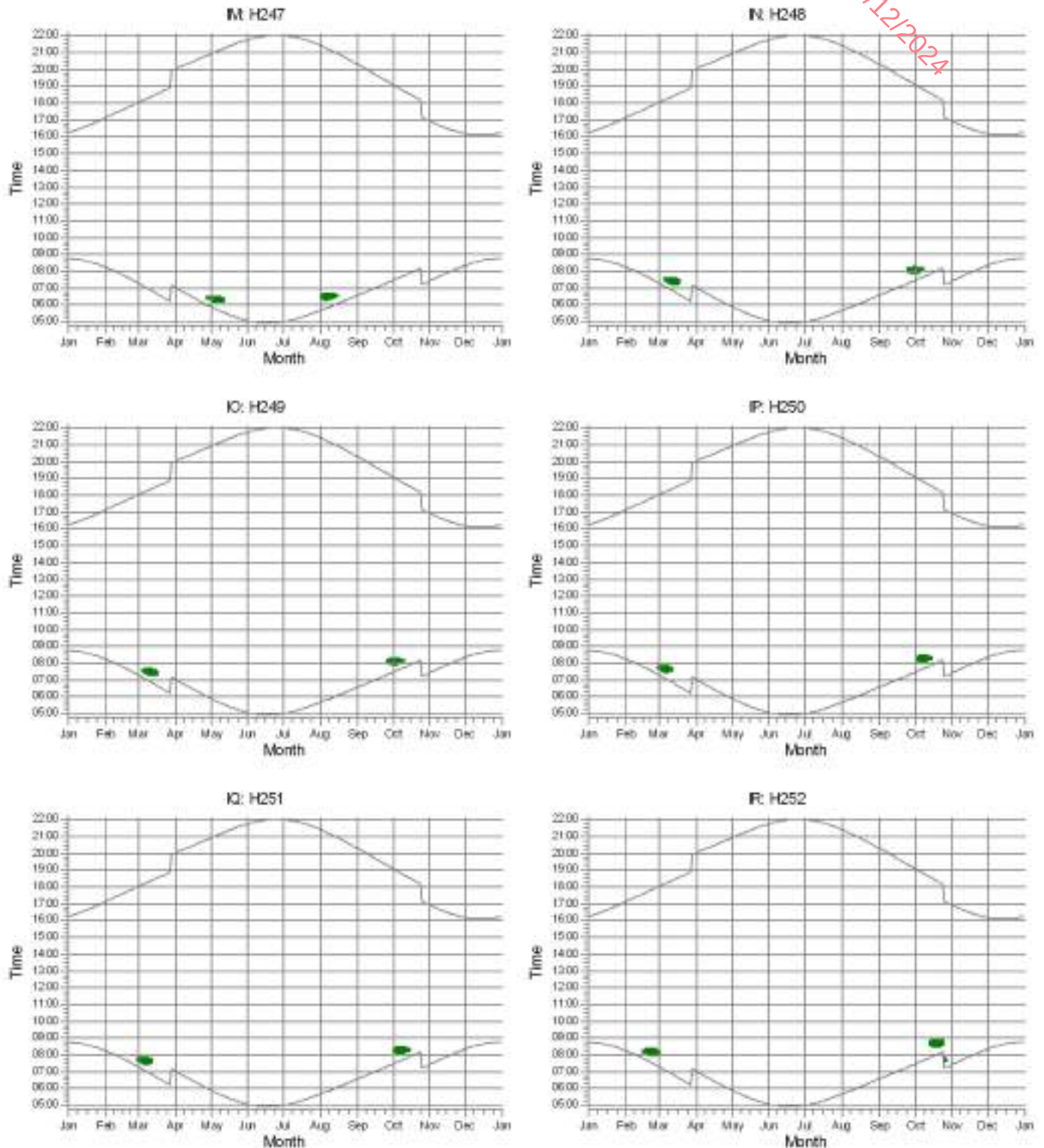


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

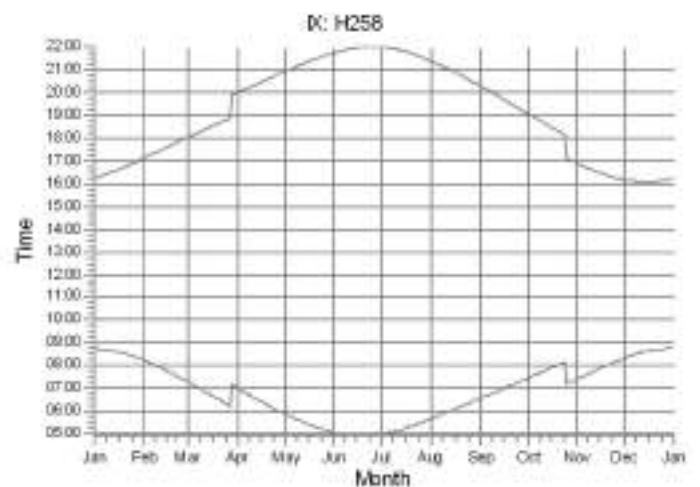
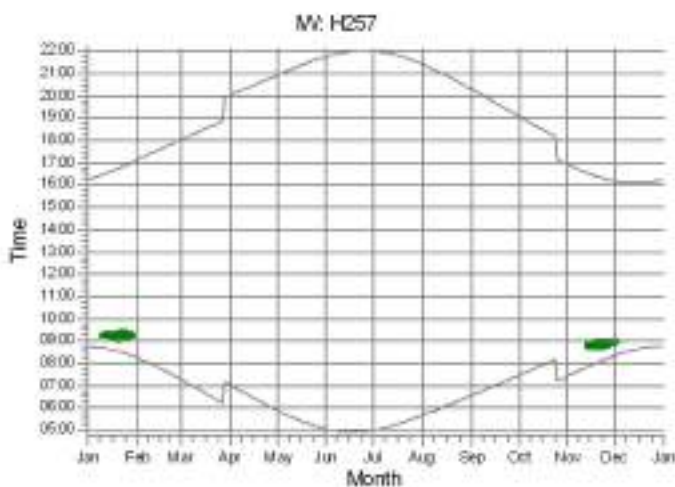
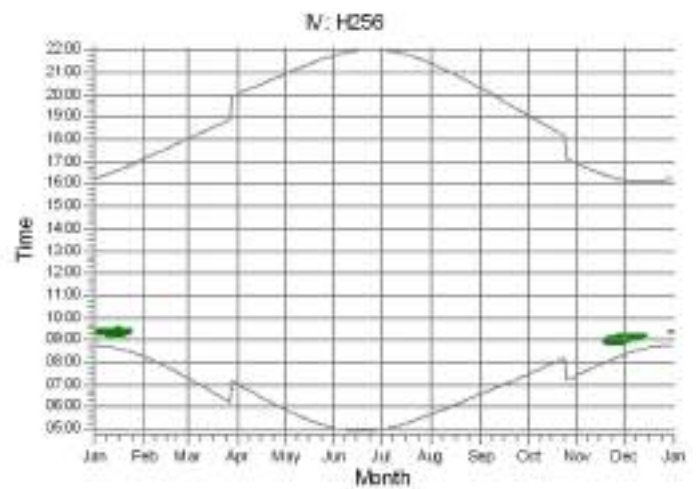
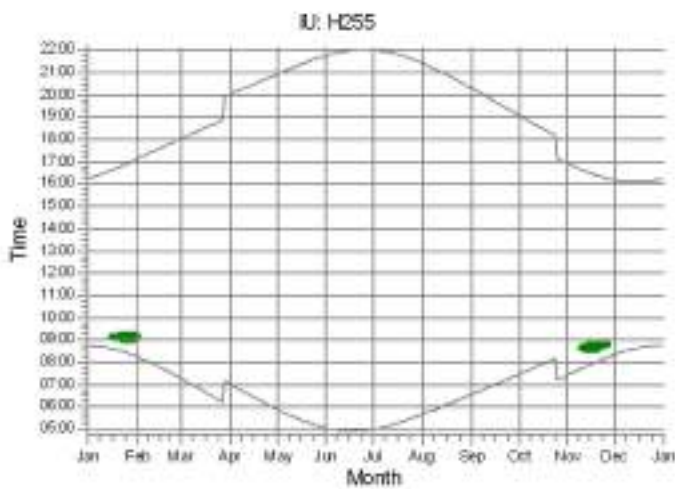
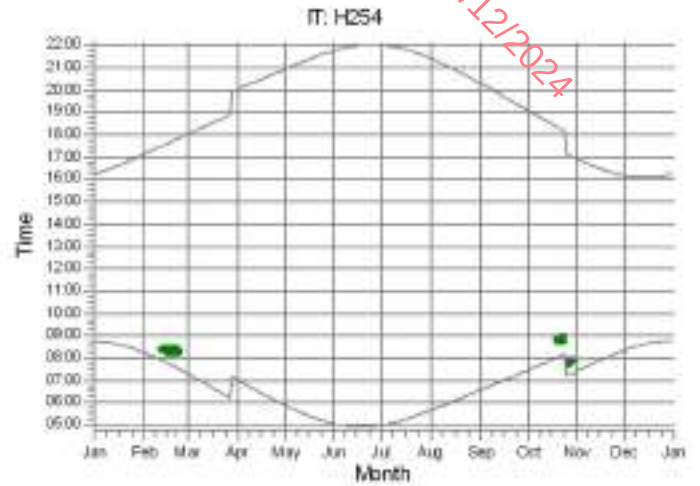
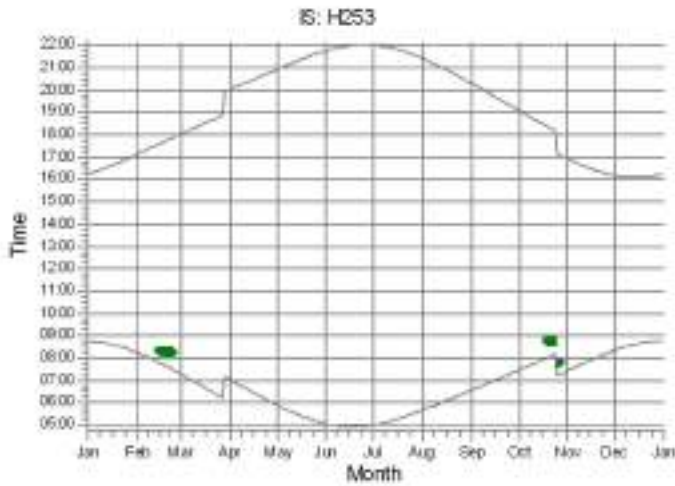


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



WTGs

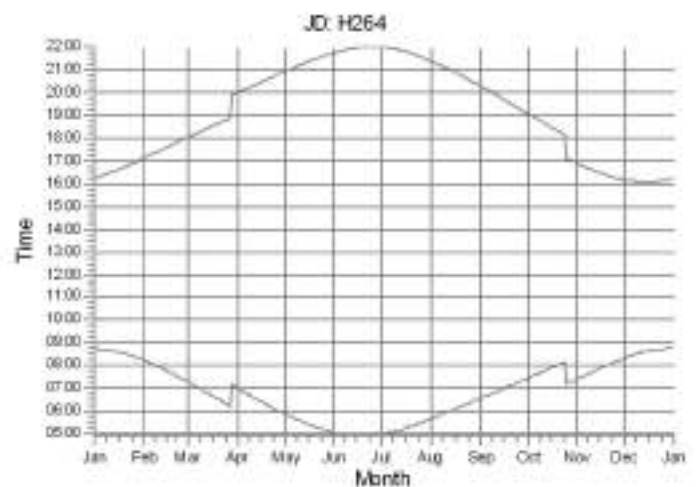
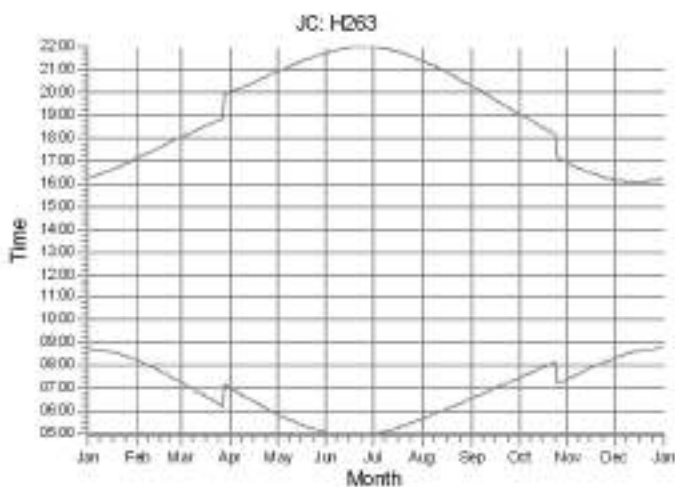
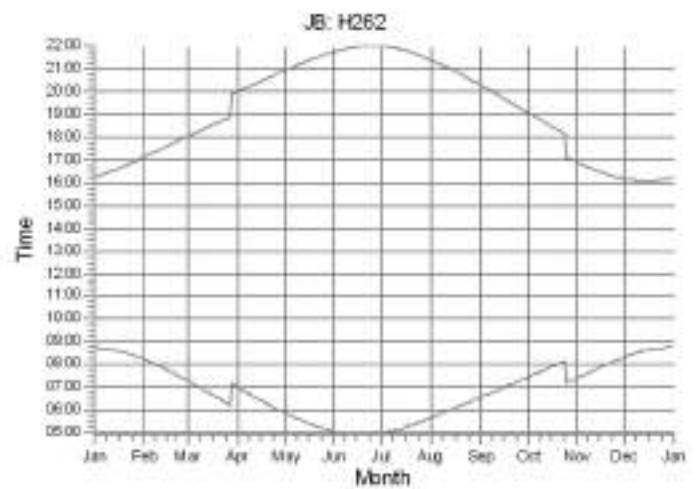
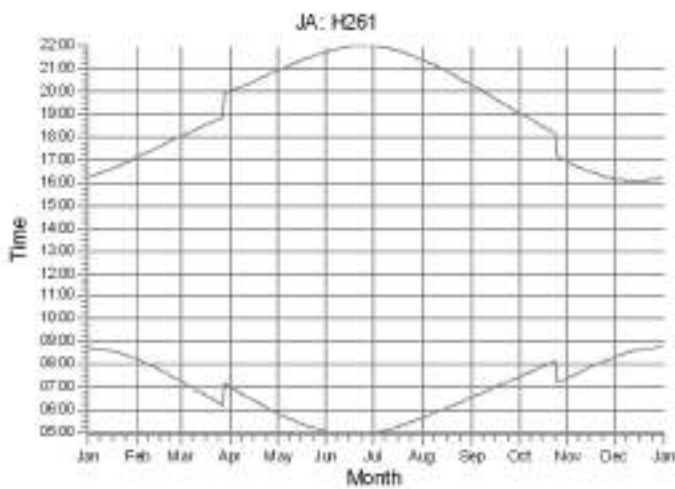
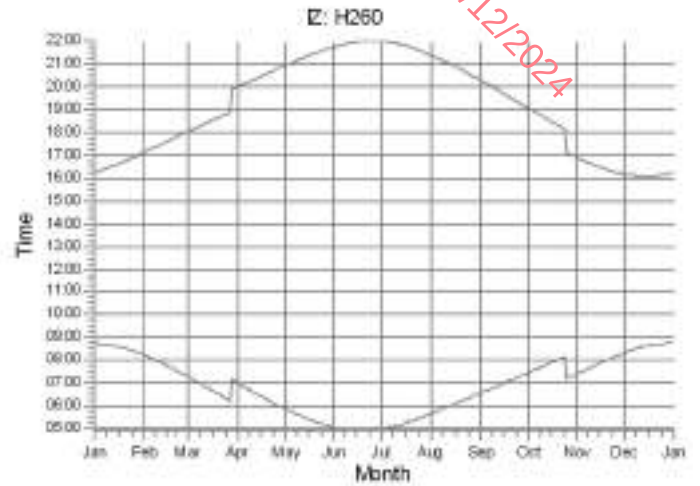
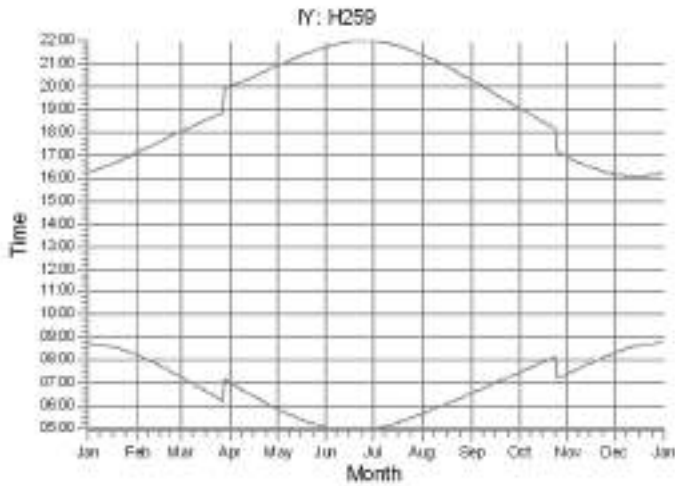
1: T01

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

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Finisklin Business Park
IE-F91 RHH9 Sligo
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SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



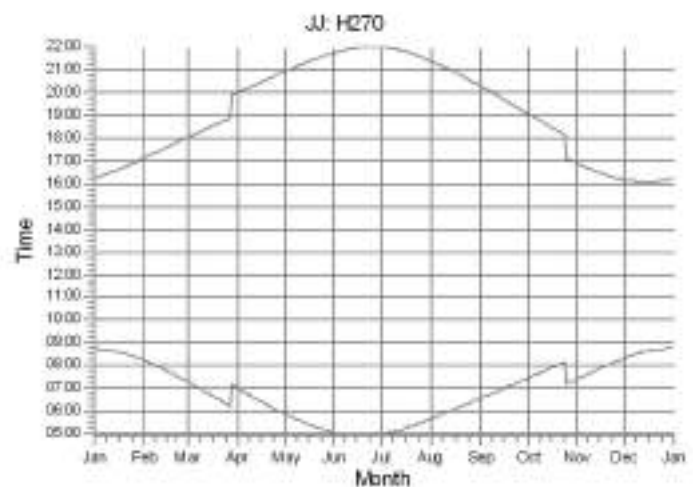
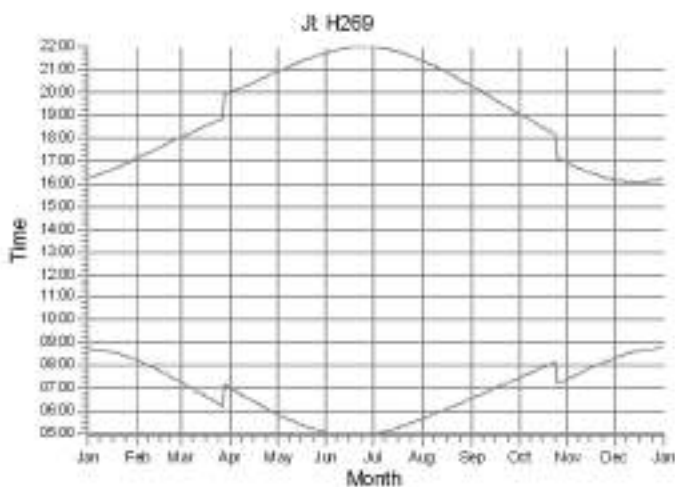
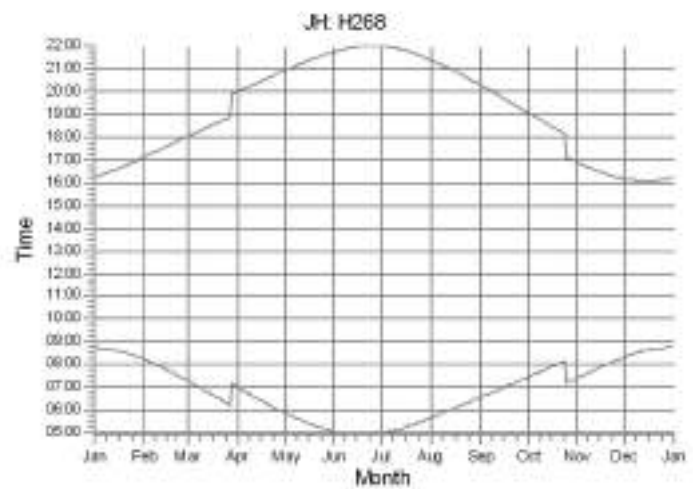
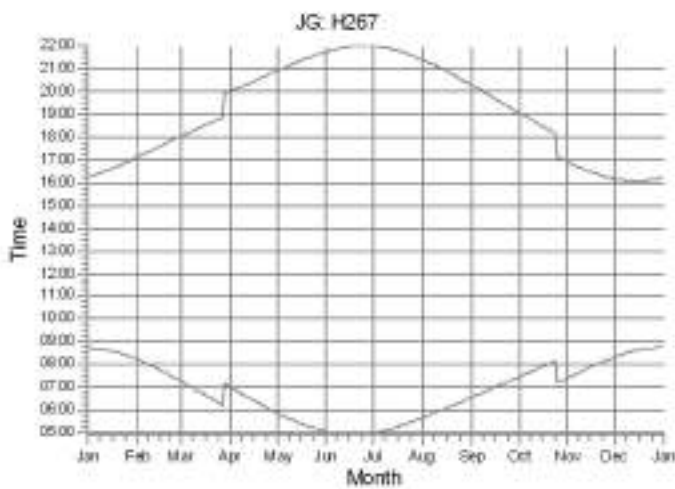
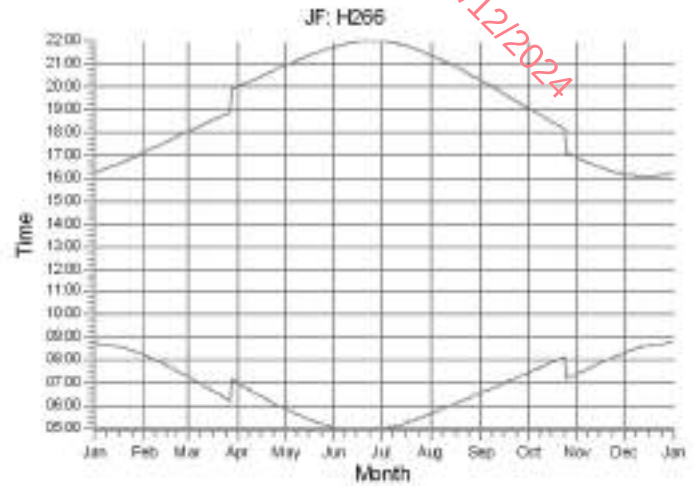
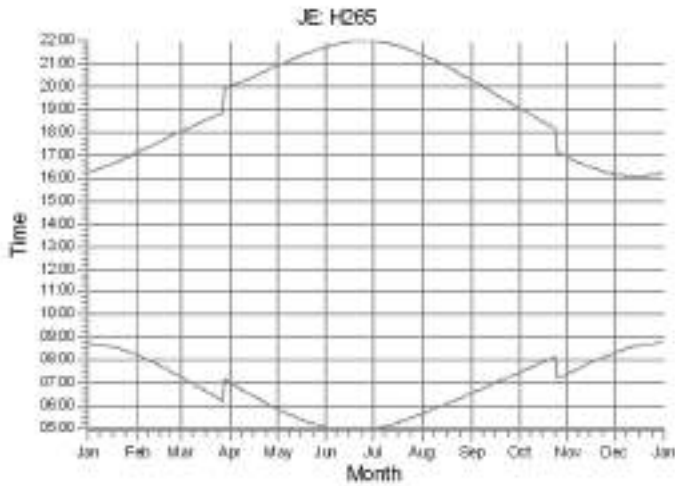
WTGs

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

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Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



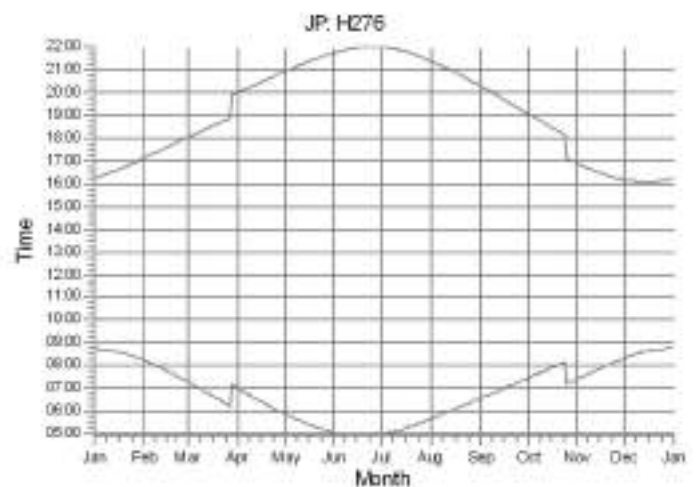
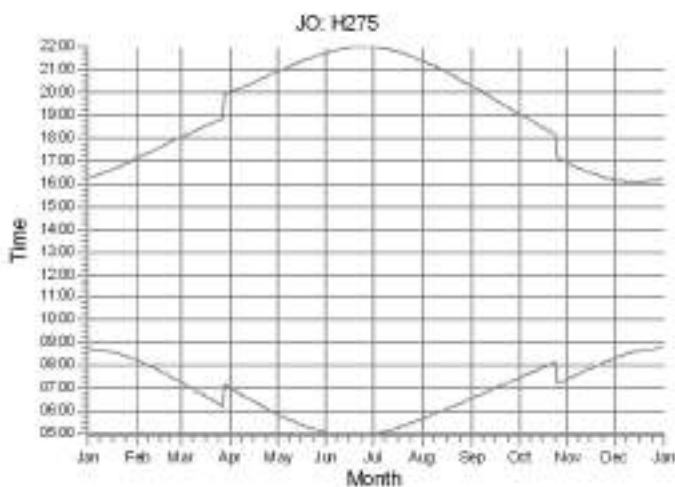
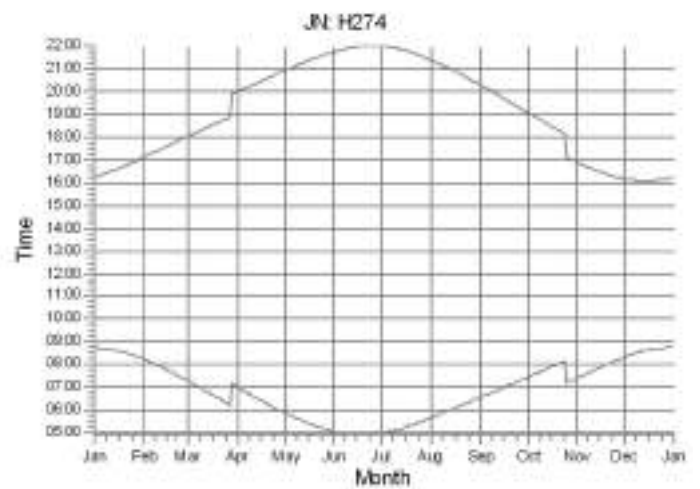
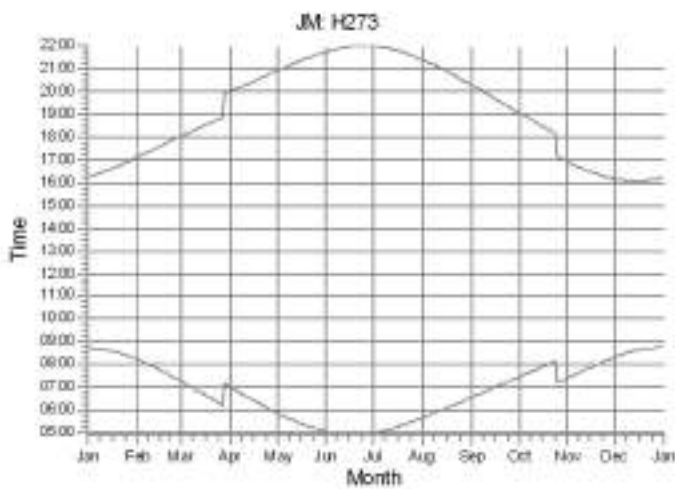
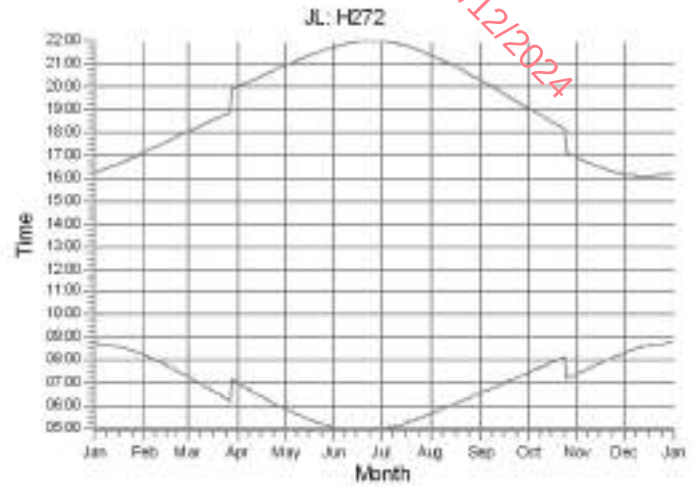
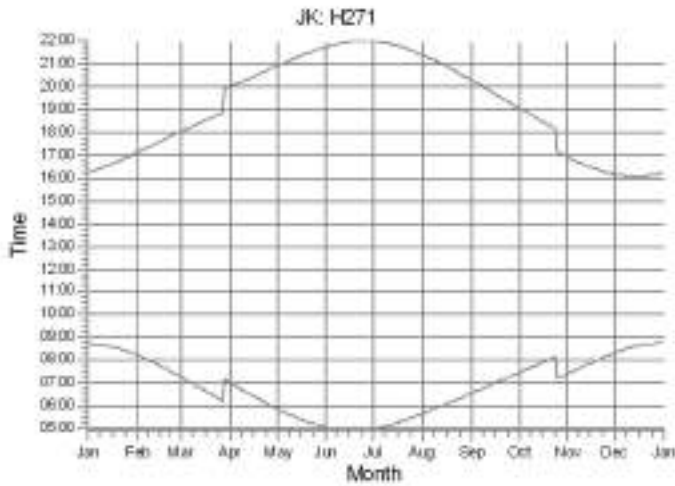
WTGs

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

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Finisklin Business Park
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abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



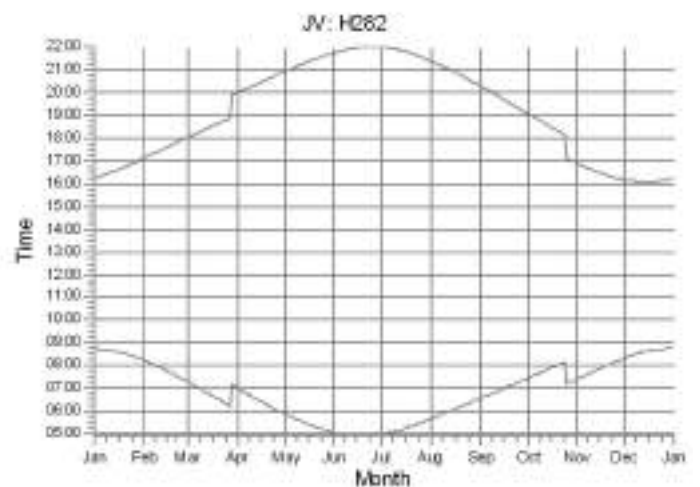
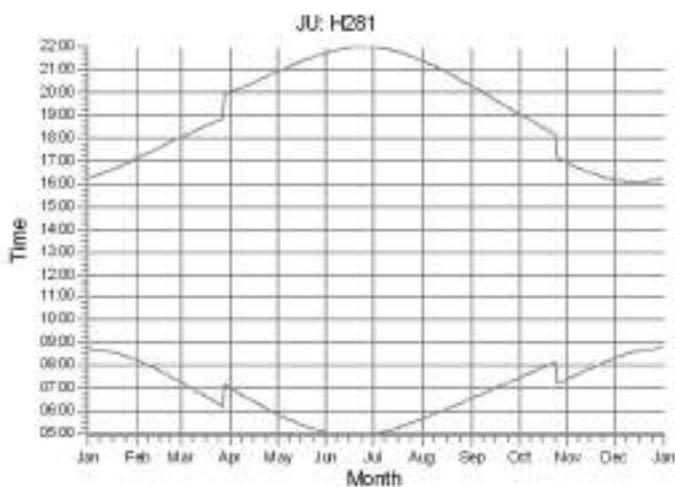
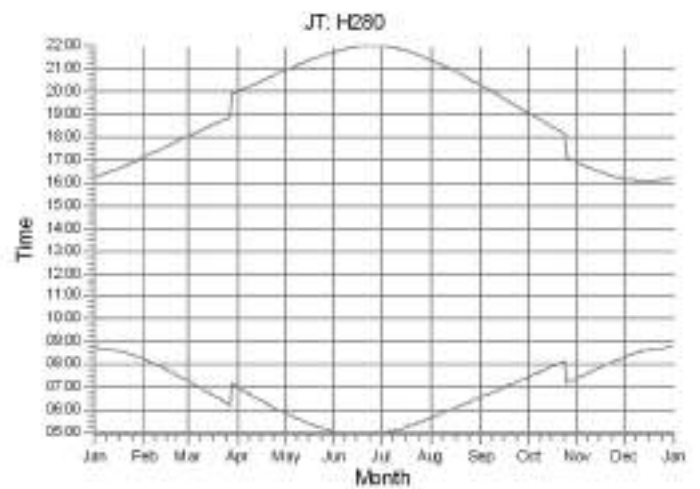
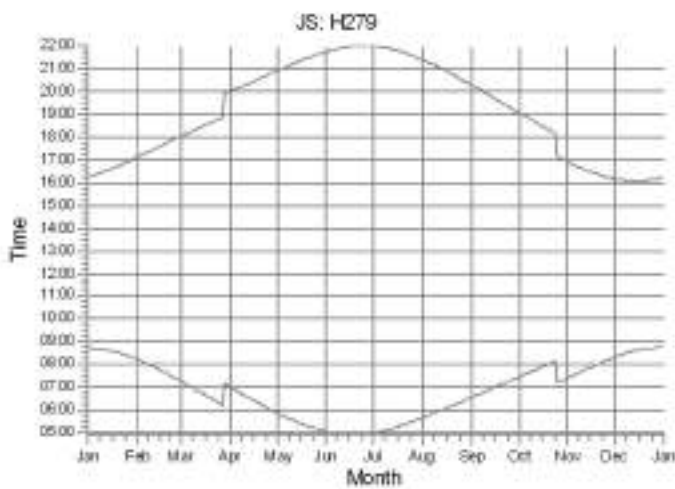
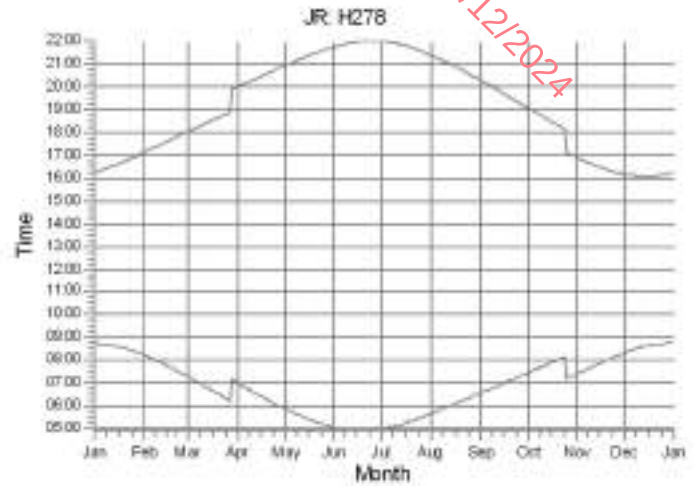
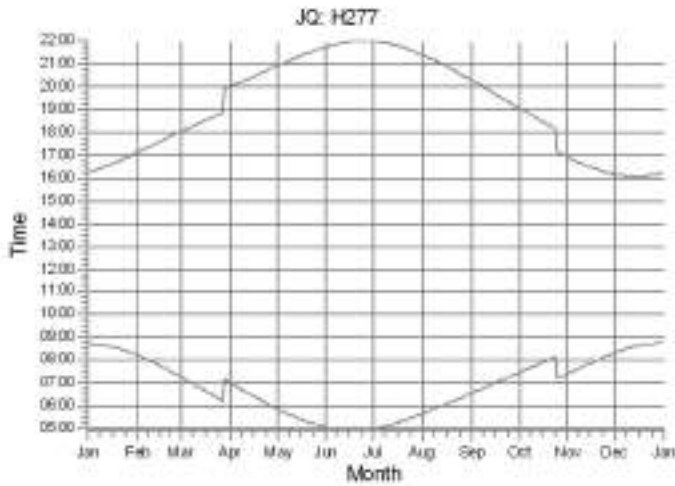
WTGs

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SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



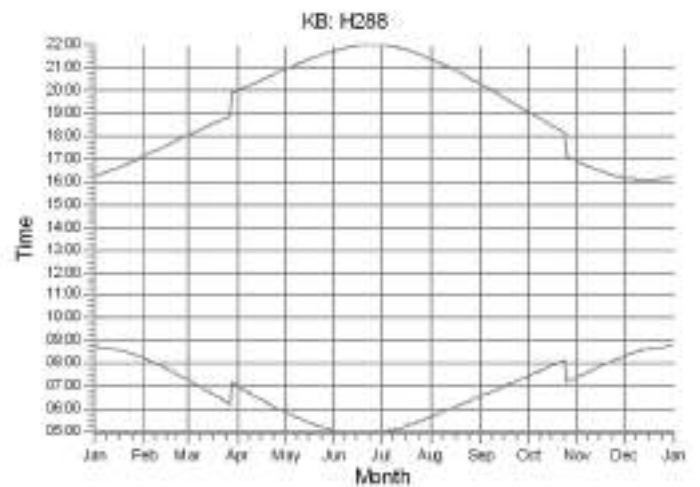
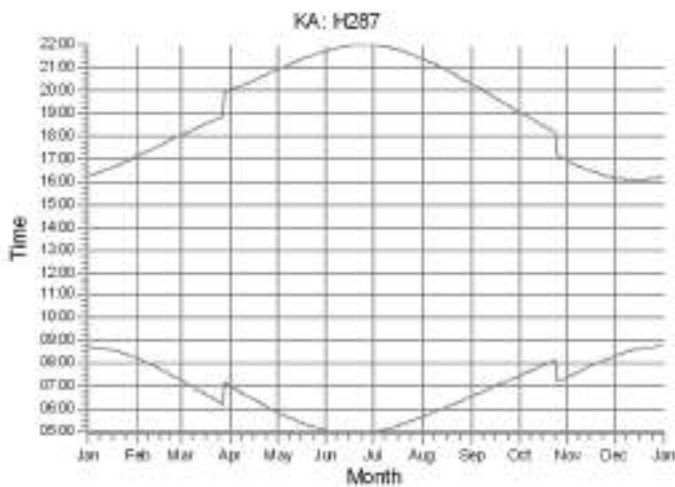
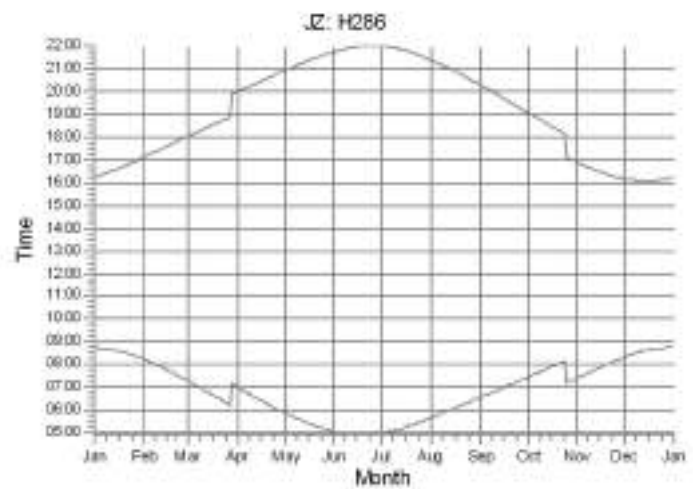
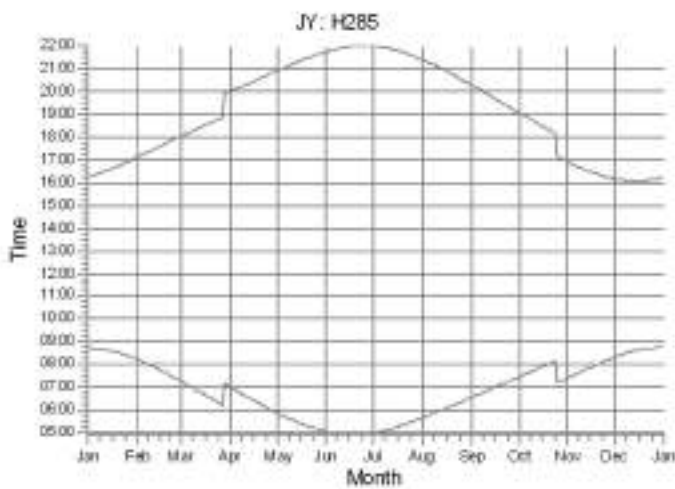
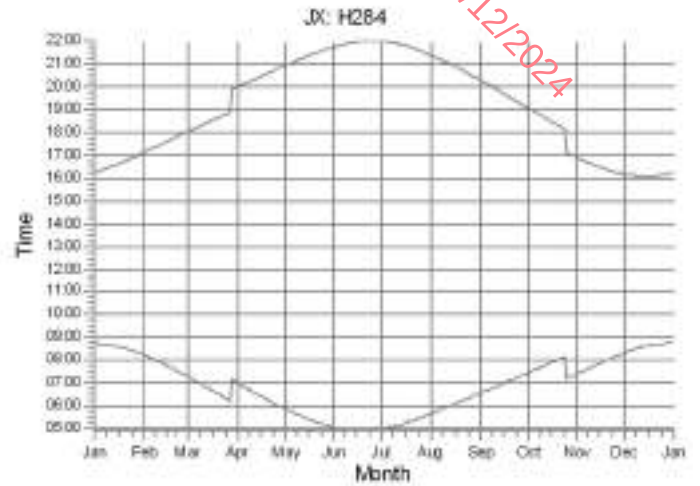
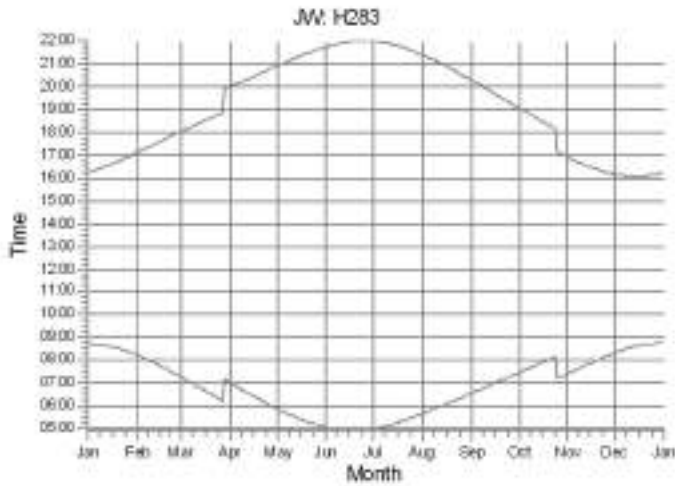
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SHADOW - Calendar, graphical

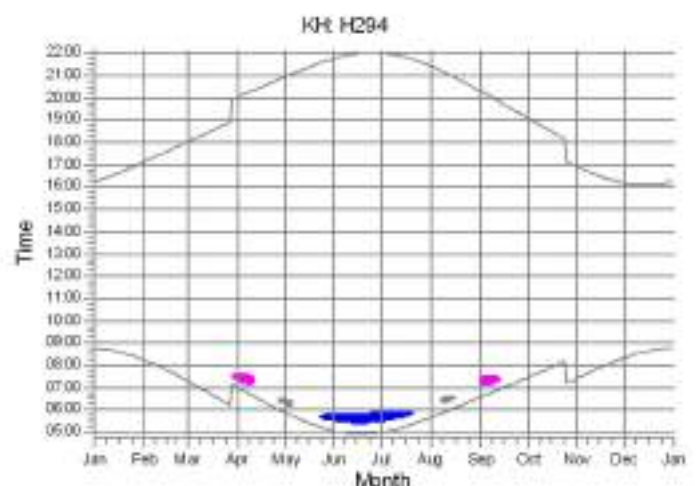
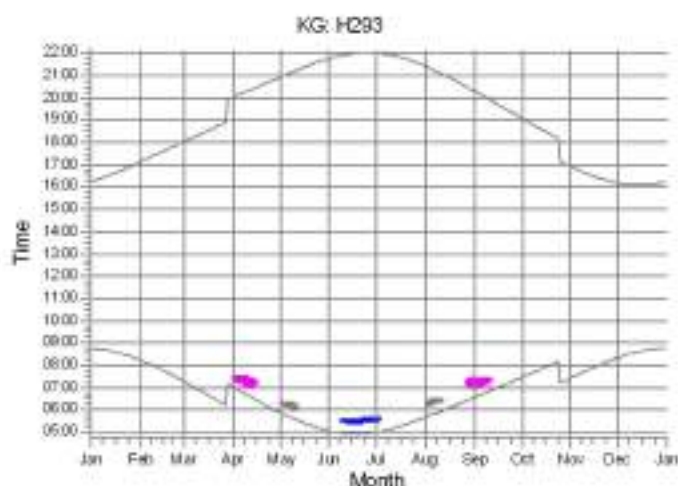
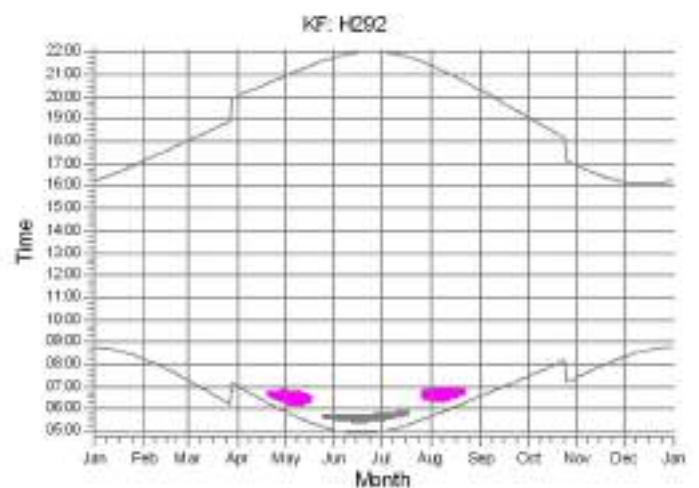
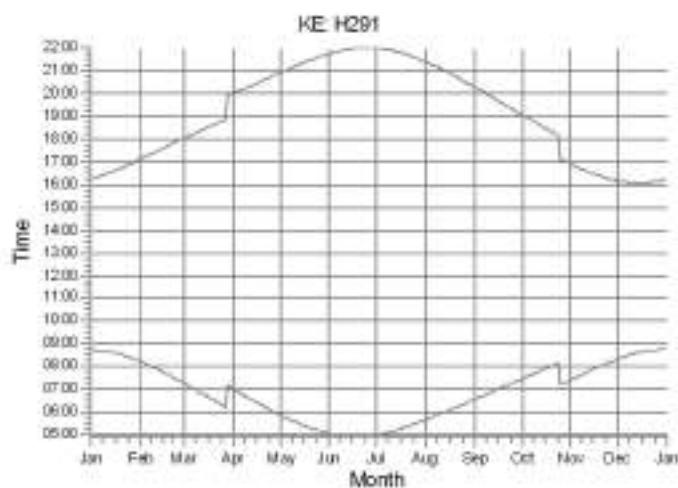
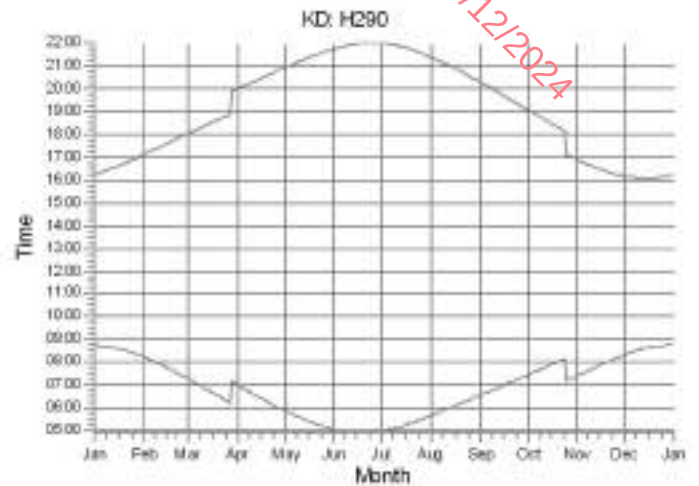
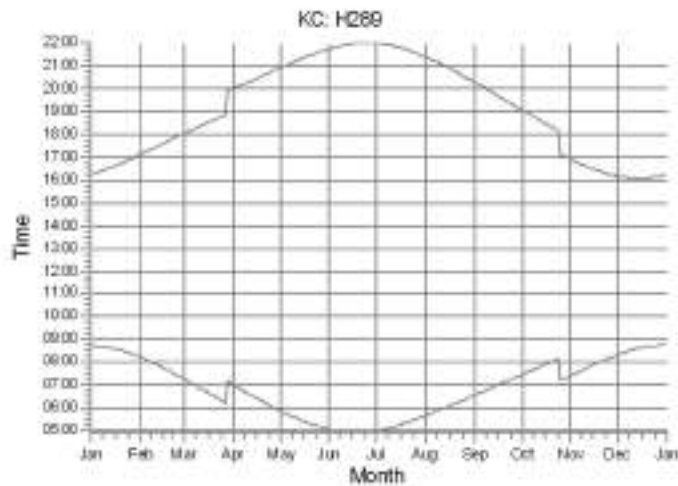
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

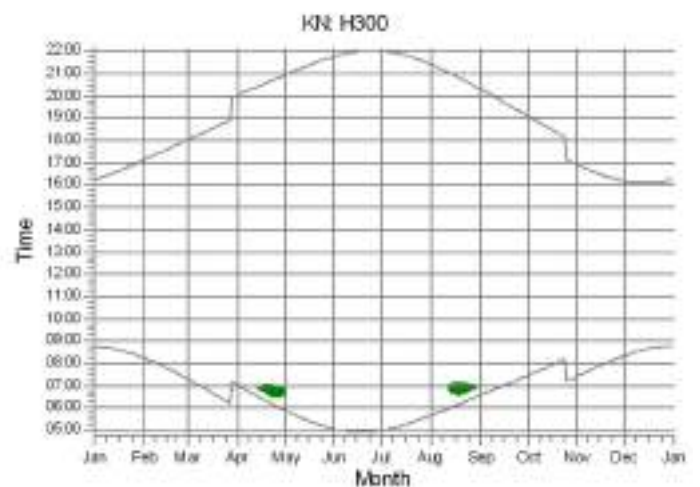
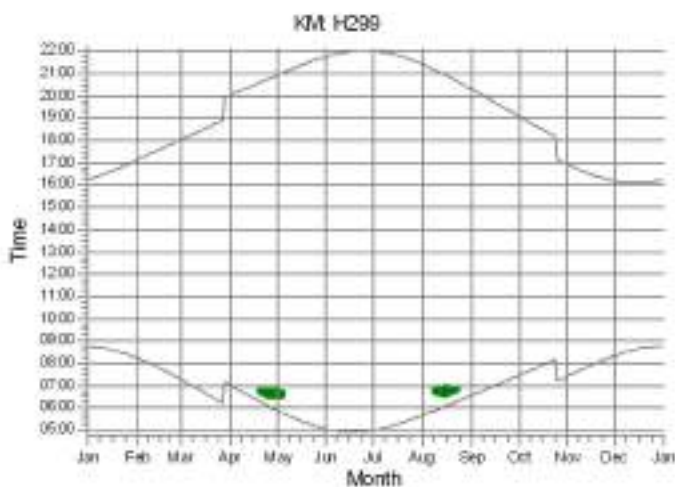
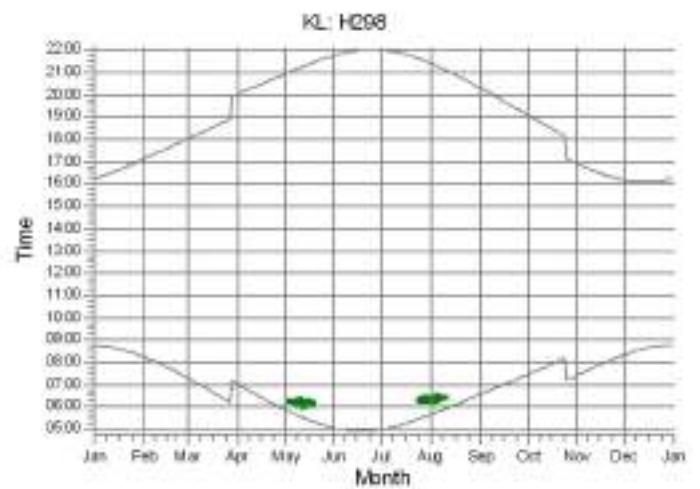
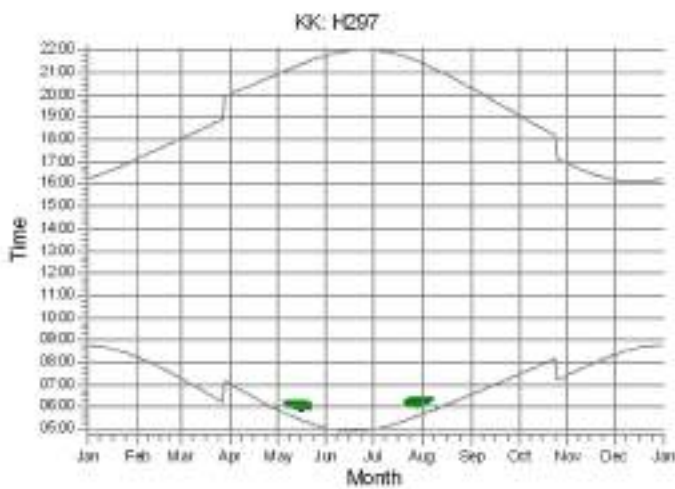
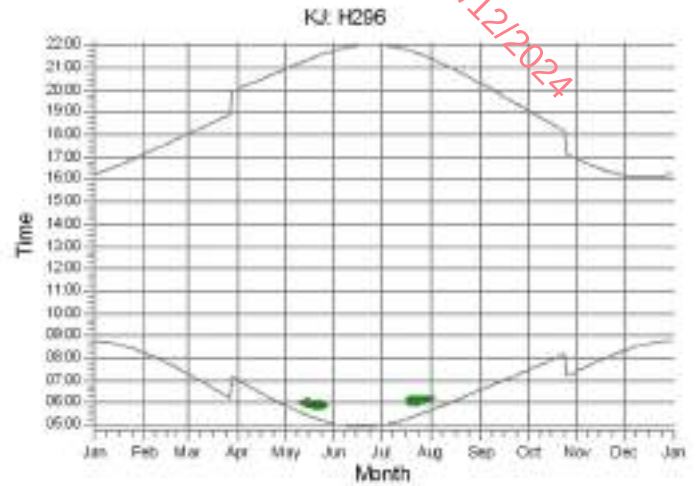
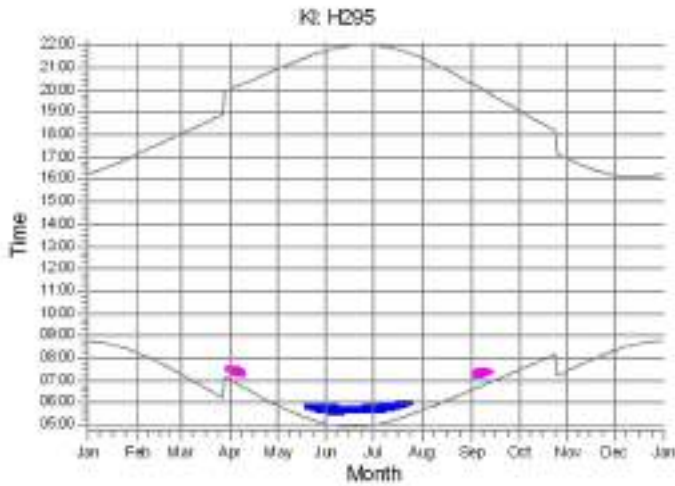


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

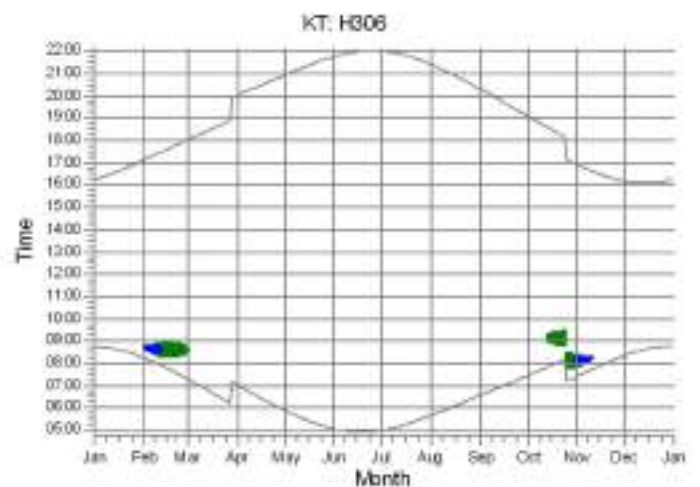
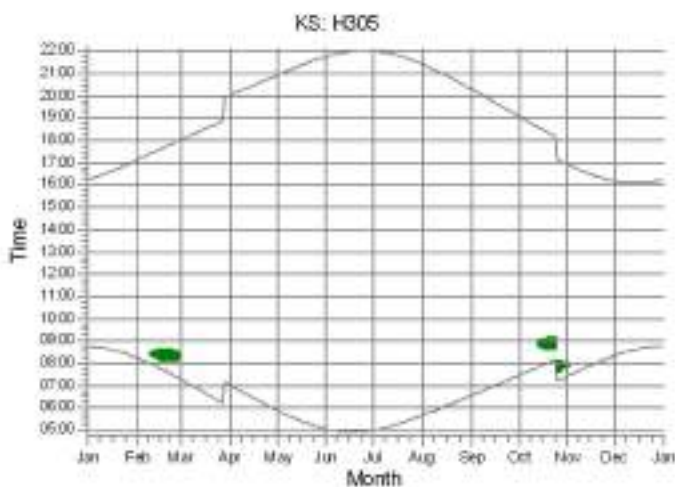
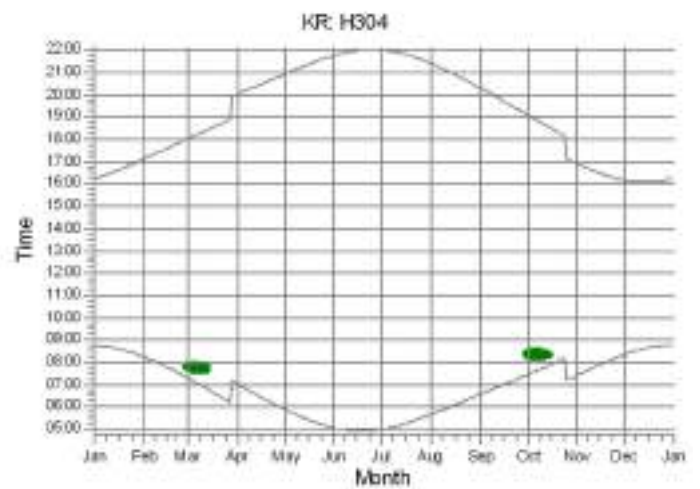
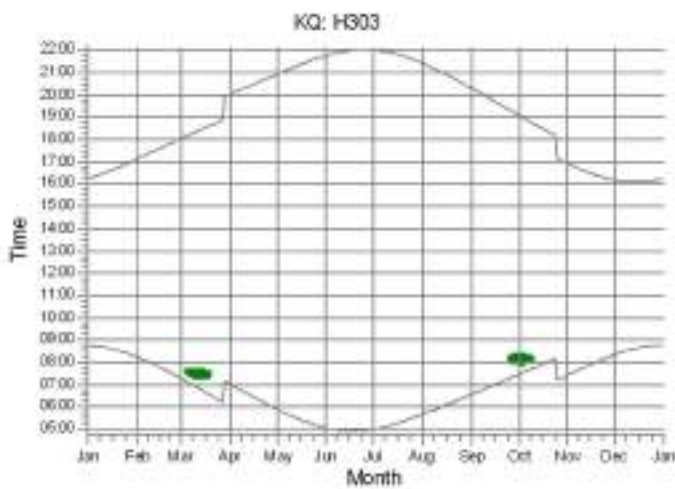
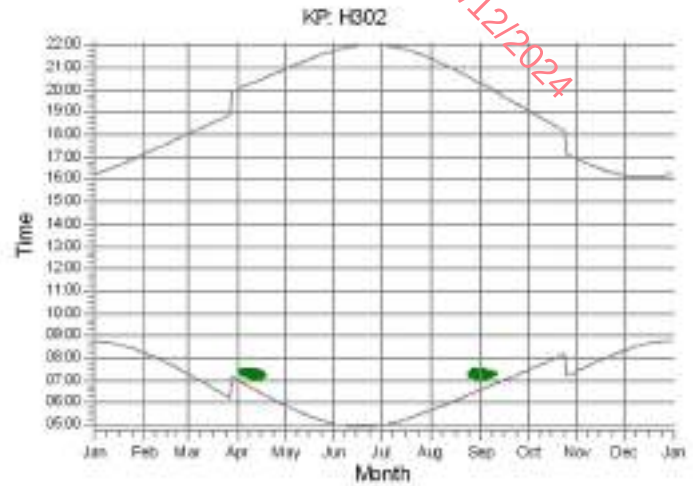
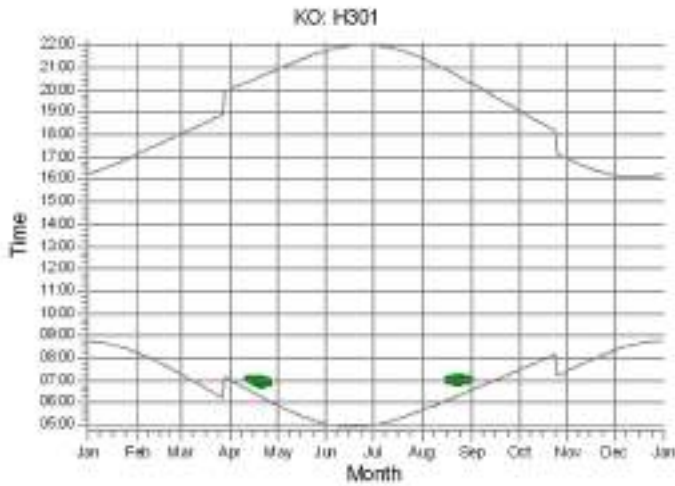


WTGs

1: T01 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

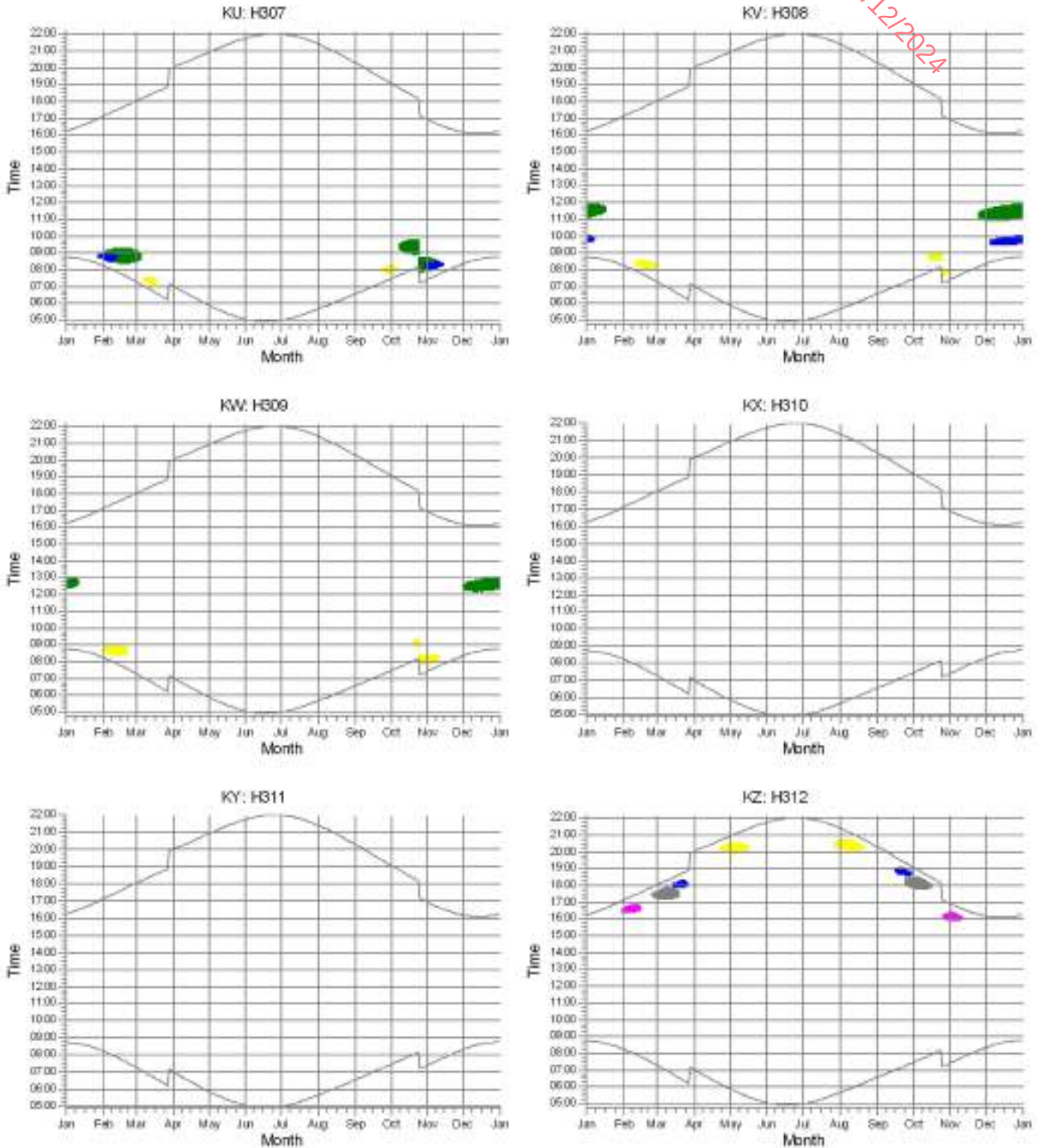


WTGs

1: T01 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

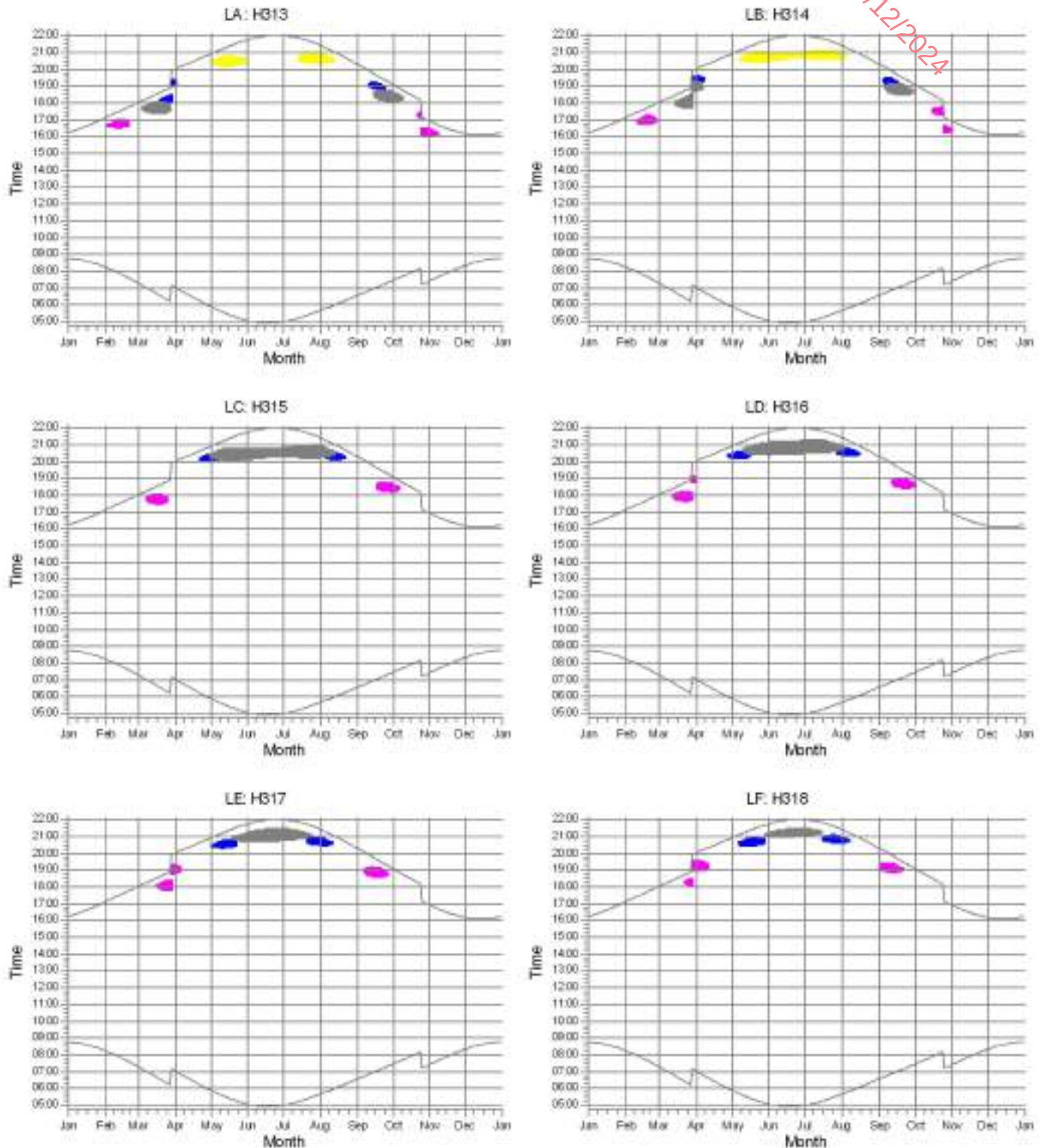


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

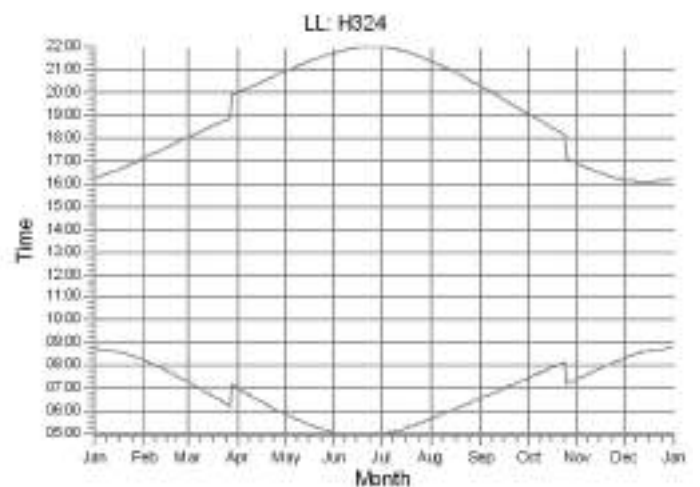
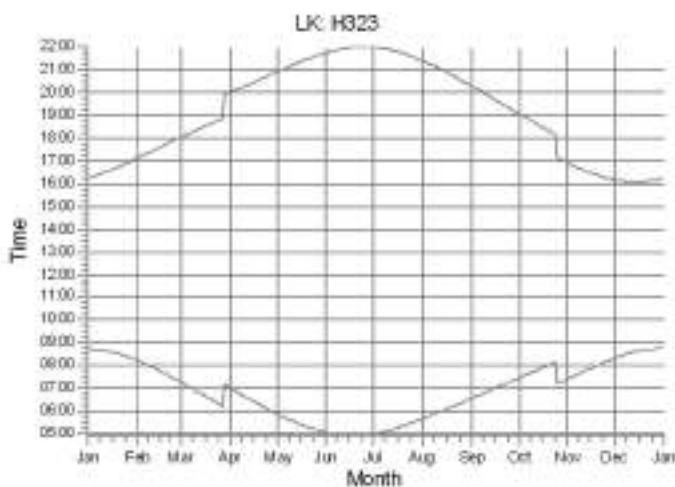
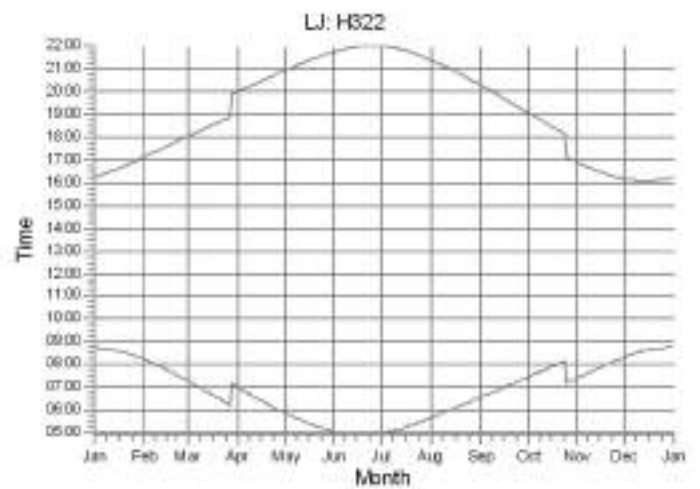
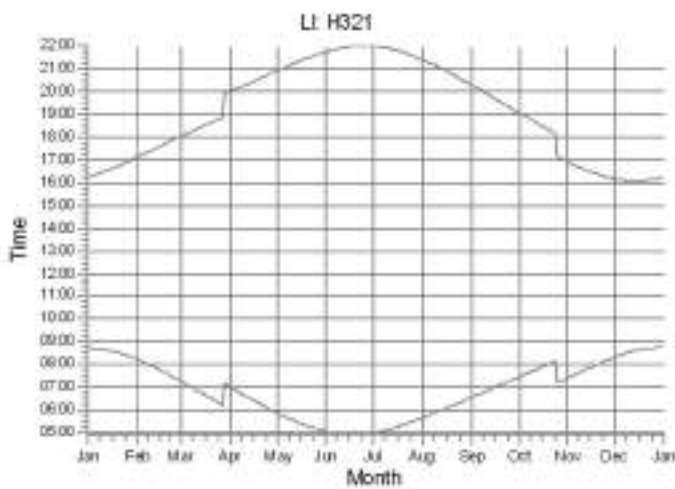
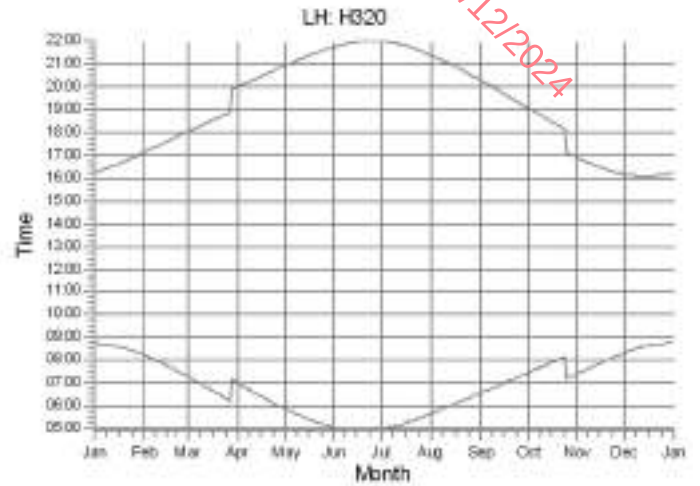
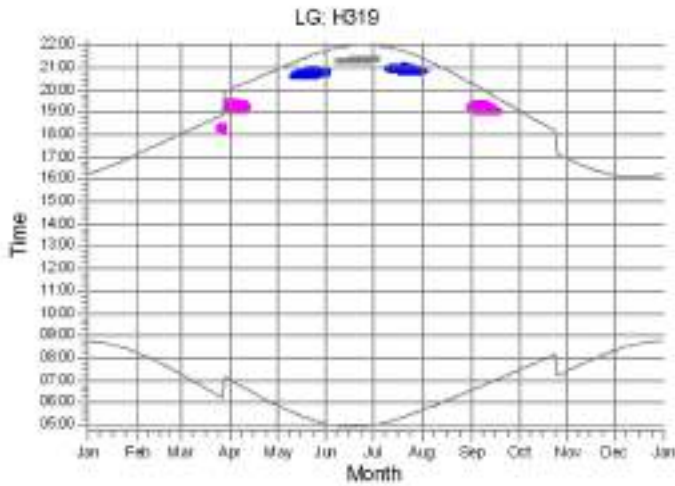


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

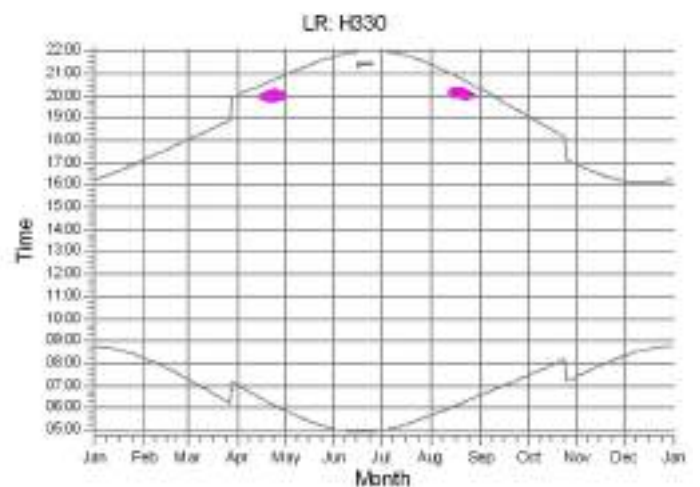
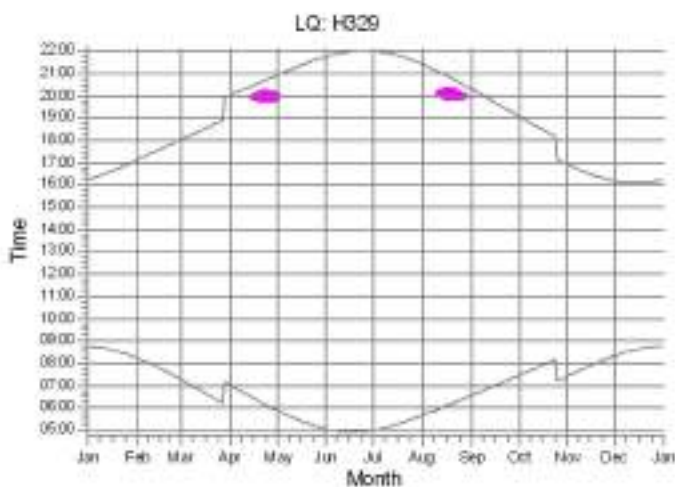
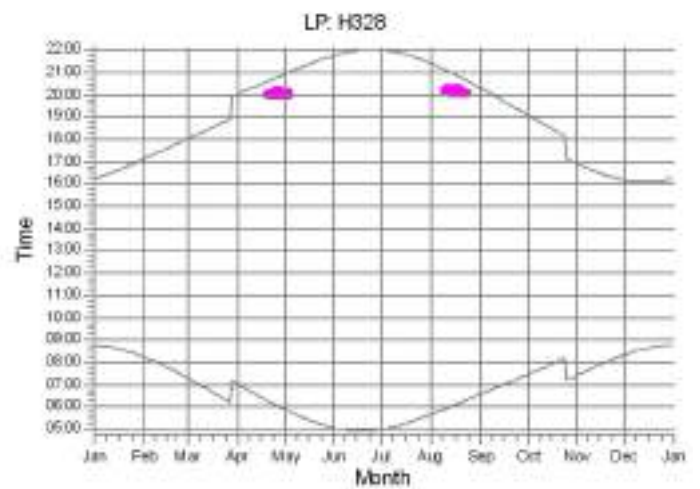
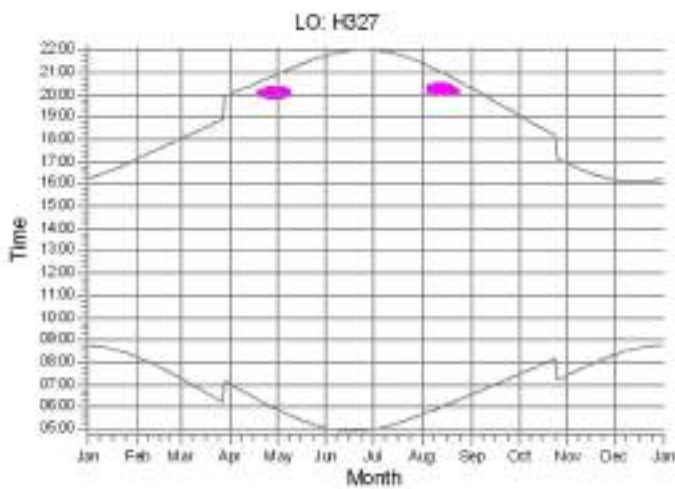
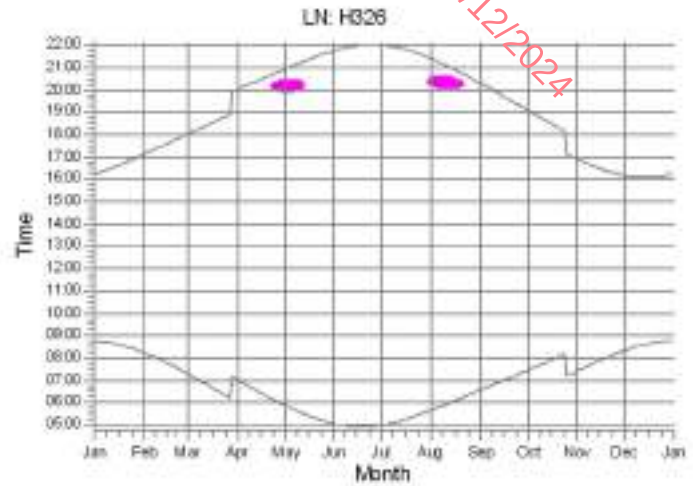
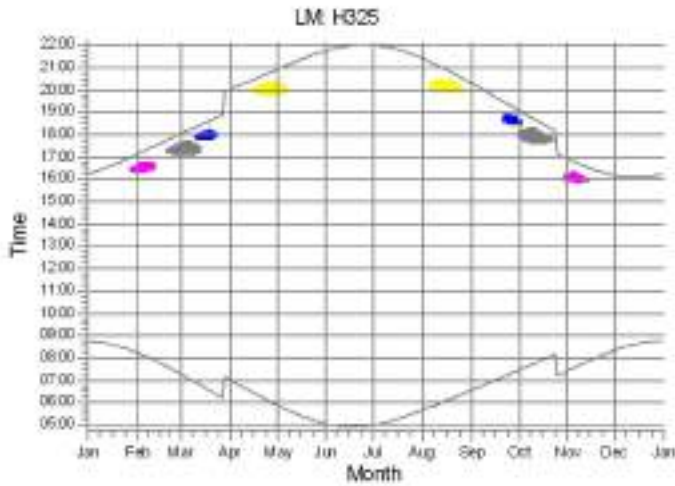


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

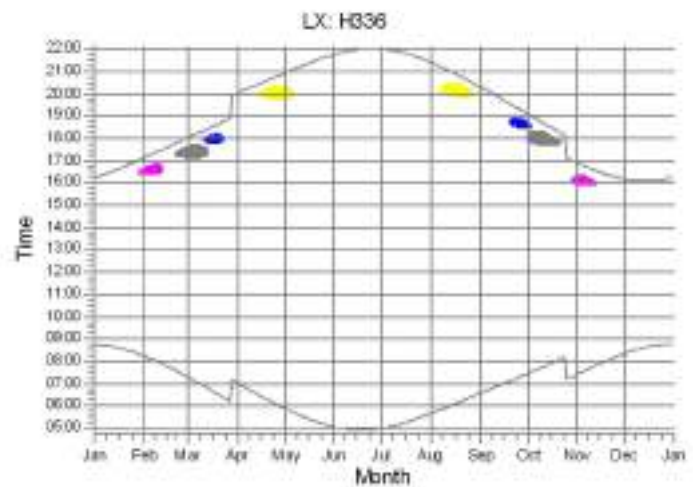
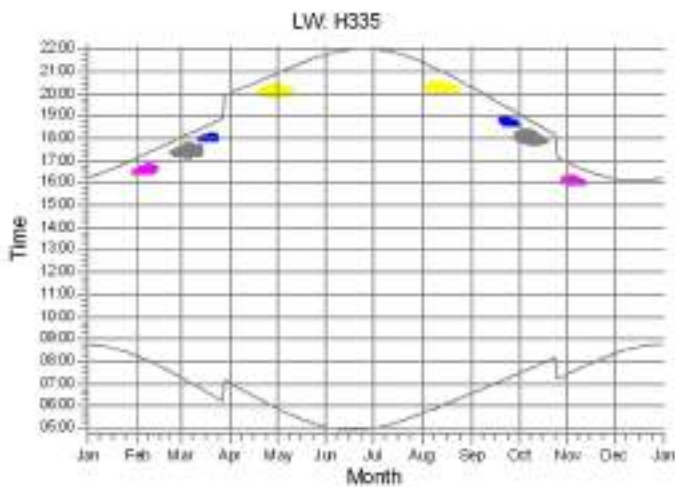
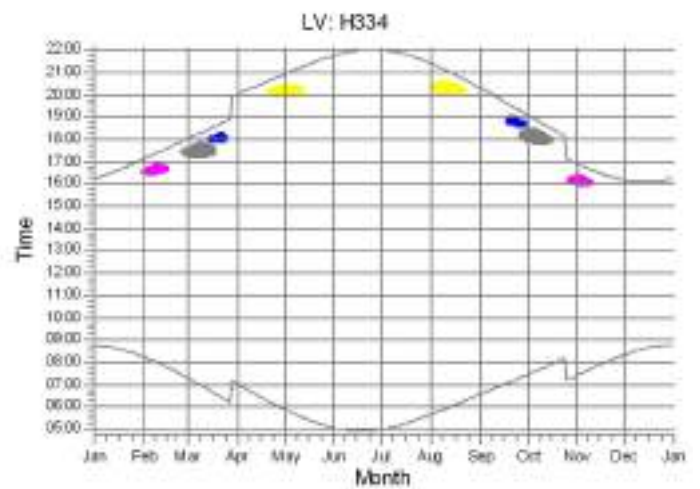
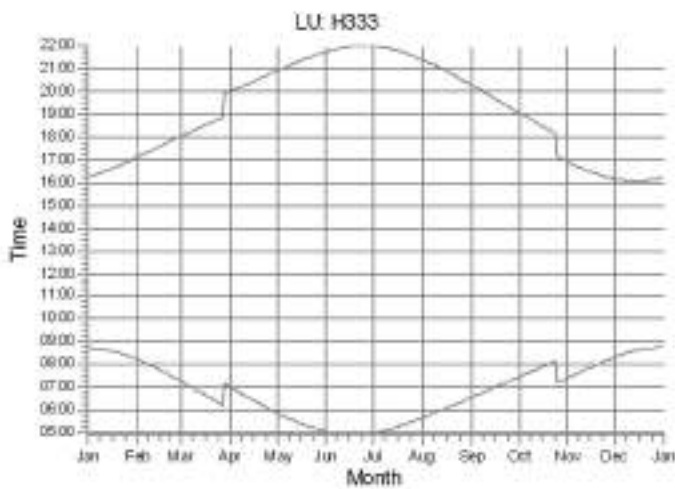
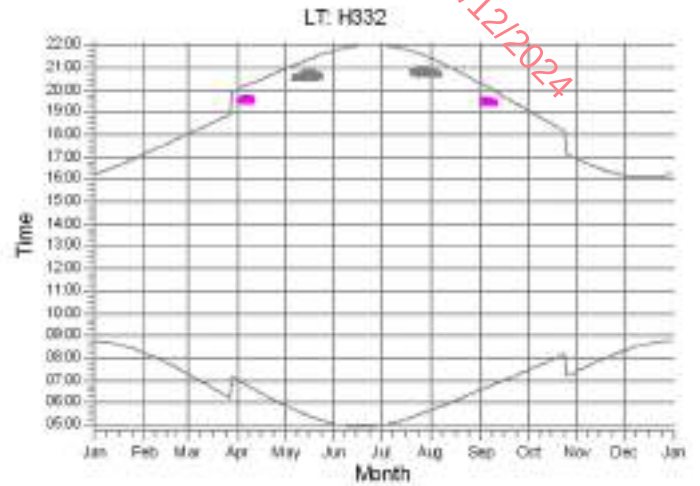
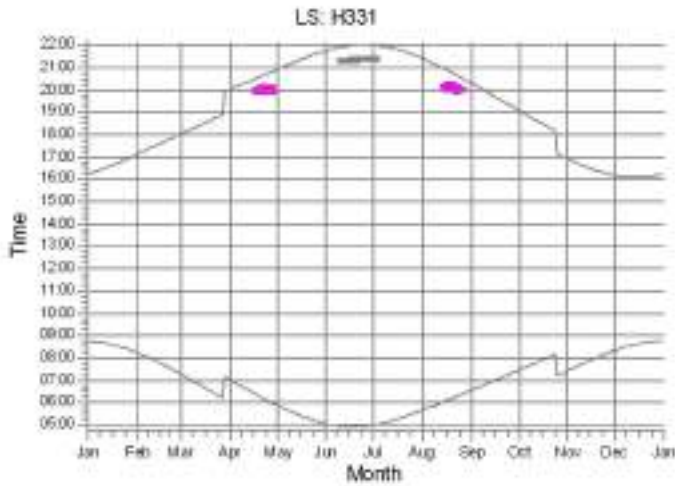


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

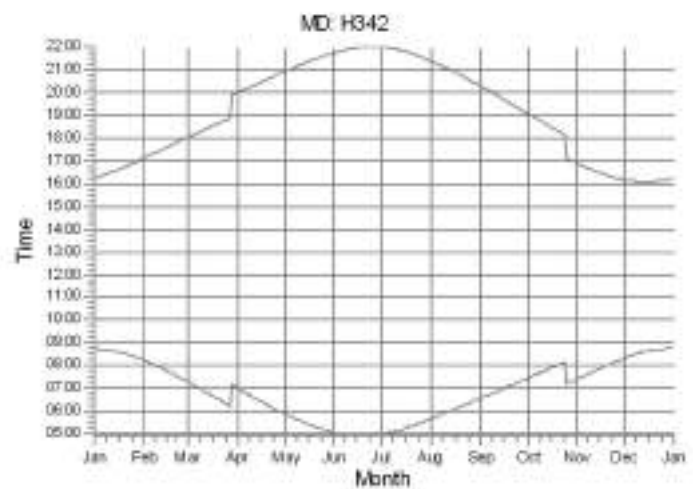
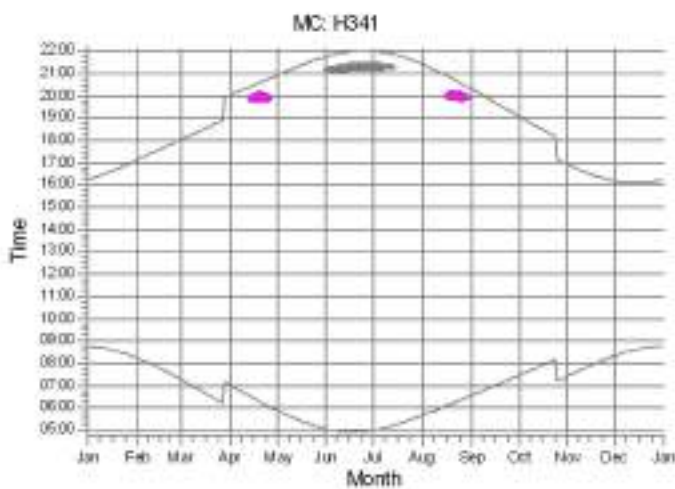
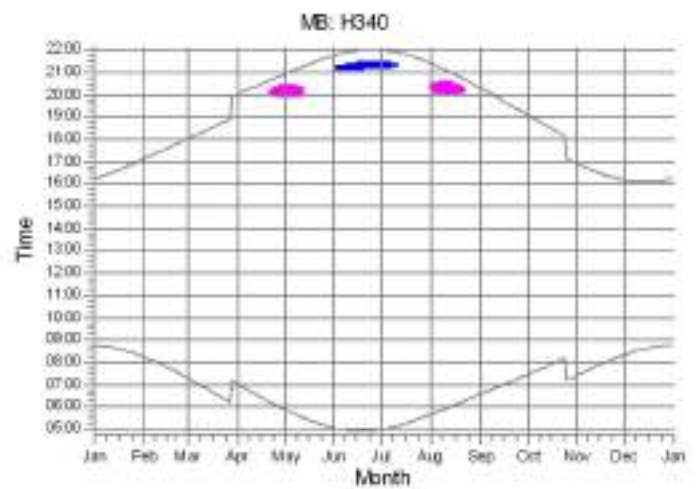
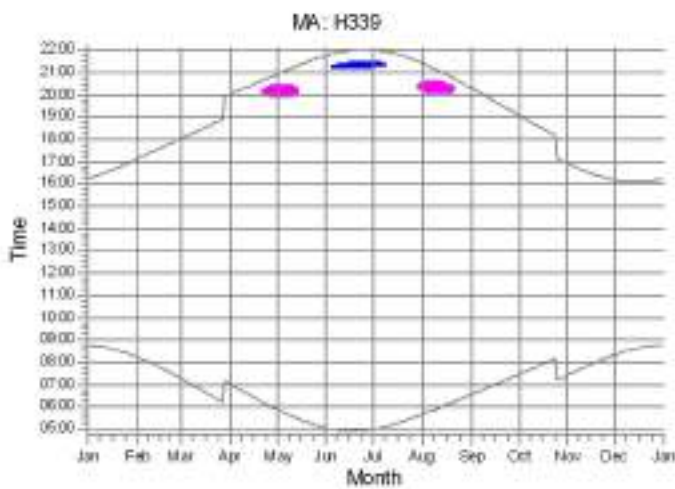
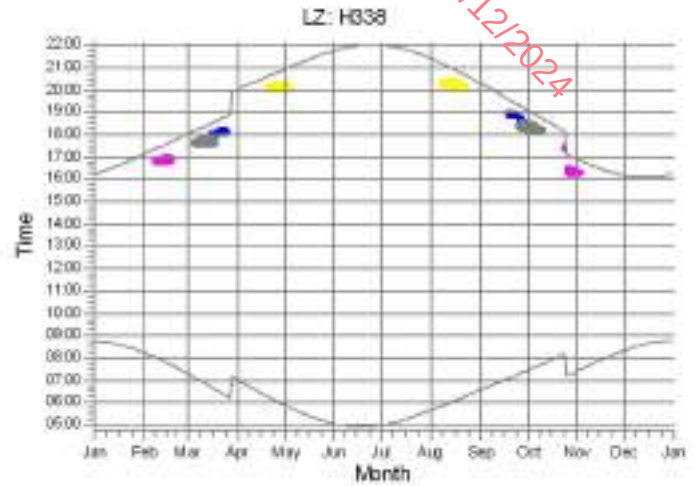
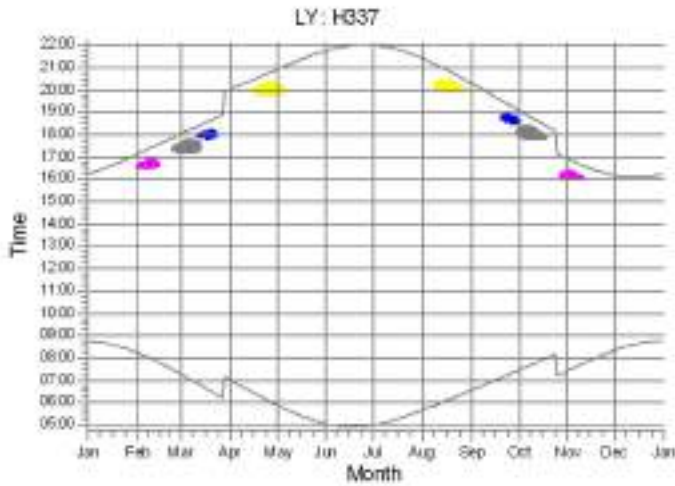


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



WTGs

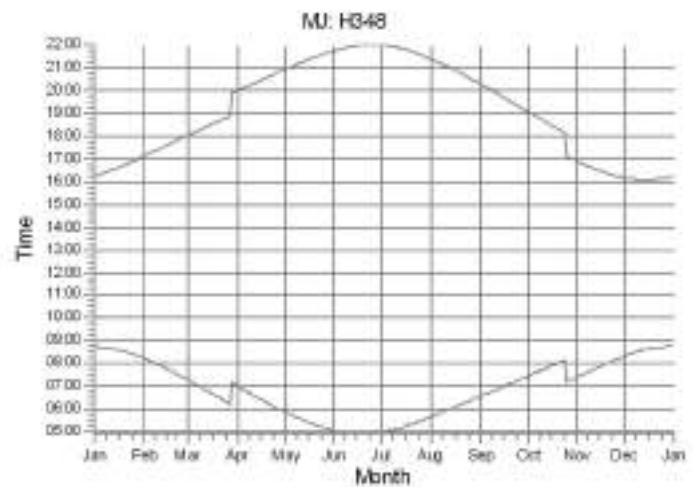
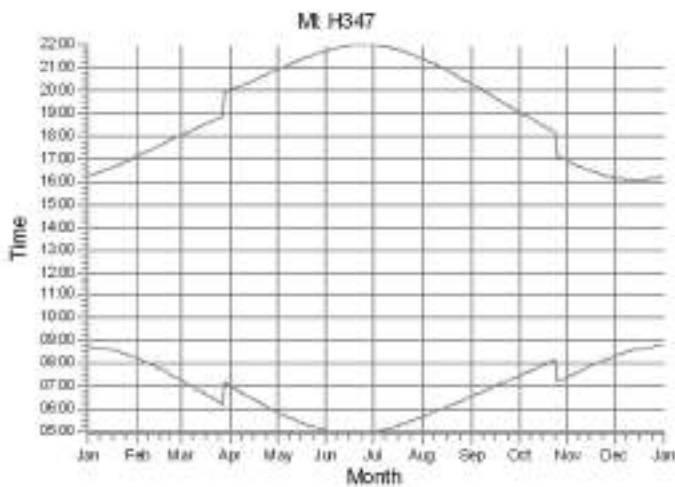
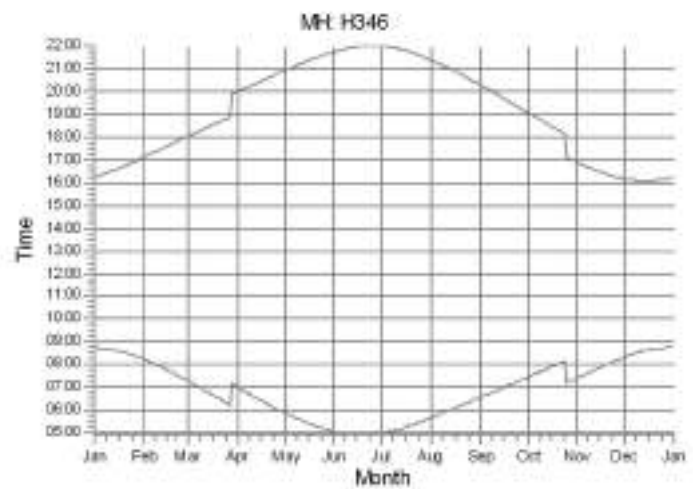
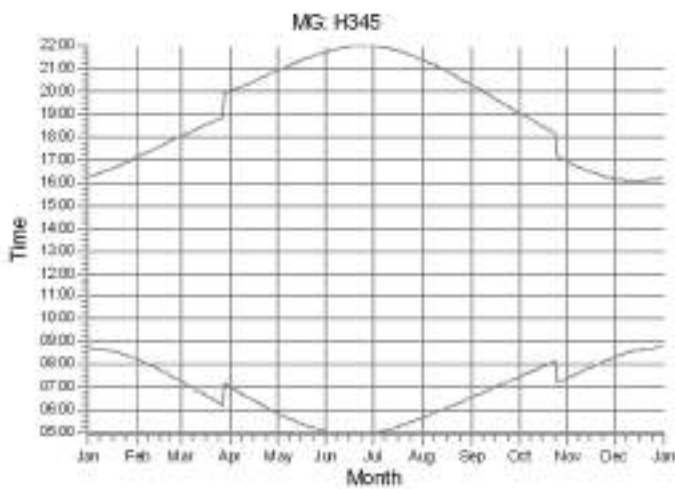
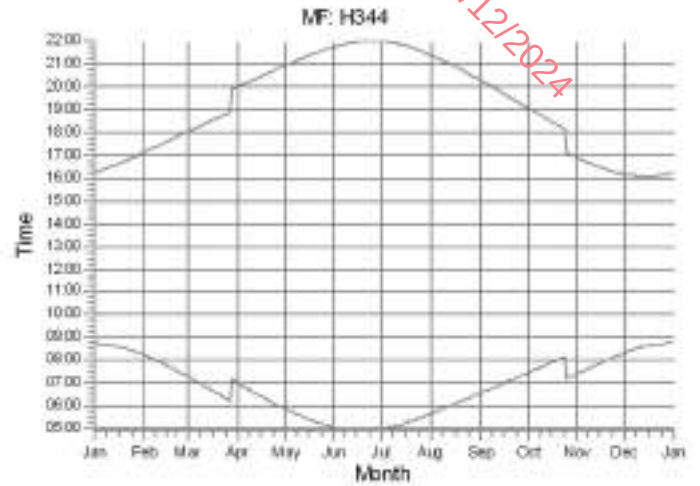
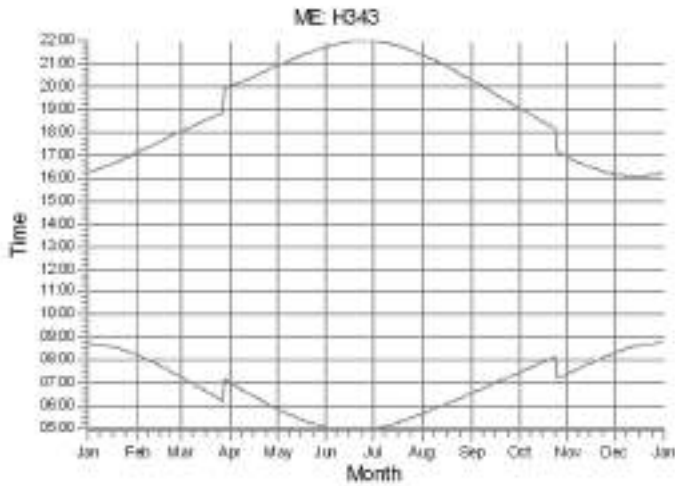
2: T02 3: T03 4: T04 5: T05

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

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SHADOW - Calendar, graphical

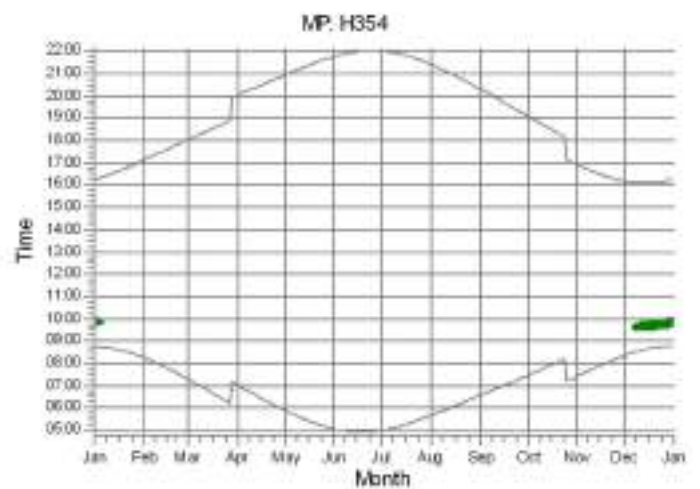
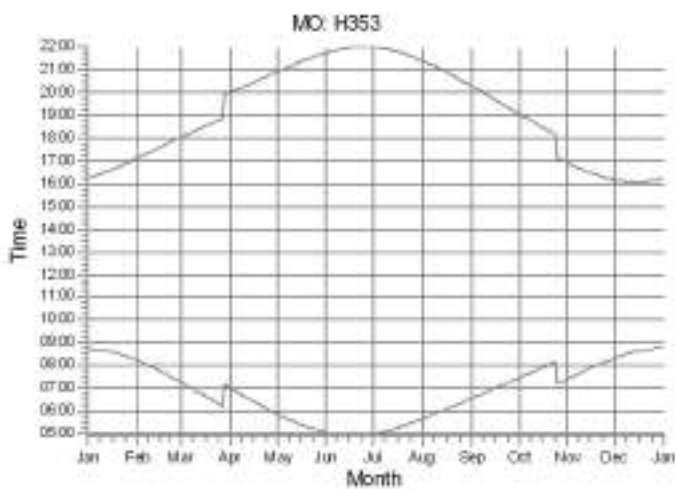
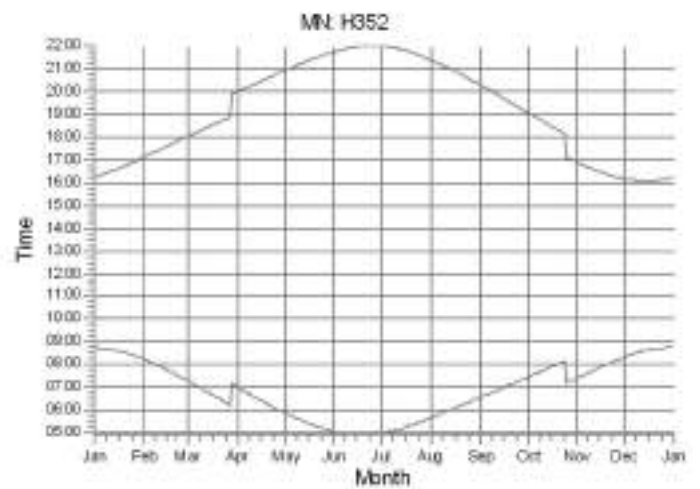
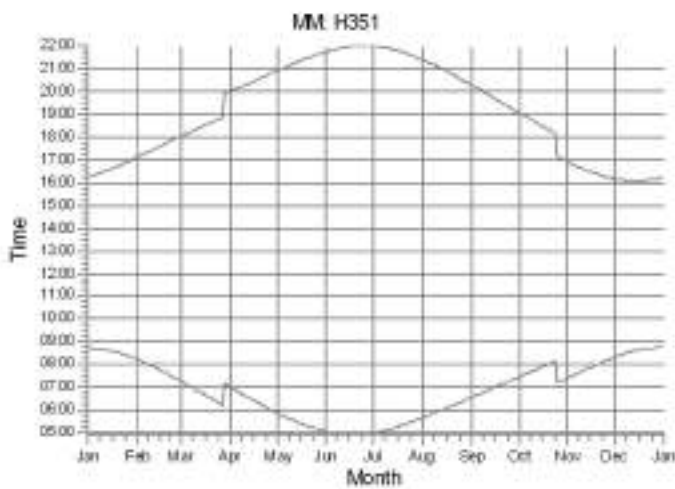
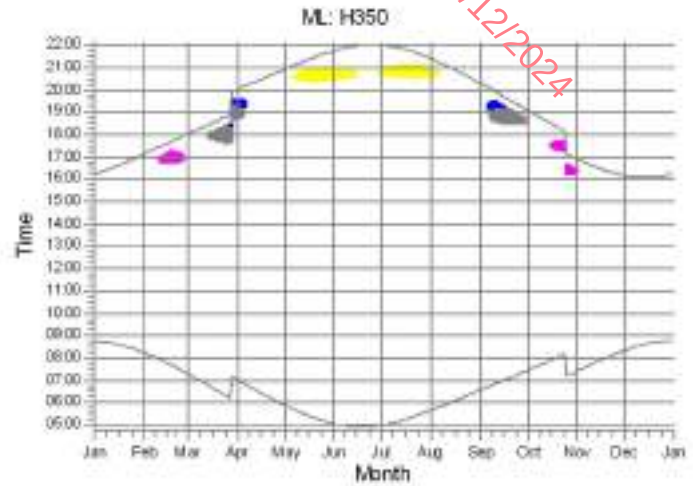
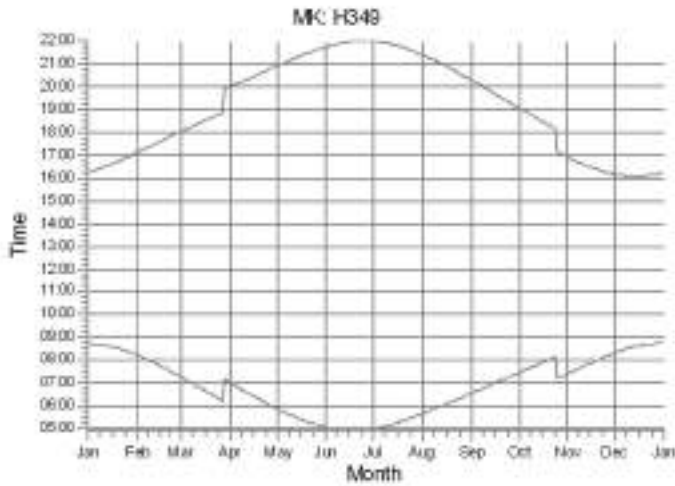
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

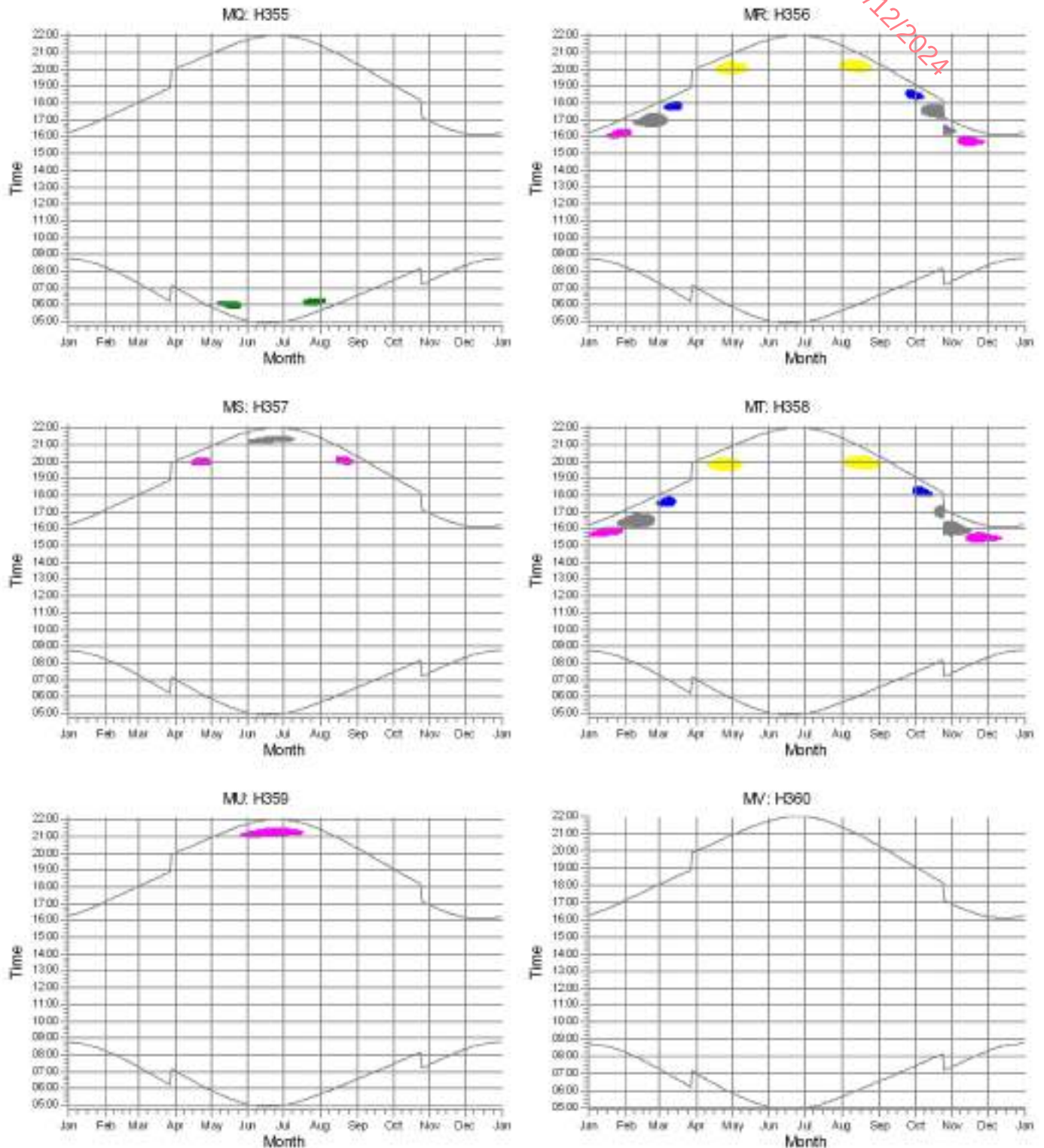


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

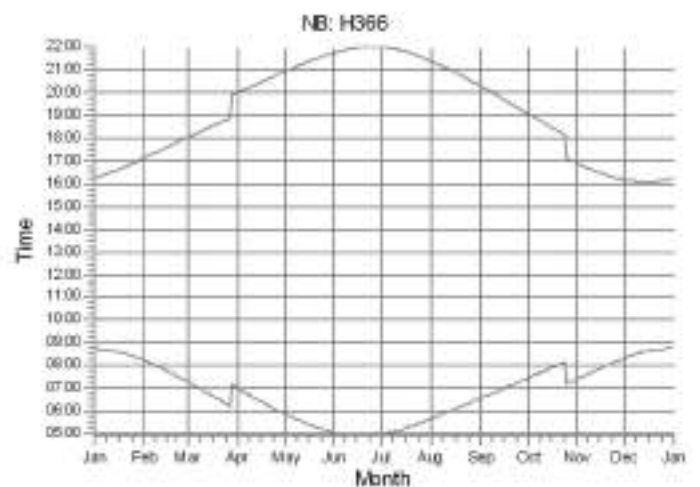
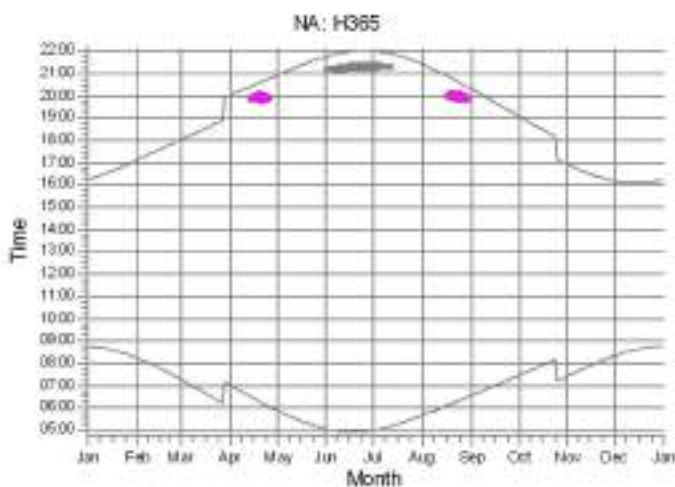
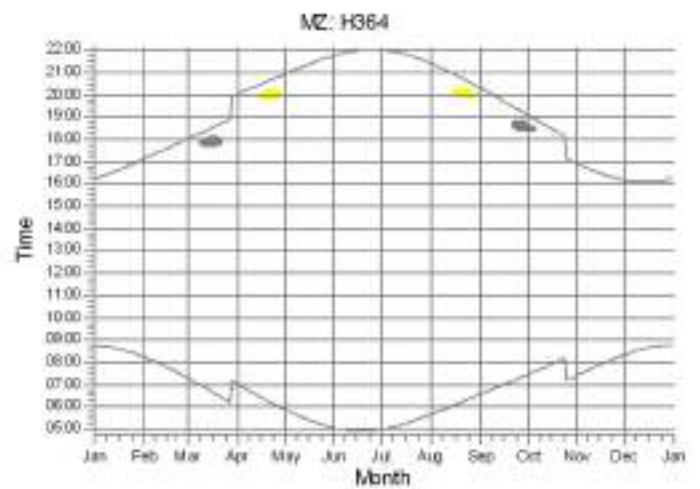
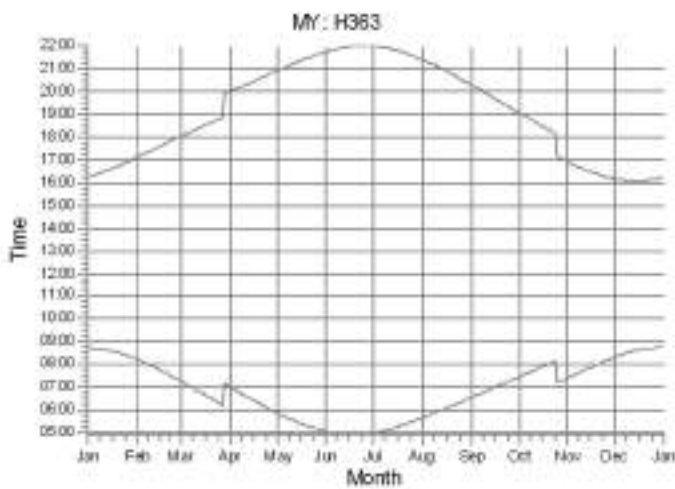
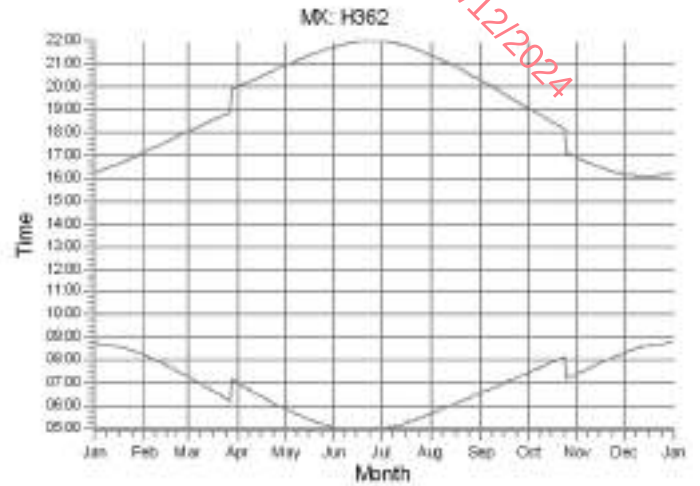
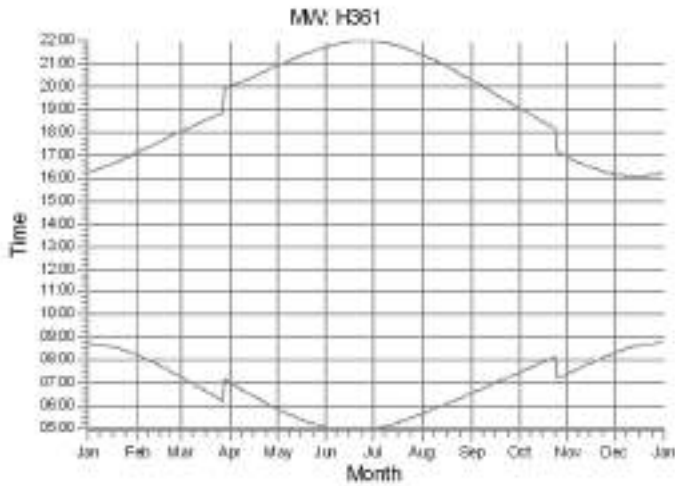


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



WTGs

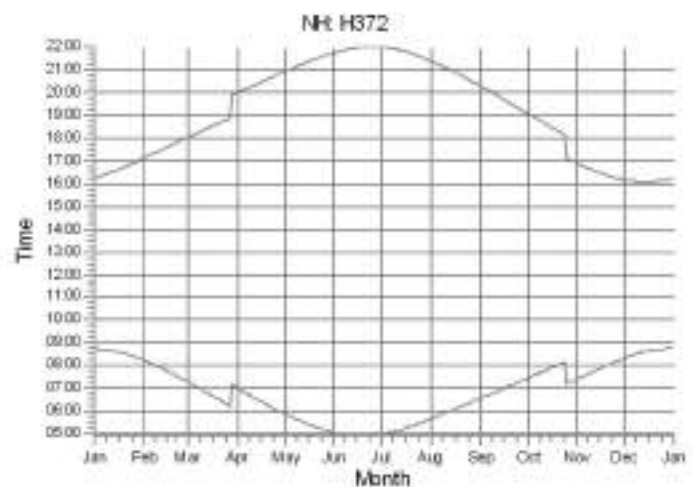
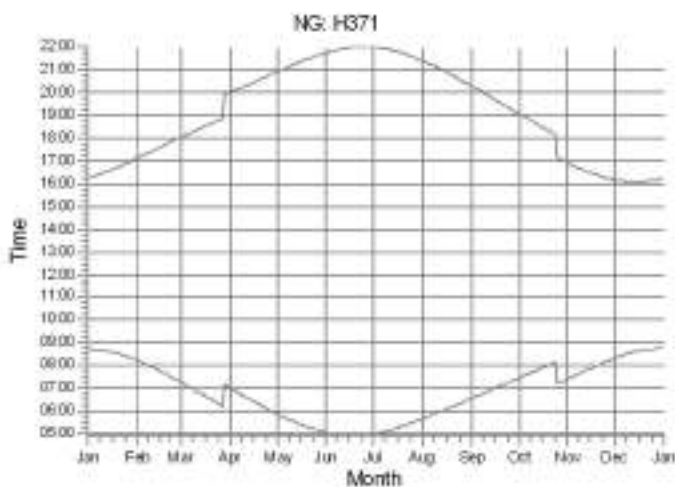
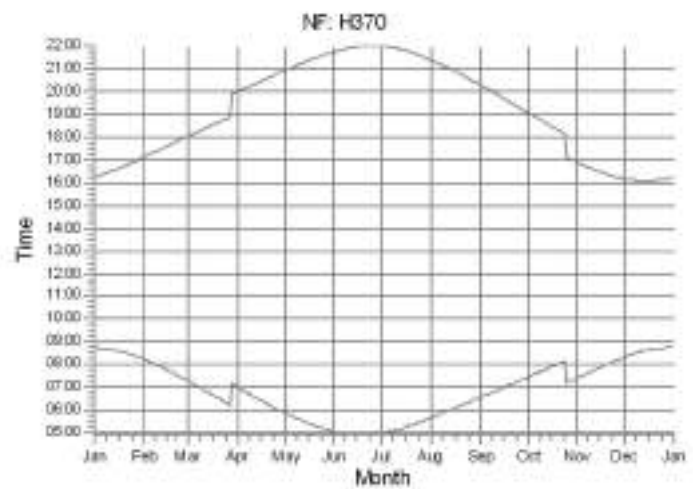
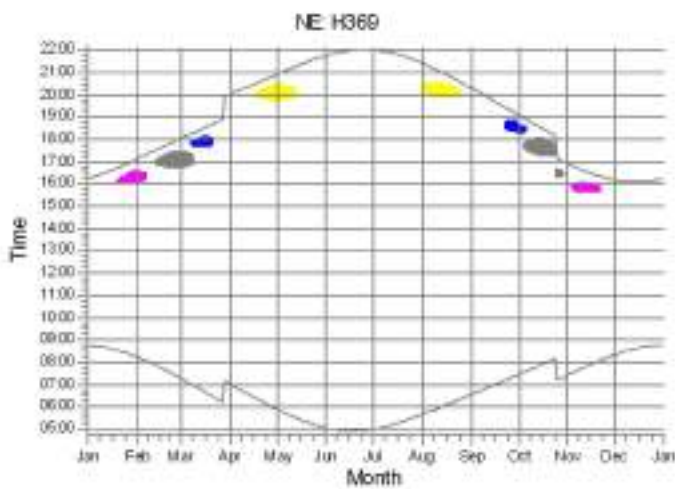
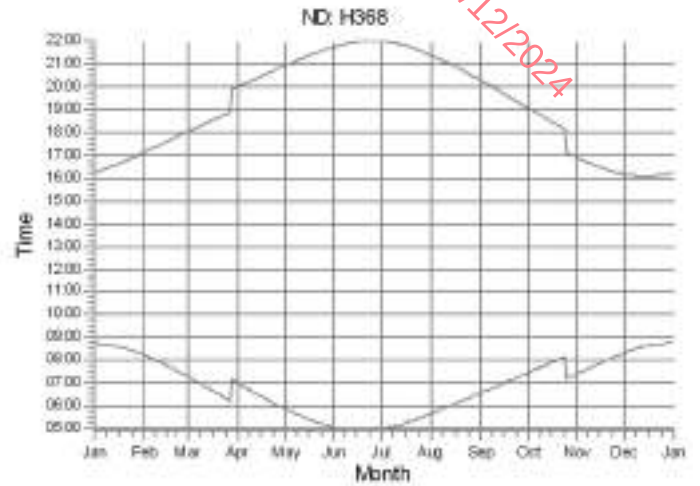
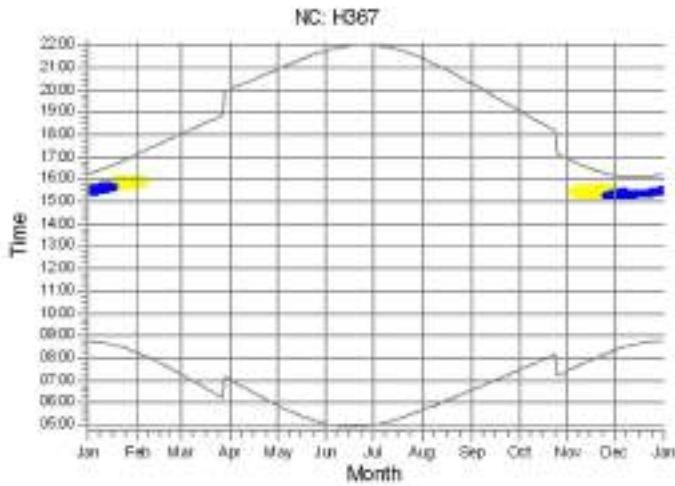
2: T02 4: T04 5: T05

Project: 6918 Kellystown
 Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
 Jennings O'Donovan
 Finisklin Business Park
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 abyryne / abyryne@jodireland.com
 Calculated:
 11/07/2024 09:39/4.0.547

SHADOW - Calendar, graphical

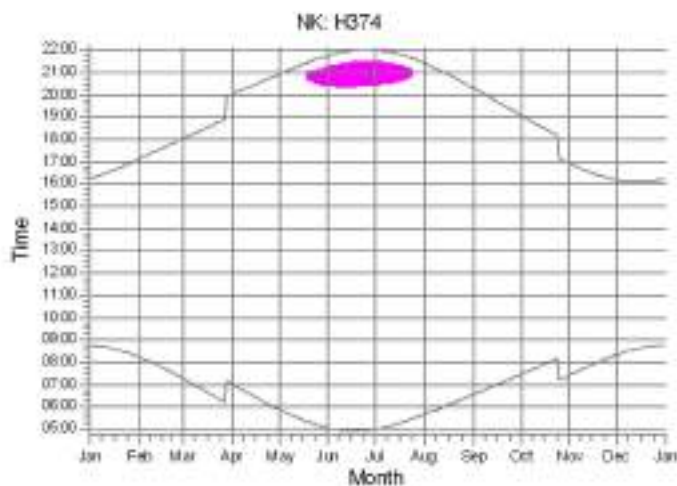
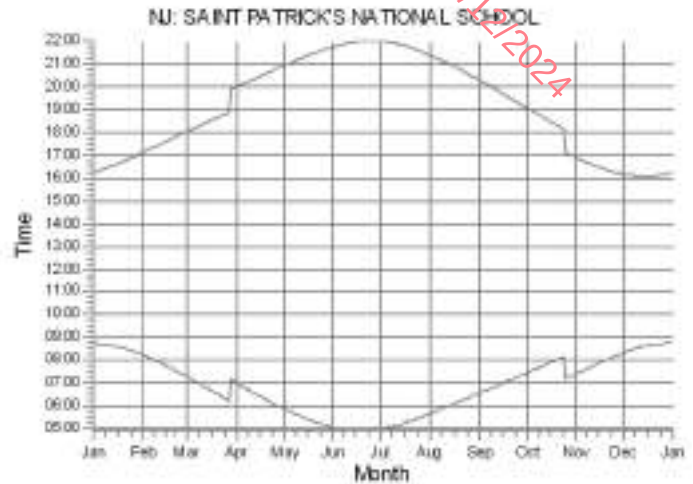
Calculation: Kellystown SG155 Worst Case



WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical
Calculation: Kellystown SG155 Worst Case



WTGs

5: T05

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park IE-F91 RHH9 Sligo +353719161416 abyrne / abyrne@jodireland.com Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 1 - T01 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT] Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time table with columns: N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, NNW, Sum. Values range from 160 to 8,760.

Main shadow calculation table with columns for months (January to June) and rows for each day of the month. Includes sunrise/sunset times and shadow lengths.

Table layout: For each day in each month the following matrix apply

Matrix table with columns: Day in month, Sun rise (hh:mm), Sun set (hh:mm), First time (hh:mm) with flicker, Last time (hh:mm) with flicker, Minutes with flicker.

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Description: 5 no. turbine Wind Farm, Co. Louth

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Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 1 - T01
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59 05:32-05:52/20	05:39 06:09-06:39/30	06:33 07:00-07:46/46	07:26 07:53-08:34/41	07:24 07:54-08:45/51	08:19 10:20-12:24/124	13:10-13:19/9	08:19 10:20-12:24/124	13:10-13:19/9	08:19 10:20-12:24/124	13:10-13:19/9
2	05:00 05:33-05:53/20	05:40 06:11-06:40/29	06:35 07:02-07:46/44	07:28 07:54-08:35/41	07:26 07:56-08:44/48	08:21 10:20-12:30/130	13:07-13:23/16	08:21 10:20-12:30/130	13:07-13:23/16	08:21 10:20-12:30/130	13:07-13:23/16
3	05:00 05:34-05:54/20	05:42 06:12-06:41/29	06:36 07:04-07:45/41	07:30 07:56-08:36/40	07:28 07:58-08:44/46	08:22 10:19-12:33/134	13:04-13:24/20	08:22 10:19-12:33/134	13:04-13:24/20	08:22 10:19-12:33/134	13:04-13:24/20
4	05:01 05:34-05:54/20	05:44 06:14-06:42/28	06:38 07:05-07:42/37	07:32 07:58-08:37/39	07:30 08:00-08:43/43	08:24 10:19-12:35/136	13:04-13:27/23	08:24 10:19-12:35/136	13:04-13:27/23	08:24 10:19-12:35/136	13:04-13:27/23
5	05:02 05:35-05:54/19	05:45 06:16-06:43/27	06:40 07:07-07:41/34	07:33 08:00-08:38/38	07:32 08:02-08:42/40	08:25 10:19-12:37/138	13:02-13:28/26	08:25 10:19-12:37/138	13:02-13:28/26	08:25 10:19-12:37/138	13:02-13:28/26
6	05:03 05:36-05:55/19	05:47 06:17-06:43/26	06:42 07:09-07:40/31	07:35 08:02-08:38/36	07:34 08:04-08:40/36	08:27 10:20-12:39/139	13:02-13:30/28	08:27 10:20-12:39/139	13:02-13:30/28	08:27 10:20-12:39/139	13:02-13:30/28
7	05:04 05:37-05:55/18	05:49 06:19-06:44/25	06:44 07:10-07:37/27	07:37 08:04-08:38/34	07:36 08:06-08:39/33	08:29 10:21-12:40/141	13:01-13:30/29	08:29 10:21-12:40/141	13:01-13:30/29	08:29 10:21-12:40/141	13:01-13:30/29
8	05:05 05:38-05:56/18	05:51 06:20-06:47/27	06:45 07:12-07:38/24	07:39 08:06-08:38/32	07:38 08:09-08:38/29	08:30 10:22-12:43/143	13:01-13:32/30	08:30 10:22-12:43/143	13:01-13:32/30	08:30 10:22-12:43/143	13:01-13:32/30
9	05:06 05:39-05:56/17	05:52 06:22-06:50/28	06:47 07:14-07:34/20	07:41 09:17-09:31/14	07:40 08:11-08:41/30	08:32 10:23-12:44/144	13:01-13:33/31	08:32 10:23-12:44/144	13:01-13:33/31	08:32 10:23-12:44/144	13:01-13:33/31
10	05:07 05:40-05:56/16	05:54 06:24-06:52/28	06:49 07:16-07:32/16	07:43 09:19-09:36/24	07:42 08:13-08:44/31	08:34 10:24-12:45/145	13:01-13:34/32	08:34 10:24-12:45/145	13:01-13:34/32	08:34 10:24-12:45/145	13:01-13:34/32
11	05:08 05:41-05:57/16	05:56 06:25-06:53/28	06:51 07:17-07:28/11	07:44 09:20-09:38/29	07:44 08:32-08:45/13	08:36 10:25-12:46/146	13:01-13:35/33	08:36 10:25-12:46/146	13:01-13:35/33	08:36 10:25-12:46/146	13:01-13:35/33
12	05:09 05:42-06:03/4	05:58 06:27-06:54/27	06:52 07:19-07:21/2	07:46 09:21-09:40/33	07:46 08:31-08:46/15	08:38 10:26-12:47/147	13:01-13:36/34	08:38 10:26-12:47/147	13:01-13:36/34	08:38 10:26-12:47/147	13:01-13:36/34
13	05:10 05:43-06:06/23	05:59 06:29-06:56/27	06:54 07:21-07:22/15	07:48 09:22-09:41/33	07:48 08:33-08:47/16	08:40 10:27-12:48/148	13:01-13:37/35	08:40 10:27-12:48/148	13:01-13:37/35	08:40 10:27-12:48/148	13:01-13:37/35
14	05:11 05:44-06:07/23	06:01 06:30-06:58/28	06:56 07:23-07:24/17	07:50 09:23-09:43/40	07:50 08:34-08:48/17	08:42 10:28-12:49/149	13:01-13:38/36	08:42 10:28-12:49/149	13:01-13:38/36	08:42 10:28-12:49/149	13:01-13:38/36
15	05:12 05:45-06:09/24	06:03 06:32-06:59/27	06:58 07:25-07:26/18	07:52 09:24-09:44/40	07:52 08:35-08:49/18	08:44 10:29-12:50/150	13:01-13:39/37	08:44 10:29-12:50/150	13:01-13:39/37	08:44 10:29-12:50/150	13:01-13:39/37
16	05:13 05:46-06:10/23	06:05 06:34-07:01/27	06:59 07:26-07:27/19	07:54 09:25-09:45/41	07:54 08:36-08:50/19	08:46 10:30-12:51/151	13:01-13:40/38	08:46 10:30-12:51/151	13:01-13:40/38	08:46 10:30-12:51/151	13:01-13:40/38
17	05:14 05:47-06:11/22	06:07 06:35-07:02/26	07:01 07:27-07:28/10	07:56 09:26-09:46/42	07:56 08:37-08:51/20	08:48 10:31-12:52/152	13:01-13:41/39	08:48 10:31-12:52/152	13:01-13:41/39	08:48 10:31-12:52/152	13:01-13:41/39
18	05:15 05:48-06:12/22	06:09 06:36-07:03/25	07:03 07:28-07:29/11	07:58 09:27-09:47/43	07:58 08:38-08:52/21	08:50 10:32-12:53/153	13:01-13:42/40	08:50 10:32-12:53/153	13:01-13:42/40	08:50 10:32-12:53/153	13:01-13:42/40
19	05:16 05:49-06:13/21	06:11 06:37-07:04/24	07:05 07:29-07:30/12	07:59 09:28-09:48/44	07:59 08:39-08:53/22	08:52 10:33-12:54/154	13:01-13:43/41	08:52 10:33-12:54/154	13:01-13:43/41	08:52 10:33-12:54/154	13:01-13:43/41
20	05:17 05:50-06:14/21	06:13 06:38-07:05/23	07:07 07:30-07:31/13	08:01 09:29-09:49/45	08:01 08:40-08:54/23	08:54 10:34-12:55/155	13:01-13:44/42	08:54 10:34-12:55/155	13:01-13:44/42	08:54 10:34-12:55/155	13:01-13:44/42
21	05:18 05:51-06:15/21	06:15 06:39-07:06/22	07:09 07:31-07:32/14	08:03 09:30-09:50/46	08:03 08:41-08:55/24	08:56 10:35-12:56/156	13:01-13:45/43	08:56 10:35-12:56/156	13:01-13:45/43	08:56 10:35-12:56/156	13:01-13:45/43
22	05:19 05:52-06:16/21	06:17 06:40-07:07/21	07:11 07:32-07:33/15	08:05 09:31-09:51/47	08:05 08:42-08:56/25	08:58 10:36-12:57/157	13:01-13:46/44	08:58 10:36-12:57/157	13:01-13:46/44	08:58 10:36-12:57/157	13:01-13:46/44
23	05:20 05:53-06:17/21	06:19 06:41-07:08/20	07:13 07:33-07:34/16	08:07 09:32-09:52/48	08:07 08:43-08:57/26	08:60 10:37-12:58/158	13:01-13:47/45	08:60 10:37-12:58/158	13:01-13:47/45	08:60 10:37-12:58/158	13:01-13:47/45
24	05:21 05:54-06:18/21	06:21 06:42-07:09/19	07:15 07:34-07:35/17	08:09 09:33-09:53/49	08:09 08:44-08:58/27	08:62 10:38-12:59/159	13:01-13:48/46	08:62 10:38-12:59/159	13:01-13:48/46	08:62 10:38-12:59/159	13:01-13:48/46
25	05:22 05:55-06:19/21	06:23 06:43-07:10/18	07:17 07:35-07:36/18	08:11 09:34-09:54/50	08:11 08:45-08:59/28	08:64 10:39-13:00/160	13:01-13:49/47	08:64 10:39-13:00/160	13:01-13:49/47	08:64 10:39-13:00/160	13:01-13:49/47
26	05:23 05:56-06:20/21	06:25 06:44-07:11/17	07:19 07:36-07:37/19	08:13 09:35-09:55/51	08:13 08:46-09:00/29	08:66 10:40-13:01/161	13:01-13:50/48	08:66 10:40-13:01/161	13:01-13:50/48	08:66 10:40-13:01/161	13:01-13:50/48
27	05:24 05:57-06:21/21	06:27 06:45-07:12/16	07:21 07:37-07:38/20	08:15 09:36-09:56/52	08:15 08:47-09:01/30	08:68 10:41-13:02/162	13:01-13:51/49	08:68 10:41-13:02/162	13:01-13:51/49	08:68 10:41-13:02/162	13:01-13:51/49
28	05:25 05:58-06:22/21	06:29 06:46-07:13/15	07:23 07:38-07:39/21	08:17 09:37-09:57/53	08:17 08:48-09:02/31	08:70 10:42-13:03/163	13:01-13:52/50	08:70 10:42-13:03/163	13:01-13:52/50	08:70 10:42-13:03/163	13:01-13:52/50
29	05:26 05:59-06:23/21	06:31 06:47-07:14/14	07:25 07:39-07:40/22	08:19 09:38-09:58/54	08:19 08:49-09:03/32	08:72 10:43-13:04/164	13:01-13:53/51	08:72 10:43-13:04/164	13:01-13:53/51	08:72 10:43-13:04/164	13:01-13:53/51
30	05:27 06:00-06:24/21	06:33 06:48-07:15/13	07:27 07:40-07:41/23	08:21 09:39-09:59/55	08:21 08:50-09:04/33	08:74 10:44-13:05/165	13:01-13:54/52	08:74 10:44-13:05/165	13:01-13:54/52	08:74 10:44-13:05/165	13:01-13:54/52
31	05:28 06:01-06:25/21	06:35 06:49-07:16/12	07:29 07:41-07:42/24	08:23 09:40-10:00/56	08:23 08:51-09:05/34	08:76 10:45-13:06/166	13:01-13:55/53	08:76 10:45-13:06/166	13:01-13:55/53	08:76 10:45-13:06/166	13:01-13:55/53
Potential sun hours	512	460	382	254	3576	9391					
Sum of minutes with flicker	699	1763	909	2544	3576	9391					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

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Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 2 - T02
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 14:56-15:37/41 09:18-10:43/85 16:15 10:49-12:06/77 12:23-14:35/132	08:14 15:16-16:34/78 09:33-10:08/35 17:06 08:42-09:22/40 13:54-14:38/44	07:16 16:33-17:34/61 18:02	07:01 18:32-19:33/61 20:00 07:25-07:26/1	05:52 19:18-20:26/68 20:55	05:03 20:29-21:10/41 21:45 20:06-20:16/10
2	08:44 14:57-15:39/42 09:18-10:43/85 16:16 10:50-12:06/76 12:24-14:36/132	08:12 15:18-16:37/79 09:35-10:06/31 17:08 08:40-09:18/38 13:55-14:37/42	07:14 16:36-17:36/60 18:04	06:59 18:31-19:35/64 20:02 07:23-07:27/4	05:50 19:18-20:27/69 20:57	05:02 20:31-21:12/41 21:47 20:11-20:14/3
3	08:44 14:57-15:39/42 09:17-10:43/86 16:17 10:51-12:05/74 12:24-14:36/132	08:10 15:20-16:39/79 09:38-10:04/26 17:10 08:38-09:15/37 13:57-14:35/38	07:12 16:45-17:38/53 18:06	06:56 18:32-19:37/65 20:04 07:20-07:27/7	05:48 19:19-20:29/70 20:59	05:01 20:32-21:13/41 21:48
4	08:43 14:59-15:41/42 09:17-10:44/87 16:18 10:52-12:06/74 12:25-14:37/132	08:08 15:21-16:41/80 09:48-10:01/13 17:12 08:36-09:14/38 13:59-14:33/34	07:09 16:48-17:41/53 18:08	06:54 18:33-19:39/66 20:06 07:18-07:27/9	05:46 19:21-20:30/69 21:01	05:00 20:33-21:14/41 21:49
5	08:43 14:59-15:42/43 09:16-10:44/88 16:20 10:53-12:05/72 12:25-14:37/132	08:07 15:23-16:43/80 14:02-14:31/29 17:14 08:34-09:13/39	07:07 16:48-17:42/54 18:09	06:51 18:33-19:40/67 20:07 07:15-07:26/11	05:44 19:22-20:32/70 21:03	04:59 20:33-21:14/41 21:50
6	08:43 15:01-15:44/43 09:16-10:44/88 16:21 10:54-12:05/71 12:27-14:38/131	08:05 15:25-16:45/80 14:05-14:29/24 17:16 08:32-09:13/41	07:05 16:49-17:45/56 18:11	06:49 18:34-19:42/68 20:09 07:13-07:25/13	05:42 19:24-20:33/69 21:04	04:59 20:35-21:16/41 21:51
7	08:42 15:02-15:45/43 09:15-10:44/89 16:22 10:55-12:04/69 12:27-14:38/131	08:03 15:27-16:47/80 14:09-14:25/16 17:18 08:30-09:13/43	07:02 16:49-17:45/56 18:13	06:47 18:34-19:43/69 20:11 07:11-07:26/15	05:40 19:27-20:36/69 21:06	04:58 20:35-21:16/41 21:52
8	08:42 15:03-15:46/43 10:56-11:41/45 12:28-14:38/130 16:24 11:44-12:03/19 09:14-10:44/90	08:01 08:28-09:13/45 17:20 15:31-16:50/79	07:00 07:24-07:28/4 18:15 16:50-17:46/56	06:44 18:35-19:46/71 20:13 07:08-07:24/16	05:38 19:43-20:37/54 21:08 19:30-19:40/10	04:57 20:36-21:17/41 21:53
9	08:41 15:04-15:49/45 10:59-11:42/43 12:29-14:39/130 16:25 11:47-12:02/15 09:14-10:45/91	07:59 08:26-09:12/46 17:22 15:37-16:52/75	06:57 07:22-07:29/7 18:17 16:51-17:45/54	06:42 18:37-19:48/71 20:15 07:08-07:23/15	05:36 19:47-20:39/52 21:10	04:57 20:36-21:17/41 21:54
10	08:40 15:04-15:50/46 11:00-11:42/42 12:30-14:40/130 16:27 11:49-12:00/11 09:13-10:45/92	07:57 08:24-09:12/48 17:24 15:37-16:54/77	06:55 07:19-07:29/10 18:19 16:53-17:45/52	06:39 18:38-19:49/71 20:17 07:09-07:21/12	05:34 19:47-20:40/53 21:12	04:56 20:37-21:18/41 21:55
11	08:40 15:04-15:52/48 09:12-10:45/93 16:28 11:03-11:41/38 12:31-14:40/129	07:55 08:22-09:11/49 17:26 15:38-16:56/78	06:53 07:17-07:29/12 18:21 16:55-17:45/50	06:37 18:40-19:51/71 20:19 07:11-07:18/7	05:33 19:49-20:42/53 21:13	04:56 20:38-21:18/40 21:55
12	08:39 15:04-15:54/50 09:11-10:45/94 16:30 11:06-11:41/35 12:32-14:40/128	07:53 08:20-09:10/50 17:28 15:39-16:59/80	06:50 07:14-07:29/15 18:23 16:56-17:43/47	06:35 18:44-19:53/69 20:20	05:31 19:48-20:43/55 21:15	04:55 20:38-21:18/40 21:56
13	08:38 15:05-15:55/50 11:11-11:40/29 16:31 09:10-10:45/95 12:33-14:41/128	07:51 08:18-09:07/49 17:30 15:40-17:00/80	06:48 07:12-07:29/17 18:25 16:58-17:43/45	06:32 18:53-19:54/61 20:22	05:29 19:48-20:44/56 21:17	04:55 20:39-21:18/39 21:57
14	08:37 15:05-15:57/52 11:13-11:39/26 16:33 09:09-10:44/96 12:34-14:41/127	07:49 08:15-09:05/50 17:32 15:41-17:02/81	06:45 07:09-07:27/18 18:27 16:59-17:41/42	06:30 18:55-19:56/61 20:24	05:27 19:49-20:47/58 21:18	04:55 20:40-21:18/38 21:58
15	08:36 15:05-15:59/54 11:15-11:38/23 12:35-14:41/126 16:34 09:08-10:12/64 10:13-10:44/31	07:47 08:13-09:02/49 17:34 15:43-17:05/82	06:43 07:09-07:27/18 17:01-17:40/39 18:28 17:53-18:02/9	06:28 18:56-19:58/62 20:26	05:26 19:49-20:48/59 21:20	04:55 20:41-21:19/38 21:58
16	08:35 15:05-16:00/55 11:17-11:37/20 12:37-14:41/124 16:36 09:07-10:12/65 10:14-10:44/30	07:45 08:11-08:51/40 17:36 15:45-17:07/82	06:40 07:09-07:25/16 17:04-17:38/34 18:30 17:48-18:04/16	06:25 18:58-20:00/62 20:28	05:24 19:50-20:50/60 21:22	04:54 20:41-21:19/38 21:59
17	08:34 15:05-16:02/57 11:19-11:34/15 12:38-14:41/123 16:38 09:05-10:12/67 10:14-10:43/29	07:43 08:09-08:50/41 15:48-16:05/17 17:38 16:10-17:09/59	06:38 07:11-07:23/12 17:11-17:36/25 18:32 17:46-18:06/20	06:23 18:59-20:01/62 20:30	05:22 19:50-20:51/61 21:23	04:54 20:42-21:19/37 21:59
18	08:33 15:06-16:05/59 11:23-11:31/8 12:40-14:42/122 16:40 09:04-10:12/68 10:16-10:42/26	07:41 08:07-08:48/41 15:52-16:00/8 17:40 16:11-17:11/60	06:36 07:14-07:19/5 17:15-17:32/17 18:34 17:43-18:07/24	06:21 19:02-20:03/61 20:32	05:21 19:51-20:53/62 21:25	04:54 20:42-21:19/37 22:00
19	08:32 15:06-16:07/61 10:18-10:42/24 16:41 09:03-10:13/70 12:42-14:42/120	07:39 08:04-08:46/42 17:42 16:12-17:13/61	06:33 17:41-18:10/29 18:36	06:18 19:06-20:05/59 20:33	05:19 19:52-20:54/62 21:27	04:54 20:43-21:20/37 22:00
20	08:31 15:06-16:08/62 10:19-10:40/21 16:43 09:01-10:12/71 12:43-14:41/118	07:37 08:02-08:43/41 17:44 16:14-17:16/62	06:31 17:39-18:11/32 18:38	06:16 19:12-20:07/55 20:35	05:18 19:52-20:55/63 21:28	04:54 20:43-21:20/37 22:00
21	08:30 15:07-16:11/64 10:21-10:38/17 12:47-13:07/20 16:45 09:00-10:13/73 13:43-14:42/59 13:10-13:42/32	07:34 08:00-08:41/41 17:46 16:17-17:18/61	06:28 17:38-18:13/35 18:40	06:14 19:13-20:08/55 20:37	05:16 19:53-20:57/64 21:30	04:54 20:43-21:20/37 22:01
22	08:29 15:07-16:12/65 10:24-10:35/11 12:50-13:03/13 16:47 08:58-10:12/74 13:43-14:41/58 13:12-13:41/29	07:32 07:57-08:36/39 17:48 16:19-17:19/60	06:26 17:36-18:15/39 18:42	06:12 19:13-20:10/57 20:39	05:15 19:54-20:59/65 21:31	04:55 20:44-21:21/37 22:01
23	08:27 15:08-16:15/67 13:45-14:42/57 16:49 08:57-10:13/76 13:15-13:39/24	07:30 07:55-08:33/38 17:50 16:21-17:22/61	06:23 17:36-18:17/41 18:43	06:09 19:14-20:12/58 20:41	05:13 19:54-20:59/65 21:33	04:55 20:44-21:21/37 22:01
24	08:26 15:08-16:16/68 13:45-14:41/56 16:51 08:55-10:12/77 13:17-13:37/20	07:28 07:54-08:29/35 17:52 16:23-17:24/61	06:21 17:34-18:18/44 18:45	06:07 19:14-20:14/60 20:43	05:12 19:55-21:01/66 21:34	04:55 20:44-21:20/36 22:01
25	08:25 15:09-16:19/70 13:46-14:42/56 16:52 08:54-10:13/79 13:22-13:34/12	07:25 07:54-08:24/30 17:54 16:25-17:26/61	06:18 17:34-18:21/47 18:47	06:05 19:14-20:15/61 20:44	05:11 19:56-21:02/66 21:36	04:56 20:44-21:21/37 22:01
26	08:23 15:09-16:21/72 13:47-14:41/54 16:54 08:52-10:12/80	07:23 07:56-08:21/25 17:56 16:28-17:28/60	06:16 17:34-18:23/49 18:49	06:03 19:15-20:17/62 20:46	05:09 19:57-21:04/67 21:37	04:56 20:44-21:21/37 22:01
27	08:22 15:10-16:23/73 09:27-10:12/45 16:56 08:51-09:26/35 13:47-14:40/53	07:21 16:29-17:31/62 17:58 07:57-08:14/17	06:13 17:33-18:24/51 18:51	06:01 19:15-20:19/64 20:48	05:08 19:59-21:05/66 21:39	04:56 20:43-21:21/38 22:01
28	08:20 15:11-16:26/75 09:28-10:11/43 16:58 08:49-09:26/37 13:49-14:41/52	07:19 16:30-17:32/62 18:00 07:59-08:10/11	06:11 17:33-18:26/53 18:53	05:58 19:15-20:21/66 20:50	05:07 20:00-21:06/66 21:40	04:57 20:43-21:22/39 22:01
29	08:19 15:12-16:27/75 09:29-10:10/41 17:00 08:47-09:25/38 13:50-14:40/50		07:09 18:32-19:28/56 19:55	05:56 19:16-20:22/66 20:52	05:06 20:24-21:07/43 21:41	04:57 20:44-21:22/38 22:01
30	08:17 15:13-16:29/76 09:30-10:09/39 17:02 08:45-09:24/39 13:51-14:39/48		07:06 18:32-19:30/58 19:56	05:54 19:17-20:24/67 20:54	05:05 20:26-21:08/42 21:43	04:58 20:43-21:22/39 22:00
31	08:15 15:14-16:31/77 09:32-10:08/36 17:04 08:44-09:23/39 13:52-14:38/46		07:04 18:31-19:31/60 19:58		05:04 20:28-21:09/41 21:44	
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	8641	3460	1651	2022	1944	1213

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 2 - T02
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 20:43-21:22/39	05:39 19:59-20:53/54	06:33 18:39-19:50/71	07:26 07:52-08:07/15	07:24 07:54-08:41/47	07:26 07:52-08:07/15	07:24 07:54-08:41/47	07:26 07:52-08:07/15	07:24 07:54-08:41/47	08:19 14:46-15:34/48	08:54-10:27/93
2	05:00 20:43-21:23/40	05:40 19:59-20:52/53	06:35 18:37-19:48/71	07:28 07:54-08:07/13	07:26 07:54-08:42/46	07:28 07:54-08:07/13	07:26 07:54-08:42/46	07:28 07:54-08:07/13	07:26 07:54-08:42/46	08:21 14:46-15:32/46	09:11-12:13-14:22/129
3	05:00 20:42-21:22/40	05:42 19:58-20:50/52	06:36 18:35-19:46/71	07:30 07:56-08:07/11	07:28 07:54-08:07/13	07:30 07:56-08:07/11	07:28 07:54-08:07/13	07:30 07:56-08:07/11	07:28 07:54-08:07/13	08:22 14:47-15:32/45	09:12-12:14-23/131
4	05:01 20:42-21:23/41	05:44 19:56-20:48/52	06:38 18:32-19:43/71	07:32 07:58-08:06/8	07:30 07:56-08:07/11	07:32 07:58-08:06/8	07:30 07:56-08:07/11	07:32 07:58-08:06/8	07:30 07:56-08:07/11	08:24 14:48-15:32/44	09:13-12:14-23/130
5	05:02 20:42-21:23/41	05:45 19:58-20:46/68	06:40 18:31-19:41/70	07:33 08:00-08:05/5	07:32 07:58-08:06/8	07:33 08:00-08:05/5	07:32 07:58-08:06/8	07:33 08:00-08:05/5	07:32 07:58-08:06/8	08:25 14:47-15:30/43	09:14-12:14-23/131
6	05:03 20:41-21:22/41	05:47 19:35-20:45/70	06:42 18:30-19:39/69	07:35 08:02-08:04/2	07:34 14:52-16:12/80	07:35 08:02-08:04/2	07:34 14:52-16:12/80	07:35 08:02-08:04/2	07:34 14:52-16:12/80	08:26 14:47-15:30/43	09:15-12:14-23/131
7	05:04 20:41-21:22/41	05:49 19:34-20:43/69	06:43 18:28-19:35/67	07:37 17:24-18:21/57	07:36 14:51-16:10/79	07:37 17:24-18:21/57	07:36 14:51-16:10/79	07:37 17:24-18:21/57	07:36 14:51-16:10/79	08:28 14:47-15:29/42	09:16-12:14-23/131
8	05:05 20:41-21:21/40	05:51 19:31-20:41/70	06:45 18:27-19:33/66	07:39 17:24-18:18/54	07:38 14:49-16:08/79	06:45 18:27-19:33/66	07:39 17:24-18:18/54	07:38 14:49-16:08/79	07:38 14:49-16:08/79	08:29 14:46-15:28/42	09:17-12:14-23/131
9	05:06 20:40-21:21/41	05:52 19:30-20:39/69	06:47 18:26-19:31/65	07:41 17:23-18:16/53	07:40 14:49-16:07/78	06:47 18:26-19:31/65	07:41 17:23-18:16/53	07:40 14:49-16:07/78	07:40 14:49-16:07/78	08:30 14:47-15:28/41	09:18-12:14-23/131
10	05:07 20:39-21:20/41	05:54 19:28-20:37/69	06:49 18:25-19:28/63	07:42 17:22-18:14/52	07:42 14:47-16:05/78	05:54 19:28-20:37/69	07:42 17:22-18:14/52	07:42 14:47-16:05/78	07:42 14:47-16:05/78	08:32 14:46-15:28/42	09:19-12:14-23/131
11	05:08 20:38-21:19/41	05:56 19:27-20:35/68	06:51 18:24-19:26/62	07:44 17:15-17:16/1	07:44 14:46-16:03/77	05:56 19:27-20:35/68	07:44 17:15-17:16/1	07:44 14:46-16:03/77	07:44 14:46-16:03/77	08:33 14:46-15:27/41	09:20-12:14-23/131
12	05:09 20:37-21:18/41	05:58 19:26-20:34/68	06:52 18:24-19:24/60	07:46 17:08-18:09/61	07:46 14:45-16:01/76	05:58 19:26-20:34/68	07:46 17:08-18:09/61	07:46 14:45-16:01/76	07:46 14:45-16:01/76	08:34 14:46-15:27/41	09:21-12:14-23/131
13	05:10 20:36-21:17/40	05:59 19:25-20:33/67	06:54 18:23-19:22/59	07:48 17:05-18:07/62	07:47 14:44-15:59/75	05:59 19:25-20:33/67	07:48 17:05-18:07/62	07:47 14:44-15:59/75	07:47 14:44-15:59/75	08:35 14:47-15:26/39	09:22-12:14-23/131
14	05:11 20:35-21:16/40	06:01 19:24-20:32/66	06:56 18:22-19:18/56	07:50 17:03-18:04/61	07:49 14:43-15:57/74	06:01 19:24-20:32/66	07:50 17:03-18:04/61	07:49 14:43-15:57/74	07:49 14:43-15:57/74	08:36 14:47-15:27/40	09:23-12:14-23/131
15	05:12 20:34-21:15/40	06:02 19:23-20:31/65	06:57 18:21-19:17/55	07:52 17:02-18:03/60	07:51 14:43-15:56/73	06:02 19:23-20:31/65	07:52 17:02-18:03/60	07:51 14:43-15:56/73	07:51 14:43-15:56/73	08:37 14:46-15:26/40	09:24-12:14-23/131
16	05:13 20:33-21:14/40	06:03 19:22-20:30/64	06:58 18:20-19:16/54	07:54 17:01-18:02/61	07:53 14:42-15:54/72	06:03 19:22-20:30/64	07:54 17:01-18:02/61	07:53 14:42-15:54/72	07:53 14:42-15:54/72	08:38 14:45-15:26/40	09:25-12:14-23/131
17	05:14 20:32-21:13/40	06:04 19:21-20:29/63	06:59 18:19-19:15/53	07:56 16:59-17:59/60	07:55 14:42-15:52/70	06:04 19:21-20:29/63	07:56 16:59-17:59/60	07:55 14:42-15:52/70	07:55 14:42-15:52/70	08:39 14:46-15:27/41	09:26-12:14-23/131
18	05:15 20:31-21:12/40	06:05 19:20-20:28/62	07:01 18:18-19:14/52	07:57 16:58-17:57/61	07:56 14:41-15:51/69	06:05 19:20-20:28/62	07:57 16:58-17:57/61	07:56 14:41-15:51/69	07:56 14:41-15:51/69	08:40 14:46-15:28/42	09:27-12:14-23/131
19	05:16 20:30-21:11/40	06:06 19:19-20:27/61	07:02 18:17-19:13/51	07:58 16:57-17:56/62	07:57 14:40-15:50/68	06:06 19:19-20:27/61	07:58 16:57-17:56/62	07:57 14:40-15:50/68	07:57 14:40-15:50/68	08:41 14:47-15:29/42	09:28-12:14-23/131
20	05:17 20:29-21:10/40	06:07 19:18-20:26/60	07:03 18:16-19:12/50	07:59 16:56-17:55/63	07:58 14:39-15:49/67	06:07 19:18-20:26/60	07:59 16:56-17:55/63	07:58 14:39-15:49/67	07:58 14:39-15:49/67	08:42 14:47-15:30/43	09:29-12:14-23/131
21	05:18 20:28-21:09/40	06:08 19:17-20:25/59	07:04 18:15-19:11/49	08:00 16:55-17:54/64	08:00 14:38-15:48/66	06:08 19:17-20:25/59	08:00 16:55-17:54/64	08:00 14:38-15:48/66	08:00 14:38-15:48/66	08:43 14:48-15:31/44	09:30-12:14-23/131
22	05:19 20:27-21:08/40	06:09 19:16-20:24/58	07:05 18:14-19:10/48	08:01 16:54-17:53/65	08:01 14:37-15:47/65	06:09 19:16-20:24/58	08:01 16:54-17:53/65	08:01 14:37-15:47/65	08:01 14:37-15:47/65	08:44 14:49-15:32/45	09:31-12:14-23/131
23	05:20 20:26-21:07/40	06:10 19:15-20:23/57	07:06 18:13-19:09/47	08:02 16:53-17:52/66	08:02 14:36-15:46/64	06:10 19:15-20:23/57	08:02 16:53-17:52/66	08:02 14:36-15:46/64	08:02 14:36-15:46/64	08:45 14:50-15:33/46	09:32-12:14-23/131
24	05:21 20:25-21:06/40	06:11 19:14-20:22/56	07:07 18:12-19:08/46	08:03 16:52-17:51/67	08:03 14:35-15:45/63	06:11 19:14-20:22/56	08:03 16:52-17:51/67	08:03 14:35-15:45/63	08:03 14:35-15:45/63	08:46 14:51-15:34/47	09:33-12:14-23/131
25	05:22 20:24-21:05/40	06:12 19:13-20:21/55	07:08 18:11-19:07/45	08:04 16:51-17:50/68	08:04 14:34-15:44/62	06:12 19:13-20:21/55	08:04 16:51-17:50/68	08:04 14:34-15:44/62	08:04 14:34-15:44/62	08:47 14:52-15:35/48	09:34-12:14-23/131
26	05:23 20:23-21:04/40	06:13 19:12-20:20/54	07:09 18:10-19:06/44	08:05 16:50-17:49/69	08:05 14:33-15:43/61	06:13 19:12-20:20/54	08:05 16:50-17:49/69	08:05 14:33-15:43/61	08:05 14:33-15:43/61	08:48 14:53-15:36/49	09:35-12:14-23/131
27	05:24 20:22-21:03/40	06:14 19:11-20:19/53	07:10 18:09-19:05/43	08:06 16:49-17:48/70	08:06 14:32-15:42/60	06:14 19:11-20:19/53	08:06 16:49-17:48/70	08:06 14:32-15:42/60	08:06 14:32-15:42/60	08:49 14:54-15:37/50	09:36-12:14-23/131
28	05:25 20:21-21:02/40	06:15 19:10-20:18/52	07:11 18:08-19:04/42	08:07 16:48-17:47/71	08:07 14:31-15:41/59	06:15 19:10-20:18/52	08:07 16:48-17:47/71	08:07 14:31-15:41/59	08:07 14:31-15:41/59	08:50 14:55-15:38/51	09:37-12:14-23/131
29	05:26 20:20-21:01/40	06:16 19:09-20:17/51	07:12 18:07-19:03/41	08:08 16:47-17:46/72	08:08 14:30-15:40/58	06:16 19:09-20:17/51	08:08 16:47-17:46/72	08:08 14:30-15:40/58	08:08 14:30-15:40/58	08:51 14:56-15:39/52	09:38-12:14-23/131
30	05:27 20:19-20:59/58	06:17 19:08-20:16/50	07:13 18:06-19:02/40	08:09 16:46-17:45/73	08:09 14:29-15:39/57	06:17 19:08-20:16/50	08:09 16:46-17:45/73	08:09 14:29-15:39/57	08:09 14:29-15:39/57	08:52 14:57-15:40/53	09:39-12:14-23/131
31	05:28 20:18-20:58/57	06:18 19:07-20:15/49	07:14 18:05-19:01/39	08:10 16:45-17:44/74	08:10 14:28-15:38/56	06:18 19:07-20:15/49	08:10 16:45-17:44/74	08:10 14:28-15:38/56	08:10 14:28-15:38/56	08:53 14:58-15:41/54	09:40-12:14-23/131
Potential sun hours	512	460	382	2704	6555	259	10315	233	10315	233	10315
Sum of minutes with flicker	1686	1935	1802	2704	6555	259	10315	233	10315	233	10315

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 3 - T03
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June	
1	08:44	15:04-15:37/33	08:14	08:42-08:55/13	07:16	17:04-17:34/30	07:01	19:08-19:33/25	05:52	20:02-20:26/24	05:03	20:33-21:07/34
	16:15	09:21-10:00/39	17:06	16:04-16:34/30	18:02	07:41-07:49/8	20:00		20:55		21:45	05:33-05:51/18
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29	08:19	08:47-08:52/5			07:09	19:03-19:28/25	05:56	20:02-20:22/20	05:06	20:31-21:07/36	04:58	21:15-21:25/10 20:49-21:11/22
	17:00	15:57-16:28/31			19:55		20:52		21:41	05:36-05:52/16	22:01	05:31-05:51/20
30	08:17	08:45-08:53/8			07:06	19:04-19:30/26	05:54	20:02-20:24/22	05:05	20:31-21:07/36	04:58	21:15-21:24/9 20:49-21:11/22
	17:02	16:00-16:29/29			19:56		20:54		21:43	05:35-05:52/17	22:00	05:31-05:51/20
31	08:15	08:44-08:54/10			07:04	19:05-19:31/26			05:04	20:32-21:07/35		
	17:04	16:01-16:31/30			19:58				21:44	05:34-05:51/17		
Potential sun hours	250		273		367		420		494		510	
Sum of minutes with flicker	1443		1061		1131		671		1198		1540	

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 3 - T03
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 21:16-21:24/8 20:49-21:11/22 22:00 05:32-05:52/20 22:00 05:33-05:53/20	05:39 20:23-20:53/30 21:25 05:40 20:22-20:52/30 21:23	06:33 19:24-19:45/21 20:18 19:46-19:50/4 06:35 19:22-19:45/23 20:16	07:26 18:05-18:36/31 19:05 07:58-08:13/15 07:28 18:04-18:33/29 19:02 07:57-08:19/22	07:24 07:58-08:21/23 16:54 15:53-16:23/30 07:26 07:57-08:22/25 16:52 15:51-16:21/30	08:19 14:56-15:34/38 16:10 09:11-09:28/17 08:21 14:55-15:32/37 16:09 09:11-09:31/20
2	05:00 21:16-21:24/8 20:49-21:12/23 21:59 05:33-05:53/20	05:42 20:21-20:50/29 21:21 05:44 20:19-20:48/29 21:19	06:36 19:19-19:45/26 20:13 06:38 19:17-19:43/26 20:11	07:30 18:03-18:31/28 19:00 07:56-08:22/26 07:32 18:02-18:29/27 18:57 07:58-08:23/25	07:28 07:58-08:23/25 16:50 15:49-16:19/30 07:30 08:00-08:24/24 16:48 15:47-16:17/30	08:22 14:55-15:32/37 16:08 09:10-09:32/22 08:24 14:54-15:32/38 16:08 09:11-09:32/22
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5	05:03 21:17-21:22/5 20:46-21:14/28 21:58 05:36-05:55/19	05:47 20:15-20:45/30 21:16 05:49 20:14-20:43/29 21:14	06:40 19:15-19:41/26 20:09 06:42 19:13-19:39/26 20:06	07:33 18:01-18:26/25 18:55 08:00-08:24/24 07:35 17:54-18:24/30 18:52 08:02-08:25/23	07:32 08:02-08:24/22 16:46 15:46-16:15/29 07:34 08:04-08:25/21 16:44 15:45-16:12/27	08:25 14:54-15:30/36 16:07 09:10-09:37/27 08:26 14:54-15:30/36 16:07 09:11-09:40/29
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Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park IE-F91 RHH9 Sligo +353719161416 abyrne / abyrne@jodireland.com Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 4 - T04 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44 09:18-09:42/24	08:14 15:25-16:35/70	07:16 16:35-17:34/59	07:01 18:44-19:33/49	05:52 20:18-20:26/8	19:29-20:04/35	05:03 20:08-21:10/62				
	16:15 14:39-15:37/58	17:06 18:02 20:00	18:02 20:00	20:00	20:55 06:18-06:31/13	21:45 05:33-05:46/13	21:45 05:33-05:46/13				
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	16:56 17:58 20:48	18:51 20:48	18:51 20:48	20:48	21:39 05:38-05:47/9	22:01 05:30-05:44/14	22:01 05:30-05:44/14				
28	08:20 15:23-16:26/63	07:19 16:31-17:32/61	06:11 17:39-18:26/47	05:58 19:28-20:06/38	05:07 20:07-21:06/59		04:57 20:19-21:25/66				
	16:58 18:00 20:50	18:53 20:50	18:53 20:50	20:50	21:40 05:37-05:47/10	22:01 05:30-05:44/14	22:01 05:30-05:44/14				
29	08:19 15:23-16:28/65		07:09 18:39-19:28/49	05:56 19:28-20:06/38	05:06 20:07-21:07/60		04:58 20:19-21:25/66				
	17:00 19:55 20:52		19:55 20:52	20:52	21:41 05:36-05:46/10	22:01 05:31-05:44/13	22:01 05:31-05:44/13				
30	08:17 15:23-16:30/67		07:06 18:40-19:30/50	05:54 20:22-20:24/2 19:29-20:05/36	05:05 20:07-21:08/61		04:58 20:18-21:24/66				
	17:02 19:56 20:54		19:56 20:54	20:54	21:43 05:35-05:46/11	22:00 05:31-05:44/13	22:00 05:31-05:44/13				
31	08:15 15:24-16:32/68		07:04 18:41-19:31/50		05:04 20:08-21:09/61						
	17:04 19:58 20:54		19:58 20:54		21:44 05:34-05:46/12						
Potential sun hours	250	273	367	420	494		510				
Sum of minutes with flicker	2472	1995	1658	1437	1808		2377				

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 09:39/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 4 - T04
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 20:19-21:24/65 22:00 05:32-05:45/13	05:39 20:16-20:53/37 21:25 06:09-06:20/11	06:33 18:56-19:36/40 20:18 19:40-19:50/10	07:26 17:37-18:36/59 19:05	07:24 15:09-16:23/74 16:54	08:19 14:29-15:34/65 16:10 08:54-09:13/19
2	05:00 20:19-21:24/65 22:00 05:33-05:46/13	05:40 20:16-20:52/36 21:23 06:11-06:21/10	06:35 18:55-19:36/41 20:16 19:44-19:48/4	07:28 17:36-18:33/57 19:02	07:26 15:06-16:21/75 16:52	08:21 14:29-15:33/64 16:09 08:56-09:15/19
3	05:00 20:18-21:23/65 21:59 05:33-05:46/13	05:42 20:16-20:50/34 21:21 06:12-06:21/9	06:36 18:53-19:35/42 20:13	07:30 17:34-18:31/57 19:00	07:28 15:03-16:19/76 16:50	08:22 14:29-15:32/63 16:08 08:57-09:15/18
4	05:01 20:18-21:23/65 21:59 05:34-05:47/13	05:44 20:17-20:48/31 19:51-20:02/11 21:19 06:14-06:31/17	06:38 18:51-19:36/45 20:11	07:31 17:33-18:29/56 18:57	07:30 15:02-16:17/75 16:48	08:24 09:19-09:22/3 08:59-09:17/18 16:08 14:30-15:32/62
5	05:02 20:18-21:23/65 21:58 05:35-05:49/14	05:45 20:17-20:46/29 19:47-20:04/17 21:17 06:16-06:34/18	06:40 18:49-19:36/47 20:09	07:33 17:31-18:26/55 18:55	07:32 15:00-16:15/75 16:46	08:25 09:00-09:24/24 16:07 14:29-15:30/61
6	05:03 20:18-21:22/64 21:58 05:36-05:50/14	05:47 20:18-20:45/27 19:45-20:06/21 21:15 06:17-06:35/18	06:42 18:47-19:35/48 20:06	07:35 17:31-18:24/53 18:52	07:34 14:59-16:12/73 16:44	08:26 09:02-09:27/25 16:07 14:30-15:30/60
7	05:04 20:18-21:22/64 21:57 05:37-05:51/14	05:49 20:19-20:43/24 19:44-20:08/24 21:14 06:19-06:37/18	06:43 18:45-19:34/49 20:04	07:37 17:29-18:21/52 18:50	07:36 14:58-16:10/72 16:43	08:28 09:03-09:28/25 16:06 14:30-15:29/59
8	05:05 20:17-21:21/64 21:56 05:38-05:51/13	05:51 20:20-20:41/21 19:42-20:09/27 21:12 06:20-06:37/17	06:45 18:42-19:33/51 20:01	07:39 17:24-18:18/54 18:48	07:38 14:57-16:08/71 16:41	08:29 09:05-09:30/25 16:06 14:30-15:28/58
9	05:06 20:17-21:21/64 21:55 05:39-05:52/13	05:52 20:21-20:39/18 19:41-20:10/29 21:10 06:22-06:38/16	06:47 18:40-19:31/51 19:59	07:41 17:20-18:16/56 18:45	07:40 14:56-16:06/70 16:39	08:30 09:06-09:30/24 16:05 14:30-15:28/58
10	05:07 20:17-21:20/63 21:55 05:40-05:53/13	05:54 20:22-20:37/15 19:39-20:10/31 21:08 06:24-06:39/15	06:49 18:38-19:28/50 19:56	07:42 17:16-18:14/58 18:43	07:42 14:56-16:05/69 16:37	08:31 09:07-09:31/24 16:05 14:30-15:28/58
11	05:08 20:17-21:19/62 21:54 05:41-05:53/12	05:56 20:24-20:35/11 19:38-20:11/33 21:05 06:25-06:39/14	06:51 18:36-19:26/50 19:55	07:44 17:12-18:11/59 18:40	07:44 14:56-16:03/67 16:36	08:33 09:08-09:32/24 16:05 14:30-15:27/58
12	05:09 20:16-21:18/62 21:53 05:42-05:54/12	05:58 20:27-20:34/7 19:38-20:12/34 21:03 06:27-06:40/13	06:52 18:34-19:24/50 19:52	07:46 17:09-18:09/60 18:38	07:45 14:55-16:01/66 16:34	08:34 09:09-09:32/23 16:05 14:29-15:27/58
13	05:11 20:16-21:17/61 21:52 05:43-05:54/11	05:59 20:26-06:41/13 21:01 19:36-20:12/36	06:54 18:32-19:22/50 19:49	07:48 17:07-18:07/60 18:36	07:47 14:55-15:59/64 16:32	08:35 09:11-09:34/23 16:05 14:29-15:27/58
14	05:12 20:16-21:16/60 21:51 05:44-05:55/11	06:01 20:30-06:41/11 20:59 19:36-20:13/37	06:56 18:30-19:18/48 19:47	07:50 17:00-18:04/64 18:33	07:49 14:54-15:58/64 16:31	08:36 09:12-09:35/23 16:05 14:29-15:26/57
15	05:13 20:15-21:15/60 21:50 05:45-05:55/10	06:03 20:32-06:41/9 20:57 19:36-20:14/38	06:58 18:28-19:16/48 19:44	07:52 16:55-18:02/67 18:31	07:51 14:54-15:56/62 16:29	08:37 09:13-09:35/22 16:05 14:29-15:26/57
16	05:14 20:16-21:15/59 21:49 05:47-05:56/9	06:05 19:33-06:41/8 20:55 19:34-20:13/39	06:59 18:23-19:14/51 19:42	07:54 16:47-17:59/72 18:29	07:53 14:54-15:54/60 16:27	08:38 09:13-09:35/22 16:05 14:30-15:26/56
17	05:16 20:16-21:14/58 21:47 05:48-05:56/8	06:06 20:35-06:41/6 20:53 19:34-20:13/39	07:01 18:19-19:11/52 19:39	07:55 16:42-17:57/75 18:26	07:55 14:54-15:52/58 16:26	08:38 09:14-09:36/22 16:05 14:30-15:27/57
18	05:17 20:15-21:12/57 21:46 05:49-05:56/7	06:08 20:37-06:41/4 20:51 19:34-20:14/40	07:03 18:16-19:08/52 19:37	07:57 16:39-17:55/76 18:24	07:57 14:54-15:51/57 16:25	08:39 09:15-09:37/22 16:05 14:31-15:27/56
19	05:18 20:15-21:11/56 21:45 05:50-05:56/6	06:10 19:33-20:13/40 20:48 20:38-06:40/2	07:05 18:14-19:06/52 19:34	07:59 16:36-17:52/76 18:22	07:59 14:39-14:48/9 08:36-08:48/12 16:23	08:40 09:16-09:37/21 16:05 14:31-15:28/57
20	05:20 20:15-21:10/55 21:44 05:52-05:57/5	06:12 19:33-20:13/40 20:46	07:06 18:13-19:04/51 19:32	08:01 16:34-17:50/76 18:20	08:00 14:36-14:51/15 08:35-08:51/16 16:22	08:41 09:16-09:37/21 16:06 14:31-15:27/56
21	05:21 20:15-21:09/54 21:42 05:53-05:57/4	06:13 19:33-20:13/40 20:44	07:08 18:10-19:01/51 19:29	08:03 16:33-17:48/75 18:17	08:02 14:54-15:46/72 16:20	08:41 09:17-09:38/21 16:06 14:32-15:28/56
22	05:23 20:14-21:07/53 21:41 05:55-05:57/2	06:15 19:33-20:12/39 20:42	07:10 18:09-18:58/49 19:27	08:05 16:31-17:45/74 18:15	08:04 14:33-15:44/71 16:19	08:42 09:17-09:38/21 16:07 14:32-15:28/56
23	05:24 20:15-21:07/52 21:39 05:56-05:57/1	06:17 19:16-19:25/9 20:39 19:33-20:10/37	07:12 18:09-18:56/47 19:24	08:07 16:30-17:43/73 18:13	08:06 14:32-15:43/71 16:18	08:42 09:18-09:39/21 16:07 14:33-15:29/56
24	05:26 20:14-21:05/51 21:38	06:19 19:12-19:29/17 20:37 19:33-20:09/36	07:14 18:06-18:54/48 19:22	08:09 16:29-17:41/72 18:11	08:08 14:31-15:42/71 16:17	08:43 09:18-09:39/21 16:08 14:33-15:30/57
25	05:27 20:15-21:04/49 21:36	06:20 19:09-19:30/21 20:35 19:33-20:06/33	07:15 18:01-18:51/50 19:19	08:10 15:28-16:38/70 17:09	08:09 14:30-15:41/71 16:16	08:43 09:18-09:40/22 16:08 14:34-15:30/56
26	05:29 20:15-21:02/47 21:35	06:22 19:17-19:32/25 20:32 19:34-20:04/30	07:17 17:57-18:48/51 19:17	08:11 15:27-16:36/69 17:01	08:11 14:30-15:39/69 16:15	08:43 09:19-09:41/22 16:09 14:34-15:30/56
27	05:31 20:15-21:01/46 21:33	06:24 19:06-19:34/28 20:30 19:35-20:02/27	07:19 17:53-18:46/53 19:14	08:13 15:26-16:34/68 17:04	08:13 14:30-15:38/68 16:14	08:44 09:20-09:42/23 16:10 14:36-15:32/56
28	05:32 20:15-20:59/44 21:32 06:08-06:14/6	06:26 19:03-19:34/31 20:28 19:35-19:59/24	07:21 17:49-18:44/55 19:12	08:15 15:25-16:31/66 17:02	08:14 14:30-15:37/67 16:13	08:44 09:19-09:41/22 16:11 14:36-15:33/57
29	05:34 20:15-20:58/43 21:30 06:07-06:17/10	06:28 19:02-19:35/33 20:25 19:36-19:57/21	07:22 17:44-18:41/57 19:10	08:16 15:25-16:29/64 17:00	08:16 14:29-15:36/67 16:12	08:44 09:19-09:42/23 16:11 14:37-15:34/57
30	05:35 20:15-20:56/41 21:28 06:06-06:18/12	06:29 19:02-19:36/34 20:23 19:37-19:55/18	07:24 17:40-18:38/58 19:07	08:18 15:23-16:27/64 16:58	08:18 14:29-15:35/66 16:11	08:44 09:19-09:42/23 16:12 14:37-15:34/57
31	05:37 20:16-20:55/39 21:27 06:08-06:20/12	06:31 18:58-19:35/37 20:21 19:38-19:52/14	 	07:22 15:21-16:25/64 16:56	08:19 14:29-15:34/65 16:11	08:44 09:18-09:41/23 16:13 14:38-15:35/57
Potential sun hours	512	460	382	328	259	233
Sum of minutes with flicker	2024	1609	1501	2005	2286	2487

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 5 - T05
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 15:06-15:37/31 16:15	08:14 16:00-16:35/35 17:06	07:16 16:59-17:34/35 18:02	07:01 18:36-19:33/57 18:02	05:52 19:53-20:26/33 20:55 06:18-06:51/33	05:03 20:28-21:10/42 21:45 05:33-05:52/19
2	08:44 15:07-15:39/32 16:16	08:12 16:04-16:37/33 17:08	07:14 17:00-17:36/36 18:04	06:59 18:37-19:35/58 20:02 07:23-08:05/42	05:50 19:54-20:27/33 20:57 06:16-06:50/34	05:02 20:28-21:12/44 21:46 05:33-05:53/20
3	08:44 15:07-15:39/32 16:17	08:10 16:06-16:39/33 17:10	07:12 17:01-17:38/37 18:06	06:56 18:39-19:37/58 20:04 07:20-08:00/40	05:48 19:54-20:29/35 20:59 06:14-06:49/35	05:01 20:28-21:13/45 21:48 05:32-05:53/21
4	08:43 15:08-15:41/33 16:18	08:08 16:09-16:41/32 17:12	07:09 17:04-17:41/37 18:08	06:54 18:41-19:39/58 20:06 07:18-07:58/40	05:46 19:54-20:30/36 21:01 06:12-06:48/36	05:00 20:27-21:14/47 21:49 05:31-05:53/22
5	08:43 15:08-15:42/34 16:20	08:07 16:11-16:43/32 17:14	07:07 17:07-17:11/4 18:09 17:13-17:40/27	06:52 18:44-19:40/56 07:47-07:52/5 20:07 07:15-07:42/27	05:44 19:54-20:32/38 21:03 06:10-06:47/37	04:59 20:27-21:15/48 21:50 05:31-05:54/23
6	08:43 15:09-15:44/35 16:21	08:05 16:12-16:45/33 17:16	07:05 17:14-17:40/26 18:11	06:49 18:50-19:42/52 20:09 07:13-07:41/28	05:42 19:54-20:33/39 21:04 06:10-06:46/36	04:59 20:27-21:16/49 21:51 05:30-05:54/24
7	08:42 15:10-15:45/35 16:22	08:03 16:13-16:47/34 17:18	07:02 17:13-17:46/33 18:13	06:47 18:49-19:43/54 20:11 07:11-07:40/29	05:40 19:55-20:36/41 21:06 06:11-06:44/33	04:58 20:26-21:16/50 21:52 05:30-05:55/25
8	08:42 15:10-15:46/36 16:24	08:01 16:15-16:50/35 17:20	07:00 17:14-17:48/34 18:15	06:44 18:50-19:46/56 20:13 07:08-07:37/29	05:38 19:56-20:37/41 21:08 06:11-06:42/31	04:57 20:26-21:17/51 21:53 05:29-05:55/26
9	08:41 15:12-15:49/37 16:25	07:59 16:17-16:52/35 17:22	06:57 17:14-17:50/36 18:17	06:42 18:51-19:48/57 20:15 07:06-07:33/27	05:36 19:56-20:38/42 21:10 06:11-06:41/30	04:57 20:27-21:19/52 21:54 05:29-05:56/27
10	08:40 15:12-15:50/38 16:27	07:57 16:21-16:54/33 17:24	06:55 17:15-17:52/37 18:19	06:39 18:51-19:49/58 20:17 07:03-07:27/24	05:34 19:57-20:39/42 21:11 06:12-06:41/29	04:56 20:26-21:19/53 21:55 05:28-05:55/27
11	08:40 15:13-15:52/39 16:28	07:55 16:23-16:56/33 17:26	06:53 17:16-17:55/39 18:21	06:37 18:53-19:51/58 20:19 07:01-07:27/26	05:33 19:58-20:40/42 21:13 06:13-06:40/27	04:56 20:26-21:20/54 21:55 05:28-05:56/28
12	08:39 15:14-15:54/40 16:30	07:53 16:25-16:58/33 17:28	06:50 17:17-17:56/39 18:23	06:35 18:55-19:53/58 20:20 06:59-07:26/27	05:31 19:59-20:39/40 20:40-20:43/3 21:15 06:13-06:38/25	04:55 20:27-21:21/54 21:56 05:28-05:57/29
13	08:38 15:16-15:55/39 16:31	07:51 16:28-17:00/32 17:30	06:48 17:20-17:58/38 18:25 07:12-07:13/1	06:32 18:56-19:54/58 20:22 06:58-07:25/27	05:29 20:00-20:44/44 21:17 06:15-06:38/23	04:55 20:26-21:21/55 21:57 05:27-05:56/29
14	08:37 15:17-15:57/40 16:33	07:49 16:31-17:02/31 17:32	06:45 17:26-18:00/34 18:27 07:09-07:14/5	06:30 19:36-19:56/20 18:59-19:35/36 20:24 06:58-07:24/26	05:27 06:16-06:36/20 21:18 20:01-20:47/46	04:55 20:26-21:22/56 21:58 05:27-05:57/30
15	08:36 15:19-15:59/40 16:35	07:47 16:34-17:05/31 17:34	06:43 17:25-18:02/37 18:28 07:07-07:16/9	06:28 19:36-19:58/22 19:12-19:33/21 20:26 06:59-07:23/24	05:26 06:17-06:34/17 21:20 20:02-20:48/46	04:55 20:26-21:22/56 21:58 05:27-05:57/30
16	08:35 15:21-16:00/39 16:36	07:45 16:36-17:07/31 17:36	06:40 17:24-18:04/40 18:30 07:04-07:16/12	06:25 19:36-20:00/24 07:01-07:21/20 20:28 19:13-19:32/19	05:24 06:19-06:32/13 21:22 20:05-20:50/45	04:54 20:26-21:23/57 21:59 05:27-05:57/30
17	08:34 15:28-16:03/35 16:38	07:43 16:37-17:09/32 17:38	06:38 17:24-18:06/42 18:32 07:02-07:17/15	06:23 19:38-20:01/23 06:47-06:48/1 20:30 19:15-19:28/13 07:01-07:18/17	05:22 06:23-06:30/7 05:51-05:52/1 21:23 20:07-20:51/44	04:54 20:26-21:23/57 21:59 05:27-05:58/31
18	08:33 15:29-16:05/36 16:40	07:41 16:38-17:11/33 17:40	06:36 17:23-18:07/44 18:34 06:59-07:17/18	06:21 19:41-20:03/22 06:45-06:50/5 20:31 19:21-19:22/1 07:04-07:16/12	05:21 20:10-20:52/42 21:25 05:49-05:51/2	04:54 20:27-21:24/57 22:00 05:27-05:58/31
19	08:32 15:31-16:07/36 16:41	07:39 16:40-17:13/33 17:42	06:33 17:24-18:10/46 18:36 06:57-07:18/21	06:18 19:45-20:05/20 20:33 06:43-06:51/8	05:19 20:11-20:54/43 21:27 05:48-05:51/3	04:54 20:27-21:24/57 22:00 05:27-05:58/31
20	08:31 15:31-16:08/37 16:43	07:36 16:44-17:16/32 17:44	06:31 17:23-18:11/48 18:38 06:54-07:18/24	06:16 19:45-20:07/22 20:35 06:41-06:52/11	05:18 20:11-20:55/44 21:28 05:46-05:50/4	04:54 20:27-21:24/57 22:00 05:27-05:58/31
21	08:30 15:33-16:11/38 16:45	07:34 16:47-17:18/31 17:46	06:28 17:24-18:13/49 18:40 06:52-07:18/26	06:14 19:44-20:08/24 20:37 06:39-06:53/14	05:16 20:12-20:57/45 21:30 05:45-05:50/5	04:55 20:27-21:24/57 22:01 05:27-05:58/31
22	08:29 15:33-16:12/39 16:47	07:32 16:47-17:19/32 17:48	06:26 17:23-18:15/52 18:42 06:49-07:17/28	06:12 19:45-20:10/25 20:39 06:36-06:52/16	05:15 20:13-20:59/46 21:31 05:44-05:49/5	04:55 20:28-21:25/57 22:01 05:28-05:59/31
23	08:27 15:35-16:15/40 16:49	07:30 16:49-17:22/33 17:50	06:23 17:24-18:17/53 18:43 06:47-07:17/30	06:09 19:46-20:12/26 20:41 06:34-06:53/19	05:13 20:14-20:59/45 21:33 05:43-05:49/6	04:55 20:28-21:25/57 22:01 05:28-05:59/31
24	08:26 15:36-16:17/41 16:51	07:28 16:51-17:24/33 17:52	06:21 17:24-18:18/54 18:45 06:45-07:17/32	06:07 19:47-20:13/26 20:43 06:32-06:53/21	05:12 20:15-21:01/46 21:34 05:41-05:47/6	04:55 20:28-21:25/57 22:01 05:28-05:59/31
25	08:24 15:39-16:19/40 16:52	07:25 16:53-17:23/30 17:54 17:24-17:26/2	06:18 17:26-18:21/55 18:47 06:42-07:16/34	06:05 19:47-20:15/28 20:44 06:30-06:53/23	05:11 20:17-21:02/45 21:36 05:40-05:47/7	04:56 20:29-21:25/56 22:01 05:29-06:00/31
26	08:23 15:43-16:21/38 16:54	07:23 16:55-17:28/33 17:56	06:16 17:27-18:23/56 18:49 06:40-07:16/36	06:03 19:48-20:17/29 20:46 06:28-06:53/25	05:09 20:19-21:03/44 21:37 05:39-05:48/9	04:56 20:28-21:25/57 22:01 05:29-05:59/30
27	08:22 15:46-16:23/37 16:56	07:21 16:57-17:31/34 17:58	06:13 17:28-18:24/56 18:51 06:37-07:15/38	06:01 19:48-20:19/31 20:48 06:26-06:53/27	05:08 20:28-21:05/37 20:22-20:25/3 21:39 05:38-05:49/11	04:56 20:29-21:25/56 22:01 05:30-06:00/30
28	08:20 15:49-16:26/37 16:58	07:19 16:57-17:32/35 18:00	06:11 17:31-18:26/55 18:53 06:35-07:14/39	05:58 19:49-20:21/32 20:50 06:24-06:52/28	05:07 20:28-21:06/38 21:40 05:37-05:50/13	04:57 20:29-21:25/56 22:01 05:30-06:00/30
29	08:19 15:54-16:28/34 17:00		07:09 18:34-19:28/54 19:55 07:32-08:12/40	05:56 19:50-20:22/32 20:52 06:22-06:52/30	05:06 20:28-21:07/39 21:41 05:36-05:50/14	04:58 20:30-21:25/55 22:01 05:31-06:00/29
30	08:17 15:56-16:30/34 17:02		07:06 18:35-19:30/55 19:56 07:30-08:11/41	05:54 19:51-20:24/33 20:54 06:20-06:51/31	05:05 20:28-21:08/40 21:43 05:35-05:51/16	04:58 20:30-21:24/54 22:00 05:31-06:00/29
31	08:15 15:57-16:32/35 17:04		07:04 18:35-19:31/56 19:58 07:27-08:09/42		05:04 20:28-21:09/41 21:44 05:34-05:51/17	
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	1137	919	1835	2038	1873	2440

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 09:39/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 5 - T05
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 20:30-21:24/54	05:39 20:09-20:50/41	06:33 18:52-19:50/58	07:26 17:57-18:36/39	07:24 15:50-16:23/33	08:19 14:55-15:34/39
2	05:00 20:31-21:24/53	05:40 20:09-20:50/41	06:35 18:50-19:48/58	07:28 17:55-18:33/38	07:26 15:46-16:21/35	08:21 14:55-15:33/38
3	05:00 20:31-21:23/52	05:42 20:07-20:50/43	06:36 18:49-19:45/56	07:30 17:53-18:31/38	07:28 15:44-16:19/35	08:22 14:55-15:32/37
4	05:01 20:32-21:23/51	05:44 20:07-20:48/41	06:38 18:47-19:43/56	07:32 17:52-18:29/37	07:30 15:43-16:17/34	08:24 14:55-15:32/37
5	05:02 20:32-21:23/51	05:45 20:05-20:46/41	06:40 18:46-19:41/55	07:33 17:51-18:26/35	07:32 15:41-16:15/34	08:25 14:55-15:30/35
6	05:03 20:33-21:22/49	05:47 20:05-20:45/40	06:42 18:46-19:38/52	07:35 17:50-18:24/34	07:34 15:41-16:12/31	08:26 14:55-15:30/35
7	05:04 20:34-21:22/48	05:49 20:04-20:43/39	06:43 18:40-19:35/55	07:37 17:49-18:15/26	07:36 15:39-16:10/31	08:28 14:55-15:29/34
8	05:05 20:34-21:21/47	05:51 20:03-20:41/38	06:45 18:36-19:33/57	07:39 17:49-18:15/26	07:38 15:36-16:08/32	08:29 14:55-15:28/33
9	05:06 20:35-21:21/46	05:52 20:03-20:39/36	06:47 18:33-19:31/58	07:41 17:40-18:15/35	07:40 15:34-16:06/32	08:30 14:56-15:29/33
10	05:07 20:35-21:20/45	05:54 20:02-20:37/35	06:49 18:30-19:28/58	07:42 17:37-18:14/37	07:42 15:31-16:05/34	08:31 14:56-15:28/32
11	05:08 20:36-21:19/43	05:56 20:02-20:35/33	06:51 18:29-19:26/57	07:44 17:35-18:11/36	07:44 15:29-16:03/34	08:33 14:56-15:27/31
12	05:09 20:36-21:18/42	05:58 20:01-20:34/33	06:52 18:27-19:24/57	07:46 17:33-18:09/36	07:45 15:27-16:01/34	08:34 14:56-15:27/31
13	05:11 20:37-21:17/40	05:59 19:58-20:31/33	06:54 18:26-19:22/56	07:48 17:32-18:07/35	07:47 15:26-15:59/33	08:35 14:56-15:27/31
14	05:12 20:37-21:16/39	06:01 19:57-20:29/32	06:56 18:24-19:18/54	07:50 17:30-18:04/34	07:49 15:21-15:58/37	08:36 14:57-15:26/29
15	05:13 20:37-21:15/38	06:03 19:56-20:28/32	06:58 18:21-19:16/55	07:52 17:28-18:02/34	07:51 15:19-15:56/37	08:37 14:49-14:53/4
16	05:14 20:38-21:15/37	06:05 19:55-20:25/30	06:59 18:18-19:14/56	07:54 17:26-18:00/34	07:53 15:15-15:54/39	08:38 14:48-14:55/7
17	05:16 20:38-21:14/36	06:06 19:54-20:23/29	07:01 18:15-19:11/56	07:56 17:24-17:55/31	07:55 15:12-15:52/40	08:38 14:49-14:56/7
18	05:17 20:37-21:12/45	06:08 19:54-20:22/28	07:03 18:13-19:08/55	07:57 17:22-17:55/33	07:57 15:10-15:51/41	08:39 14:49-14:57/8
19	05:19 20:35-21:11/46	06:10 19:52-20:19/27	07:05 18:12-19:06/54	07:59 17:20-17:52/32	07:59 15:09-15:49/40	08:40 14:49-14:58/9
20	05:20 20:35-21:10/45	06:12 19:51-20:17/26	07:06 18:11-19:04/53	08:00 17:18-17:50/32	08:00 15:08-15:47/39	08:41 14:49-14:58/9
21	05:21 20:34-21:09/45	06:13 19:50-20:15/25	07:08 18:09-19:01/52	08:03 17:17-17:48/31	08:02 15:08-15:46/38	08:41 14:50-14:59/9
22	05:23 20:33-21:07/45	06:15 19:49-20:12/23	07:10 18:08-18:59/51	08:05 17:13-17:45/32	08:04 15:07-15:44/37	08:42 14:50-14:59/9
23	05:24 20:32-21:06/44	06:17 19:49-20:10/21	07:12 18:08-18:56/48	08:07 17:10-17:43/33	08:06 15:07-15:43/36	08:42 14:51-15:00/9
24	05:26 20:31-21:05/44	06:19 19:49-20:09/20	07:14 18:07-18:54/47	08:09 17:08-17:41/33	08:08 15:06-15:42/36	08:43 14:51-15:00/9
25	05:27 20:31-21:04/43	06:20 19:43-20:06/23	07:15 18:06-18:51/45	08:11 16:06-16:38/32	08:09 15:06-15:41/35	08:43 14:52-15:00/8
26	05:29 20:30-21:02/42	06:22 19:41-20:04/23	07:17 18:06-18:48/42	08:13 16:05-16:36/31	08:11 15:00-15:40/40	08:43 14:52-15:00/8
27	05:31 20:30-21:01/41	06:24 19:39-20:02/23	07:19 18:06-18:46/40	08:15 16:03-16:34/31	08:13 14:58-15:38/40	08:44 14:54-15:01/7
28	05:32 20:29-21:00/40	06:26 19:37-19:59/22	07:21 18:06-18:44/38	08:16 16:00-16:31/31	08:14 14:57-15:38/41	08:44 14:55-15:01/6
29	05:34 20:28-21:00/40	06:28 19:37-19:57/20	07:22 18:06-18:41/35	08:18 15:57-16:29/32	08:16 14:56-15:36/40	08:44 14:57-15:00/3
30	05:35 20:28-21:00/40	06:29 19:37-19:57/20	07:24 18:00-18:38/38	08:20 15:54-16:27/33	08:18 14:55-15:35/40	08:44 15:04-15:34/30
31	05:37 20:28-21:00/40	06:31 18:53-19:52/59	07:26 18:00-18:38/38	08:22 15:51-16:25/34	08:20 15:51-16:25/34	08:44 15:05-15:35/30
Potential sun hours	512	460	382	328	259	233
Sum of minutes with flicker	1885	1910	2412	1035	1088	1069

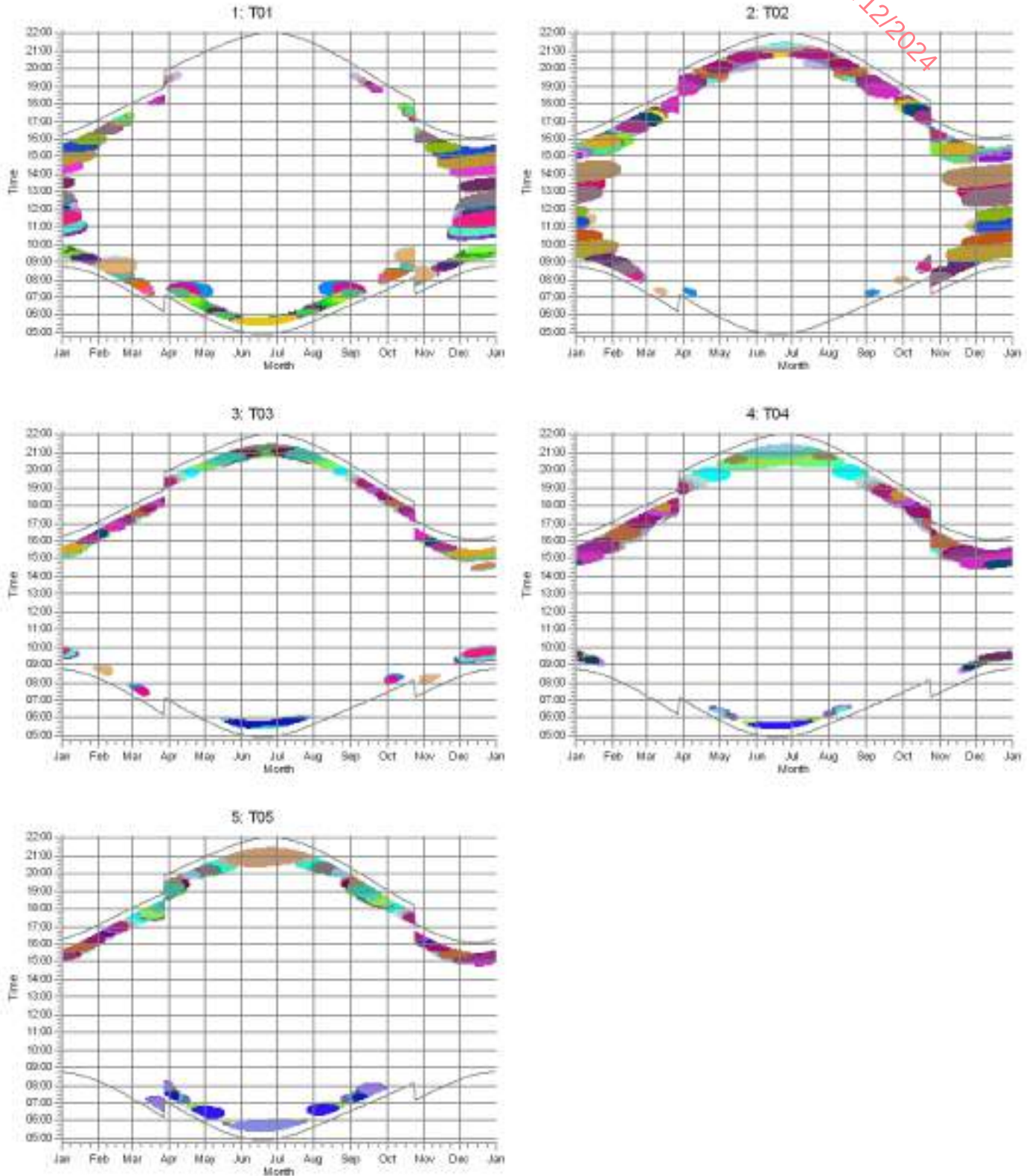
Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG, graphical

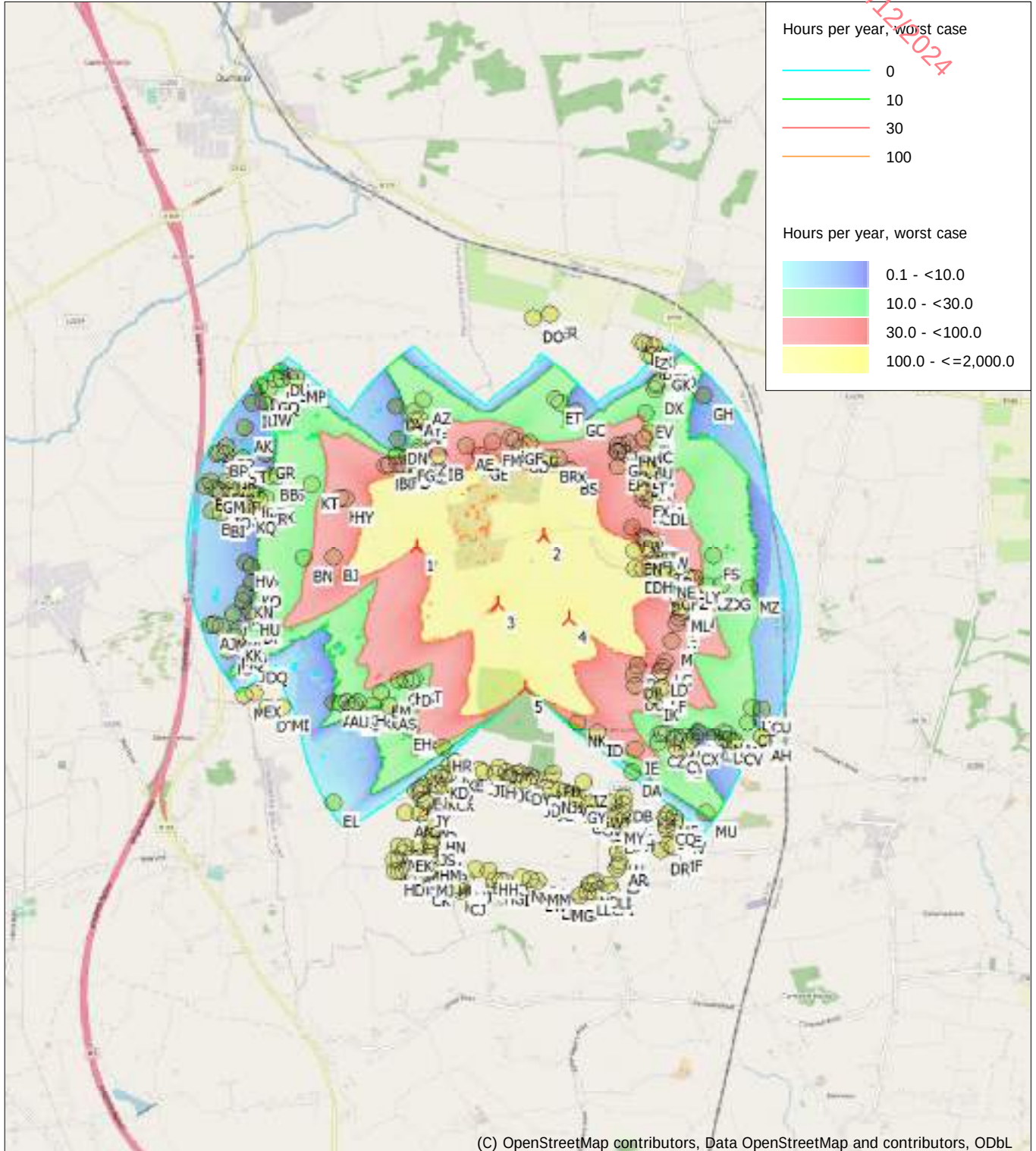
Calculation: Kellystown SG155 Worst Case

RECEIVED: 04/12/2024



SHADOW - Map

Calculation: Kellystown SG155 Worst Case

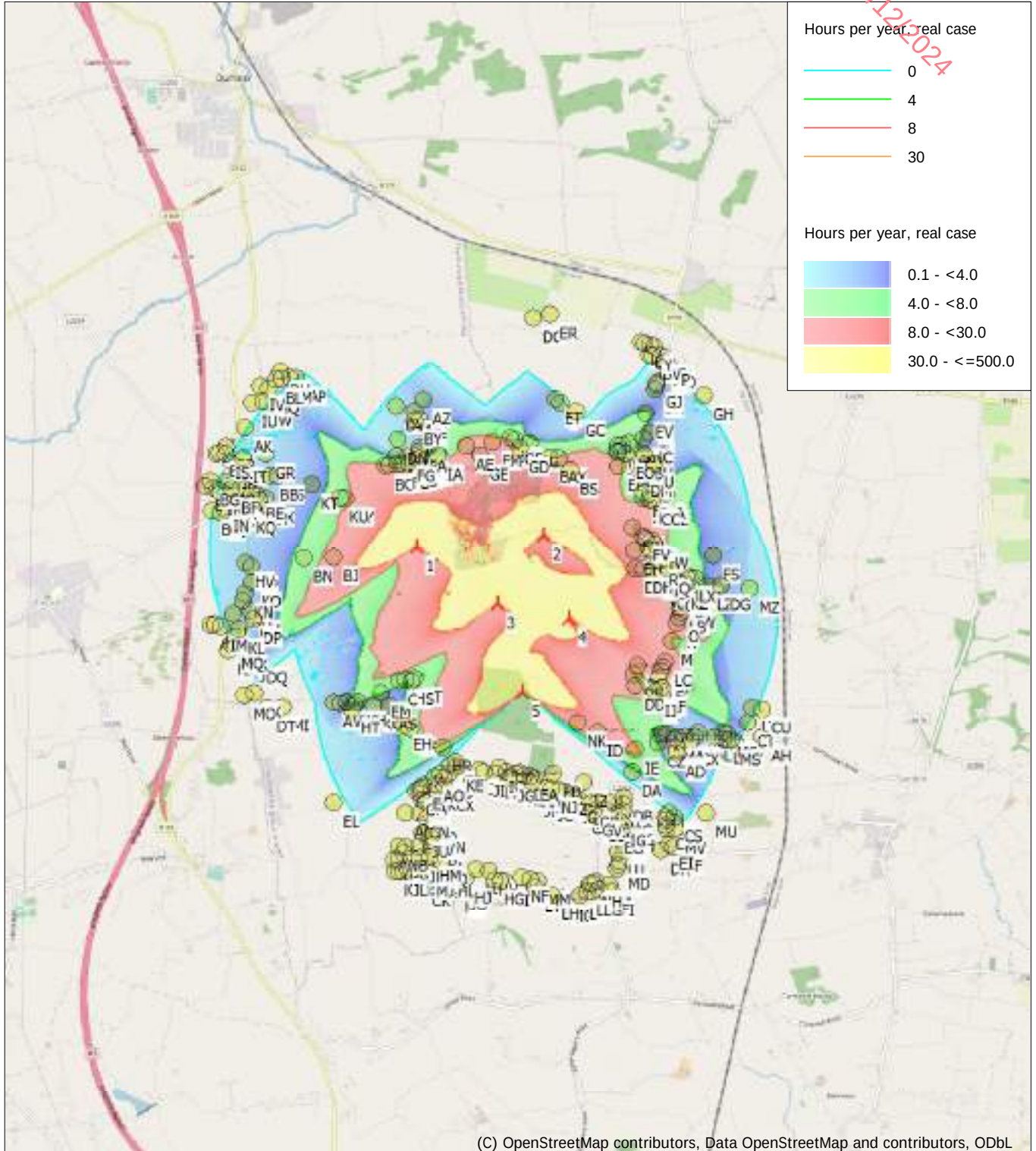


0 500 1000 1500 2000 m

Map: EMD OpenStreetMap , Print scale 1:50,000, Map center Irish ITM-IRENET95 (IE), geocentric, GRS80 East: 708,030 North: 783,620
 New WTG Shadow receptor
 Flicker map level: Height Contours: CONTOURLINE_6918 Kellystown_3.wpo (3)
 Time step: 2 minutes, Day step: 3 days, Map resolution: 10 m, Visibility resolution: 5 m, Eye height: 1.5 m

SHADOW - Map

Calculation: Kellystown N149 Real Case



0 500 1000 1500 2000 m

Map: EMD OpenStreetMap, Print scale 1:50,000, Map center Irish ITM-IRENET95 (IE), geocentric, GRS80 East: 708,030 North: 783,620
New WTG Shadow receptor
Flicker map level: Height Contours: CONTOURLINE_6918 Kellystown_3.wpo (3)
Time step: 2 minutes, Day step: 3 days, Map resolution: 10 m, Visibility resolution: 5 m, Eye height: 1.5 m

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time
N NNE NE ENE E ESE SE SSE S SSW SW WSW
160 97 158 383 373 261 461 767 532 825 1,031 1,215

W WNW NW NNW Sum
766 673 581 477 8,760

Monthly aggregation of real case reduction
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_6918 Kellystown_3.w
Receptor grid resolution: 1.0 m

All coordinates are in
Irish ITM-IRENET95 (IE), geocentric, GRS80

WTGs

	Easting	Northing	Z	Row data/Description	WTG type		Power, rated	Rotor diameter	Hub height	Shadow data	
					Valid	Manufact.				Calculation distance	RPM
			[m]				[kW]	[m]	[m]	[m]	[RPM]
1	707,338	784,036	115.1	T01	Yes	NORDEX	N149/5.X-5,700	5,700	149.0	105.0	1,809 10.7
2	708,442	784,163	104.9	T02	Yes	NORDEX	N149/5.X-5,700	5,700	149.0	105.0	1,809 10.7
3	708,057	783,557	98.1	T03	Yes	NORDEX	N149/5.X-5,700	5,700	149.0	105.0	1,809 10.7
4	708,686	783,447	90.3	T04	Yes	NORDEX	N149/5.X-5,700	5,700	149.0	105.0	1,809 10.7
5	708,289	782,794	112.2	T05	Yes	NORDEX	N149/5.X-5,700	5,700	149.0	105.0	1,809 10.7

Shadow receptor-Input

No.	Name	Easting	Northing	Z	Width	Height	Elevation	Slope of	Direction mode	Eye height
							a.g.l.	window		(ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	H1	709,505	784,550	91.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
B	H2	709,367	784,550	93.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
C	H3	707,206	782,871	130.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
D	H4	707,318	782,870	131.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
E	H5	707,444	781,961	140.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
F	H6	707,513	781,507	158.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
G	H7	707,383	781,906	145.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
H	H8	705,584	783,319	107.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
I	H9	705,744	783,414	104.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
J	H10	705,902	783,048	123.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
K	H11	708,134	781,146	127.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
L	H12	706,829	782,648	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
M	H13	709,591	783,271	84.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
N	H14	709,625	783,428	81.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
O	H15	709,647	783,479	84.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
P	H16	709,657	783,517	86.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Q	H17	709,551	783,895	97.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
R	H18	709,459	783,967	94.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
S	H19	709,386	784,693	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
T	H20	709,354	784,771	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
U	H21	709,398	784,820	73.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
V	H22	709,114	784,973	73.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...



SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
W H23		709,077	784,968	73.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
X H24		708,564	785,327	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Y H25		709,371	785,841	63.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Z H26		709,336	785,853	64.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AA H27		709,496	782,453	88.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AB H28		709,526	782,458	88.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AC H29		709,557	782,461	87.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AD H30		709,649	782,293	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AE H31		707,754	784,932	85.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AF H32		707,338	785,150	88.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AG H33		707,139	784,828	105.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AH H34		710,397	782,450	63.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AI H35		705,824	784,510	80.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AJ H36		705,550	783,314	106.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AK H37		705,812	785,050	78.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AL H38		707,240	781,305	179.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AM H39		707,528	781,402	160.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AN H40		707,291	781,712	158.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AO H41		707,540	782,027	136.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AP H42		707,674	782,146	133.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AQ H43		708,690	781,931	116.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AR H44		709,175	781,337	87.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AS H45		707,126	782,653	129.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AT H46		707,344	782,894	131.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AU H47		706,698	782,663	128.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AV H48		706,639	782,666	128.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AW H49		709,674	783,593	86.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AX H50		708,565	784,842	79.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AY H51		707,289	785,222	92.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AZ H52		707,364	785,326	87.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BA H53		706,194	785,494	90.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BB H54		706,039	784,628	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BC H55		707,042	784,741	105.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BD H56		707,077	784,751	104.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BE H57		705,927	784,462	79.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BF H58		705,705	784,510	85.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BG H59		705,521	784,573	88.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BH H60		705,656	784,393	92.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BI H61		705,616	784,300	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BJ H62		706,612	783,934	103.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BK H63		705,816	783,140	110.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BL H64		706,071	785,473	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BM H65		706,123	785,479	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BN H66		706,349	783,922	93.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BO H67		705,540	784,312	102.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BP H68		705,596	784,822	78.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BQ H69		708,136	785,009	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BR H70		708,483	784,848	80.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BS H71		708,669	784,739	80.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BT H72		709,294	784,805	78.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BU H73		709,311	784,893	73.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BV H74		709,363	785,756	61.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BW H75		709,335	785,767	61.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BX H76		709,291	785,868	64.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BY H77		707,293	785,144	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BZ H78		707,340	784,844	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CA H79		707,301	784,792	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CB H80		707,252	784,779	97.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CC H81		709,390	784,492	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CD H82		709,503	783,935	96.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CE H83		709,610	783,743	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CF H84		709,573	783,753	94.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CG H85		709,535	783,765	95.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CH H86		709,484	783,778	96.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

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SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
CI	H87	708,177	781,136	125.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CJ	H88	707,792	781,047	132.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CK	H89	707,456	781,117	152.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CL	H90	707,203	781,303	180.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CM	H91	707,245	781,206	170.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CN	H92	707,415	781,706	152.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CO	H93	709,577	781,624	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CP	H94	709,574	781,659	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CQ	H95	709,571	781,704	81.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CR	H96	709,565	781,730	82.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CS	H97	709,652	781,734	79.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CT	H98	710,271	782,572	67.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CU	H99	710,392	782,695	67.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CV	H100	710,154	782,410	71.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CW	H101	710,096	782,415	72.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CX	H102	709,782	782,400	81.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CY	H103	709,653	782,327	85.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CZ	H104	709,486	782,375	89.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DA	H105	709,265	782,119	91.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DB	H106	709,201	781,889	100.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DC	H107	709,196	781,773	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DD	H108	709,275	782,875	91.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DE	H109	709,266	782,972	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DF	H110	709,289	783,047	90.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DG	H111	710,003	783,760	89.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DH	H112	709,324	783,893	105.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DI	H113	709,411	783,875	103.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DJ	H114	709,463	783,861	102.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DK	H115	709,255	783,893	105.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DL	H116	709,467	784,495	94.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DM	H117	709,282	784,741	84.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DN	H118	707,145	784,976	107.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DO	H119	708,308	786,067	65.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DP	H120	705,922	783,376	107.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DQ	H121	705,963	783,037	123.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DR	H122	709,536	781,439	81.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DS	H123	706,804	782,632	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DT	H124	706,066	782,611	127.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DU	H125	706,111	785,544	88.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DV	H126	707,126	785,263	97.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DW	H127	709,426	784,111	91.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DX	H128	709,392	785,462	69.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DY	H129	708,305	782,018	122.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DZ	H130	708,330	782,064	124.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EA	H131	708,379	782,060	124.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EB	H132	708,418	782,035	123.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EC	H133	708,356	782,014	122.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ED	H134	708,578	782,087	121.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EE	H135	709,648	781,687	77.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EF	H136	709,004	781,720	103.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EG	H137	709,126	781,613	94.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EH	H138	707,259	782,476	128.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EI	H139	709,611	781,494	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EJ	H140	707,668	782,062	132.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EK	H141	707,304	781,411	179.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EL	H142	706,657	781,789	159.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EM	H143	707,054	782,762	127.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EN	H144	709,238	784,049	99.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EO	H145	709,146	784,894	74.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EP	H146	709,081	784,786	78.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EQ	H147	707,624	782,023	133.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ER	H148	708,458	786,104	60.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ES	H149	709,179	781,738	99.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ET	H150	708,515	785,357	78.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
EU	H151	709,357	784,502	92.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EV	H152	709,311	785,254	65.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EW	H153	708,444	781,087	111.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EX	H154	705,947	782,729	126.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EY	H155	705,470	784,531	91.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EZ	H156	707,342	784,881	98.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FA	H157	707,342	784,908	100.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FB	H158	707,196	784,755	100.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FC	H159	709,256	785,879	64.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FD	H160	708,205	782,041	121.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FE	H161	708,510	781,960	119.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FF	H162	707,719	782,168	133.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FG	H163	707,234	784,825	101.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FH	H164	709,237	781,637	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FI	H165	709,111	781,063	90.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FJ	H166	709,367	784,069	93.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FK	H167	709,307	784,515	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FL	H168	709,352	785,081	70.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FM	H169	707,979	784,969	85.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FN	H170	709,169	784,987	73.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FO	H171	709,496	785,693	59.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FP	H172	709,460	785,707	60.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FQ	H173	709,467	785,745	60.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FR	H174	709,433	785,761	62.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FS	H175	709,934	784,019	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FT	H176	709,387	784,150	92.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FU	H177	709,340	784,163	94.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FV	H178	709,318	784,178	94.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FW	H179	709,215	784,252	97.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FX	H180	709,312	784,556	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FY	H181	709,279	784,682	86.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FZ	H182	709,116	784,922	74.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GA	H183	709,082	784,914	74.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GB	H184	709,070	784,913	74.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GC	H185	708,707	785,255	80.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GD	H186	708,216	784,924	80.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GE	H187	707,874	784,854	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GF	H188	708,178	784,996	82.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GG	H189	708,305	784,969	81.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GH	H190	709,818	785,414	62.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GI	H191	709,402	785,500	69.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GJ	H192	709,405	785,517	69.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GK	H193	709,453	785,665	59.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GL	H194	709,456	785,693	59.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GM	H195	705,544	784,509	90.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GN	H196	705,680	784,453	88.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GO	H197	705,657	784,572	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GP	H198	705,651	784,873	80.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GQ	H199	706,010	785,393	90.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GR	H200	705,999	784,823	97.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GS	H201	708,974	781,721	104.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GT	H202	708,947	781,729	104.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GU	H203	708,977	781,847	107.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GV	H204	708,935	781,765	106.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GW	H205	708,905	781,831	109.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GX	H206	708,838	781,781	109.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GY	H207	708,796	781,872	111.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GZ	H208	708,636	781,939	116.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HA	H209	708,397	782,002	121.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HB	H210	708,267	782,013	120.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HC	H211	708,078	782,066	123.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HD	H212	707,212	781,200	170.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HE	H213	707,323	781,217	168.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HF	H214	707,484	781,251	162.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

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SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

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No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
HG	H215	708,081	781,151	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HH	H216	708,031	781,228	128.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HI	H217	707,920	781,237	134.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HJ	H218	707,831	781,155	137.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HK	H219	707,748	781,065	135.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HL	H220	707,681	781,206	148.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HM	H221	707,513	781,338	162.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HN	H222	707,561	781,590	149.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HO	H223	707,469	781,664	152.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HP	H224	707,425	781,885	142.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HQ	H225	707,542	781,969	136.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HR	H226	707,609	782,297	132.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HS	H227	707,268	782,879	130.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HT	H228	706,805	782,611	128.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HU	H229	705,896	783,448	103.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HV	H230	705,841	783,863	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HW	H231	705,887	784,475	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HX	H232	706,014	784,437	79.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HY	H233	706,701	784,453	96.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HZ	H234	707,338	784,807	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IA	H235	707,506	784,843	97.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IB	H236	707,514	784,845	97.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IC	H237	708,102	782,128	123.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ID	H238	708,956	782,454	108.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IE	H239	709,290	782,312	91.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IF	H240	709,136	781,735	101.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IG	H241	709,182	781,682	97.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IH	H242	709,642	783,733	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
II	H243	709,515	783,040	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IJ	H244	709,454	782,822	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IK	H245	709,444	782,792	92.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IL	H246	705,567	784,809	77.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IM	H247	705,638	783,305	105.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IN	H248	705,640	784,350	95.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IO	H249	705,650	784,374	93.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IP	H250	705,583	784,500	89.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IQ	H251	705,613	784,489	89.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IR	H252	705,712	784,727	77.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IS	H253	705,654	784,815	78.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IT	H254	705,800	784,781	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IU	H255	705,868	785,262	73.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IV	H256	705,937	785,412	86.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IW	H257	705,962	785,280	81.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IX	H258	709,053	781,852	105.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IY	H259	709,046	781,725	102.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IZ	H260	708,843	782,018	113.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JA	H261	708,760	781,877	112.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JB	H262	708,726	781,912	114.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JC	H263	708,535	781,883	115.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JD	H264	708,421	781,927	118.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JE	H265	708,252	782,077	123.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JF	H266	708,233	782,021	120.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JG	H267	708,187	782,044	121.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JH	H268	708,163	782,093	122.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JI	H269	707,974	782,092	127.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JJ	H270	707,933	782,103	128.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JK	H271	707,283	781,361	179.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JL	H272	707,284	781,205	168.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JM	H273	707,360	781,320	173.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JN	H274	707,423	781,321	169.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JO	H275	707,786	781,092	135.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JP	H276	707,640	781,305	151.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JQ	H277	707,609	781,309	153.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JR	H278	707,530	781,439	159.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
JS H279		707,518	781,467	159.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JT H280		707,417	781,420	170.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JU H281		707,445	781,545	160.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JV H282		707,503	781,557	155.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JW H283		707,479	781,570	157.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JX H284		707,471	781,630	157.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JY H285		707,466	781,810	141.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JZ H286		707,440	781,835	140.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KA H287		707,401	781,915	144.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KB H288		707,430	781,935	142.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KC H289		707,570	781,956	135.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KD H290		707,588	782,057	134.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KE H291		707,733	782,121	133.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KF H292		707,320	782,445	128.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KG H293		706,989	782,647	130.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KH H294		706,850	782,679	126.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KI H295		706,756	782,676	128.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KJ H296		705,706	783,101	120.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KK H297		705,767	783,216	110.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KL H298		705,798	783,285	108.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KM H299		705,822	783,531	100.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KN H300		705,842	783,600	106.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KO H301		705,902	783,694	102.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KP H302		705,896	783,830	98.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KQ H303		705,844	784,342	88.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KR H304		705,959	784,420	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KS H305		706,102	784,637	91.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KT H306		706,407	784,566	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KU H307		706,661	784,461	96.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KV H308		707,151	784,761	103.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KW H309		707,353	784,818	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KX H310		709,200	781,828	99.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KY H311		709,179	781,595	93.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KZ H312		709,659	783,758	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LA H313		709,633	783,663	85.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LB H314		709,653	783,554	87.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LC H315		709,531	783,091	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LD H316		709,503	783,005	87.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LE H317		709,478	782,944	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LF H318		709,508	782,861	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LG H319		709,450	782,849	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LH H320		708,598	781,027	105.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LI H321		709,088	781,130	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LJ H322		709,157	781,278	85.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LK H323		708,833	781,031	96.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LL H324		708,900	781,062	94.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LM H325		709,704	783,834	98.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LN H326		709,694	782,393	84.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LO H327		709,723	782,432	83.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LP H328		709,807	782,438	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LQ H329		709,837	782,477	78.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LR H330		709,987	782,433	75.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LS H331		710,055	782,422	73.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LT H332		710,299	782,705	69.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LU H333		709,157	781,422	89.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LV H334		709,700	783,772	96.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LW H335		709,700	783,800	98.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LX H336		709,734	783,831	97.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LY H337		709,777	783,823	96.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LZ H338		709,888	783,758	91.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MA H339		709,626	782,417	86.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MB H340		709,655	782,420	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MC H341		710,093	782,469	72.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MD H342		709,164	781,301	86.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
ME H343		709,597	781,764	80.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MF H344		709,643	781,469	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MG H345		708,679	781,011	102.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MH H346		708,399	781,162	113.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MI H347		706,194	782,621	124.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MJ H348		707,491	781,202	157.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MK H349		709,000	781,085	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ML H350		709,665	783,563	87.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MM H351		708,461	781,151	111.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MN H352		708,290	782,083	124.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MO H353		705,858	782,712	125.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MP H354		706,252	785,486	90.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MQ H355		705,733	783,152	113.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MR H356		709,492	783,870	102.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MS H357		710,128	782,412	71.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MT H358		709,404	783,965	96.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MU H359		709,923	781,772	70.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MV H360		709,659	781,632	75.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MW H361		709,031	781,787	106.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MX H362		707,629	781,952	131.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MY H363		709,130	781,697	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MZ H364		710,258	783,747	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NA H365		710,059	782,479	72.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NB H366		707,240	781,420	179.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NC H367		709,301	785,032	71.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ND H368		708,915	781,135	92.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NE H369		709,539	783,850	102.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NF H370		708,323	781,177	117.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NG H371		708,949	781,069	93.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NH H372		708,942	781,142	92.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NI H373		708,972	781,153	91.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NJ SAINT PATRICK'S NATIONAL SCHOOL		708,565	781,951	118.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NK H374		708,783	782,534	110.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5

Calculation Results

Shadow receptor

		Shadow, worst case			Shadow, expected values
No.	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
	A H1	40:34	119	0:31	6:36
	B H2	37:03	113	0:35	6:14
	C H3	24:39	105	0:31	5:08
	D H4	20:57	70	0:35	4:22
	E H5	0:00	0	0:00	0:00
	F H6	0:00	0	0:00	0:00
	G H7	0:00	0	0:00	0:00
	H H8	0:00	0	0:00	0:00
	I H9	6:32	30	0:20	1:34
	J H10	14:10	63	0:19	3:02
	K H11	0:00	0	0:00	0:00
	L H12	16:44	79	0:20	3:37
	M H13	37:28	98	0:39	8:09
	N H14	56:36	143	0:46	11:47
	O H15	60:12	151	0:48	12:29
	P H16	60:27	157	0:49	12:31
	Q H17	50:46	156	0:36	9:53
	R H18	63:04	179	0:39	12:01
	S H19	25:16	78	0:33	4:22
	T H20	27:28	84	0:33	4:39
	U H21	17:40	45	0:31	2:59
	V H22	44:00	92	0:35	6:50
	W H23	44:33	90	0:36	6:53

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]	Shadow hours per year [h/year]
	X H24	11:36	50	0:21	1:54	
	Y H25	0:00	0	0:00	0:00	
	Z H26	0:00	0	0:00	0:00	
	AA H27	16:05	46	0:29	3:41	
	AB H28	15:02	44	0:28	3:26	
	AC H29	14:00	42	0:27	3:11	
	AD H30	13:07	43	0:25	3:01	
	AE H31	72:14	88	1:05	10:19	
	AF H32	13:50	50	0:25	2:07	
	AG H33	24:53	67	0:43	3:27	
	AH H34	0:00	0	0:00	0:00	
	AI H35	7:34	28	0:22	1:21	
	AJ H36	0:00	0	0:00	0:00	
	AK H37	0:00	0	0:00	0:00	
	AL H38	0:00	0	0:00	0:00	
	AM H39	0:00	0	0:00	0:00	
	AN H40	0:00	0	0:00	0:00	
	AO H41	0:00	0	0:00	0:00	
	AP H42	0:00	0	0:00	0:00	
	AQ H43	0:00	0	0:00	0:00	
	AR H44	0:00	0	0:00	0:00	
	AS H45	13:54	59	0:28	3:12	
	AT H46	22:24	72	0:36	4:37	
	AU H47	13:15	74	0:18	2:55	
	AV H48	10:16	61	0:17	2:19	
	AW H49	51:06	139	0:46	10:32	
	AX H50	62:08	105	0:53	9:11	
	AY H51	12:20	50	0:24	1:52	
	AZ H52	19:44	64	0:24	2:43	
	BA H53	0:00	0	0:00	0:00	
	BB H54	9:56	34	0:25	1:39	
	BC H55	62:48	90	1:11	8:36	
	BD H56	56:48	87	1:09	7:46	
	BE H57	9:00	30	0:24	1:37	
	BF H58	6:00	26	0:20	1:05	
	BG H59	0:00	0	0:00	0:00	
	BH H60	5:23	24	0:20	0:59	
	BI H61	4:48	23	0:19	0:55	
	BJ H62	48:44	95	0:48	11:04	
	BK H63	8:47	43	0:19	2:02	
	BL H64	0:00	0	0:00	0:00	
	BM H65	0:00	0	0:00	0:00	
	BN H66	25:59	70	0:35	5:48	
	BO H67	0:00	0	0:00	0:00	
	BP H68	0:00	0	0:00	0:00	
	BQ H69	51:32	80	0:55	7:26	
	BR H70	57:23	102	0:52	8:26	
	BS H71	96:39	128	1:08	14:53	
	BT H72	31:22	94	0:34	5:16	
	BU H73	20:54	51	0:32	3:30	
	BV H74	0:00	0	0:00	0:00	
	BW H75	0:00	0	0:00	0:00	
	BX H76	0:00	0	0:00	0:00	
	BY H77	12:17	45	0:25	1:53	
	BZ H78	25:37	73	0:30	3:43	
	CA H79	35:08	82	0:39	5:02	
	CB H80	37:01	81	0:48	5:13	
	CC H81	44:36	123	0:35	7:25	
	CD H82	56:51	164	0:38	10:55	
	CE H83	49:50	144	0:36	10:05	
	CF H84	53:42	151	0:37	10:50	
	CG H85	57:51	158	0:38	11:38	
	CH H86	65:06	169	0:41	13:02	

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]	
CI	H87	0:00	0	0:00	0:00	
CJ	H88	0:00	0	0:00	0:00	
CK	H89	0:00	0	0:00	0:00	
CL	H90	0:00	0	0:00	0:00	
CM	H91	0:00	0	0:00	0:00	
CN	H92	0:00	0	0:00	0:00	
CO	H93	0:00	0	0:00	0:00	
CP	H94	0:00	0	0:00	0:00	
CQ	H95	0:00	0	0:00	0:00	
CR	H96	0:00	0	0:00	0:00	
CS	H97	0:00	0	0:00	0:00	
CT	H98	0:00	0	0:00	0:00	
CU	H99	0:00	0	0:00	0:00	
CV	H100	6:16	39	0:14	1:13	
CW	H101	3:26	31	0:10	0:40	
CX	H102	9:33	36	0:23	2:10	
CY	H103	12:39	43	0:25	2:55	
CZ	H104	17:36	50	0:29	4:03	
DA	H105	12:43	44	0:24	2:28	
DB	H106	0:00	0	0:00	0:00	
DC	H107	0:00	0	0:00	0:00	
DD	H108	45:58	122	0:35	9:39	
DE	H109	38:58	107	0:35	8:10	
DF	H110	63:05	147	0:41	12:57	
DG	H111	15:39	62	0:25	3:16	
DH	H112	88:35	222	0:46	17:00	
DI	H113	69:36	187	0:42	13:33	
DJ	H114	61:32	173	0:40	12:04	
DK	H115	113:49	248	0:50	21:41	
DL	H116	44:53	124	0:33	7:23	
DM	H117	31:40	92	0:35	5:21	
DN	H118	7:26	32	0:22	1:09	
DO	H119	0:00	0	0:00	0:00	
DP	H120	9:38	38	0:23	2:18	
DQ	H121	12:30	55	0:19	2:39	
DR	H122	0:00	0	0:00	0:00	
DS	H123	16:22	80	0:20	3:33	
DT	H124	0:00	0	0:00	0:00	
DU	H125	0:00	0	0:00	0:00	
DV	H126	7:56	37	0:21	1:13	
DW	H127	70:45	185	0:36	13:00	
DX	H128	17:57	54	0:24	2:34	
DY	H129	0:00	0	0:00	0:00	
DZ	H130	0:00	0	0:00	0:00	
EA	H131	0:00	0	0:00	0:00	
EB	H132	0:00	0	0:00	0:00	
EC	H133	0:00	0	0:00	0:00	
ED	H134	0:00	0	0:00	0:00	
EE	H135	0:00	0	0:00	0:00	
EF	H136	0:00	0	0:00	0:00	
EG	H137	0:00	0	0:00	0:00	
EH	H138	22:34	90	0:32	5:15	
EI	H139	0:00	0	0:00	0:00	
EJ	H140	0:00	0	0:00	0:00	
EK	H141	0:00	0	0:00	0:00	
EL	H142	0:00	0	0:00	0:00	
EM	H143	19:39	99	0:27	4:14	
EN	H144	105:59	202	0:45	19:32	
EO	H145	46:35	106	0:36	7:25	
EP	H146	54:37	118	0:40	8:49	
EQ	H147	0:00	0	0:00	0:00	
ER	H148	0:00	0	0:00	0:00	
ES	H149	0:00	0	0:00	0:00	

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]	
ET	H150	15:13	68	0:21	2:22	
EU	H151	43:09	120	0:35	7:14	
EV	H152	27:49	72	0:27	4:12	
EW	H153	0:00	0	0:00	0:00	
EX	H154	0:00	0	0:00	0:00	
EY	H155	0:00	0	0:00	0:00	
EZ	H156	16:17	58	0:28	2:25	
FA	H157	12:12	41	0:28	1:52	
FB	H158	46:44	84	1:02	6:25	
FC	H159	0:00	0	0:00	0:00	
FD	H160	0:00	0	0:00	0:00	
FE	H161	0:00	0	0:00	0:00	
FF	H162	0:00	0	0:00	0:00	
FG	H163	23:16	69	0:30	3:20	
FH	H164	0:00	0	0:00	0:00	
FI	H165	0:00	0	0:00	0:00	
FJ	H166	82:02	195	0:39	15:07	
FK	H167	42:08	117	0:37	7:11	
FL	H168	20:14	58	0:29	3:22	
FM	H169	71:30	72	1:13	10:00	
FN	H170	33:02	82	0:33	5:20	
FO	H171	0:00	0	0:00	0:00	
FP	H172	0:00	0	0:00	0:00	
FQ	H173	0:00	0	0:00	0:00	
FR	H174	0:00	0	0:00	0:00	
FS	H175	16:49	62	0:25	3:23	
FT	H176	76:19	177	0:37	13:46	
FU	H177	80:17	177	0:38	14:26	
FV	H178	81:32	172	0:39	14:35	
FW	H179	79:06	157	0:45	13:56	
FX	H180	36:24	107	0:37	6:14	
FY	H181	31:48	88	0:36	5:26	
FZ	H182	46:36	100	0:36	7:20	
GA	H183	47:55	98	0:37	7:31	
GB	H184	48:26	98	0:37	7:35	
GC	H185	0:00	0	0:00	0:00	
GD	H186	53:53	96	0:44	7:54	
GE	H187	97:55	90	1:19	14:09	
GF	H188	48:09	84	0:47	7:03	
GG	H189	35:44	93	0:34	5:17	
GH	H190	0:00	0	0:00	0:00	
GI	H191	16:05	50	0:23	2:16	
GJ	H192	15:03	48	0:23	2:07	
GK	H193	0:00	0	0:00	0:00	
GL	H194	0:00	0	0:00	0:00	
GM	H195	0:00	0	0:00	0:00	
GN	H196	5:48	25	0:21	1:03	
GO	H197	5:31	25	0:20	0:59	
GP	H198	0:00	0	0:00	0:00	
GQ	H199	0:00	0	0:00	0:00	
GR	H200	8:20	32	0:23	1:19	
GS	H201	0:00	0	0:00	0:00	
GT	H202	0:00	0	0:00	0:00	
GU	H203	0:00	0	0:00	0:00	
GV	H204	0:00	0	0:00	0:00	
GW	H205	0:00	0	0:00	0:00	
GX	H206	0:00	0	0:00	0:00	
GY	H207	0:00	0	0:00	0:00	
GZ	H208	0:00	0	0:00	0:00	
HA	H209	0:00	0	0:00	0:00	
HB	H210	0:00	0	0:00	0:00	
HC	H211	0:00	0	0:00	0:00	
HD	H212	0:00	0	0:00	0:00	

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]	
HE	H213	0:00	0	0:00	0:00	
HF	H214	0:00	0	0:00	0:00	
HG	H215	0:00	0	0:00	0:00	
HH	H216	0:00	0	0:00	0:00	
HI	H217	0:00	0	0:00	0:00	
HJ	H218	0:00	0	0:00	0:00	
HK	H219	0:00	0	0:00	0:00	
HL	H220	0:00	0	0:00	0:00	
HM	H221	0:00	0	0:00	0:00	
HN	H222	0:00	0	0:00	0:00	
HO	H223	0:00	0	0:00	0:00	
HP	H224	0:00	0	0:00	0:00	
HQ	H225	0:00	0	0:00	0:00	
HR	H226	27:09	64	0:36	5:50	
HS	H227	22:04	97	0:33	4:35	
HT	H228	14:11	74	0:19	3:05	
HU	H229	9:06	36	0:23	2:12	
HV	H230	7:36	30	0:23	1:44	
HW	H231	8:23	30	0:23	1:31	
HX	H232	10:27	33	0:25	1:53	
HY	H233	45:02	95	0:46	7:18	
HZ	H234	33:00	80	0:37	4:45	
IA	H235	36:56	92	0:34	5:19	
IB	H236	37:45	92	0:35	5:26	
IC	H237	0:00	0	0:00	0:00	
ID	H238	61:45	87	0:50	13:03	
IE	H239	40:53	89	0:34	8:46	
IF	H240	0:00	0	0:00	0:00	
IG	H241	0:00	0	0:00	0:00	
IH	H242	46:58	138	0:35	9:32	
II	H243	72:29	150	0:41	15:25	
IJ	H244	27:31	92	0:30	5:59	
IK	H245	30:37	106	0:30	6:38	
IL	H246	0:00	0	0:00	0:00	
IM	H247	0:00	0	0:00	0:00	
IN	H248	5:11	24	0:20	0:58	
IO	H249	5:23	24	0:20	1:00	
IP	H250	0:00	0	0:00	0:00	
IQ	H251	5:02	24	0:19	0:55	
IR	H252	6:10	26	0:20	1:02	
IS	H253	0:00	0	0:00	0:00	
IT	H254	6:38	28	0:21	1:06	
IU	H255	0:00	0	0:00	0:00	
IV	H256	0:00	0	0:00	0:00	
IW	H257	0:00	0	0:00	0:00	
IX	H258	0:00	0	0:00	0:00	
IY	H259	0:00	0	0:00	0:00	
IZ	H260	0:00	0	0:00	0:00	
JA	H261	0:00	0	0:00	0:00	
JB	H262	0:00	0	0:00	0:00	
JC	H263	0:00	0	0:00	0:00	
JD	H264	0:00	0	0:00	0:00	
JE	H265	0:00	0	0:00	0:00	
JF	H266	0:00	0	0:00	0:00	
JG	H267	0:00	0	0:00	0:00	
JH	H268	0:00	0	0:00	0:00	
JI	H269	0:00	0	0:00	0:00	
JJ	H270	0:00	0	0:00	0:00	
JK	H271	0:00	0	0:00	0:00	
JL	H272	0:00	0	0:00	0:00	
JM	H273	0:00	0	0:00	0:00	
JN	H274	0:00	0	0:00	0:00	
JO	H275	0:00	0	0:00	0:00	

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]	
JP	H276	0:00	0	0:00	0:00	
JQ	H277	0:00	0	0:00	0:00	
JR	H278	0:00	0	0:00	0:00	
JS	H279	0:00	0	0:00	0:00	
JT	H280	0:00	0	0:00	0:00	
JU	H281	0:00	0	0:00	0:00	
JV	H282	0:00	0	0:00	0:00	
JW	H283	0:00	0	0:00	0:00	
JX	H284	0:00	0	0:00	0:00	
JY	H285	0:00	0	0:00	0:00	
JZ	H286	0:00	0	0:00	0:00	
KA	H287	0:00	0	0:00	0:00	
KB	H288	0:00	0	0:00	0:00	
KC	H289	0:00	0	0:00	0:00	
KD	H290	0:00	0	0:00	0:00	
KE	H291	0:00	0	0:00	0:00	
KF	H292	29:05	106	0:34	6:44	
KG	H293	9:10	54	0:24	2:03	
KH	H294	19:24	84	0:22	4:11	
KI	H295	18:40	91	0:19	4:03	
KJ	H296	0:00	0	0:00	0:00	
KK	H297	7:00	35	0:19	1:39	
KL	H298	7:24	34	0:20	1:46	
KM	H299	7:50	33	0:22	1:51	
KN	H300	7:27	30	0:22	1:45	
KO	H301	8:36	32	0:23	2:00	
KP	H302	8:38	31	0:24	1:59	
KQ	H303	7:43	29	0:23	1:26	
KR	H304	9:32	31	0:24	1:44	
KS	H305	10:56	35	0:26	1:49	
KT	H306	19:43	47	0:33	3:12	
KU	H307	40:38	92	0:44	6:38	
KV	H308	46:56	83	1:03	6:25	
KW	H309	31:22	80	0:35	4:32	
KX	H310	0:00	0	0:00	0:00	
KY	H311	0:00	0	0:00	0:00	
KZ	H312	42:57	135	0:34	8:40	
LA	H313	53:07	145	0:42	10:51	
LB	H314	59:09	165	0:50	12:13	
LC	H315	71:22	156	0:40	15:26	
LD	H316	68:03	146	0:41	14:18	
LE	H317	53:01	138	0:39	10:55	
LF	H318	35:00	126	0:29	7:19	
LG	H319	28:56	111	0:30	6:13	
LH	H320	0:00	0	0:00	0:00	
LI	H321	0:00	0	0:00	0:00	
LJ	H322	0:00	0	0:00	0:00	
LK	H323	0:00	0	0:00	0:00	
LL	H324	0:00	0	0:00	0:00	
LM	H325	36:41	128	0:32	7:16	
LN	H326	11:11	38	0:25	2:33	
LO	H327	10:31	37	0:24	2:23	
LP	H328	9:03	33	0:23	2:02	
LQ	H329	8:35	32	0:23	1:56	
LR	H330	6:50	29	0:21	1:32	
LS	H331	8:07	53	0:19	1:46	
LT	H332	8:20	38	0:20	1:52	
LU	H333	0:00	0	0:00	0:00	
LV	H334	38:42	128	0:33	7:47	
LW	H335	37:23	128	0:32	7:28	
LX	H336	34:38	123	0:31	6:52	
LY	H337	26:41	91	0:30	5:29	
LZ	H338	19:14	68	0:27	4:02	

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Max shadow hours per day [h/day]	Shadow, expected values
		Shadow hours per year [h/year]	Shadow days per year [days/year]		Shadow hours per year [h/year]
MA	H339	12:28	40	0:26	2:51
MB	H340	11:52	39	0:26	2:42
MC	H341	8:07	43	0:16	1:34
MD	H342	0:00	0	0:00	0:00
ME	H343	0:00	0	0:00	0:00
MF	H344	0:00	0	0:00	0:00
MG	H345	0:00	0	0:00	0:00
MH	H346	0:00	0	0:00	0:00
MI	H347	0:00	0	0:00	0:00
MJ	H348	0:00	0	0:00	0:00
MK	H349	0:00	0	0:00	0:00
ML	H350	54:38	150	0:48	11:18
MM	H351	0:00	0	0:00	0:00
MN	H352	0:00	0	0:00	0:00
MO	H353	0:00	0	0:00	0:00
MP	H354	0:00	0	0:00	0:00
MQ	H355	0:00	0	0:00	0:00
MR	H356	57:03	168	0:39	11:11
MS	H357	4:59	36	0:12	0:58
MT	H358	72:11	194	0:40	13:42
MU	H359	0:00	0	0:00	0:00
MV	H360	0:00	0	0:00	0:00
MW	H361	0:00	0	0:00	0:00
MX	H362	0:00	0	0:00	0:00
MY	H363	0:00	0	0:00	0:00
MZ	H364	5:29	26	0:20	1:04
NA	H365	13:07	67	0:19	2:44
NB	H366	0:00	0	0:00	0:00
NC	H367	22:14	58	0:30	3:42
ND	H368	0:00	0	0:00	0:00
NE	H369	51:12	155	0:37	10:06
NF	H370	0:00	0	0:00	0:00
NG	H371	0:00	0	0:00	0:00
NH	H372	0:00	0	0:00	0:00
NI	H373	0:00	0	0:00	0:00
NJ	SAINT PATRICK'S NATIONAL SCHOOL	0:00	0	0:00	0:00
NK	H374	73:40	83	1:05	15:27

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	T01	458:45	77:26
2	T02	712:10	120:36
3	T03	238:07	43:49
4	T04	366:11	69:52
5	T05	346:09	70:05

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

The calculation of the total expected values for a given receptor assumes a weighted average directional reduction for all WTGs contributing to shadow flicker within the same day. In the case where shadow flicker from different WTGs is not concurrent within the day, the total expected time at a given receptor may deviate marginally from the individual flicker time caused by each turbine separately.

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: A - H1

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44		15:03 (4)	08:14		16:31 (3)	07:16		17:09 (2)	07:01		05:52		05:03			
	16:15	26	15:29 (4)	17:06	3	16:34 (3)	18:02	25	17:34 (2)	20:00		20:55		21:45			
2	08:44		15:04 (4)	08:12		16:30 (3)	07:14		17:08 (2)	06:59		05:50		05:02			
	16:16	26	15:30 (4)	17:08	7	16:37 (3)	18:04	28	17:36 (2)	20:02		20:57		21:46			
3	08:44		15:04 (4)	08:10		16:30 (3)	07:12		17:08 (2)	06:56		05:48		05:01			
	16:17	26	15:30 (4)	17:10	9	16:39 (3)	18:06	30	17:38 (2)	20:04		20:59		21:48			
4	08:43		15:05 (4)	08:08		16:30 (3)	07:09		17:08 (2)	06:54		05:46		05:00			
	16:18	25	15:30 (4)	17:12	11	16:41 (3)	18:07	30	17:38 (2)	20:06		21:01		21:49			
5	08:43		15:05 (4)	08:07		16:30 (3)	07:07		17:07 (2)	06:51		05:44		04:59			
	16:19	25	15:30 (4)	17:14	13	16:43 (3)	18:09	31	17:38 (2)	20:07		21:03		21:50			
6	08:43		15:06 (4)	08:05		16:30 (3)	07:04		17:07 (2)	06:49		05:42		04:58			
	16:21	25	15:31 (4)	17:16	15	16:45 (3)	18:11	31	17:38 (2)	20:09		21:04		21:51			
7	08:42		15:07 (4)	08:03		16:30 (3)	07:02		17:07 (2)	06:47		05:40		04:58			
	16:22	24	15:31 (4)	17:18	17	16:47 (3)	18:13	30	17:37 (2)	20:11		21:06		21:52			
8	08:42		15:07 (4)	08:01		16:30 (3)	07:00		17:07 (2)	06:44		05:38		04:57			
	16:24	24	15:31 (4)	17:20	20	16:50 (3)	18:15	30	17:37 (2)	20:13		21:08		21:53			
9	08:41		15:09 (4)	07:59		16:31 (3)	06:57		17:07 (2)	06:42		05:36		04:57			
	16:25	22	15:31 (4)	17:22	19	16:50 (3)	18:17	28	17:35 (2)	20:15		21:10		21:54			
10	08:40		15:09 (4)	07:57		16:32 (3)	06:55		17:08 (2)	06:39		05:34		04:56			
	16:26	22	15:31 (4)	17:24	17	16:49 (3)	18:19	27	17:35 (2)	20:17		21:11		21:55			
11	08:40		15:10 (4)	07:55		16:33 (3)	06:52		17:10 (2)	06:37		05:33		04:56			
	16:28	21	15:31 (4)	17:26	15	16:48 (3)	18:21	24	17:34 (2)	20:19		21:13		21:55			
12	08:39		15:11 (4)	07:53		16:35 (3)	06:50		17:10 (2)	06:35		05:31		04:55			
	16:30	20	15:31 (4)	17:28	11	16:46 (3)	18:23	22	17:32 (2)	20:20		21:15		21:56			
13	08:38		15:13 (4)	07:51		16:38 (3)	06:48		17:12 (2)	06:32		05:29		04:55			
	16:31	17	15:30 (4)	17:30	5	16:43 (3)	18:25	18	17:30 (2)	20:22		21:17		21:57			
14	08:37		15:14 (4)	07:49			06:45		17:15 (2)	06:30		05:27		04:55			
	16:33	16	15:30 (4)	17:32			18:27	11	17:26 (2)	20:24		21:18		21:58			
15	08:36		15:16 (4)	07:47			06:43			06:28		05:25		04:54			
	16:34	13	15:29 (4)	17:34			18:28			20:26		21:20		21:58			
16	08:35		15:17 (4)	07:45			06:40			06:25		05:24		04:54			
	16:36	10	15:27 (4)	17:36			18:30			20:28		21:22		21:59			
17	08:34		15:21 (4)	07:43			06:38			06:23		05:22		04:54			
	16:38	3	15:24 (4)	17:38			18:32			20:30		21:23		21:59			
18	08:33			07:41			06:35			06:21		05:21		04:54			
	16:40			17:40			18:34			20:31		21:25		22:00			
19	08:32			07:39			06:33			06:18		05:19		04:54			
	16:41			17:42			18:36			20:33		21:27		22:00			
20	08:31			07:36			06:31			06:16		05:18		04:54			
	16:43			17:44			18:38			20:35		21:28		22:00			
21	08:30			07:34			06:28			06:14		05:16		04:54			
	16:45			17:46			18:40			20:37		21:30		22:01			
22	08:29			07:32			06:26			06:12		05:15		04:55			
	16:47			17:48			18:42			20:39		21:31		22:01			
23	08:27			07:30			06:23			06:09		05:13		04:55			
	16:49			17:50			18:43			20:41		21:33		22:01			
24	08:26			07:28		17:18 (2)	06:21			06:07		05:12		04:55			
	16:50			17:52	6	17:24 (2)	18:45			20:43		21:34		22:01			
25	08:24			07:25		17:14 (2)	06:18			06:05		05:11		04:55			
	16:52			17:54	12	17:26 (2)	18:47			20:44		21:36		22:01			
26	08:23			07:23		17:13 (2)	06:16			06:03		05:09		04:56			
	16:54			17:56	15	17:28 (2)	18:49			20:46		21:37		22:01			
27	08:22			07:21		17:12 (2)	06:13			06:00		05:08		04:56			
	16:56			17:58	19	17:31 (2)	18:51			20:48		21:39		22:01			
28	08:20			07:18		17:10 (2)	06:11			05:58		05:07		04:57			
	16:58			18:00	22	17:32 (2)	18:53			20:50		21:40		22:01			
29	08:19						07:08			05:56		05:06		04:57			
	17:00						19:54			20:52		21:41		22:01			
30	08:17						07:06			05:54		05:05		04:58			
	17:02						19:56			20:54		21:43		22:00			
31	08:15						07:04					05:04					
	17:04						19:58					21:44					
Potential sun hours	250			273			367			420		494		510			
Total, worst case		345			236			365									
Sun reduction		0.24			0.23			0.27									
Oper. time red.		1.00			1.00			1.00									
Wind dir. red.		0.65			0.66			0.68									
Total reduction		0.16			0.15			0.18									
Total, real		54			36			67									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: A - H1

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:50 (2) 18:10 (2)	07:24 16:54	16:02 (3) 16:19 (3)	08:19 16:10	14:52 (4) 15:13 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:48 (2) 18:11 (2)	07:26 16:52	16:01 (3) 16:19 (3)	08:21 16:09	14:52 (4) 15:13 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:47 (2) 18:12 (2)	07:28 16:50	16:00 (3) 16:19 (3)	08:22 16:08	14:52 (4) 15:14 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:46 (2) 18:13 (2)	07:30 16:48	16:00 (3) 16:17 (3)	08:24 16:08	14:52 (4) 15:16 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:45 (2) 18:13 (2)	07:32 16:46	15:59 (3) 16:15 (3)	08:25 16:07	14:52 (4) 15:16 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:44 (2) 18:14 (2)	07:34 16:44	15:59 (3) 16:12 (3)	08:26 16:07	14:52 (4) 15:17 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:43 (2) 18:13 (2)	07:36 16:43	16:00 (3) 16:10 (3)	08:28 16:06	14:52 (4) 15:17 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:42 (2) 18:13 (2)	07:38 16:41	16:00 (3) 16:08 (3)	08:29 16:06	14:52 (4) 15:17 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:42 (2) 18:13 (2)	07:40 16:39	16:01 (3) 16:07 (3)	08:30 16:05	14:53 (4) 15:19 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:42 (2) 18:12 (2)	07:42 16:37	16:02 (3) 16:05 (3)	08:31 16:05	14:53 (4) 15:19 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:42 (2) 18:11 (2)	07:44 16:35	08:33 16:05	14:53 (4) 15:19 (4)	
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:42 (2) 18:09 (2)	07:45 16:34	08:34 16:05	14:53 (4) 15:20 (4)	
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:43 (2) 18:07 (2)	07:47 16:32	08:35 16:04	14:54 (4) 15:20 (4)	
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:44 (2) 18:04 (2)	07:49 16:31	08:36 16:04	14:54 (4) 15:21 (4)	
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:44 (2) 18:02 (2)	07:51 16:29	08:37 16:04	14:54 (4) 15:21 (4)	
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:46 (2) 17:59 (2)	07:53 16:27	08:38 16:05	14:55 (4) 15:22 (4)	
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:47 (2) 17:57 (2)	07:55 16:26	08:38 16:05	14:55 (4) 15:23 (4)	
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:50 (2) 17:55 (2)	07:57 16:24	08:39 16:05	14:56 (4) 15:23 (4)	
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:59 (2) 18:23	07:59 16:23	08:40 16:05	14:57 (4) 15:24 (4)	
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	18:00 16:22	08:00 16:06	08:41 16:06	14:57 (4) 15:24 (4)	
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	18:02 16:20	08:02 16:06	08:41 16:06	14:58 (4) 15:25 (4)	
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	18:04 16:19	08:04 16:06	08:42 16:06	14:58 (4) 15:25 (4)	
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	18:06 16:18	08:06 16:07	08:42 16:07	14:59 (4) 15:26 (4)	
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	18:08 16:17	08:08 16:08	08:43 16:08	14:59 (4) 15:26 (4)	
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	18:09 16:16	08:09 15:01 (4)	15:00 (4) 15:01 (4)	08:43 16:08	14:59 (4) 15:26 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	18:11 16:14	08:11 16:14	14:56 (4) 15:06 (4)	08:43 16:09	14:59 (4) 15:26 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	18:13 16:13	08:13 16:13	14:55 (4) 15:08 (4)	08:44 16:10	15:01 (4) 15:28 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	18:14 16:12	08:14 16:12	14:54 (4) 15:10 (4)	08:44 16:10	15:01 (4) 15:28 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	17:57 (2) 18:06 (2)	07:18 17:00	08:16 16:13 (3)	14:53 (4) 15:10 (4)	08:44 16:11	15:02 (4) 15:29 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:52 (2) 18:08 (2)	07:20 16:58	08:18 16:15 (3)	14:53 (4) 15:12 (4)	08:44 16:12	15:01 (4) 15:28 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	16:02 (3) 16:17 (3)	16:02 (3) 16:13	08:44 16:13	15:02 (4) 15:29 (4)	
Potential sun hours	512	460	382	328	259	233			
Total, worst case			25	455	203	805			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.68	0.68	0.65	0.65			
Total reduction			0.22	0.20	0.17	0.13			
Total, real			5	90	35	108			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: B - H2

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44		14:47 (4)	08:14		16:18 (3)	07:16		16:56 (2)	07:01		05:52	05:03					
	16:15	18	15:05 (4)	17:06	16	16:34 (3)	18:02	34	17:30 (2)	20:00		20:55	21:45					
2	08:44		14:48 (4)	08:12		16:19 (3)	07:14		16:55 (2)	06:59		05:50	05:02					
	16:16	18	15:06 (4)	17:08	18	16:37 (3)	18:04	35	17:30 (2)	20:02		20:57	21:46					
3	08:44		14:48 (4)	08:10		16:19 (3)	07:12		16:55 (2)	06:56		05:48	05:01					
	16:17	17	15:05 (4)	17:10	20	16:39 (3)	18:06	35	17:30 (2)	20:04		20:59	21:48					
4	08:43		14:50 (4)	08:08		16:19 (3)	07:09		16:56 (2)	06:54		05:46	05:00					
	16:18	15	15:05 (4)	17:12	21	16:40 (3)	18:07	34	17:30 (2)	20:06		21:01	21:49					
5	08:43		14:51 (4)	08:07		16:20 (3)	07:07		16:55 (2)	06:51		05:44	04:59					
	16:19	13	15:04 (4)	17:14	20	16:40 (3)	18:09	34	17:29 (2)	20:07		21:03	21:50					
6	08:43		14:53 (4)	08:05		16:20 (3)	07:04		16:56 (2)	06:49		05:42	04:58					
	16:21	11	15:04 (4)	17:16	19	16:39 (3)	18:11	33	17:29 (2)	20:09		21:04	21:51					
7	08:42		14:54 (4)	08:03		16:21 (3)	07:02		16:56 (2)	06:47		05:40	04:58					
	16:22	9	15:03 (4)	17:18	17	16:38 (3)	18:13	31	17:27 (2)	20:11		21:06	21:52					
8	08:42		14:57 (4)	08:01		16:23 (3)	07:00		16:57 (2)	06:44		05:38	04:57					
	16:24	3	15:00 (4)	17:20	14	16:37 (3)	18:15	30	17:27 (2)	20:13		21:08	21:53					
9	08:41			07:59		16:25 (3)	06:57		16:57 (2)	06:42		05:36	04:57					
	16:25			17:22	11	16:36 (3)	18:17	28	17:25 (2)	20:15		21:10	21:54					
10	08:40			07:57		16:29 (3)	06:55		16:58 (2)	06:39		05:34	04:56					
	16:26			17:24	3	16:32 (3)	18:19	26	17:24 (2)	20:17		21:11	21:55					
11	08:40			07:55			06:53		17:00 (2)	06:37		05:33	04:56					
	16:28			17:26			18:21	22	17:22 (2)	20:19		21:13	21:55					
12	08:39			07:53			06:50		17:02 (2)	06:35		05:31	04:55					
	16:30			17:28			18:23	17	17:19 (2)	20:20		21:15	21:56					
13	08:38			07:51			06:48		17:05 (2)	06:32		05:29	04:55					
	16:31			17:30			18:25	11	17:16 (2)	20:22		21:17	21:57					
14	08:37			07:49			06:45		06:30	05:27		04:55						
	16:33			17:32			18:27		20:24	21:18		21:58						
15	08:36			07:47			06:43		06:28	05:26		04:54						
	16:34			17:34			18:28		20:26	21:20		21:58						
16	08:35			07:45			06:40		06:25	05:24		04:54						
	16:36			17:36			18:30		20:28	21:22		21:59						
17	08:34			07:43			06:38		06:23	05:22		04:54						
	16:38			17:38			18:32		20:30	21:23		21:59						
18	08:33			07:41			06:35		06:21	05:21		04:54						
	16:40			17:40			18:34		20:31	21:25		22:00						
19	08:32			07:39			06:33		06:18	05:19		04:54						
	16:41			17:42			18:36		20:33	21:27		22:00						
20	08:31			07:36		17:07 (2)	06:31		06:16	05:18		04:54						
	16:43			17:44	9	17:16 (2)	18:38		20:35	21:28		22:00						
21	08:30			07:34		17:05 (2)	06:28		06:14	05:16		04:54						
	16:45			17:46	13	17:18 (2)	18:40		20:37	21:30		22:01						
22	08:29			07:32		17:02 (2)	06:26		06:12	05:15		04:55						
	16:47			17:48	17	17:19 (2)	18:42		20:39	21:31		22:01						
23	08:27			07:30		17:01 (2)	06:23		06:09	05:13		04:55						
	16:49			17:50	21	17:22 (2)	18:43		20:41	21:33		22:01						
24	08:26			07:28		17:00 (2)	06:21		06:07	05:12		04:55						
	16:50			17:52	24	17:24 (2)	18:45		20:43	21:34		22:01						
25	08:24			07:25		16:58 (2)	06:18		06:05	05:11		04:55						
	16:52			17:54	28	17:26 (2)	18:47		20:44	21:36		22:01						
26	08:23		16:19 (3)	07:23		16:58 (2)	06:16		06:03	05:09		04:56						
	16:54	2	16:21 (3)	17:56	30	17:28 (2)	18:49		20:46	21:37		22:01						
27	08:22		16:19 (3)	07:21		16:57 (2)	06:13		06:00	05:08		04:56						
	16:56	4	16:23 (3)	17:58	33	17:30 (2)	18:51		20:48	21:39		22:01						
28	08:20		16:19 (3)	07:18		16:56 (2)	06:11		05:58	05:07		04:57						
	16:58	7	16:26 (3)	18:00	34	17:30 (2)	18:53		20:50	21:40		22:01						
29	08:19		16:18 (3)				07:08		05:56	05:06		04:57						
	17:00	10	16:28 (3)				19:54		20:52	21:41		22:01						
30	08:17		16:18 (3)				07:06		05:54	05:05		04:58						
	17:02	11	16:29 (3)				19:56		20:54	21:43		22:00						
31	08:15		16:18 (3)				07:04			05:04								
	17:04	13	16:31 (3)				19:58			21:44								
Potential sun hours	250			273			367		420	494		510						
Total, worst case	151			368			370											
Sun reduction	0.24			0.23			0.27											
Oper. time red.	1.00			1.00			1.00											
Wind dir. red.	0.65			0.67			0.67											
Total reduction	0.16			0.16			0.18											
Total, real	24			57			68											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: B - H2

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:42 (2) 17:57 (2)	07:24 16:54	15:57 (3) 16:03 (3)	08:19 16:10	
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:39 (2) 17:59 (2)	07:26 16:52	15:54 (3) 16:06 (3)	08:21 16:09	
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:37 (2) 18:01 (2)	07:28 16:50	15:52 (3) 16:07 (3)	08:22 16:08	
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:35 (2) 18:02 (2)	07:30 16:48	15:51 (3) 16:08 (3)	08:24 16:08	14:43 (4) 14:45 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:34 (2) 18:03 (2)	07:32 16:46	15:50 (3) 16:09 (3)	08:25 16:07	14:40 (4) 14:48 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:33 (2) 18:04 (2)	07:34 16:44	15:49 (3) 16:10 (3)	08:26 16:07	14:39 (4) 14:50 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:31 (2) 18:03 (2)	07:36 16:43	15:49 (3) 16:10 (3)	08:28 16:06	14:38 (4) 14:51 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:30 (2) 18:04 (2)	07:38 16:41	15:48 (3) 16:08 (3)	08:29 16:06	14:37 (4) 14:52 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:30 (2) 18:04 (2)	07:40 16:39	15:49 (3) 16:07 (3)	08:30 16:05	14:37 (4) 14:54 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:29 (2) 18:04 (2)	07:42 16:37	15:49 (3) 16:05 (3)	08:31 16:05	14:37 (4) 14:55 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:29 (2) 18:04 (2)	07:44 16:35	15:49 (3) 16:03 (3)	08:33 16:05	14:37 (4) 14:55 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:29 (2) 18:04 (2)	07:45 16:34	15:50 (3) 16:01 (3)	08:34 16:05	14:37 (4) 14:56 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:29 (2) 18:03 (2)	07:47 16:32	15:50 (3) 15:59 (3)	08:35 16:05	14:37 (4) 14:57 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:29 (2) 18:03 (2)	07:49 16:31	15:51 (3) 15:57 (3)	08:36 16:04	14:37 (4) 14:58 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:29 (2) 18:02 (2)	07:51 16:29	15:52 (3) 15:56 (3)	08:37 16:04	14:37 (4) 14:58 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:30 (2) 17:59 (2)	07:53 16:27	15:52 (3) 15:54 (3)	08:38 16:05	14:37 (4) 14:59 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:31 (2) 17:57 (2)	07:55 16:26	16:05 16:05	08:38 16:05	14:38 (4) 15:00 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:31 (2) 17:55 (2)	07:57 16:24	16:05 16:05	08:39 16:05	14:38 (4) 15:01 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:32 (2) 17:52 (2)	07:59 16:23	16:05 16:05	08:40 16:05	14:39 (4) 15:01 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:34 (2) 17:50 (2)	08:00 16:22	16:05 16:06	08:41 16:06	14:39 (4) 15:01 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:36 (2) 17:48 (2)	08:02 16:20	16:06 16:06	08:41 16:06	14:40 (4) 15:02 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:39 (2) 17:45 (2)	08:04 16:19	16:06 16:06	08:42 16:06	14:40 (4) 15:02 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:45 (2)	16:19	16:06 16:07	08:42 16:07	14:41 (4) 15:03 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:48 (2)	16:20	16:07 16:08	16:07 16:08	15:03 (4) 14:41 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	17:48 (2)	16:20	16:08 16:08	16:08 16:08	15:03 (4) 14:41 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	17:48 (2)	16:20	16:08 16:09	16:08 16:09	15:04 (4) 14:42 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	17:48 (2)	16:20	16:09 16:10	16:09 16:10	15:04 (4) 14:43 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	17:48 (2)	16:20	16:10 16:10	16:10 16:10	15:05 (4) 14:44 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	17:48 (2)	16:20	16:11 16:11	16:11 16:11	15:05 (4) 14:44 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:47 (2) 17:53 (2)	17:47 (2) 17:53 (2)	16:20 16:19	16:11 16:11	16:11 16:11	15:05 (4) 14:45 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56			16:12 16:13	16:12 16:13	15:05 (4) 15:05 (4)
Potential sun hours	512	460	382	328	259	233	532		
Total, worst case			6	585	211	532			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.67	0.67	0.66	0.65			
Total reduction			0.22	0.20	0.17	0.13			
Total, real			1	116	37	71			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: C - H3

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	06:18 (4) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	06:16 (4) 20:57	05:02 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	06:15 (4) 20:59	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	06:16 (4) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	07:09 (5) 07:13 (5)	06:30 20:24	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	07:07 (5) 07:15 (5)	06:28 20:26	04:55 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	07:04 (5) 07:15 (5)	06:25 20:28	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	07:02 (5) 07:16 (5)	06:23 20:30	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:59 (5) 07:16 (5)	06:21 20:32	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:57 (5) 07:17 (5)	06:18 20:33	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:54 (5) 07:16 (5)	06:16 20:35	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:52 (5) 07:17 (5)	06:14 20:37	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:50 (5) 07:17 (5)	06:12 20:39	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:47 (5) 07:16 (5)	06:09 20:41	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:45 (5) 07:16 (5)	06:07 20:43	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:44 (5) 07:14 (5)	06:05 20:44	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:45 (5) 07:14 (5)	06:03 20:46	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:45 (5) 07:12 (5)	06:01 20:48	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	06:47 (5) 07:11 (5)	05:59 20:50	04:57 22:01
29	08:19 17:00		07:09 19:55	07:47 (5) 08:09 (5)	05:56 20:52	04:58 22:01
30	08:17 17:02		07:06 19:56	07:49 (5) 08:07 (5)	05:54 20:54	04:58 22:00
31	08:15 17:04		07:04 19:58	07:51 (5) 08:03 (5)	05:54 20:54	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			370	52	54	408
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.68	0.67	0.66
Total reduction			0.18	0.24	0.26	0.21
Total, real			67	12	14	86

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: C - H3

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 14	05:32 (3) 05:46 (3) 21:25	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54
2	05:00 22:00 13	05:33 (3) 05:46 (3) 21:23	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52
3	05:00 21:59 13	05:33 (3) 05:46 (3) 21:21	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50
4	05:01 21:59 12	05:34 (3) 05:46 (3) 21:19	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48
5	05:02 21:58 11	05:35 (3) 05:46 (3) 21:17	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46
6	05:03 21:58 10	05:36 (3) 05:46 (3) 21:16	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45
7	05:04 21:57 9	05:37 (3) 05:46 (3) 21:14	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43
8	05:05 21:56 8	05:38 (3) 05:46 (3) 21:12	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41
9	05:06 21:55 7	05:39 (3) 05:46 (3) 21:10	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39
10	05:07 21:55 6	05:40 (3) 05:46 (3) 21:08	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37
11	05:08 21:54 5	05:41 (3) 05:46 (3) 21:06	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36
12	05:09 21:53 3	05:42 (3) 05:45 (3) 21:03	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34
13	05:11 21:52 2	05:43 (3) 05:45 (3) 21:01	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32
14	05:12 21:51 11	05:44 (3) 20:59	06:01 19:47	06:56 19:47	07:50 18:34	07:49 16:31
15	05:13 21:50 9	06:03 20:57	06:32 (4) 19:44	06:58 19:44	07:52 18:31	07:51 16:29
16	05:14 21:49 7	06:05 20:55	06:33 (4) 19:42	06:59 19:42	07:54 18:29	07:53 16:28
17	05:16 21:47 6	06:06 20:53	06:35 (4) 19:39	07:01 19:39	07:56 18:27	07:55 16:26
18	05:17 21:46 4	06:08 20:51	06:37 (4) 19:37	07:03 19:37	07:57 18:24	07:57 16:25
19	05:19 21:45 1	06:10 20:48	06:38 (4) 19:34	07:05 19:34	07:59 18:22	07:59 16:23
20	05:20 21:44 29	06:12 20:46	07:06 19:32	07:33 (5) 18:20	08:01 18:20	08:01 16:22
21	05:21 21:42 27	06:13 20:44	07:08 19:29	07:35 (5) 18:18	08:03 18:18	08:02 16:21
22	05:23 21:41 25	06:15 20:42	07:10 19:27	07:36 (5) 18:15	08:05 18:15	08:04 16:19
23	05:24 21:39 23	06:17 20:39	07:12 19:24	07:38 (5) 18:13	08:07 18:13	08:06 16:18
24	05:26 21:38 21	06:19 20:37	07:14 19:22	07:40 (5) 18:11	08:09 18:11	08:08 16:17
25	05:27 21:36 18	06:21 20:35	07:15 19:19	07:42 (5) 18:09	07:11 18:09	08:09 16:16
26	05:29 21:35 15	06:22 20:32	07:17 19:17	07:43 (5) 18:07	07:13 18:07	08:11 16:15
27	05:31 21:33 12	06:24 20:30	07:19 19:15	07:45 (5) 18:05	07:15 18:05	08:13 16:14
28	05:32 21:32 9	06:26 20:28	07:21 19:12	07:47 (5) 18:03	07:17 18:03	08:14 16:13
29	05:34 21:30 6	06:28 20:25	07:23 19:10	07:49 (5) 18:01	07:18 18:01	08:16 16:12
30	05:35 21:28 2	06:29 20:23	07:24 19:07	07:51 (5) 17:59	07:20 18:00	08:18 16:11
31	05:37 21:27	06:31 20:21		07:53 (5) 17:57	16:58 16:56	16:13 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	113	107	375			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.68	0.67			
Total reduction	0.21	0.23	0.21			
Total, real	24	25	80			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: D - H4

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:51 (5) 08:07 (5)	05:52 20:55	06:18 (4) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:56 (5) 08:03 (5)	05:50 20:57	06:16 (4) 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	06:14 (4) 21:48	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	06:12 (4) 21:49	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	06:10 (4) 21:50	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	06:09 (4) 21:51	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	06:09 (4) 21:52	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	06:10 (4) 21:53	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	06:13 (4) 21:54	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	06:19 (4) 21:55	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	07:12 (5) 07:17 (5)	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	07:09 (5) 07:18 (5)	06:30 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	07:07 (5) 07:19 (5)	06:28 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	07:04 (5) 07:19 (5)	06:25 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	07:02 (5) 07:20 (5)	06:23 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:59 (5) 07:20 (5)	06:21 20:32	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:57 (5) 07:21 (5)	06:18 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:54 (5) 07:21 (5)	06:16 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:52 (5) 07:21 (5)	06:14 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:50 (5) 07:21 (5)	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:47 (5) 07:20 (5)	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:45 (5) 07:20 (5)	06:07 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:45 (5) 07:19 (5)	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:45 (5) 07:18 (5)	06:03 20:46	06:28 (4) 06:29 (4)	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:45 (5) 07:17 (5)	06:01 20:48	06:26 (4) 06:29 (4)	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	06:46 (5) 07:16 (5)	05:59 20:50	06:24 (4) 06:29 (4)	04:57 22:01
29	08:19 17:00	07:19 19:55	07:09 19:55	07:47 (5) 08:14 (5)	05:56 20:52	06:22 (4) 06:29 (4)	04:58 22:01
30	08:17 17:02	07:17 19:56	07:06 19:56	07:48 (5) 08:13 (5)	05:54 20:54	06:20 (4) 06:29 (4)	04:58 22:01
31	08:15 17:04	07:15 19:58	07:04 19:58	07:49 (5) 08:10 (5)	05:54 20:54	06:29 (4) 21:43	04:58 22:01
Potential sun hours	250	273	367	420	494	510	
Total, worst case			461	48	117		
Sun reduction			0.27	0.35	0.38		
Oper. time red.			1.00	1.00	1.00		
Wind dir. red.			0.67	0.67	0.67		
Total reduction			0.18	0.24	0.26		
Total, real			84	11	30		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: D - H4

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (5) 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (5) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:22 (4) 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:46 21:17	06:30 (4) 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:18 (4) 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57	05:49 21:14	06:34 (4) 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:35 (4) 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:22 (4) 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55	05:54 21:08	06:24 (4) 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:37 (4) 19:54	07:44 (5) 18:41	07:44 16:36	08:33 16:05
12	05:09 21:53	05:58 21:03	06:25 (4) 19:52	07:45 (5) 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	06:37 (4) 19:49	07:40 (5) 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:30 (4) 19:47	07:37 (5) 18:34	07:50 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	06:37 (4) 19:44	08:04 (5) 18:31	07:51 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	06:32 (4) 19:42	08:05 (5) 18:29	07:52 16:28	08:38 16:05
17	05:16 21:47	06:06 20:53	06:36 (4) 19:40	07:34 (5) 18:27	07:53 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:01 19:37	07:32 (5) 18:24	07:55 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:03 19:34	08:06 (5) 18:22	07:57 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:05 19:32	07:32 (5) 18:20	07:59 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:07 19:29	08:07 (5) 18:18	08:01 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	07:36 (5) 18:15	08:05 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	08:06 (5) 18:13	08:07 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	07:40 (5) 18:11	08:09 16:17	08:43 16:08
25	05:27 21:36	06:21 20:35	07:15 19:19	08:05 (5) 18:09	08:11 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:43 (5) 18:07	07:13 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	08:02 (5) 18:04	07:15 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	08:01 (5) 18:02	17:04 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	08:00 (5) 18:00	17:02 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:59 (5) 17:58	17:00 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:51 (5) 16:58	07:22 16:56	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case		141	488	2		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.67	0.67	0.67		
Total reduction		0.23	0.21	0.20		
Total, real		32	104	0		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: E - H5

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: F - H6

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: G - H7

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: H - H8

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:30 20:23	07:24 19:07	08:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: I - H9

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:56	18	06:36 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50		06:16 (1)	05:02	05:00	05:41	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	20	06:36 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	06:57	05:48		06:15 (1)	05:01	05:01	05:42	06:37	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	20	06:35 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09		
4	08:43	08:09	07:09	06:54	05:46		06:16 (1)	05:00	05:01	05:44	6	06:32 (1)	06:38	07:32	07:30	08:24
	16:18	17:12	18:08	20:06	21:01	18	06:34 (1)	21:49	21:59	21:19	5	06:37 (1)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44		06:16 (1)	04:59	05:02	05:46	6	06:30 (1)	06:40	07:33	07:32	08:25
	16:20	17:14	18:10	20:08	21:03	17	06:33 (1)	21:50	21:58	21:18	10	06:40 (1)	20:09	18:55	16:47	16:07
6	08:43	08:05	07:05	06:49	05:42		06:18 (1)	04:59	05:03	05:47	7	06:28 (1)	06:42	07:35	07:34	08:27
	16:21	17:16	18:12	20:10	21:05	15	06:33 (1)	21:51	21:58	21:16	13	06:41 (1)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40		06:19 (1)	04:58	05:04	05:49	8	06:27 (1)	06:44	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	12	06:31 (1)	21:52	21:57	21:14	16	06:43 (1)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38		06:20 (1)	04:57	05:05	05:51	9	06:25 (1)	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	9	06:29 (1)	21:53	21:56	21:12	18	06:43 (1)	20:02	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36			04:57	05:06	05:52	10	06:25 (1)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10			21:54	21:56	21:10	19	06:44 (1)	21:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35			04:56	05:07	05:54	11	06:25 (1)	06:49	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12			21:55	21:55	21:08	20	06:45 (1)	21:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33			04:56	05:08	05:56	12	06:25 (1)	06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13			21:56	21:54	21:06	19	06:44 (1)	21:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31			04:56	05:10	05:58	10	06:27 (1)	06:52	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	21:15			21:56	21:53	21:04	17	06:44 (1)	21:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29			04:55	05:11	05:59	11	06:29 (1)	06:54	07:48	07:48	08:35
	16:31	17:30	18:25	20:22	21:17			21:57	21:52	21:01	16	06:45 (1)	21:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27			04:55	05:12	06:01	12	06:30 (1)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:19			21:58	21:51	20:59	14	06:44 (1)	21:47	18:34	16:31	16:05
15	08:37	07:47	06:43	06:28	05:26			04:55	05:13	06:03	13	06:32 (1)	06:58	07:52	07:51	08:37
	16:35	17:34	18:29	20:26	21:20			21:58	21:50	20:57	12	06:44 (1)	21:44	18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24			04:55	05:15	06:05	9	06:34 (1)	07:00	07:54	07:53	08:38
	16:36	17:36	18:31	20:28	21:22			21:59	21:49	20:55	9	06:43 (1)	21:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22			04:54	05:16	06:06	7	06:35 (1)	07:01	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21:24			21:59	21:48	20:53	7	06:42 (1)	21:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21			04:54	05:17	06:08	4	06:37 (1)	07:03	07:58	07:57	08:39
	16:40	17:40	18:34	20:32	21:25			22:00	21:46	20:51	4	06:41 (1)	21:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19			04:54	05:19	06:10			07:05	07:59	07:59	08:40
	16:42	17:42	18:36	20:34	21:27			22:00	21:45	20:49			19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	06:16	05:18			04:55	05:20	06:12			07:07	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	21:28			22:00	21:44	20:46			19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16			04:55	05:22	06:14			07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30			22:01	21:42	20:44			19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15			04:55	05:23	06:15			07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	21:32			22:01	21:41	20:42			19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13			04:55	05:24	06:17			07:12	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	21:33			22:01	21:40	20:39			19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	06:32 (1)		04:55	05:26	06:19			07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	1	06:33 (1)		22:01	21:38	20:37			19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11	06:30 (1)		04:56	05:28	06:21			07:15	07:11	08:09	08:43
	16:53	17:54	18:47	20:45	4	06:34 (1)		22:01	21:37	20:35			19:20	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:10	06:28 (1)		04:56	05:29	06:22			07:17	07:13	08:11	08:44
	16:55	17:56	18:49	20:46	7	06:35 (1)		22:01	21:35	20:33			19:17	17:07	16:15	16:09
27	08:22	07:21	06:14	06:01	05:08	06:26 (1)		04:57	05:31	06:24			07:19	07:15	08:13	08:44
	16:56	17:58	18:51	20:48	10	06:36 (1)		22:01	21:33	20:30			19:15	17:05	16:14	16:10
28	08:20	07:19	06:11	05:59	05:07	06:24 (1)		04:57	05:32	06:26			07:21	07:17	08:15	08:44
	16:58	18:00	18:53	20:50	12	06:36 (1)		22:01	21:32	20:28			19:12	17:02	16:13	16:11
29	08:19		07:09	05:56	06:22 (1)	05:06		04:58	05:34	06:28			07:23	07:19	08:16	08:44
	17:00		19:55	20:52	14	06:36 (1)		22:01	21:30	20:26			19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	06:20 (1)	05:05		04:58	05:36	06:29			07:24	07:21	08:18	08:44
	17:02		19:57	20:54	16	06:36 (1)		22:01	21:28	20:23			19:07	16:58	16:11	16:13
31	08:15		07:04		05:04				05:37	06:31				07:22		08:44
	17:04		19:58		21:44				21:27	20:21				16:56		16:14
Potential sun hours	250	273	367	420	494		510	512	460		382	328		259		233
Total, worst case				64	129				199							
Sun reduction				0.35	0.38				0.34							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.68	0.68				0.68							
Total reduction				0.24	0.26				0.23							
Total, real				15	33				46							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: J - H10

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	05:34 (1) 05:49 (1)	04:59 22:00	05:36 (1) 05:52 (1)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:33 (1) 05:49 (1)	05:00 22:00	05:36 (1) 05:53 (1)	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:32 (1) 05:49 (1)	05:01 21:59	05:36 (1) 05:54 (1)	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:31 (1) 05:48 (1)	05:01 21:59	05:35 (1) 05:53 (1)	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:31 (1) 05:49 (1)	05:02 21:58	05:35 (1) 05:54 (1)	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	05:00 21:51	05:30 (1) 05:48 (1)	05:03 21:58	05:36 (1) 05:55 (1)	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	05:00 21:52	05:30 (1) 05:49 (1)	05:04 21:57	05:37 (1) 05:55 (1)	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	05:00 21:53	05:30 (1) 05:48 (1)	05:05 21:56	05:38 (1) 05:55 (1)	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:31 (1) 05:49 (1)	05:06 21:56	05:39 (1) 05:56 (1)	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:31 (1) 05:48 (1)	05:07 21:55	05:40 (1) 05:56 (1)	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:31 (1) 05:48 (1)	05:08 21:54	05:41 (1) 05:56 (1)	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:32 (1) 05:49 (1)	05:10 21:53	05:42 (1) 05:57 (1)	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:32 (1) 05:48 (1)	05:11 21:52	05:43 (1) 05:57 (1)	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:32 (1) 05:48 (1)	05:12 21:51	05:44 (1) 05:57 (1)	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:06
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:33 (1) 05:48 (1)	05:13 21:50	05:46 (1) 05:58 (1)	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:33 (1) 05:48 (1)	05:15 21:49	05:47 (1) 05:57 (1)	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:34 (1) 05:48 (1)	05:16 21:48	05:48 (1) 05:57 (1)	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:34 (1) 05:48 (1)	05:17 21:46	05:49 (1) 05:57 (1)	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:34 (1) 05:48 (1)	05:19 21:45	05:51 (1) 05:57 (1)	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:34 (1) 05:48 (1)	05:20 21:44	05:52 (1) 05:57 (1)	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:35 (1) 05:49 (1)	05:22 21:42	05:53 (1) 05:56 (1)	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:35 (1) 05:49 (1)	05:23 21:41	05:55 (1) 05:57 (1)	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:35 (1) 05:49 (1)	05:24 21:40	05:57 (1) 05:59 (1)	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:35 (1) 05:49 (1)	05:26 21:38	05:59 (1) 05:59 (1)	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:36 (1) 05:50 (1)	05:28 21:37	05:59 (1) 05:59 (1)	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:35 (1) 05:50 (1)	05:29 21:35	05:59 (1) 05:59 (1)	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:36 (1) 05:51 (1)	05:31 21:33	05:59 (1) 05:59 (1)	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:35 (1) 05:51 (1)	05:32 21:32	05:59 (1) 05:59 (1)	06:26 20:28	07:21 19:12	08:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00	07:19 19:05	06:11 19:55	05:59 20:52	05:07 21:42	04:58 22:01	05:36 (1) 05:51 (1)	04:58 21:30	05:59 (1) 05:59 (1)	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02	07:19 19:07	06:11 20:04	05:59 20:54	05:07 21:43	04:58 22:01	05:36 (1) 05:51 (1)	05:36 21:28	05:59 (1) 05:59 (1)	06:29 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04	07:19 19:07	06:11 20:04	05:59 20:54	05:07 21:43	04:58 22:01	05:36 (1) 05:51 (1)	05:36 21:28	05:59 (1) 05:59 (1)	06:30 20:23	07:25 19:07	08:20 16:58	08:19 16:11	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case					89	474	287							
Sun reduction					0.38	0.32	0.32							
Oper. time red.					1.00	1.00	1.00							
Wind dir. red.					0.66	0.66	0.66							
Total reduction					0.25	0.21	0.21							
Total, real					22	99	61							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: K - H11

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: L - H12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 21:03	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:12 (5) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:12 (5) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:13 (5) 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:29 (5) 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	07:32 (5) 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	07:30 (5) 20:54	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	07:27 (5) 20:54	05:04 21:44	05:34 (3) 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			12	156	28	464
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.66	0.66
Total reduction			0.18	0.24	0.25	0.21
Total, real			2	37	7	98

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: L - H12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 16	05:32 (3) 05:48 (3) 21	05:39 21:25 20:18	07:26 19:05 16:10	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 15	05:33 (3) 05:48 (3) 21	05:40 20:16 16:09	07:13 (5) 19:02 16:52	07:28 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 15	05:33 (3) 05:48 (3) 21	05:42 20:14 16:09	07:11 (5) 19:00 16:50	07:30 16:50 16:09	08:22 16:09 16:09
4	05:01 21:59 14	05:34 (3) 05:48 (3) 21	05:44 20:11 16:08	07:09 (5) 18:57 16:48	07:32 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 14	05:35 (3) 05:49 (3) 21	05:46 20:09 16:07	07:08 (5) 18:55 16:46	07:33 16:46 16:07	08:25 16:07 16:07
6	05:03 21:58 13	05:36 (3) 05:49 (3) 21	05:47 20:06 16:07	07:09 (5) 18:53 16:45	07:35 16:45 16:07	08:26 16:07 16:07
7	05:04 21:57 13	05:37 (3) 05:50 (3) 21	05:44 20:04 16:06	07:10 (5) 18:50 16:43	07:37 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 12	05:38 (3) 05:50 (3) 21	05:45 20:01 16:06	07:12 (5) 18:48 16:41	07:39 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 11	05:39 (3) 05:50 (3) 21	05:47 19:59 16:06	07:14 (5) 18:45 16:39	07:41 16:39 16:06	08:30 16:06 16:06
10	05:07 21:55 10	05:40 (3) 05:50 (3) 21	05:49 19:57 16:05	07:16 (5) 18:43 16:37	07:43 16:37 16:05	08:32 16:05 16:05
11	05:08 21:54 9	05:41 (3) 05:50 (3) 21	05:51 19:54 16:05	07:17 (5) 18:41 16:36	07:44 16:36 16:05	08:33 16:05 16:05
12	05:10 21:53 8	05:42 (3) 05:50 (3) 21	05:52 19:52 16:05	07:19 (5) 18:38 16:34	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 7	05:43 (3) 05:50 (3) 21	05:59 19:49 16:05	07:21 (5) 18:36 16:32	07:48 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 6	05:44 (3) 05:50 (3) 20	06:01 19:47 16:05	07:22 (5) 18:34 16:31	07:50 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 5	05:45 (3) 05:50 (3) 20	06:03 19:44 16:05	07:23 (5) 18:31 16:29	07:51 16:29 16:05	08:37 16:05 16:05
16	05:15 21:49 3	05:47 (3) 05:50 (3) 20	06:05 19:42 16:05	07:54 18:29 16:28	07:53 16:28 16:05	08:38 16:05 16:05
17	05:16 21:47 2	05:48 (3) 05:50 (3) 20	07:01 19:39 16:05	07:56 18:27 16:26	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 1	06:08 20:51 19:37	07:03 19:37 16:05	07:57 18:24 16:25	07:57 16:25 16:05	08:39 16:05 16:05
19	05:19 21:45 1	06:10 20:48 19:34	07:05 19:34 16:05	07:59 18:22 16:23	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44 1	06:12 20:46 19:32	07:07 19:32 16:06	08:01 18:20 16:22	08:01 16:22 16:06	08:41 16:06 16:06
21	05:21 21:42 1	06:14 20:44 19:29	07:08 19:29 16:06	08:03 18:18 16:21	08:02 16:21 16:06	08:41 16:06 16:06
22	05:23 21:41 1	06:15 20:42 19:27	07:10 19:27 16:07	08:05 18:15 16:19	08:04 16:19 16:07	08:42 16:07 16:07
23	05:24 21:39 1	06:17 20:39 19:24	07:12 19:24 16:07	08:07 18:13 16:18	08:06 16:18 16:07	08:42 16:07 16:07
24	05:26 21:38 1	06:19 20:37 19:22	07:14 19:22 16:08	08:09 18:11 16:17	08:08 16:17 16:08	08:43 16:08 16:08
25	05:28 21:36 1	06:21 20:35 19:19	07:15 19:19 16:08	07:11 17:09 16:16	08:09 16:16 16:08	08:43 16:08 16:08
26	05:29 21:35 1	06:22 20:33 19:17	07:17 19:17 16:09	07:13 17:07 16:15	08:11 16:15 16:09	08:43 16:09 16:09
27	05:31 21:33 1	06:24 20:30 19:15	07:19 19:15 16:10	07:15 17:05 16:14	08:13 16:14 16:10	08:44 16:10 16:10
28	05:32 21:32 1	06:26 20:28 19:12	07:21 19:12 16:11	07:17 17:02 16:13	08:14 16:13 16:11	08:44 16:11 16:11
29	05:34 21:30 1	06:28 20:25 19:10	07:23 19:10 16:12	07:19 17:00 16:12	08:16 16:12 16:12	08:44 16:12 16:12
30	05:35 21:28 1	06:29 20:23 19:07	07:24 19:07 16:13	07:20 16:58 16:11	08:18 16:11 16:13	08:44 16:13 16:13
31	05:37 21:27 1	06:31 20:21 19:05	07:25 19:05 16:14	07:22 16:56 16:14	08:19 16:14 16:14	08:44 16:14 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	173		171			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	37		37			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: M - H13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	17:12 (5) 22 17:34 (5)	07:01 20:00	05:52 33 20:03 (4)
2	08:44 16:16	08:12 17:08	07:14 18:04	17:11 (5) 25 17:36 (5)	06:59 20:02	05:50 32 20:02 (4)
3	08:43 16:17	08:10 17:10	07:11 18:06	17:11 (5) 25 17:36 (5)	06:56 20:04	05:48 30 20:01 (4)
4	08:43 16:18	08:08 17:12	07:09 18:07	17:11 (5) 25 17:36 (5)	06:54 20:06	05:46 27 19:59 (4)
5	08:43 16:20	08:07 17:14	07:07 18:09	17:11 (5) 24 17:35 (5)	06:51 20:07	05:44 25 19:58 (4)
6	08:42 16:21	08:05 17:16	07:04 18:11	17:11 (5) 24 17:35 (5)	06:49 20:09	05:42 22 19:56 (4)
7	08:42 16:22	08:03 17:18	07:02 18:13	17:11 (5) 23 17:34 (5)	06:47 20:11	05:40 18 19:55 (4)
8	08:41 16:24	08:01 17:20	07:00 18:15	17:12 (5) 21 17:33 (5)	06:44 20:13	05:38 14 19:53 (4)
9	08:41 16:25	07:59 17:22	06:57 18:17	17:12 (5) 19 17:31 (5)	06:42 20:15	05:36 5 19:48 (4)
10	08:40 16:26	07:57 17:24	06:55 18:19	17:14 (5) 16 17:30 (5)	06:39 20:17	05:34 21:11
11	08:40 16:28	07:55 17:26	06:52 18:21	17:17 (5) 11 17:28 (5)	06:37 20:19	05:33 7 19:51 (4)
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 12 19:53 (4)	05:31 21:15
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 16 19:54 (4)	05:29 21:17
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 20 19:56 (4)	05:27 21:18
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 23 19:58 (4)	05:26 21:20
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 26 20:00 (4)	05:24 21:22
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 29 20:01 (4)	05:22 21:23
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 32 20:03 (4)	05:21 21:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 35 20:05 (4)	05:19 21:27
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 37 20:07 (4)	05:18 21:28
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 38 20:06 (4)	05:16 21:30
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 38 20:06 (4)	05:15 21:31
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 38 20:06 (4)	05:13 21:33
24	08:26 16:50	07:28 17:52	17:21 (5) 3 17:24 (5)	06:21 20:42	05:12 38 20:06 (4)	05:12 21:34
25	08:24 16:52	07:25 17:54	17:17 (5) 9 17:26 (5)	06:18 20:44	05:11 38 20:06 (4)	05:11 21:36
26	08:23 16:54	07:23 17:56	17:16 (5) 12 17:28 (5)	06:16 20:46	05:09 38 20:06 (4)	05:09 21:37
27	08:22 16:56	07:21 17:58	17:15 (5) 16 17:31 (5)	06:13 20:48	05:08 37 20:05 (4)	05:08 21:39
28	08:20 16:58	07:18 18:00	17:13 (5) 19 17:32 (5)	06:11 20:50	05:07 37 20:05 (4)	05:07 21:40
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 35 20:04 (4)	05:06 21:41
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 35 20:04 (4)	05:05 21:43
31	08:15 17:04		07:04 19:58		05:04 21:44	05:04 21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case		59	235	609	206	7
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.68	0.68	0.65	0.65	0.61
Total reduction		0.16	0.18	0.23	0.25	0.19
Total, real		9	43	140	51	1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
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+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: M - H13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:43 (4) 19:50 (4)	07:26 19:05	07:24 16:54
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:57 (5) 18:04 (5)	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:53 (5) 18:07 (5)	07:28 16:50
4	05:01 21:59	05:44 21:19	19:51 (4) 20:00 (4)	06:38 20:11	07:31 18:57	17:51 (5) 18:09 (5)
5	05:02 21:58	05:45 21:17	19:47 (4) 20:03 (4)	06:40 20:09	07:33 18:55	17:50 (5) 18:10 (5)
6	05:03 21:57	05:47 21:15	19:45 (4) 20:05 (4)	06:42 20:06	07:35 18:52	17:48 (5) 18:11 (5)
7	05:04 21:57	05:49 21:13	19:44 (4) 20:07 (4)	06:43 20:04	07:37 18:50	17:47 (5) 18:10 (5)
8	05:05 21:56	05:51 21:11	19:42 (4) 20:08 (4)	06:45 20:01	07:39 18:48	17:46 (5) 18:10 (5)
9	05:06 21:55	05:52 21:09	19:41 (4) 20:09 (4)	06:47 19:59	07:41 18:45	17:45 (5) 18:10 (5)
10	05:07 21:55	05:54 21:07	19:39 (4) 20:09 (4)	06:49 19:56	07:42 18:43	17:45 (5) 18:10 (5)
11	05:08 21:54	05:56 21:05	19:38 (4) 20:11 (4)	06:50 19:54	07:44 18:40	17:45 (5) 18:10 (5)
12	05:09 21:53	05:57 21:03	19:38 (4) 20:11 (4)	06:52 19:51	07:46 18:38	17:45 (5) 18:09 (5)
13	05:11 21:52	05:59 21:01	19:36 (4) 20:11 (4)	06:54 19:49	07:48 18:36	17:46 (5) 18:07 (5)
14	05:12 21:51	06:01 20:59	19:36 (4) 20:12 (4)	06:56 19:47	07:50 18:33	17:46 (5) 18:04 (5)
15	05:13 21:50	06:03 20:57	19:36 (4) 20:13 (4)	06:58 19:44	07:52 18:31	17:47 (5) 18:02 (5)
16	05:14 21:49	06:05 20:55	19:35 (4) 20:12 (4)	06:59 19:42	07:54 18:29	17:48 (5) 18:00 (5)
17	05:16 21:47	06:06 20:53	19:34 (4) 20:12 (4)	07:01 19:39	07:55 18:26	17:50 (5) 17:57 (5)
18	05:17 21:46	06:08 20:50	19:34 (4) 20:13 (4)	07:03 19:37	07:57 18:24	17:54 (5) 17:55 (5)
19	05:18 21:45	06:10 20:48	19:33 (4) 20:12 (4)	07:05 19:34	07:59 18:22	17:59 16:23
20	05:20 21:44	06:12 20:46	19:34 (4) 20:12 (4)	07:06 19:32	08:01 18:20	16:22 16:22
21	05:21 21:42	06:13 20:44	19:34 (4) 20:12 (4)	07:08 19:29	08:03 18:17	16:20 16:20
22	05:23 21:41	06:15 20:42	19:33 (4) 20:11 (4)	07:10 19:27	08:05 18:15	16:19 16:19
23	05:24 21:39	06:17 20:39	19:34 (4) 20:10 (4)	07:12 19:24	08:07 18:13	16:18 16:18
24	05:26 21:38	06:19 20:37	19:34 (4) 20:09 (4)	07:13 19:22	08:09 18:11	16:17 16:17
25	05:27 21:36	06:20 20:35	19:34 (4) 20:06 (4)	07:15 19:19	07:11 17:09	16:16 16:16
26	05:29 21:35	06:22 20:32	19:35 (4) 20:04 (4)	07:17 19:17	07:13 17:06	16:11 16:14
27	05:30 21:33	06:24 20:30	19:35 (4) 20:02 (4)	07:19 19:14	07:14 17:04	16:13 16:13
28	05:32 21:32	06:26 20:28	19:36 (4) 19:59 (4)	07:21 19:12	07:16 17:02	16:14 16:12
29	05:34 21:30	06:27 20:25	19:37 (4) 19:57 (4)	07:22 19:09	07:18 17:00	16:16 16:12
30	05:35 21:28	06:29 20:23	19:39 (4) 19:55 (4)	07:24 19:07	07:20 16:58	16:18 16:11
31	05:37 21:26	06:31 20:21	19:40 (4) 19:52 (4)	07:22 16:56	07:22 16:56	16:11 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		823	7	302		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.65	0.68		
Total reduction		0.22	0.21	0.20		
Total, real		183	1	60		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
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+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: N - H14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June								
1	08:44	08:14	07:16	16:59 (5)	07:01	19:06 (4)	05:52	05:03	20:49 (2)					
	16:15	17:06	18:02	17	17:16 (5)	20:00	27	19:33 (4)	20:55	21:45	21	21:10 (2)		
2	08:44	08:12	07:14	17:00 (5)	06:59	19:04 (4)	05:50	05:02	20:50 (2)					
	16:16	17:08	18:04	13	17:13 (5)	20:02	31	19:35 (4)	20:57	21:46	22	21:12 (2)		
3	08:43	08:10	07:11	17:03 (5)	06:56	19:03 (4)	05:48	05:01	20:49 (2)					
	16:17	17:10	18:06	7	17:10 (5)	20:04	34	19:37 (4)	20:59	21:48	24	21:13 (2)		
4	08:43	08:08	07:09		06:54	19:03 (4)	05:46	05:00	20:49 (2)					
	16:18	17:12	18:07		20:06	36	19:39 (3)	21:01	21:49	25	21:14 (2)			
5	08:43	08:07	07:07		06:51	19:02 (4)	05:44	04:59	20:49 (2)					
	16:19	17:14	18:09		20:07	38	19:40 (3)	21:03	21:50	25	21:14 (2)			
6	08:42	08:05	07:04		06:49	19:01 (4)	05:42	04:59	20:49 (2)					
	16:21	17:16	18:11		20:09	41	19:42 (3)	21:04	21:51	27	21:16 (2)			
7	08:42	08:03	07:02		06:47	19:00 (4)	05:40	04:58	20:49 (2)					
	16:22	17:18	18:13		20:11	43	19:43 (3)	21:06	21:52	27	21:16 (2)			
8	08:41	08:01	07:00		06:44	19:01 (4)	05:38	04:57	20:50 (2)					
	16:24	17:20	18:15		20:13	45	19:46 (3)	21:08	21:53	26	21:16 (2)			
9	08:41	07:59	06:57		06:42	19:01 (4)	05:36	04:57	20:49 (2)					
	16:25	17:22	18:17		20:15	46	19:47 (3)	21:10	21:54	27	21:16 (2)			
10	08:40	07:57	06:55		06:39	19:00 (4)	05:34	04:56	20:50 (2)					
	16:26	17:24	18:19		20:17	46	19:46 (3)	21:11	21:55	27	21:17 (2)			
11	08:40	07:55	06:52		06:37	19:01 (4)	05:33	04:56	20:50 (2)					
	16:28	17:26	18:21		20:19	44	19:45 (3)	21:13	21:55	27	21:17 (2)			
12	08:39	07:53	06:50		06:35	19:01 (4)	05:31	04:55	20:50 (2)					
	16:30	17:28	18:23		20:20	43	19:44 (3)	21:15	21:56	27	21:17 (2)			
13	08:38	07:51	06:48		06:32	19:01 (4)	05:29	04:55	20:50 (2)					
	16:31	17:30	18:25		20:22	41	19:42 (3)	21:17	21:57	27	21:17 (2)			
14	08:37	07:49	06:45		06:30	19:02 (4)	05:27	04:55	20:50 (2)					
	16:33	17:32	18:27		20:24	38	19:40 (3)	21:18	21:57	27	21:17 (2)			
15	08:36	07:47	06:43		06:28	19:03 (4)	05:26	04:55	20:51 (2)					
	16:34	17:34	18:28		20:26	34	19:37 (3)	21:20	21:58	27	21:18 (2)			
16	08:35	07:45	17:04 (5)	06:40	06:25	19:04 (4)	05:24	04:54	20:51 (2)					
	16:36	17:36	3	17:07 (5)	18:30	20:28	27	19:31 (4)	21:22	21:59	27	21:18 (2)		
17	08:34	07:43	17:02 (5)	06:38	06:23	19:05 (4)	05:22	04:54	20:51 (2)					
	16:38	17:38	7	17:09 (5)	18:32	20:30	23	19:28 (4)	21:23	21:59	27	21:18 (2)		
18	08:33	07:41	16:59 (5)	06:35	06:21	19:07 (4)	05:21	04:54	20:51 (2)					
	16:40	17:40	12	17:11 (5)	18:34	20:31	19	19:26 (4)	21:25	22:00	28	21:19 (2)		
19	08:32	07:39	16:58 (5)	06:33	06:18	19:09 (4)	05:19	04:54	20:52 (2)					
	16:41	17:42	15	17:13 (5)	18:36	20:33	15	19:24 (4)	21:27	22:00	27	21:19 (2)		
20	08:31	07:36	16:58 (5)	06:31	06:16	19:14 (4)	05:18	04:54	20:52 (2)					
	16:43	17:44	18	17:16 (5)	18:38	20:35	5	19:19 (4)	21:28	22:00	27	21:19 (2)		
21	08:30	07:34	16:57 (5)	06:28	06:14		05:16	04:54	20:52 (2)					
	16:45	17:46	21	17:18 (5)	18:40	20:37		21:30	22:01	27	21:19 (2)			
22	08:28	07:32	16:56 (5)	06:26	06:12		05:15	20:56 (2)	04:55	20:53 (2)				
	16:47	17:48	23	17:19 (5)	18:41	20:39		21:31	3	20:59 (2)	22:01	27	21:20 (2)	
23	08:27	07:30	16:56 (5)	06:23	06:09		05:13	20:54 (2)	04:55	20:53 (2)				
	16:49	17:50	24	17:20 (5)	18:43	20:41		21:33	5	20:59 (2)	22:01	27	21:20 (2)	
24	08:26	07:28	16:56 (5)	06:21	06:07		05:12	20:53 (2)	04:55	20:53 (2)				
	16:50	17:52	24	17:20 (5)	18:45	20:42		21:34	8	21:01 (2)	22:01	27	21:20 (2)	
25	08:24	07:25	16:56 (5)	06:18	06:05		05:11	20:52 (2)	04:56	20:53 (2)				
	16:52	17:54	23	17:19 (5)	18:47	20:44		21:36	10	21:02 (2)	22:01	27	21:20 (2)	
26	08:23	07:23	16:56 (5)	06:16	06:03		05:09	20:51 (2)	04:56	20:53 (2)				
	16:54	17:56	23	17:19 (5)	18:49	20:46		21:37	13	21:04 (2)	22:01	27	21:20 (2)	
27	08:22	07:21	16:57 (5)	06:13		18:17 (4)	06:01	05:08	20:51 (2)	04:56	20:53 (2)			
	16:56	17:58	21	17:18 (5)	18:51	7	18:24 (4)	20:48	21:39	14	21:05 (2)	22:01	27	21:20 (2)
28	08:20	07:18	16:57 (5)	06:11		18:14 (4)	05:58	05:07	20:50 (2)	04:57	20:54 (2)			
	16:58	18:00	20	17:17 (5)	18:53	12	18:26 (4)	20:50	21:40	16	21:06 (2)	22:01	27	21:21 (2)
29	08:18			07:08		19:11 (4)	05:56	05:06	20:50 (2)	04:57	20:54 (2)			
	17:00			19:54	17	19:28 (4)	20:52	21:41	17	21:07 (2)	22:01	27	21:21 (2)	
30	08:17			07:06		19:09 (4)	05:54	05:05	20:50 (2)	04:58	20:54 (2)			
	17:02			19:56	21	19:30 (4)	20:53	21:43	18	21:08 (2)	22:00	27	21:21 (2)	
31	08:15			07:04		19:07 (4)		05:04	20:49 (2)					
	17:04			19:58	24	19:31 (4)		21:44	20	21:09 (2)				
Potential sun hours	250	273		367		420		494		510				
Total, worst case		234		118		676		124		792				
Sun reduction		0.23		0.27		0.35		0.38		0.32				
Oper. time red.		1.00		1.00		1.00		1.00		1.00				
Wind dir. red.		0.67		0.67		0.67		0.62		0.62				
Total reduction		0.16		0.18		0.24		0.24		0.20				
Total, real		37		22		160		29		156				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyarne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: N - H14

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:54 (2)	05:39	06:33	18:59 (4)	07:26		07:24	08:19		
	22:00	27	21:21 (2)	21:25	20:18	45	19:44 (3)	19:05	16:54	16:10	
2	05:00	20:55 (2)	05:40	06:35	18:59 (4)	07:28		07:26	08:21		
	22:00	27	21:22 (2)	21:23	20:16	46	19:45 (3)	19:02	16:52	16:09	
3	05:00	20:54 (2)	05:42	06:36	18:58 (4)	07:30		07:28	08:22		
	21:59	27	21:21 (2)	21:21	20:13	46	19:44 (3)	19:00	16:50	16:08	
4	05:01	20:55 (2)	05:44	06:38	18:58 (4)	07:31		07:30	08:24		
	21:59	27	21:22 (2)	21:19	20:11	45	19:43 (3)	18:57	16:48	16:08	
5	05:02	20:55 (2)	05:45	06:40	18:57 (4)	07:33		07:32	08:25		
	21:58	27	21:22 (2)	21:17	20:09	44	19:41 (3)	18:55	16:46	16:07	
6	05:03	20:56 (2)	05:47	06:42	18:58 (4)	07:35		07:34	08:26		
	21:57	26	21:22 (2)	21:15	20:06	41	19:39 (3)	18:52	16:44	16:07	
7	05:04	20:56 (2)	05:49	06:43	18:57 (4)	07:37		07:36	08:28		
	21:57	26	21:22 (2)	21:13	20:04	38	19:35 (3)	18:50	16:43	16:06	
8	05:05	20:56 (2)	05:51	06:45	18:57 (4)	07:39		07:38	08:29		
	21:56	25	21:21 (2)	21:11	20:01	36	19:33 (4)	18:48	16:41	16:06	
9	05:06	20:57 (2)	05:52	06:47	18:57 (4)	07:41		07:40	08:30		
	21:55	24	21:21 (2)	21:09	19:59	34	19:31 (4)	18:45	16:39	16:05	
10	05:07	20:57 (2)	05:54	06:49	18:57 (4)	07:42		07:42	08:31		
	21:55	23	21:20 (2)	21:07	19:56	31	19:28 (4)	18:43	16:37	16:05	
11	05:08	20:57 (2)	05:56	06:50	18:58 (4)	07:44		17:35 (5)	07:44	08:33	
	21:54	22	21:19 (2)	21:05	19:54	28	19:26 (4)	18:40	17:46 (5)	16:35	16:05
12	05:09	20:58 (2)	05:57	06:52	18:59 (4)	07:46		17:33 (5)	07:45	08:34	
	21:53	20	21:18 (2)	21:03	19:51	25	19:24 (4)	18:38	17:48 (5)	16:34	16:05
13	05:10	20:58 (2)	05:59	06:54	19:00 (4)	07:48		17:31 (5)	07:47	08:35	
	21:52	19	21:17 (2)	21:01	19:49	22	19:22 (4)	18:36	17:49 (5)	16:32	16:05
14	05:12	20:58 (2)	06:01	06:56	19:01 (4)	07:50		17:30 (5)	07:49	08:36	
	21:51	18	21:16 (2)	20:59	19:47	17	19:18 (4)	18:33	17:50 (5)	16:31	16:05
15	05:13	20:59 (2)	06:03	06:58	19:03 (4)	07:52		17:29 (5)	07:51	08:37	
	21:50	16	21:15 (2)	20:57	19:44	13	19:16 (4)	18:31	17:51 (5)	16:29	16:05
16	05:14	20:59 (2)	06:04	06:59	19:06 (4)	07:54		17:28 (5)	07:53	08:38	
	21:49	15	21:14 (2)	20:55	19:42	8	19:14 (4)	18:29	17:51 (5)	16:27	16:05
17	05:16	21:01 (2)	06:06	07:01		07:55		17:28 (5)	07:55	08:38	
	21:47	13	21:14 (2)	20:53	19:39		18:26	23	17:51 (5)	16:26	16:05
18	05:17	21:01 (2)	06:08	07:03		07:57		17:27 (5)	07:57	08:39	
	21:46	11	21:12 (2)	20:50	19:37		18:24	24	17:51 (5)	16:24	16:05
19	05:18	21:02 (2)	06:10	07:05		07:59		17:27 (5)	07:59	08:40	
	21:45	9	21:11 (2)	20:48	19:34		18:22	24	17:51 (5)	16:23	16:05
20	05:20	21:04 (2)	06:12	07:06		08:01		17:27 (5)	08:00	08:41	
	21:44	6	21:10 (2)	20:46	19:32		18:20	23	17:50 (5)	16:22	16:06
21	05:21	21:05 (2)	06:13	07:08		08:03		17:28 (5)	08:02	08:41	
	21:42	4	21:09 (2)	20:44	19:29		18:17	20	17:48 (5)	16:20	16:06
22	05:23		06:15	07:10		08:05		17:28 (5)	08:04	08:42	
	21:41		20:42	19:27		18:15	17	17:45 (5)	16:19	16:06	
23	05:24		06:17	07:12		08:07		17:29 (5)	08:06	08:42	
	21:39		20:39	19:24 (4)	19:24		18:13	14	17:43 (5)	16:18	16:07
24	05:26		06:19	19:13 (4)	07:13		08:09		17:30 (5)	08:08	08:43
	21:38		20:37	19:22		18:11	11	17:41 (5)	16:17	16:08	
25	05:27		06:20	19:09 (4)	07:15		07:11		16:32 (5)	08:09	08:43
	21:36		20:35	19:29 (4)	19:19		17:09	6	16:38 (5)	16:16	16:08
26	05:29		06:22	19:07 (4)	07:17		07:13		16:35 (5)	08:11	08:43
	21:35		20:32	19:31 (4)	19:17		17:06	1	16:36 (5)	16:14	16:09
27	05:30		06:24	19:06 (4)	07:19		07:14		08:13	08:44	
	21:33		20:30	19:33 (4)	19:14		17:04		16:13	16:10	
28	05:32		06:26	19:04 (4)	07:21		07:16		08:14	08:44	
	21:32		20:28	19:38 (3)	19:12		17:02		16:12	16:11	
29	05:34		06:27	19:03 (4)	07:22		07:18		08:16	08:44	
	21:30		20:25	19:41 (3)	19:09		17:00		16:12	16:11	
30	05:35		06:29	19:02 (4)	07:24		07:20		08:18	08:44	
	21:28		20:23	19:43 (3)	19:07		16:58		16:11	16:12	
31	05:37		06:31	19:00 (4)			07:22			08:44	
	21:26		20:21	19:43 (3)			16:56			16:13	
Potential sun hours	512		460		382		328		259	233	
Total, worst case		412		249		519					
Sun reduction		0.32		0.34		0.32		0.29			
Oper. time red.		1.00		1.00		1.00		1.00			
Wind dir. red.		0.62		0.67		0.67		0.67			
Total reduction		0.20		0.23		0.22		0.20			
Total, real		82		57		112		53			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: O - H15

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:54 (4) 19:33 (3)	05:52 20:55
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:53 (4) 19:35 (3)	05:50 20:57
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:54 (4) 19:37 (3)	05:48 20:59
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:54 (4) 19:39 (3)	05:46 21:01
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	18:53 (4) 19:40 (3)	05:44 21:03
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	18:54 (4) 19:42 (3)	05:42 21:04
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	18:54 (4) 19:41 (3)	05:40 21:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	18:55 (4) 19:40 (3)	05:38 21:08
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	18:56 (4) 19:39 (3)	05:36 21:10
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	18:56 (4) 19:37 (3)	05:34 21:11
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	18:58 (4) 19:34 (3)	05:33 21:13
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	19:00 (4) 19:19 (4)	05:31 21:15
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:02 (4) 19:15 (4)	05:29 21:17
14	08:37 16:33	07:49 17:32	16:58 (5) 17:02 (5)	06:45 18:27	05:27 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	16:57 (5) 17:05 (5)	06:43 18:28	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	16:55 (5) 17:07 (5)	06:40 18:30	05:24 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	16:55 (5) 17:09 (5)	06:38 18:32	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	16:53 (5) 17:11 (5)	06:35 18:34	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	16:53 (5) 17:13 (5)	06:33 18:36	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	16:53 (5) 17:16 (5)	06:31 18:38	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	16:53 (5) 17:16 (5)	06:28 18:40	05:16 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	16:52 (5) 17:15 (5)	06:26 18:41	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	16:53 (5) 17:15 (5)	06:23 18:43	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	16:53 (5) 17:15 (5)	06:21 18:45	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	16:53 (5) 17:13 (5)	06:18 18:47	05:11 21:36	04:55 22:02
26	08:23 16:54	07:23 17:56	16:55 (5) 17:12 (5)	06:16 18:49	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	16:56 (5) 17:11 (5)	06:13 18:51	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	16:58 (5) 17:08 (5)	06:11 18:53	05:07 21:40	04:57 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	05:54 (4) 19:31 (3)	05:04 21:44	20:40 (2) 21:07 (2)
Potential sun hours	250	273	367	420	494	510
Total, worst case		251	230	503	290	750
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.62	0.62
Total reduction		0.16	0.18	0.24	0.24	0.20
Total, real		39	42	120	69	150

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: O - H15

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59	20:47 (2)	05:39	06:33	18:57 (4)	07:26		07:24	08:19		
	22:00	25	21:12 (2)	21:25	20:18	32	19:33 (3)	19:05	16:54	16:10	
2	04:59	20:48 (2)	05:40	06:35	18:55 (4)	07:28		07:26	08:21		
	22:00	25	21:13 (2)	21:23	20:16	40	19:36 (3)	19:02	16:52	16:09	
3	05:00	20:47 (2)	05:42	06:36	18:53 (4)	07:30		07:28	08:22		
	21:59	26	21:13 (2)	21:21	20:13	43	19:36 (3)	19:00	16:50	16:08	
4	05:01	20:47 (2)	05:44	06:38	18:52 (4)	07:31		07:30	08:24		
	21:59	26	21:13 (2)	21:19	20:11	45	19:37 (3)	18:57	16:48	16:08	
5	05:02	20:48 (2)	05:45	06:40	18:51 (4)	07:33		07:32	08:25		
	21:58	26	21:14 (2)	21:17	20:09	47	19:38 (3)	18:55	16:46	16:07	
6	05:03	20:48 (2)	05:47	06:42	18:50 (4)	07:35		07:34	08:26		
	21:57	26	21:14 (2)	21:15	20:06	48	19:38 (3)	18:52	16:44	16:07	
7	05:04	20:48 (2)	05:49	06:43	18:49 (4)	07:37		07:36	08:28		
	21:57	26	21:14 (2)	21:13	20:04	46	19:35 (3)	18:50	16:43	16:06	
8	05:05	20:48 (2)	05:51	06:45	18:48 (4)	07:39		07:38	08:29		
	21:56	27	21:15 (2)	21:11	20:01	45	19:33 (3)	18:48	16:41	16:06	
9	05:06	20:48 (2)	05:52	06:47	18:48 (4)	07:41		07:40	08:30		
	21:55	27	21:15 (2)	21:09	19:59	43	19:31 (3)	18:45	16:39	16:05	
10	05:07	20:48 (2)	05:54	06:49	18:47 (4)	07:42		07:42	08:31		
	21:55	27	21:15 (2)	21:07	19:56	41	19:28 (3)	18:43	16:37	16:05	
11	05:08	20:48 (2)	05:56	06:50	18:47 (4)	07:44		07:44	08:33		
	21:54	27	21:15 (2)	21:05	19:54	39	19:26 (3)	18:40	16:35	16:05	
12	05:09	20:48 (2)	05:57	06:52	18:47 (4)	07:46		07:45	08:34		
	21:53	27	21:15 (2)	21:03	19:51	37	19:24 (3)	18:38	16:34	16:05	
13	05:10	20:48 (2)	05:59	06:54	18:47 (4)	07:48		17:34 (5)	07:47	08:35	
	21:52	27	21:15 (2)	21:01	19:49	35	19:22 (4)	18:36	16:32	16:05	
14	05:12	20:48 (2)	06:01	06:56	18:46 (4)	07:50	4	17:30 (5)	07:49	08:36	
	21:51	27	21:15 (2)	20:59	19:47	32	19:18 (4)	18:33	16:31	16:05	
15	05:13	20:48 (2)	06:03	06:58	18:47 (4)	07:52		17:28 (5)	07:51	08:37	
	21:50	27	21:15 (2)	20:57	19:44	29	19:16 (4)	18:31	16:29	16:05	
16	05:14	20:49 (2)	06:04	06:59	18:48 (4)	07:54		17:26 (5)	07:53	08:38	
	21:49	25	21:14 (2)	20:55	19:42	26	19:14 (4)	18:29	16:27	16:05	
17	05:16	20:50 (2)	06:06	07:01	18:48 (4)	07:55		17:25 (5)	07:55	08:38	
	21:47	24	21:14 (2)	20:53	19:39	23	19:11 (4)	18:26	16:26	16:05	
18	05:17	20:50 (2)	06:08	07:03	18:49 (4)	07:57	21	17:46 (5)	16:26	16:05	
	21:46	22	21:12 (2)	20:50	19:37	19	19:08 (4)	18:24	16:24	16:05	
19	05:18	20:50 (2)	06:10	07:05	18:50 (4)	07:59		17:24 (5)	07:59	08:40	
	21:45	21	21:11 (2)	20:48	19:34	16	19:06 (4)	18:22	16:23	16:05	
20	05:20	20:51 (2)	06:12	07:06	18:52 (4)	08:01		17:23 (5)	08:00	08:41	
	21:44	19	21:10 (2)	20:46	19:32	12	19:04 (4)	18:20	16:22	16:06	
21	05:21	20:51 (2)	06:13	07:08	18:54 (4)	08:03		17:23 (5)	08:02	08:41	
	21:42	18	21:09 (2)	20:44	19:29	7	19:01 (4)	18:17	16:20	16:06	
22	05:23	20:51 (2)	06:15	07:10	18:53 (4)	08:05		17:23 (5)	08:04	08:42	
	21:41	16	21:07 (2)	20:42	19:27			18:15	16:19	16:06	
23	05:24	20:52 (2)	06:17	07:12	18:51 (4)	08:07		17:23 (5)	08:06	08:42	
	21:39	15	21:07 (2)	20:39	19:24			18:13	16:18	16:07	
24	05:26	20:53 (2)	06:19	07:13	18:50 (4)	08:09		17:24 (5)	08:08	08:43	
	21:38	12	21:05 (2)	20:37	19:22			18:11	16:17	16:08	
25	05:27	20:54 (2)	06:20	07:15	18:49 (4)	07:11		16:24 (5)	08:09	08:43	
	21:36	10	21:04 (2)	20:35	19:19			17:09	16:16	16:08	
26	05:29	20:55 (2)	06:22	07:17	18:47 (4)	07:13		16:25 (5)	08:11	08:43	
	21:35	7	21:02 (2)	20:32	19:17			17:06	16:14	16:09	
27	05:30	20:56 (2)	06:24	07:19	18:46 (4)	07:14		16:26 (5)	08:13	08:44	
	21:33	4	21:00 (2)	20:30	19:14			17:04	16:13	16:10	
28	05:32		06:26	07:21	18:45 (4)	07:16		16:28 (5)	08:14	08:44	
	21:32		20:28	19:12	18:44 (4)	07:17		16:31 (5)	16:12	16:11	
29	05:34		06:27	19:08 (4)	07:22			16:31 (5)	16:12	16:11	
	21:30		20:25	3	19:11 (4)	19:09		17:00	16:12	16:11	
30	05:35		06:29	19:02 (4)	07:24			17:00	16:12	16:11	
	21:28		20:23	15	19:17 (4)	19:07		16:58	16:11	16:12	
31	05:37		06:31	18:59 (4)		07:22		17:02	16:12	16:11	
	21:26		20:21	19	19:18 (4)			16:56	16:12	16:13	
Potential sun hours	512		460		382			328	259	233	
Total, worst case		589		37	705		257				
Sun reduction		0.32		0.34	0.32		0.29				
Oper. time red.		1.00		1.00	1.00		1.00				
Wind dir. red.		0.62		0.68	0.67		0.67				
Total reduction		0.20		0.23	0.22		0.20				
Total, real		119		9	152		50				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: P - H16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:48 (4) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:48 (4) 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:49 (4) 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:50 (4) 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	18:50 (4) 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	18:51 (4) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	18:52 (4) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	18:54 (4) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	18:57 (4) 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	19:29 (3) 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	16:55 (5) 18:23	06:35 20:20	05:31 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	16:53 (5) 18:25	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	16:52 (5) 18:27	06:30 20:24	05:27 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	16:51 (5) 18:28	06:28 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	16:50 (5) 18:30	06:25 20:28	05:24 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	16:50 (5) 18:32	06:23 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	16:49 (5) 18:34	06:21 20:31	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	16:49 (5) 18:36	18:02 (4) 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	16:49 (5) 18:38	17:59 (4) 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	16:50 (5) 18:40	17:57 (4) 20:37	05:16 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	16:50 (5) 18:41	17:55 (4) 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	16:51 (5) 18:43	17:54 (4) 20:41	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	16:52 (5) 18:45	17:52 (4) 20:42	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	16:53 (5) 18:47	17:51 (4) 20:44	05:11 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	16:55 (5) 18:49	17:50 (4) 20:46	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	17:05 (5) 18:51	18:22 (4) 20:48	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	06:13 18:53	18:24 (4) 20:50	05:07 21:40	04:57 22:01
29	08:18 17:00		07:08 19:54	18:49 (4) 20:52	05:06 21:41	04:57 22:01
30	08:17 17:02		07:06 19:56	18:49 (4) 20:53	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	18:48 (4) 20:53	05:04 21:44	20:35 (2) 21:01 (2)
Potential sun hours	250	273	367	420	494	510
Total, worst case		241	361	368	397	615
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.68	0.67	0.63	0.63
Total reduction		0.16	0.18	0.24	0.24	0.20
Total, real		37	66	88	95	124

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
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abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: P - H16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59	20:44 (2)	05:39	06:33		07:26		07:24	08:19		
	22:00	21	21:05 (2)	21:25	20:18	19:05		16:54	16:10		
2	04:59	20:44 (2)	05:40	06:35		07:28		07:26	08:21		
	22:00	21	21:05 (2)	21:23	20:16	19:02		16:52	16:09		
3	05:00	20:44 (2)	05:42	06:36		18:54 (4)	07:30	07:28	08:22		
	21:59	21	21:05 (2)	21:21	20:13	19:26 (3)	19:00	16:50	16:08		
4	05:01	20:44 (2)	05:44	06:38		18:51 (4)	07:31	07:30	08:24		
	21:59	22	21:06 (2)	21:19	20:11	19:29 (3)	18:57	16:48	16:08		
5	05:02	20:44 (2)	05:45	06:40		18:49 (4)	07:33	07:32	08:25		
	21:58	22	21:06 (2)	21:17	20:09	19:31 (3)	18:55	16:46	16:07		
6	05:03	20:44 (2)	05:47	06:42		18:47 (4)	07:35	07:34	08:26		
	21:58	23	21:07 (2)	21:15	20:06	19:32 (3)	18:52	16:44	16:07		
7	05:04	20:44 (2)	05:49	06:43		18:45 (4)	07:37	07:36	08:28		
	21:57	24	21:08 (2)	21:13	20:04	19:32 (3)	18:50	16:43	16:06		
8	05:05	20:44 (2)	05:51	06:45		18:44 (4)	07:39	07:38	08:29		
	21:56	24	21:08 (2)	21:11	20:01	19:33 (3)	18:48	16:41	16:06		
9	05:06	20:44 (2)	05:52	06:47		18:43 (4)	07:41	07:40	08:30		
	21:55	24	21:08 (2)	21:09	19:59	19:31 (3)	18:45	16:39	16:05		
10	05:07	20:44 (2)	05:54	06:49		18:41 (4)	07:42	07:42	08:31		
	21:55	25	21:09 (2)	21:07	19:56	19:28 (3)	18:43	16:37	16:05		
11	05:08	20:44 (2)	05:56	06:50		18:41 (4)	07:44	07:44	08:33		
	21:54	25	21:09 (2)	21:05	19:54	19:26 (3)	18:40	16:35	16:05		
12	05:09	20:43 (2)	05:57	06:52		18:40 (4)	07:46	07:45	08:34		
	21:53	26	21:09 (2)	21:03	19:51	19:24 (3)	18:38	16:34	16:05		
13	05:10	20:43 (2)	05:59	06:54		18:40 (4)	07:48	07:47	08:35		
	21:52	26	21:09 (2)	21:01	19:49	19:22 (3)	18:36	16:32	16:05		
14	05:12	20:43 (2)	06:01	06:56		18:39 (4)	07:50	07:49	08:36		
	21:51	27	21:10 (2)	20:59	19:47	19:18 (3)	18:33	16:31	16:05		
15	05:13	20:43 (2)	06:03	06:58		18:39 (4)	07:52	17:31 (5)	07:51	08:37	
	21:50	27	21:10 (2)	20:57	19:44	19:16 (3)	18:31	17:34 (5)	16:29	16:05	
16	05:14	20:43 (2)	06:04	06:59		18:39 (4)	07:54	17:27 (5)	07:53	08:38	
	21:49	27	21:10 (2)	20:55	19:42	19:14 (4)	18:29	17:38 (5)	16:27	16:05	
17	05:16	20:44 (2)	06:06	07:01		18:38 (4)	07:55	17:24 (5)	07:55	08:38	
	21:47	27	21:11 (2)	20:53	19:39	19:11 (4)	18:26	17:40 (5)	16:26	16:05	
18	05:17	20:43 (2)	06:08	07:03		18:39 (4)	07:57	17:23 (5)	07:57	08:39	
	21:46	27	21:10 (2)	20:50	19:37	19:08 (4)	18:24	17:41 (5)	16:24	16:05	
19	05:18	20:43 (2)	06:10	07:05		18:39 (4)	07:59	17:22 (5)	07:59	08:40	
	21:45	27	21:10 (2)	20:48	19:34	19:06 (4)	18:22	17:42 (5)	16:23	16:05	
20	05:20	20:44 (2)	06:12	07:06		18:40 (4)	08:01	17:21 (5)	08:00	08:41	
	21:44	26	21:10 (2)	20:46	19:32	19:04 (4)	18:20	17:42 (5)	16:22	16:06	
21	05:21	20:44 (2)	06:13	07:08		18:40 (4)	08:03	17:20 (5)	08:02	08:41	
	21:42	25	21:09 (2)	20:44	19:29	19:01 (4)	18:17	17:42 (5)	16:20	16:06	
22	05:23	20:44 (2)	06:15	07:10		18:41 (4)	08:05	17:20 (5)	08:04	08:42	
	21:41	23	21:07 (2)	20:42	19:27	18:58 (4)	18:15	17:42 (5)	16:19	16:06	
23	05:24	20:45 (2)	06:17	07:12		18:43 (4)	08:07	17:19 (5)	08:06	08:42	
	21:39	22	21:07 (2)	20:39	19:24	18:56 (4)	18:13	17:42 (5)	16:18	16:07	
24	05:26	20:45 (2)	06:19	07:13		18:45 (4)	08:09	17:19 (5)	08:08	08:43	
	21:38	20	21:05 (2)	20:37	19:22	18:54 (4)	18:11	17:41 (5)	16:17	16:08	
25	05:27	20:46 (2)	06:20	07:15		18:48 (4)	07:11	16:20 (5)	08:09	08:43	
	21:36	18	21:04 (2)	20:35	19:19	18:51 (4)	17:09	16:38 (5)	16:16	16:08	
26	05:29	20:46 (2)	06:22	07:17			07:13	16:20 (5)	08:11	08:43	
	21:35	16	21:02 (2)	20:32	19:17		17:06	16:36 (5)	16:14	16:09	
27	05:30	20:46 (2)	06:24	07:19			07:14	16:21 (5)	08:13	08:44	
	21:33	14	21:00 (2)	20:30	19:14		17:04	16:34 (5)	16:13	16:10	
28	05:32	20:47 (2)	06:26	07:21			07:16	16:21 (5)	08:14	08:44	
	21:32	12	20:59 (2)	20:28	19:12		17:02	16:31 (5)	16:12	16:11	
29	05:34	20:48 (2)	06:27	07:22			07:18	16:23 (5)	08:16	08:44	
	21:30	9	20:57 (2)	20:25	19:09		17:00	16:29 (5)	16:12	16:11	
30	05:35	20:50 (2)	06:29	07:24			07:20	16:25 (5)	08:18	08:44	
	21:28	6	20:56 (2)	20:23	19:07		16:58	16:27 (5)	16:11	16:12	
31	05:37	20:52 (2)	06:31				07:22			08:44	
	21:26	3	20:55 (2)	20:21			16:56			16:13	
Potential sun hours	512		460	382		328		259	233		
Total, worst case	660			742		243					
Sun reduction	0.32			0.32		0.29					
Oper. time red.	1.00			1.00		1.00					
Wind dir. red.	0.63			0.67		0.67					
Total reduction	0.20			0.22		0.20					
Total, real	134			160		47					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: Q - H17

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	08:14	16:06 (5)	07:16	16:45 (4)	07:01	05:52	19:44 (2)	05:03		
	16:15	17:06	16:23 (5)	18:02	17:14 (4)	20:00	20:55	27	20:11 (2)	21:45	
2	08:44	08:12	16:07 (5)	07:14	16:46 (4)	06:59	05:50		19:45 (2)	05:02	
	16:16	17:08	16:22 (5)	18:04	17:12 (4)	20:02	20:57	25	20:10 (2)	21:46	
3	08:44	08:10	16:09 (5)	07:12	16:48 (4)	06:56	05:48		19:45 (2)	05:01	
	16:17	17:10	16:21 (5)	18:06	17:10 (4)	20:04	20:59	24	20:09 (2)	21:48	
4	08:43	08:08	16:11 (5)	07:09	16:51 (4)	06:54	05:46		19:46 (2)	05:00	
	16:18	17:12	16:18 (5)	18:07	17:08 (4)	20:06	21:01	22	20:08 (2)	21:49	
5	08:43	08:07		07:07	16:54 (4)	06:51	05:44		19:47 (2)	04:59	
	16:19	17:14		18:09	17:04 (4)	20:07	21:03	19	20:06 (2)	21:50	
6	08:42	08:05		07:04	17:43 (3)	06:49	05:42		19:49 (2)	04:59	
	16:21	17:16		18:11	2	17:45 (3)	20:09	15	20:04 (2)	21:51	
7	08:42	08:03		07:02	17:41 (3)	06:47	05:40		19:52 (2)	04:58	
	16:22	17:18		18:13	5	17:46 (3)	20:11	11	20:03 (2)	21:52	
8	08:42	08:01		07:00	17:40 (3)	06:44	05:38			04:57	
	16:24	17:20		18:15	8	17:48 (3)	20:13		21:08	21:53	
9	08:41	07:59		06:57	17:39 (3)	06:42	05:36			04:57	
	16:25	17:22		18:17	11	17:50 (3)	20:15		21:10	21:54	
10	08:40	07:57	16:53 (4)	06:55	17:39 (3)	06:39	05:34			04:56	
	16:26	17:24	1	16:54 (4)	13	17:52 (3)	20:17		21:11	21:55	
11	08:40	07:55	16:51 (4)	06:52	17:39 (3)	06:37	05:33			04:56	
	16:28	17:26	5	16:56 (4)	16	17:55 (3)	20:19		21:13	21:55	
12	08:39	07:53	16:48 (4)	06:50	17:38 (3)	06:35	05:31			04:55	
	16:30	17:28	10	16:58 (4)	18	17:56 (3)	20:20		21:15	21:56	
13	08:38	07:51	16:47 (4)	06:48	17:38 (3)	06:32	05:29			04:55	
	16:31	17:30	13	17:00 (4)	20	17:58 (3)	20:22		21:17	21:57	
14	08:37	07:49	16:46 (4)	06:45	17:38 (3)	06:30	05:27			04:55	
	16:33	17:32	16	17:02 (4)	21	17:59 (3)	20:24		21:18	21:58	
15	08:36	07:47	16:45 (4)	06:43	17:39 (3)	06:28	05:26			04:54	
	16:34	17:34	20	17:05 (4)	20	17:59 (3)	20:26	3	19:58 (2)	21:20	
16	08:35	07:45	16:45 (4)	06:40	17:39 (3)	06:25	05:24		19:52 (2)	05:24	
	16:36	17:36	22	17:07 (4)	18	17:57 (3)	20:28	8	20:00 (2)	21:22	
17	08:34	07:43	16:44 (4)	06:38	17:41 (3)	06:23	05:22		19:49 (2)	05:22	
	16:38	17:38	25	17:09 (4)	14	17:55 (3)	20:30	12	20:01 (2)	21:23	
18	08:33	16:03 (5)	07:41	16:43 (4)	17:43 (3)	06:21	05:21		19:48 (2)	05:21	
	16:40	2	16:05 (5)	17:40	9	17:52 (3)	20:31	15	20:03 (2)	21:25	
19	08:32	16:03 (5)	07:39	16:43 (4)		06:18	05:19		19:47 (2)	05:19	
	16:41	4	16:07 (5)	17:42		20:33	21:27	18	20:05 (2)	21:27	
20	08:31	16:02 (5)	07:36	16:43 (4)		06:16	05:18		19:46 (2)	05:18	
	16:43	6	16:08 (5)	17:44		20:35	21:28	21	20:07 (2)	21:28	
21	08:30	16:02 (5)	07:34	16:43 (4)		06:14	05:16		19:44 (2)	05:16	
	16:45	9	16:11 (5)	17:46		20:37	21:30	24	20:08 (2)	21:30	
22	08:29	16:02 (5)	07:32	16:42 (4)		06:12	05:15		19:44 (2)	05:15	
	16:47	10	16:12 (5)	17:48		20:39	21:31	26	20:10 (2)	21:31	
23	08:27	16:02 (5)	07:30	16:42 (4)		06:09	05:13		19:43 (2)	05:13	
	16:49	13	16:15 (5)	17:50		20:41	21:33	29	20:12 (2)	21:33	
24	08:26	16:02 (5)	07:28	16:43 (4)		06:07	05:12		19:43 (2)	05:12	
	16:50	15	16:17 (5)	17:52		20:42	21:34	31	20:14 (2)	21:34	
25	08:24	16:02 (5)	07:25	16:42 (4)		06:05	05:11		19:43 (2)	05:11	
	16:52	17	16:19 (5)	17:54		20:44	21:36	31	20:14 (2)	21:36	
26	08:23	16:02 (5)	07:23	16:43 (4)		06:03	05:09		19:43 (2)	05:09	
	16:54	19	16:21 (5)	17:56		20:46	21:37	31	20:14 (2)	21:37	
27	08:22	16:02 (5)	07:21	16:44 (4)		06:01	05:08		19:43 (2)	05:08	
	16:56	21	16:23 (5)	17:58		20:48	21:39	31	20:14 (2)	21:39	
28	08:20	16:03 (5)	07:18	16:44 (4)		05:58	05:07		19:43 (2)	05:07	
	16:58	21	16:24 (5)	18:00		20:50	21:40	30	20:13 (2)	21:40	
29	08:18	16:03 (5)		07:08		05:56	05:06		19:43 (2)	05:06	
	17:00	21	16:24 (5)			20:52	21:41	30	20:13 (2)	21:41	
30	08:17	16:04 (5)		07:06		05:54	05:05		19:43 (2)	05:05	
	17:02	20	16:24 (5)			20:53	21:43	29	20:12 (2)	21:43	
31	08:15	16:04 (5)		07:04			05:04				
	17:04	19	16:23 (5)				21:44				
Potential sun hours	250		273		367		420		494		510
Total, worst case		197		527		279		369		143	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.67		0.67		0.65		0.65	
Total reduction		0.16		0.16		0.18		0.23		0.25	
Total, real		32		82		51		84		35	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyarne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: Q - H17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:17 (3) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:17 (3) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:17 (3) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:17 (3) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	20:04 (2) 20:09 (2)	06:40 20:09	07:33 18:55	08:25 16:07
6	05:03 21:58	05:47 21:15	20:01 (2) 20:13 (2)	06:42 20:06	07:35 18:52	08:26 16:07
7	05:04 21:57	05:49 21:13	19:59 (2) 20:15 (2)	06:43 20:04	07:37 18:50	08:28 16:06
8	05:05 21:56	05:50 21:12	19:53 (2) 20:16 (2)	06:45 20:01	07:39 18:48	08:29 16:06
9	05:06 21:55	05:52 21:10	19:55 (2) 20:18 (2)	06:47 19:59	07:41 18:45	08:30 16:05
10	05:07 21:55	05:54 21:07	19:53 (2) 20:18 (2)	06:49 19:56	07:42 18:43	08:31 16:05
11	05:08 21:54	05:56 21:05	19:53 (2) 20:19 (2)	06:50 19:54	07:44 18:40	08:33 16:05
12	05:09 21:53	05:57 21:03	19:52 (2) 20:20 (2)	06:52 19:51	07:46 18:38	08:34 16:05
13	05:10 21:52	05:59 21:01	19:51 (2) 20:20 (2)	06:54 19:49	07:48 18:36	08:35 16:05
14	05:12 21:51	06:01 20:59	19:51 (2) 20:20 (2)	06:56 19:47	07:50 18:33	08:36 16:04
15	05:13 21:50	06:03 20:57	19:50 (2) 20:21 (2)	06:58 19:44	07:52 18:31	08:37 16:05
16	05:14 21:49	06:04 20:55	19:49 (2) 20:20 (2)	06:59 19:42	07:54 18:29	08:38 16:05
17	05:16 21:47	06:06 20:53	19:49 (2) 20:20 (2)	07:01 19:39	07:55 18:26	08:38 16:05
18	05:17 21:46	06:08 20:51	19:49 (2) 20:21 (2)	07:03 19:37	07:57 18:24	08:39 16:05
19	05:18 21:45	06:10 20:48	19:49 (2) 20:19 (2)	07:05 19:34	07:59 18:22	08:40 16:05
20	05:20 21:44	06:12 20:46	19:49 (2) 20:17 (2)	07:06 19:32	08:01 18:20	08:41 16:06
21	05:21 21:42	06:13 20:44	19:49 (2) 20:15 (2)	07:08 19:29	08:03 18:17	08:41 16:06
22	05:23 21:41	06:15 20:42	19:49 (2) 20:12 (2)	07:10 19:27	08:05 18:15	08:42 16:06
23	05:24 21:39	06:17 20:39	19:50 (2) 20:10 (2)	07:12 19:24	08:07 18:13	08:42 16:07
24	05:26 21:38	06:19 20:37	19:51 (2) 20:09 (2)	07:13 19:22	08:09 18:11	08:43 16:08
25	05:27 21:36	06:20 20:35	19:51 (2) 20:06 (2)	07:15 19:19	08:09 18:11	08:43 16:08
26	05:29 21:35	06:22 20:32	19:52 (2) 20:04 (2)	07:17 19:17	08:13 18:36 (3)	08:43 16:09
27	05:30 21:33	06:24 20:30	19:54 (2) 20:02 (2)	07:19 19:14	08:15 18:38 (3)	08:44 16:10
28	05:32 21:32	06:26 20:28	19:56 (2) 19:59 (2)	07:21 19:12	08:16 18:39 (3)	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 18:40 (3)	08:16 16:29 (4)	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 18:38 (3)	08:18 16:58	08:44 16:12
31	05:37 21:26	06:31 20:21	07:25 16:56	07:21 16:25 (4)	08:19 16:25 (4)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		521	95	665	250	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.18	
Total, real		115	21	130	44	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: R - H18

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44		08:14	16:25 (4)	07:16	17:32 (3)	07:01	05:52		19:35 (2)	05:03
	16:15		17:06	10 16:35 (4)	18:02	2 17:34 (3)	20:00	20:55	25	20:00 (2)	21:45
2	08:44		08:12	16:23 (4)	07:14	17:29 (3)	06:59	05:50		19:36 (2)	05:02
	16:16		17:08	14 16:37 (4)	18:04	7 17:36 (3)	20:02	20:57	22	19:58 (2)	21:46
3	08:44		08:10	16:22 (4)	07:12	17:29 (3)	06:56	05:48		19:37 (2)	05:01
	16:17		17:10	17 16:39 (4)	18:06	9 17:38 (3)	20:04	20:59	19	19:56 (2)	21:48
4	08:43		08:08	16:21 (4)	07:09	17:28 (3)	06:54	05:46		19:39 (2)	05:00
	16:18		17:12	20 16:41 (4)	18:07	13 17:41 (3)	20:06	21:01	15	19:54 (2)	21:49
5	08:43		08:07	16:20 (4)	07:07	17:27 (3)	06:51	05:44		19:42 (2)	04:59
	16:19		17:14	23 16:43 (4)	18:09	15 17:42 (3)	20:07	21:03	9	19:51 (2)	21:50
6	08:43		08:05	16:20 (4)	07:04	17:27 (3)	06:49	05:42		04:59	
	16:21		17:16	25 16:45 (4)	18:11	18 17:45 (3)	20:09	21:04		21:51	
7	08:42		08:03	16:19 (4)	07:02	17:26 (3)	06:47	05:40		04:58	
	16:22	1	15:45 (5)	17:18	28 16:47 (4)	18:13	20 17:46 (3)	20:11		21:52	
8	08:42		08:01	16:19 (4)	07:00	17:26 (3)	06:44	05:38		04:57	
	16:24	3	15:46 (5)	17:20	31 16:50 (4)	18:15	22 17:48 (3)	20:13		21:53	
9	08:41		07:59	16:19 (4)	06:57	17:26 (3)	06:42	05:36		04:57	
	16:25	5	15:49 (5)	17:22	33 16:52 (4)	18:17	23 17:49 (3)	20:15		21:54	
10	08:40		07:57	16:18 (4)	06:55	17:27 (3)	06:39	05:34		04:56	
	16:26	6	15:50 (5)	17:24	36 16:54 (4)	18:19	21 17:48 (3)	20:17		21:55	
11	08:40		07:55	16:18 (4)	06:52	17:28 (3)	06:37	05:33		04:56	
	16:28	8	15:52 (5)	17:26	38 16:56 (4)	18:21	19 17:47 (3)	20:19	5	19:51 (2)	21:13
12	08:39		07:53	16:17 (4)	06:50	17:28 (3)	06:35	05:31		04:55	
	16:30	10	15:54 (5)	17:28	38 16:55 (4)	18:23	17 17:45 (3)	20:20	10	19:53 (2)	21:15
13	08:38		07:51	16:17 (4)	06:48	17:30 (3)	06:32	05:29		04:55	
	16:31	11	15:55 (5)	17:30	39 16:56 (4)	18:25	14 17:44 (3)	20:22	15	19:54 (2)	21:17
14	08:37		07:49	16:18 (4)	06:45	17:33 (3)	06:30	05:27		04:55	
	16:33	13	15:57 (5)	17:32	38 16:56 (4)	18:27	7 17:40 (3)	20:24	18	19:56 (2)	21:18
15	08:36		07:47	16:18 (4)	06:43	06:28		05:26		04:54	
	16:34	15	15:59 (5)	17:34	38 16:56 (4)	18:28	20:26	21	19:58 (2)	21:20	21:58
16	08:35		07:45	16:19 (4)	06:40	06:25		05:24		04:54	
	16:36	17	16:00 (5)	17:36	37 16:56 (4)	18:30	20:28	24	20:00 (2)	21:22	21:59
17	08:34		07:43	16:19 (4)	06:38	06:23		05:22		04:54	
	16:38	19	16:03 (5)	17:38	36 16:55 (4)	18:32	20:30	27	20:01 (2)	21:23	21:59
18	08:33		07:41	16:19 (4)	06:35	06:21		05:21		04:54	
	16:40	21	16:05 (5)	17:40	35 16:54 (4)	18:34	20:31	30	20:03 (2)	21:25	22:00
19	08:32		07:39	16:20 (4)	06:33	06:18		05:19		04:54	
	16:41	22	16:07 (5)	17:42	34 16:54 (4)	18:36	20:33	32	20:05 (2)	21:27	22:00
20	08:31		07:36	16:21 (4)	06:31	06:16		05:18		04:54	
	16:43	22	16:07 (5)	17:44	32 16:53 (4)	18:38	20:35	34	20:06 (2)	21:28	22:00
21	08:30		07:34	16:22 (4)	06:28	06:14		05:16		04:54	
	16:45	22	16:08 (5)	17:46	30 16:52 (4)	18:40	20:37	34	20:05 (2)	21:30	22:01
22	08:29		07:32	16:23 (4)	06:26	06:12		05:15		04:55	
	16:47	21	16:07 (5)	17:48	27 16:50 (4)	18:42	20:39	34	20:05 (2)	21:31	22:01
23	08:27		07:30	16:25 (4)	06:23	06:09		05:13		04:55	
	16:49	20	16:07 (5)	17:50	24 16:49 (4)	18:43	20:41	34	20:05 (2)	21:33	22:01
24	08:26		07:28	16:27 (4)	06:21	06:07		05:12		04:55	
	16:50	20	16:07 (5)	17:52	20 16:47 (4)	18:45	20:43	34	20:05 (2)	21:34	22:01
25	08:24		07:25	16:29 (4)	06:18	06:05		05:11		04:55	
	16:52	18	16:07 (5)	17:54	14 16:43 (4)	18:47	20:44	33	20:04 (2)	21:36	22:01
26	08:23		07:23	06:16		06:03		05:09		04:56	
	16:54	17	16:06 (5)	17:56		18:49	20:46	33	20:04 (2)	21:37	22:01
27	08:22		07:21	06:13		06:01		05:08		04:56	
	16:56	15	16:05 (5)	17:58		18:51	20:48	31	20:03 (2)	21:39	22:01
28	08:20		07:18	06:11		05:58		05:07		04:57	
	16:58	12	16:05 (5)	18:00		18:53	20:50	31	20:03 (2)	21:40	22:01
29	08:18			07:08		05:56		05:06		04:57	
	17:00	7	16:02 (5)		19:54	20:52	29	20:02 (2)	21:41	22:01	
30	08:17			07:06		05:54		05:05		04:58	
	17:02	2	16:30 (4)		19:56	20:54	27	20:01 (2)	21:43	22:00	
31	08:15			07:04				05:04			
	17:04	5	16:31 (4)		19:58			21:44			
Potential sun hours	250		273		367		420		494		510
Total, worst case		332		717		207		536		90	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.66		0.68		0.65		0.65	
Total reduction		0.16		0.15		0.18		0.23		0.25	
Total, real		53		109		38		123		22	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: R - H18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December				
1	04:59 22:00	05:39 21:25	06:33 20:18	19:45 (2) 19:50 (2)	07:26 19:05	18:08 (3) 18:24 (3)	07:24 16:54	15:48 (4) 16:23 (4)	08:19 16:10	15:26 (5) 15:34 (5)
2	04:59 22:00	05:40 21:23	06:35 20:16		07:28 19:02	18:06 (3) 18:25 (3)	07:26 16:52	15:48 (4) 16:21 (4)	08:21 16:09	15:26 (5) 15:33 (5)
3	05:00 21:59	05:42 21:21	06:36 20:13		07:30 19:00	18:05 (3) 18:26 (3)	07:28 16:50	15:49 (4) 16:19 (4)	08:22 16:08	15:27 (5) 15:32 (5)
4	05:01 21:59	05:44 21:19	06:38 20:11		07:31 18:57	18:04 (3) 18:26 (3)	07:30 16:48	15:49 (4) 16:17 (4)	08:24 16:08	15:29 (5) 15:32 (5)
5	05:02 21:58	05:45 21:17	06:40 20:09		07:33 18:55	18:03 (3) 18:26 (3)	07:32 16:46	15:50 (4) 16:15 (4)	08:25 16:07	15:29 (5) 15:30 (5)
6	05:03 21:58	05:47 21:15	06:42 20:06		07:35 18:52	18:03 (3) 18:24 (3)	07:34 16:44	15:50 (4) 16:12 (4)	08:26 16:07	
7	05:04 21:57	05:49 21:13	06:43 20:04		07:37 18:50	18:02 (3) 18:21 (3)	07:36 16:43	15:51 (4) 16:10 (4)	08:28 16:06	
8	05:05 21:56	05:50 21:12	19:50 (2) 20:02 (2)	06:45 20:01	07:39 18:48	18:02 (3) 18:18 (3)	07:38 16:41	15:52 (4) 16:08 (4)	08:29 16:06	
9	05:06 21:55	05:52 21:10	19:48 (2) 20:04 (2)	06:47 19:59	07:41 18:45	18:02 (3) 18:16 (3)	07:40 16:39	15:53 (4) 16:06 (4)	08:30 16:05	
10	05:07 21:55	05:54 21:07	19:45 (2) 20:05 (2)	06:49 19:56	07:42 18:43	18:02 (3) 18:14 (3)	07:42 16:37	15:56 (4) 16:05 (4)	08:31 16:05	
11	05:08 21:54	05:56 21:05	19:44 (2) 20:07 (2)	06:50 19:54	07:44 18:40	18:03 (3) 18:11 (3)	07:44 16:35	15:58 (4) 16:03 (4)	08:33 16:05	
12	05:09 21:53	05:57 21:03	19:43 (2) 20:08 (2)	06:52 19:51	07:46 18:38	18:04 (3) 18:09 (3)	07:45 16:34	16:00 (4) 16:01 (4)	08:34 16:05	
13	05:10 21:52	05:59 21:01	19:41 (2) 20:09 (2)	06:54 19:49	07:48 18:36	18:06 (3) 18:07 (3)	07:47 16:32	15:27 (5) 15:34 (5)	08:35 16:05	
14	05:12 21:51	06:01 20:59	19:40 (2) 20:10 (2)	06:56 19:47	07:50 18:33		07:49 16:31	15:25 (5) 15:37 (5)	08:36 16:04	
15	05:13 21:50	06:03 20:57	19:40 (2) 20:10 (2)	06:58 19:44	07:52 18:31		07:51 16:29	15:23 (5) 15:38 (5)	08:37 16:05	
16	05:14 21:49	06:04 20:55	19:38 (2) 20:10 (2)	06:59 19:42	07:54 18:29	17:05 (4) 17:12 (4)	07:53 16:27	15:22 (5) 15:39 (5)	08:38 16:05	
17	05:16 21:47	06:06 20:53	19:38 (2) 20:11 (2)	07:01 19:39	07:55 18:26	17:00 (4) 17:17 (4)	07:55 16:26	15:22 (5) 15:40 (5)	08:38 16:05	
18	05:17 21:46	06:08 20:51	19:38 (2) 20:11 (2)	07:03 19:37	07:57 18:24	16:57 (4) 17:19 (4)	07:57 16:24	15:21 (5) 15:41 (5)	08:39 16:05	
19	05:18 21:45	06:10 20:48	19:37 (2) 20:10 (2)	07:05 19:34	07:59 18:22	16:55 (4) 17:21 (4)	07:59 16:23	15:21 (5) 15:41 (5)	08:40 16:05	
20	05:20 21:44	06:12 20:46	19:37 (2) 20:11 (2)	07:06 19:32	08:01 18:20	16:54 (4) 17:22 (4)	08:00 16:22	15:21 (5) 15:42 (5)	08:41 16:06	
21	05:21 21:42	06:13 20:44	19:37 (2) 20:11 (2)	07:08 19:29	08:03 18:17	16:52 (4) 17:23 (4)	08:02 16:20	15:21 (5) 15:43 (5)	08:41 16:06	
22	05:23 21:41	06:15 20:42	19:36 (2) 20:10 (2)	07:10 19:27	08:05 18:15	16:51 (4) 17:23 (4)	08:04 16:19	15:21 (5) 15:43 (5)	08:42 16:06	
23	05:24 21:39	06:17 20:39	19:36 (2) 20:10 (2)	07:12 19:24	08:07 18:13	16:50 (4) 17:24 (4)	08:06 16:18	15:21 (5) 15:43 (5)	08:42 16:07	
24	05:26 21:38	06:19 20:37	19:37 (2) 20:09 (2)	07:13 19:22	08:09 18:11	16:49 (4) 17:25 (4)	08:08 16:17	15:21 (5) 15:42 (5)	08:43 16:08	
25	05:27 21:36	06:20 20:35	19:36 (2) 20:06 (2)	07:15 19:19	07:11 17:09	15:48 (4) 16:25 (4)	08:09 16:16	15:22 (5) 15:41 (5)	08:43 16:08	
26	05:29 21:35	06:22 20:32	19:37 (2) 20:04 (2)	07:17 19:17	07:13 17:06	15:48 (4) 16:25 (4)	08:11 16:14	15:23 (5) 15:40 (5)	08:43 16:09	
27	05:30 21:33	06:24 20:30	19:38 (2) 20:02 (2)	07:19 19:14	07:15 17:04	15:47 (4) 16:25 (4)	08:13 16:13	15:23 (5) 15:38 (5)	08:44 16:10	
28	05:32 21:32	06:26 20:28	19:38 (2) 19:59 (2)	07:21 19:12	07:16 17:02	15:47 (4) 16:25 (4)	08:14 16:12	15:24 (5) 15:37 (5)	08:44 16:11	
29	05:34 21:30	06:27 20:25	19:39 (2) 19:57 (2)	07:22 19:09	07:18 17:00	15:47 (4) 16:25 (4)	08:16 16:12	15:24 (5) 15:36 (5)	08:44 16:11	
30	05:35 21:28	06:29 20:23	19:40 (2) 19:55 (2)	07:24 19:07	18:10 (3) 18:22 (3)	15:47 (4) 16:25 (4)	08:18 16:11	15:25 (5) 15:35 (5)	08:44 16:12	
31	05:37 21:27	06:31 20:21	19:42 (2) 19:52 (2)		07:22 16:56	15:47 (4) 16:25 (4)			08:44 16:13	
Potential sun hours	512	460	382	328	259	233				
Total, worst case		628	17	694	539	24				
Sun reduction		0.34	0.32	0.29	0.27	0.21				
Oper. time red.		1.00	1.00	1.00	1.00	1.00				
Wind dir. red.		0.65	0.67	0.66	0.66	0.66				
Total reduction		0.22	0.21	0.19	0.17	0.14				
Total, real		140	4	134	94	3				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: S - H19

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	16:09 (3) 16:25 (3)	07:16 18:02	20 16:41 (2)	07:01 17:01 (2)	05:52 20:00	05:03 20:55	04:59 21:45	05:39 22:00	06:33 21:25	07:26 19:05	07:24 16:54	16:17 (2) 16:23 (2)	08:19 16:10
2	08:44 16:16	08:12 17:08	16:10 (3) 16:24 (3)	07:14 18:04	16 16:42 (2)	06:59 20:02	05:50 20:57	05:02 21:46	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	16:09 16:09	08:21 16:09
3	08:44 16:17	08:10 17:10	16:12 (3) 16:23 (3)	07:12 18:06	9 16:46 (2)	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	16:08 16:08	08:22 16:08
4	08:43 16:18	08:08 17:12	16:14 (3) 16:20 (3)	07:09 18:07		06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	16:08 16:08	08:24 16:08
5	08:43 16:19	08:07 17:14	16:14 18:09	07:07 18:09		06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	16:07 16:07	08:25 16:07
6	08:43 16:21	08:05 17:16	16:05 18:11	17:04 18:11		06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	16:07 16:07	08:26 16:07
7	08:42 16:22	08:03 17:18	16:03 18:13	17:02 18:13		06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	15:44 (3) 15:51 (3)	08:28 16:06
8	08:42 16:24	08:01 17:20	16:01 18:15	17:00 18:15		06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	15:41 (3) 15:53 (3)	08:29 16:06
9	08:41 16:25	07:59 17:22	16:07 18:17	17:01 18:17		06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	15:41 (3) 15:55 (3)	16:06 16:05
10	08:40 16:26	07:57 17:24	16:06 (2) 16:54 (2)	16:55 18:19		06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	15:40 (3) 15:56 (3)	16:05 16:05
11	08:40 16:28	07:55 17:26	16:44 (2) 16:56 (2)	16:53 18:21		06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	13 17:18 (2)	16:35 16:35	16:05 16:05
12	08:39 16:30	07:53 17:28	16:42 (2) 16:59 (2)	18:21 18:23		06:35 20:20	05:31 21:15	04:59 21:56	05:07 21:53	06:40 21:03	07:33 19:51	18:43 18:38	19 17:34 (2)	16:34 16:34	16:05 16:05
13	08:38 16:31	07:51 17:30	16:40 (2) 17:00 (2)	16:48 18:25		06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17 17:13 (2)	16:35 16:32	16:04 16:04
14	08:37 16:33	07:49 17:32	16:39 (2) 17:02 (2)	16:45 18:27		06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	25 17:11 (2)	16:31 16:31	16:04 16:04
15	08:36 16:34	07:47 17:34	16:38 (2) 17:05 (2)	16:43 18:28		06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	27 17:10 (2)	16:29 16:29	16:04 16:04
16	08:35 16:36	07:45 17:36	16:38 (2) 17:07 (2)	16:40 18:30		06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	29 17:09 (2)	16:27 16:27	16:05 16:05
17	08:34 16:38	07:43 17:38	16:37 (2) 17:08 (2)	16:38 18:32		06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	30 17:08 (2)	16:26 16:26	16:05 16:05
18	08:33 16:40	07:41 17:40	16:36 (2) 17:07 (2)	16:35 18:34		06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	32 17:07 (2)	16:24 16:24	16:05 16:05
19	08:32 16:41	16:06 (3) 16:07 (3)	16:39 17:42	16:33 18:36		06:18 20:33	05:18 21:27	04:53 22:00	05:19 21:45	06:10 20:48	07:04 19:34	07:58 18:22	32 17:07 (2)	16:23 16:23	16:05 16:05
20	08:31 16:43	16:05 (3) 16:08 (3)	16:36 17:44	16:31 18:38		06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	32 17:06 (2)	16:20 16:22	16:05 16:06
21	08:30 16:45	16:05 (3) 16:11 (3)	16:34 17:46	16:28 18:40		06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	33 17:06 (2)	16:19 16:20	16:05 16:06
22	08:29 16:47	16:05 (3) 16:12 (3)	16:32 17:48	16:26 18:42		06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	33 17:06 (2)	16:18 16:19	16:05 16:06
23	08:27 16:49	16:05 (3) 16:15 (3)	16:30 17:50	16:23 18:43		06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	32 17:06 (2)	16:16 16:18	16:06 16:07
24	08:26 16:50	16:05 (3) 16:17 (3)	16:28 17:52	16:21 18:45		06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	32 17:06 (2)	16:17 16:17	16:07 16:08
25	08:24 16:52	16:05 (3) 16:19 (3)	16:25 17:54	16:18 18:47		06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 18:09	30 16:37 (2)	16:16 16:16	16:08 16:08
26	08:23 16:54	16:05 (3) 16:21 (3)	16:23 17:56	16:16 18:49		06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:16 19:17	07:09 18:17	29 16:37 (2)	16:11 16:14	16:09 16:09
27	08:22 16:56	16:05 (3) 16:23 (3)	16:21 17:58	16:13 18:51		06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 18:04	26 16:38 (2)	16:13 16:13	16:10 16:10
28	08:20 16:58	16:06 (3) 16:26 (3)	16:18 18:00	16:11 18:53		05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 18:02	22 16:09 (2)	16:12 16:12	16:10 16:10
29	08:19 17:00	16:06 (3) 16:26 (3)	16:17 17:54	16:08 18:44		05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 18:00	19 16:10 (2)	16:11 16:11	16:11 16:11
30	08:17 17:02	16:07 (3) 16:26 (3)	16:17 17:56	16:06 18:44		05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 18:58	16 16:11 (2)	16:12 16:12	16:12 16:12
31	08:15 17:04	16:07 (3) 16:25 (3)	16:17 18:03	16:04 18:58		05:04 21:44	05:04 21:44	04:58 22:00	05:37 21:27	06:31 20:21	07:24 19:07	07:22 18:56	12 16:13 (2)	16:13 16:13	16:13 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	218	233		
Total, worst case	164	544	45								545	218			
Sun reduction	0.24	0.23	0.27								0.29	0.27			
Oper. time red.	1.00	1.00	1.00								1.00	1.00			
Wind dir. red.	0.66	0.66	0.66								0.66	0.66			
Total reduction	0.16	0.15	0.18								0.19	0.18			
Total, real	26	84	8								106	38			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: T - H20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 18:00	05:52 20:00	05:03 20:55	04:59 21:45	05:39 22:00	06:33 21:25	07:26 20:18	07:24 19:05	15:52 (2) 16:21 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	15:52 (2) 16:20 (2)
3	08:44 16:17	08:10 17:10	16:33 (2) 18:06	07:12 20:04	06:56 20:59	05:48 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	15:53 (2) 16:19 (2)
4	08:43 16:18	08:08 17:12	16:29 (2) 18:07	07:09 20:06	06:54 20:06	05:46 21:01	05:00 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	15:54 (2) 16:17 (2)
5	08:43 16:19	08:07 17:14	16:27 (2) 18:09	07:07 20:07	06:51 20:07	05:44 21:03	04:59 21:50	05:45 21:58	06:40 21:17	07:33 18:55	07:32 16:46	15:55 (2) 16:14 (2)
6	08:43 16:21	08:05 17:16	16:25 (2) 18:11	07:04 20:09	06:49 21:04	05:42 21:51	04:58 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	15:57 (2) 16:12 (2)
7	08:42 16:22	08:03 17:18	16:24 (2) 18:13	07:02 20:11	06:47 21:06	05:40 21:52	04:58 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	15:59 (2) 16:10 (2)
8	08:42 16:24	08:01 17:20	16:23 (2) 18:15	07:00 20:13	06:44 21:08	05:38 21:53	04:57 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	16:04 (2) 16:07 (2)
9	08:41 16:25	07:59 17:22	16:23 (2) 18:17	06:57 20:15	06:42 21:10	05:36 21:54	04:57 21:55	05:06 21:10	06:47 19:59	07:41 18:45	07:40 16:39	16:03 16:05
10	08:40 16:26	07:57 17:24	16:22 (2) 18:19	06:55 20:17	06:39 21:11	05:34 21:55	04:56 21:55	05:07 21:08	06:49 19:56	07:42 18:43	07:42 16:37	16:04 16:05
11	08:40 16:28	07:55 17:26	16:22 (2) 18:21	06:53 20:19	06:37 21:13	05:33 21:55	04:56 21:54	05:08 21:05	06:50 19:54	07:44 18:40	07:44 16:35	15:35 (3) 15:42 (3)
12	08:39 16:30	07:53 17:28	16:21 (2) 18:23	06:50 20:20	06:35 21:15	05:31 21:56	04:55 21:53	05:09 21:03	06:52 19:51	07:46 18:38	07:45 16:34	15:32 (3) 15:44 (3)
13	08:38 16:31	07:51 17:30	16:20 (2) 18:25	06:48 20:22	06:32 21:17	05:29 21:57	04:55 21:52	05:10 21:01	06:54 19:49	07:48 18:36	07:47 16:32	15:31 (3) 15:45 (3)
14	08:37 16:33	15:54 (3) 17:32	16:20 (2) 18:27	06:45 20:24	06:30 21:18	05:27 21:58	04:55 21:51	05:12 20:59	06:01 19:47	06:56 18:33	06:56 16:31	15:30 (3) 15:47 (3)
15	08:36 16:34	15:57 (3) 17:34	16:22 (2) 18:28	06:43 20:26	06:28 21:20	05:25 21:58	04:54 21:50	05:13 20:57	06:03 19:44	06:58 18:31	07:52 16:29	15:29 (3) 15:47 (3)
16	08:35 16:36	15:53 (3) 17:36	16:20 (2) 18:30	06:40 20:28	06:25 21:22	05:24 21:59	04:54 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:04 (2) 17:12 (2)	15:28 (3) 15:48 (3)
17	08:34 16:38	15:50 (3) 17:43	16:21 (2) 18:38	06:38 20:23	06:21 21:23	05:17 21:59	04:56 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:00 (2) 17:15 (2)	15:27 (3) 15:49 (3)
18	08:33 16:40	15:54 (3) 17:41	16:20 (2) 18:34	06:35 20:31	06:21 21:25	05:14 22:00	04:54 21:46	06:08 20:51	07:03 19:37	07:57 18:24	16:58 (2) 17:17 (2)	15:26 (3) 15:49 (3)
19	08:32 16:41	15:54 (3) 17:42	16:21 (2) 18:36	06:33 20:33	06:18 21:27	05:18 22:00	04:54 21:45	06:10 20:48	07:05 19:34	07:59 18:22	16:56 (2) 17:19 (2)	15:25 (3) 15:49 (3)
20	08:31 16:43	15:54 (3) 17:44	16:22 (2) 18:38	06:31 20:35	06:16 21:28	05:18 22:00	04:54 21:44	06:12 20:46	07:06 19:32	08:01 18:20	16:54 (2) 17:20 (2)	15:24 (3) 15:48 (3)
21	08:30 16:45	15:54 (3) 17:46	16:23 (2) 18:40	06:28 20:37	06:14 21:30	05:16 22:01	04:54 21:42	06:13 20:44	07:08 19:29	08:03 18:17	16:53 (2) 17:21 (2)	15:23 (3) 15:46 (3)
22	08:29 16:47	15:54 (3) 17:48	16:23 (2) 18:42	06:26 20:39	06:12 21:31	05:15 22:01	04:55 21:41	06:15 20:42	07:10 19:27	08:05 18:15	16:52 (2) 17:21 (2)	15:22 (3) 15:45 (3)
23	08:27 16:49	15:55 (3) 17:50	16:25 (2) 18:43	06:23 20:41	06:09 21:33	05:13 22:01	04:55 21:39	06:17 20:39	07:12 19:24	08:07 18:13	16:51 (2) 17:22 (2)	15:21 (3) 15:44 (3)
24	08:26 16:50	15:55 (3) 17:52	16:27 (2) 18:45	06:21 20:43	06:07 21:34	05:12 22:01	04:55 21:38	06:19 20:37	07:13 19:22	08:09 18:11	16:51 (2) 17:22 (2)	15:20 (3) 15:43 (3)
25	08:25 16:52	15:56 (3) 17:54	16:29 (2) 18:47	06:18 20:44	06:05 21:36	05:11 22:01	04:55 21:36	06:20 20:35	07:15 19:19	08:09 18:09	15:50 (2) 16:22 (2)	15:19 (3) 15:42 (3)
26	08:23 16:54	15:56 (3) 17:56	16:42 (2) 18:47	06:16 20:46	06:03 21:37	05:09 22:01	04:56 21:36	06:22 20:32	07:17 19:17	08:11 18:06	15:50 (2) 16:22 (2)	15:18 (3) 15:41 (3)
27	08:22 16:56	15:57 (3) 17:58	16:13 18:49	06:13 20:46	06:00 21:37	05:08 22:01	04:56 21:35	06:24 20:32	07:19 19:17	08:13 18:06	15:50 (2) 16:22 (2)	15:17 (3) 15:40 (3)
28	08:20 16:58	15:58 (3) 18:00	16:11 18:53	06:11 20:50	05:58 21:40	05:07 22:01	04:57 21:33	06:26 20:30	07:21 19:14	08:14 18:04	15:50 (2) 16:22 (2)	15:16 (3) 15:39 (3)
29	08:19 17:00	15:59 (3) 18:01	16:15 (3) 18:54	06:13 20:52	06:06 21:41	05:06 22:01	04:57 21:30	06:27 20:25	07:22 19:09	08:16 18:00	15:50 (2) 16:21 (2)	15:15 (3) 15:38 (3)
30	08:17 17:02	16:01 (3) 18:03	16:16 (3) 18:56	06:14 20:54	06:05 21:43	05:05 22:00	04:58 21:28	06:29 20:23	07:24 19:07	08:18 18:00	15:50 (2) 16:21 (2)	15:14 (3) 15:37 (3)
31	08:15 17:04	16:03 (3) 18:05	16:17 (3) 18:58	06:15 20:55	06:06 21:44	05:06 22:01	04:58 21:27	06:30 20:21	07:25 19:06	08:19 18:01	15:50 (2) 16:20 (2)	15:13 (3) 15:36 (3)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	243	576								430	399	
Sun reduction	0.24	0.23								0.29	0.27	
Oper. time red.	1.00	1.00								1.00	1.00	
Wind dir. red.	0.66	0.65								0.65	0.66	
Total reduction	0.16	0.15								0.19	0.17	
Total, real	39	88								82	70	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: U - H21

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:49 (2)	08:19	
2	16:15	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:18 (2)	16:10	
3	08:44	08:12	16:30 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	16:52	16:17 (2)	08:21
4	16:16	17:08	16:36 (2)	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02	16:52	16:17 (2)	16:09
5	08:44	08:10	16:27 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	16:52	16:17 (2)	08:22
6	16:17	17:10	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:17 (2)	16:08
7	08:43	08:08	16:24 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	16:50	16:17 (2)	08:24
8	16:18	17:12	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:16 (2)	16:08
9	08:43	08:07	16:23 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	16:48	16:16 (2)	08:25
10	16:19	17:14	16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:14 (2)	16:07
11	08:43	08:05	16:22 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	16:46	16:14 (2)	08:26
12	16:21	17:16	16:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:12 (2)	16:07
13	08:42	08:03	16:21 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	16:44	16:12 (2)	08:28
14	16:22	17:18	16:46 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:10 (2)	16:06
15	08:42	08:01	16:20 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	16:43	16:10 (2)	08:29
16	16:24	17:20	16:47 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:08 (2)	16:06
17	08:41	07:59	16:20 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	16:40	16:02 (2)	08:30
18	16:25	17:22	16:48 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:06 (2)	16:05
19	08:40	07:57	16:19 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	16:39	16:06 (2)	08:31
20	16:26	17:24	16:48 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	16:05	16:05
21	08:40	07:55	16:19 (2)	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	16:37	16:05	08:33
22	16:28	17:26	16:49 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05	16:05
23	08:39	07:53	16:19 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	16:35	16:05	08:34
24	16:30	17:28	16:49 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	16:05
25	08:38	07:51	16:18 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	16:34	16:05	08:35
26	16:31	17:30	16:49 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04	16:04
27	08:37	07:49	16:18 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	16:32	16:04	08:36
28	16:33	17:32	16:49 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:04	16:04
29	08:36	07:47	16:19 (2)	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	16:31	16:04	08:37
30	16:34	17:34	16:49 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	16:04
31	08:35	07:45	16:19 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	16:29	16:04	08:38
32	16:36	17:36	16:49 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:03	16:05
33	08:34	07:43	16:20 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	16:27	16:03	08:38
34	16:38	17:38	16:49 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:03	16:05
35	08:33	07:41	16:19 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	16:26	16:03	08:39
36	16:40	17:40	16:47 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:03	16:05
37	08:32	07:39	16:20 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	16:25	16:03	08:40
38	16:41	17:42	16:47 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:24	16:03	16:05
39	08:31	07:36	16:22 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	16:24	16:03	08:41
40	16:43	17:44	16:46 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:23	16:03	16:06
41	08:30	07:34	16:23 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	16:23	16:03	08:41
42	16:45	17:46	16:45 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:22	16:03	16:06
43	08:29	07:32	16:24 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	16:22	16:03	08:42
44	16:47	17:48	16:42 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:21	16:03	16:06
45	08:27	07:30	16:27 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	16:21	16:03	08:42
46	16:49	17:50	16:40 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:20	16:03	16:07
47	08:26	07:28	16:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	09:05	16:20	16:03	08:43
48	16:50	17:52	16:45	06:03	05:08	04:51	05:27	06:20	07:15	08:11	09:07	16:19	16:03	16:08
49	08:25	07:25	16:46	06:04	05:09	04:52	05:28	06:21	07:16	08:12	09:08	16:18	16:03	08:43
50	16:52	17:54	16:47	06:05	05:10	04:53	05:29	06:22	07:17	08:13	09:09	16:18	16:03	16:08
51	08:23	07:23	16:48	06:06	05:11	04:54	05:30	06:23	07:17	08:13	09:09	16:17	16:03	08:43
52	16:54	17:56	16:49	06:07	05:12	04:55	05:31	06:24	07:19	08:15	09:11	16:16	16:03	16:09
53	08:22	07:21	16:50	06:08	05:13	04:56	05:32	06:25	07:20	08:16	09:12	16:16	16:03	08:44
54	16:56	17:58	16:51	06:09	05:14	04:57	05:33	06:26	07:21	08:17	09:13	16:15	16:03	16:10
55	08:20	07:18	16:52	06:10	05:15	04:58	05:34	06:27	07:22	08:18	09:14	16:15	16:03	08:44
56	16:58	18:00	16:53	06:11	05:16	04:59	05:35	06:28	07:23	08:19	09:15	16:14	16:03	16:10
57	08:19		16:54	06:12	05:17	04:59	05:36	06:29	07:24	08:20	09:16	16:14	16:03	08:44
58	17:00		16:55	06:13	05:18	04:59	05:37	06:30	07:25	08:21	09:17	16:13	16:03	16:11
59	08:17		16:56	06:14	05:19	04:59	05:38	06:31	07:26	08:22	09:18	16:13	16:03	08:44
60	17:02		16:57	06:15	05:20	04:59	05:39	06:32	07:27	08:23	09:19	16:12	16:03	16:12
61	08:15		16:58	06:16	05:21	04:59	05:40	06:33	07:28	08:24	09:20	16:12	16:03	08:44
62	17:04		16:59	06:17	05:22	04:59	05:41	06:34	07:29	08:25	09:21	16:11	16:03	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	180	233	
Total, worst case			530								350	180		
Sun reduction			0.23								0.29	0.27		
Oper. time red.			1.00								1.00	1.00		
Wind dir. red.			0.66								0.66	0.66		
Total reduction			0.15								0.19	0.17		
Total, real			81								67	31		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: V - H22

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:07 (3)	08:14	15:21 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:54 (2)									
	16:15	15:34 (2)	17:06	15:47 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	15:25 (2)									
2	08:44	15:08 (3)	08:12	15:23 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	14:54 (2)									
	16:16	15:35 (2)	17:08	15:45 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	15:24 (2)									
3	08:44	15:08 (3)	08:10	15:24 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	14:55 (2)									
	16:17	15:36 (2)	17:10	15:44 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	15:25 (2)									
4	08:43	15:09 (3)	08:08	15:27 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	14:57 (2)									
	16:18	15:37 (2)	17:12	15:42 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	15:25 (2)									
5	08:43	15:09 (3)	08:07	15:30 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	14:56 (3)									
	16:19	15:37 (2)	17:14	15:39 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	15:24 (2)									
6	08:43	15:11 (3)	08:05	15:39 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	14:59 (2)	08:26									
	16:21	15:39 (2)	17:16	15:47 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	10	15:09 (2)	16:07	28	15:25 (2)						
7	08:42	15:11 (3)	08:03	15:39 (2)	07:18	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	14:56 (2)	08:28		14:56 (3)						
	16:22	15:39 (2)	17:18	15:48 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16	15:12 (2)	16:06	28	15:24 (2)						
8	08:42	15:12 (2)	08:01	15:39 (2)	07:12	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	14:54 (2)	08:29		14:56 (3)						
	16:24	15:40 (2)	17:20	15:49 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	20	15:14 (2)	16:06	28	15:24 (2)						
9	08:41	15:12 (2)	07:59	15:39 (2)	07:09	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	14:53 (2)	08:30		14:57 (3)						
	16:25	15:41 (2)	17:22	15:50 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	23	15:16 (2)	16:05	28	15:25 (2)						
10	08:40	15:12 (2)	07:57	15:39 (2)	07:07	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	14:52 (2)	08:32		14:57 (3)						
	16:26	15:42 (2)	17:24	15:51 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	25	15:17 (2)	16:05	27	15:24 (2)						
11	08:40	15:12 (2)	07:55	15:39 (2)	07:05	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44	14:51 (2)	08:33		14:57 (3)						
	16:28	15:43 (2)	17:26	15:52 (2)	18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	27	15:18 (2)	16:05	27	15:24 (2)						
12	08:39	15:12 (2)	07:53	15:39 (2)	07:03	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	14:50 (2)	08:34		14:57 (3)						
	16:30	15:43 (2)	17:28	15:52 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	29	15:19 (2)	16:05	27	15:24 (2)						
13	08:38	15:12 (2)	07:51	15:39 (2)	07:01	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	14:49 (2)	08:35		14:57 (3)						
	16:31	15:44 (2)	17:30	15:53 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	31	15:20 (2)	16:04	27	15:24 (2)						
14	08:37	15:12 (2)	07:49	15:39 (2)	07:00	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	14:49 (2)	08:36		14:59 (3)						
	16:33	15:45 (2)	17:32	15:54 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	32	15:21 (2)	16:04	26	15:25 (2)						
15	08:36	15:13 (2)	07:47	15:40 (2)	07:00	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	14:49 (2)	08:37		14:58 (3)						
	16:34	15:46 (2)	17:34	15:55 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	32	15:21 (2)	16:04	26	15:24 (2)						
16	08:35	15:12 (2)	07:45	15:40 (2)	07:00	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	14:48 (2)	08:38		14:59 (3)						
	16:36	15:45 (2)	17:36	15:56 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	34	15:22 (2)	16:05	25	15:24 (2)						
17	08:34	15:12 (2)	07:43	15:40 (2)	07:00	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	14:48 (2)	08:39		14:59 (3)						
	16:38	15:46 (2)	17:38	15:57 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	34	15:22 (2)	16:05	26	15:25 (2)						
18	08:33	15:13 (2)	07:41	15:40 (2)	07:00	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	14:48 (2)	08:39		15:00 (3)						
	16:40	15:47 (2)	17:40	15:58 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	34	15:22 (2)	16:05	25	15:25 (2)						
19	08:32	15:13 (2)	07:39	15:40 (2)	07:00	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	14:48 (2)	08:40		15:01 (3)						
	16:41	15:48 (2)	17:42	15:59 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	35	15:23 (2)	16:05	25	15:26 (2)						
20	08:31	15:13 (2)	07:36	15:40 (2)	07:00	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	14:48 (2)	08:41		15:01 (3)						
	16:43	15:48 (2)	17:44	15:59 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	35	15:23 (2)	16:06	24	15:25 (2)						
21	08:30	15:13 (2)	07:34	15:40 (2)	07:00	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	14:48 (2)	08:41		15:01 (3)						
	16:45	15:48 (2)	17:46	15:59 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	35	15:23 (2)	16:06	25	15:26 (2)						
22	08:29	15:13 (2)	07:32	15:40 (2)	07:00	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	14:49 (2)	08:42		15:01 (3)						
	16:47	15:48 (2)	17:48	15:59 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	35	15:24 (2)	16:06	25	15:26 (2)						
23	08:27	15:14 (2)	07:30	15:40 (2)	07:00	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	14:49 (2)	08:42		15:03 (3)						
	16:49	15:49 (2)	17:50	15:59 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	35	15:24 (2)	16:07	24	15:27 (2)						
24	08:26	15:14 (2)	07:28	15:40 (2)	07:00	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	14:50 (2)	08:43		15:03 (3)						
	16:50	15:48 (2)	17:52	15:59 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	34	15:24 (2)	16:08	25	15:28 (2)						
25	08:25	15:15 (2)	07:25	15:40 (2)	07:00	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09	14:50 (2)	08:43		15:03 (3)						
	16:52	15:49 (2)	17:54	15:59 (2)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	34	15:24 (2)	16:08	25	15:28 (2)						
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	16:54	15:49 (2)	17:56	15:59 (2)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	34	15:25 (2)	16:09	25	15:28 (2)						
27	08:22	15:16 (2)	07:21	15:40 (2)	07:00	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	14:52 (2)	08:44		15:05 (3)						
	16:56	15:48 (2)	17:58	15:59 (2)	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	33	15:25 (2)	16:10	25	15:30 (2)						
28	08:20	15:17 (2)	07:19	15:40 (2)	07:00	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	14:52 (2)	08:44		15:05 (3)						
	16:58	15:49 (2)	18:00	15:59 (2)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	33	15:25 (2)	16:10	26	15:31 (2)						
29	08:19	15:18 (2)	07:18	15:40 (2)	07:00	07:09	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	14:52 (2)	08:44		15:06 (3)						
	17:00	15:48 (2)	07:18	15:59 (2)	18:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:12	32	15:24 (2)	16:11	26	15:32 (2)						
30	08:17	15:18 (2)	07:17	15:40 (2)	07:00	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	14:53 (2)	08:44		15:06 (3)						
	17:02	15:47 (2)	07:17	15:59 (2)	18:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	32	15:25 (2)	16:12	27	15:33 (2)						
31	08:15	15:19 (2)	07:16	15:40 (2)	07:00	07:04	05:54	05:04	05:37	06:31	07:22	07:18	08:14	08:14	14:54 (2)	08:44		15:06 (3)						
	17:04	15:47 (2)	07:17	15:59 (2)	18:58	20:55	21:44	22:01	21:27	20:21	19:05	16:56	16:11	32	15:25 (2)	16:12	27	15:33 (2)						
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	754	824	824	824	824								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: W - H23

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	15:04 (2) 08:14	15:17 (2) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:47 (2)
2	16:15	15:31 (2) 17:06	15:40 (2) 18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	15:20 (2)
3	08:44	15:04 (2) 08:12	15:18 (2) 07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	14:47 (2)
4	16:16	15:32 (2) 17:08	15:38 (2) 18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	15:20 (2)
5	08:44	15:04 (2) 08:10	15:21 (2) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	14:48 (2)
6	16:17	15:32 (2) 17:10	15:36 (2) 18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	15:20 (2)
7	08:43	15:04 (2) 08:08	15:24 (2) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	14:49 (2)
8	16:18	15:33 (2) 17:12	15:33 (2) 18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	15:21 (2)
9	08:43	15:04 (2) 08:07	15:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	14:49 (2)
10	16:19	15:33 (2) 17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	15:20 (2)
11	08:43	15:04 (2) 08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	14:50 (2)
12	16:21	15:35 (2) 17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:07	15:21 (2)
13	08:42	15:04 (2) 08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	14:51 (2)
14	16:22	15:35 (2) 17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	15:21 (2)
15	08:42	15:04 (2) 08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	14:51 (2)
16	16:24	15:36 (2) 17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	15:20 (2)
17	08:41	15:05 (2) 07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	14:53 (2)
18	16:25	15:37 (2) 17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	15:21 (2)
19	08:40	15:05 (2) 07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	14:53 (2)
20	16:26	15:38 (2) 17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	15:21 (2)
21	08:40	15:05 (2) 07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44	08:33	14:54 (2)
22	16:28	15:38 (2) 17:26	18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	16:05	15:21 (2)
23	08:39	15:05 (2) 07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	14:54 (2)
24	16:30	15:39 (2) 17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	15:21 (2)
25	08:38	15:05 (2) 07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	14:54 (3)
26	16:31	15:39 (2) 17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05	15:21 (2)
27	08:37	15:05 (2) 07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	14:55 (3)
28	16:33	15:40 (2) 17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:04	15:22 (2)
29	08:36	15:06 (2) 07:47	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	08:37	14:55 (3)
30	16:34	15:41 (2) 17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	15:21 (2)
31	08:35	15:05 (2) 07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	14:55 (3)
32	16:36	15:40 (2) 17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	15:22 (2)
33	08:34	15:06 (2) 07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39	14:56 (3)
34	16:38	15:41 (2) 17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05	15:22 (2)
35	08:33	15:06 (2) 07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	14:56 (3)
36	16:40	15:42 (2) 17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05	15:23 (2)
37	08:32	15:07 (2) 07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	14:57 (3)
38	16:41	15:42 (2) 17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	15:23 (2)
39	08:31	15:06 (2) 07:36	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	14:42 (2)	14:57 (3)
40	16:43	15:42 (2) 17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:06	15:23 (2)
41	08:30	15:07 (2) 07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	14:42 (2)	14:58 (3)
42	16:45	15:43 (2) 17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	15:24 (2)
43	08:29	15:07 (2) 07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	14:42 (2)	14:58 (3)
44	16:47	15:42 (2) 17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06	15:24 (2)
45	08:27	15:08 (2) 07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	14:43 (2)	14:59 (3)
46	16:49	15:43 (2) 17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07	15:25 (2)
47	08:26	15:08 (2) 07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	14:43 (2)	14:59 (3)
48	16:50	15:43 (2) 17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:08	15:25 (2)
49	08:25	15:09 (2) 07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09	14:44 (2)	14:59 (3)
50	16:52	15:43 (2) 17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	16:08	15:25 (2)
51	08:23	15:10 (2) 07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	14:44 (2)	14:59 (3)
52	16:54	15:43 (2) 17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	16:09	15:26 (2)
53	08:22	15:10 (2) 07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13	14:45 (2)	15:01 (3)
54	16:56	15:42 (2) 17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:10	15:27 (2)
55	08:20	15:12 (2) 07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	14:45 (2)	15:02 (3)
56	16:58	15:42 (2) 18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16:10	15:28 (2)
57	08:19	15:12 (2)	07:09	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	14:45 (2)	15:02 (3)
58	17:00	15:42 (2)	19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:12	16:11	15:29 (2)
59	08:17	15:13 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	14:46 (2)	15:03 (3)
60	17:02	15:41 (2)	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:12	15:30 (2)
61	08:15	15:14 (2)	07:04	05:54	05:04	04:57	05:37	06:31	07:22	07:18	08:16	14:46 (2)	15:03 (2)
62	17:04	15:40 (2)	19:58	20:54	21:44	22:01	21:27	20:21	19:05	16:56	16:11	16:13	15:29 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case	1002	67									743	861	
Sun reduction	0.24	0.23									0.27	0.21	
Oper. time red.	1.00	1.00									1.00	1.00	
Wind dir. red.	0.65	0.65									0.65	0.65	
Total reduction	0.16	0.15									0.17	0.13	
Total, real	159	10									129	116	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: X - H24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February	March	April	May	June	July	August	September	October	November	December		
1	08:44		08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:20 (1)	
	16:15		17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	14 15:34 (1)	
2	08:44		08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	15:21 (1)	
	16:16		17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	12 15:33 (1)	
3	08:44		15:38 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22	15:21 (1)	
	16:17	1	15:39 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	11 15:32 (1)
4	08:43		15:38 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	15:22 (1)
	16:18	3	15:41 (1)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	10 15:32 (1)
5	08:43		15:37 (1)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	15:22 (1)
	16:19	5	15:42 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	8 15:30 (1)
6	08:43		15:38 (1)	08:05	07:05	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	15:24 (1)
	16:21	6	15:44 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	16:07	6 15:30 (1)
7	08:42		15:37 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	15:24 (1)
	16:22	8	15:45 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	5 15:29 (1)
8	08:42		15:37 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	15:26 (1)
	16:24	9	15:46 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	3 15:29 (1)
9	08:41		15:38 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	15:27 (1)
	16:25	11	15:49 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	1 15:28 (1)
10	08:40		15:38 (1)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	
	16:26	12	15:50 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	
11	08:40		15:38 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	
	16:28	14	15:52 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:35	16:05	
12	08:39		15:38 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	
	16:30	15	15:53 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	16:05	
13	08:38		15:38 (1)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	
	16:31	17	15:55 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05	
14	08:37		15:38 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	
	16:33	19	15:57 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:04	
15	08:36		15:38 (1)	07:47	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	15:21 (1)	08:37
	16:34	21	15:59 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	7 15:28 (1)	16:04
16	08:35		15:39 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	15:19 (1)	08:38
	16:36	21	16:00 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	11 15:30 (1)	16:05
17	08:34		15:38 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	15:18 (1)	08:39
	16:38	21	15:59 (1)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	14 15:32 (1)	16:05
18	08:33		15:39 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	15:17 (1)	08:39
	16:40	21	16:00 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16 15:33 (1)	16:05
19	08:32		15:40 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	15:16 (1)	08:40
	16:41	20	16:00 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	18 15:34 (1)	16:05
20	08:31		15:40 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	15:16 (1)	08:41
	16:43	20	16:00 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	19 15:35 (1)	16:06
21	08:30		15:41 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	15:16 (1)	08:41
	16:45	19	16:00 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	19 15:35 (1)	16:06
22	08:29		15:41 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	15:16 (1)	08:42
	16:47	19	16:00 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	20 15:36 (1)	16:06
23	08:27		15:42 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	15:16 (1)	08:42
	16:49	18	16:00 (1)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	20 15:36 (1)	16:07
24	08:26		15:43 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	15:16 (1)	08:43
	16:50	16	15:59 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	21 15:37 (1)	16:08
25	08:25		15:45 (1)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09	15:17 (1)	08:43
	16:52	14	15:59 (1)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	20 15:37 (1)	16:08
26	08:23		15:46 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	15:17 (1)	08:43
	16:54	11	15:57 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	21 15:38 (1)	16:09
27	08:22		15:48 (1)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13	15:18 (1)	08:44
	16:56	7	15:55 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	20 15:38 (1)	16:10
28	08:20			07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14	15:18 (1)	08:44
	16:58		18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	19 15:37 (1)	16:11
29	08:19			07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16		15:18 (1)	08:44
	17:00			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	17	15:35 (1)	16:11
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18		15:19 (1)	08:44
	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16	15:35 (1)	16:12
31	08:15			07:04		05:04		05:37	06:31		07:22			08:44	
	17:04			19:58		21:44		21:27	20:21		16:56			16:13	
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	278	233	70
Total, worst case		348											0.27		0.21
Sun reduction		0.24													
Oper. time red.		1.00											1.00		1.00
Wind dir. red.		0.66											0.66		0.66
Total reduction		0.16											0.18		0.14
Total, real		56											49		10

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: Y - H25

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: Z - H26

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	08:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AA - H27

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:50 (5) 20:18 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:10 (5) 20:17 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10		
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:50 (5) 20:18 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:08 (5) 20:20 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09		
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:50 (5) 20:17 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:05 (5) 20:21 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08		
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:50 (5) 20:17 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:04 (5) 20:23 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08		
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:51 (5) 20:16 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:02 (5) 20:24 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07		
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:51 (5) 20:15 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:02 (5) 20:25 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07		
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:52 (5) 20:15 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:01 (5) 20:26 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06		
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	19:53 (5) 20:14 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:00 (5) 20:26 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06		
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	19:54 (5) 20:12 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:00 (5) 20:26 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05		
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	19:55 (5) 20:10 (5)	04:56 21:55	05:07 21:54	05:54 21:07	19:58 (5) 20:26 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05		
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	19:58 (5) 20:09 (5)	04:56 21:55	05:08 21:54	05:56 21:05	19:58 (5) 20:26 (5)	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05		
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:02 (5) 20:05 (5)	04:55 21:56	05:09 21:53	05:58 21:03	19:58 (5) 20:27 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05		
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	05:59 21:01	19:58 (5) 20:26 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05		
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:01 20:59	19:58 (5) 20:26 (5)	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05		
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:03 20:57	19:58 (5) 20:26 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05		
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:05 20:55	19:58 (5) 20:25 (5)	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05		
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	06:06 20:53	19:58 (5) 20:23 (5)	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05		
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	06:08 20:50	19:59 (5) 20:22 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05		
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	06:10 20:48	19:59 (5) 20:19 (5)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05		
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	06:12 20:46	20:00 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06		
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	06:13 20:44	20:02 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06		
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	06:15 20:42	20:02 (5) 20:05 (5)	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07		
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	06:17 20:39	20:05 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07		
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 20:45	04:55 22:01	05:26 21:38	06:19 20:37	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:07 16:17	08:43 16:08		
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:09 16:16	08:43 16:08		
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:11 16:15	08:43 16:09		
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:13 16:14	08:44 16:10		
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:14 16:13	08:44 16:11		
29	08:18 17:00	07:09 18:04	05:56 19:54	05:06 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:16 16:12	08:44 16:11		
30	08:17 17:02	07:06 18:06	05:54 19:56	05:05 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:17 16:11	08:44 16:12		
31	08:15 17:04	07:04 18:04	05:04 19:58	05:04 20:44	05:04 21:44	05:04 21:44	05:37 21:26	06:31 20:21	06:31 20:21	07:22 16:56	07:22 16:56	08:17 16:11	08:17 16:11	08:44 16:12		
Potential sun hours	250	273	367	420	494	510	512	460	485	382	328	259	233			
Total, worst case				230	250				485							
Sun reduction				0.35	0.38				0.34							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.65	0.65				0.65							
Total reduction				0.23	0.25				0.22							
Total, real				53	62				107							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AB - H28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:49 (5) 20:16 (5)	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10	
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:49 (5) 20:15 (5)	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:49 (5) 20:15 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:08 (5) 20:16 (5)	06:36 20:13	07:30 19:00	08:22 16:50	
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:50 (5) 20:14 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:05 (5) 20:19 (5)	06:38 20:11	07:31 18:57	08:24 16:48	
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:50 (5) 20:13 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:03 (5) 20:20 (5)	06:40 20:09	07:33 18:55	08:25 16:46	
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:51 (5) 20:12 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:02 (5) 20:21 (5)	06:42 20:06	07:35 18:52	08:26 16:44	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:53 (5) 20:11 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:01 (5) 20:22 (5)	06:43 20:04	07:37 18:50	08:28 16:43	
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	19:54 (5) 20:10 (5)	04:57 21:53	05:05 21:56	05:51 21:11	19:59 (5) 20:23 (5)	06:45 20:01	07:39 18:48	08:29 16:41	
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	19:56 (5) 20:07 (5)	04:57 21:54	05:06 21:55	05:52 21:09	19:59 (5) 20:24 (5)	06:47 19:59	07:41 18:45	08:30 16:39	
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	19:59 (5) 20:04 (5)	04:56 21:55	05:07 21:54	05:54 21:07	19:58 (5) 20:23 (5)	06:49 19:56	07:42 18:43	08:31 16:37	
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13		04:56 21:55	05:08 21:54	05:56 21:05	19:57 (5) 20:24 (5)	06:50 19:54	07:44 18:40	08:33 16:36	
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15		04:55 21:56	05:09 21:53	05:58 21:03	19:57 (5) 20:25 (5)	06:52 19:51	07:46 18:38	08:34 16:34	
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	19:56 (5) 20:24 (5)	06:54 19:49	07:48 18:36	08:35 16:32	
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	05:12 21:51	06:01 20:59	19:56 (5) 20:24 (5)	06:56 19:47	07:50 18:33	08:36 16:31	
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	05:13 21:50	06:03 20:57	19:57 (5) 20:24 (5)	06:58 19:44	07:52 18:31	08:37 16:29	
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	19:56 (5) 20:23 (5)	06:59 19:42	07:54 18:29	08:38 16:27	
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	19:56 (5) 20:23 (5)	07:01 19:39	07:55 18:26	08:38 16:26	
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25		04:54 21:59	05:17 21:46	06:08 20:50	19:57 (5) 20:22 (5)	07:03 19:37	07:57 18:24	08:39 16:25	
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	5 20:00 (5)	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	19:57 (5) 20:19 (5)	07:05 19:34	07:59 18:22	08:40 16:23	
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:57 (5) 20:07 (5)	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	19:58 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:41 16:22	
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:54 (5) 20:08 (5)	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	19:59 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:41 16:20	
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	19:53 (5) 20:10 (5)	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	19:59 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:04 16:19	
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:52 (5) 20:12 (5)	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	20:01 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:18	
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:51 (5) 20:13 (5)	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	20:04 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:07 16:17	
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19:50 (5) 20:15 (5)	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08	
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:50 (5) 20:17 (5)	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09	
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:49 (5) 20:17 (5)	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10	
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	19:49 (5) 20:17 (5)	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11	
29	08:18 17:00		07:09 19:54	05:56 20:52	19:49 (5) 20:17 (5)	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11	
30	08:17 17:02		07:06 19:56	05:54 20:53	19:49 (5) 20:16 (5)	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12	
31	08:15 17:04		07:04 19:58			05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case				251	197				454					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.65	0.65				0.65					
Total reduction				0.23	0.25				0.22					
Total, real				57	49				100					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AC - H29

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:48 (5) 20:14 (5)	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10	
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:49 (5) 20:13 (5)	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:49 (5) 20:12 (5)	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08	
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:50 (5) 20:11 (5)	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08	
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:51 (5) 20:10 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:05 (5) 20:15 (5)	06:40 20:09	07:33 18:55	07:32 16:46	
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:52 (5) 20:08 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:03 (5) 20:18 (5)	06:42 20:06	07:35 18:52	07:34 16:44	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:54 (5) 20:08 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:02 (5) 20:19 (5)	06:43 20:04	07:37 18:50	07:36 16:43	
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:05 (5) 20:05 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:00 (5) 20:20 (5)	06:45 20:01	07:39 18:48	07:38 16:41	
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10		04:57 21:54	05:06 21:55	05:52 21:09	19:59 (5) 20:21 (5)	06:47 19:59	07:41 18:45	08:30 16:05	
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11		04:56 21:55	05:07 21:54	05:54 21:07	19:57 (5) 20:21 (5)	06:49 19:56	07:42 18:43	08:31 16:05	
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13		04:56 21:55	05:08 21:54	05:56 21:05	19:57 (5) 20:22 (5)	06:50 19:54	07:44 18:40	08:33 16:05	
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15		04:55 21:56	05:09 21:53	05:58 21:03	19:57 (5) 20:22 (5)	06:52 19:51	07:46 18:38	08:34 16:05	
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	19:56 (5) 20:22 (5)	06:54 19:49	07:48 18:36	08:35 16:05	
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	05:12 21:51	06:01 20:59	19:55 (5) 20:22 (5)	06:56 19:47	07:50 18:33	08:36 16:05	
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	05:13 21:50	06:03 20:57	19:56 (5) 20:23 (5)	06:58 19:44	07:52 18:31	08:37 16:05	
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	19:55 (5) 20:22 (5)	06:59 19:42	07:54 18:29	08:38 16:05	
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	19:55 (5) 20:22 (5)	07:01 19:39	07:55 18:26	08:38 16:05	
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	19:59 (5) 20:03 (5)	04:54 21:59	05:17 21:46	06:08 20:50	19:55 (5) 20:22 (5)	07:03 19:37	07:57 18:24	08:39 16:05	
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	19:56 (5) 20:05 (5)	04:54 22:00	05:18 21:45	06:10 20:48	19:55 (5) 20:19 (5)	07:05 19:34	07:59 18:22	08:40 16:05	
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	19:54 (5) 20:07 (5)	04:54 22:00	05:20 21:43	06:12 20:46	19:56 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:41 16:06	
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	19:52 (5) 20:08 (5)	04:54 22:00	05:21 21:42	06:13 20:44	19:57 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:41 16:06	
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	19:51 (5) 20:10 (5)	04:55 22:01	05:23 21:41	06:15 20:42	19:57 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:42 16:07	
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	19:50 (5) 20:12 (5)	04:55 22:01	05:24 21:39	06:17 20:39	19:58 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:07	
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	19:49 (5) 20:13 (5)	04:55 22:01	05:26 21:38	06:19 20:37	20:00 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:43 16:08	
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	19:45 (5) 20:15 (5)	04:56 22:01	05:27 21:36	06:20 20:35	20:03 (5) 20:06 (5)	07:15 19:19	07:11 17:09	08:43 16:08	
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	19:48 (5) 20:15 (5)	04:56 22:01	05:29 21:35	06:22 20:32		07:17 19:17	07:13 17:06	08:43 16:09	
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	19:48 (5) 20:15 (5)	04:56 22:01	05:30 21:33	06:24 20:30		07:19 19:14	07:14 17:04	08:44 16:10	
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	19:48 (5) 20:15 (5)	04:57 22:01	05:32 21:32	06:26 20:28		07:21 19:12	07:16 17:02	08:44 16:11	
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	19:48 (5) 20:15 (5)	04:58 22:00	05:34 21:30	06:28 20:25		07:22 19:09	07:18 17:00	08:44 16:11	
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	19:48 (5) 20:14 (5)	04:58 22:00	05:35 21:28	06:29 20:23		07:24 19:07	07:20 16:58	08:44 16:12	
31	08:15 17:04		07:04 19:58		05:04 21:44			05:37 21:26	06:31 20:21		07:22 16:56	07:22 16:56	08:44 16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case				267	152				421					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.65	0.65				0.65					
Total reduction				0.23	0.25				0.22					
Total, real				61	38				93					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AD - H30
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time
N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:11 (5) 20:26 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:19 (5) 20:41 (5)	06:33 19:05	07:26 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	20:10 (5) 20:27 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:19 (5) 20:42 (5)	06:35 19:02	07:26 16:52
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	20:09 (5) 20:29 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:18 (5) 20:42 (5)	06:36 19:03	07:30 16:50
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	20:08 (5) 20:30 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:18 (5) 20:42 (5)	06:38 19:01	07:31 16:48
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	20:08 (5) 20:32 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:17 (5) 20:42 (5)	06:40 19:00	07:33 16:46
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:07 (5) 20:32 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:17 (5) 20:42 (5)	06:42 19:06	07:35 16:44
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:08 (5) 20:33 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:18 (5) 20:42 (5)	06:43 19:04	07:37 16:43
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:08 (5) 20:32 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:17 (5) 20:41 (5)	06:45 19:01	07:39 16:41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:07 (5) 20:32 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:18 (5) 20:39 (5)	06:47 19:05	07:41 16:39
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:07 (5) 20:31 (5)	04:56 21:54	05:07 21:54	05:54 21:07	20:17 (5) 20:37 (5)	06:49 19:06	07:42 16:37
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:08 (5) 20:32 (5)	04:56 21:55	05:08 21:54	05:56 21:05	20:18 (5) 20:35 (5)	06:50 19:04	07:44 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:08 (5) 20:31 (5)	04:55 21:56	05:09 21:53	05:58 21:03	20:19 (5) 20:34 (5)	06:52 19:01	07:46 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:09 (5) 20:30 (5)	04:55 21:57	05:11 21:52	05:59 21:01	20:20 (5) 20:31 (5)	06:54 19:05	07:48 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:10 (5) 20:30 (5)	04:55 21:57	05:12 21:51	06:01 20:59	20:21 (5) 20:29 (5)	06:56 19:07	07:50 16:31
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:10 (5) 20:28 (5)	04:55 21:58	05:13 21:50	06:03 20:57	20:24 (5) 20:28 (5)	06:58 19:04	07:52 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:12 (5) 20:28 (5)	04:54 21:59	05:14 21:48	06:05 20:55	20:25 (5) 19:42	06:59 18:29	07:54 16:27
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:13 (5) 20:26 (5)	04:54 21:59	05:16 21:47	06:06 20:53	19:41 19:39	07:01 18:26	07:55 16:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	20:15 (5) 20:24 (5)	04:54 21:59	05:17 21:46	06:08 20:50	19:38 19:37	07:03 18:24	07:57 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:14 (5) 22:00	04:54 21:45	05:18 21:45	06:10 20:48	19:36 19:34	07:05 18:22	07:59 16:23
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:13 (5) 22:00	04:54 21:43	05:20 21:43	06:12 20:46	19:33 19:32	07:06 18:20	08:01 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:12 (5) 22:00	04:54 21:42	05:21 21:42	06:13 20:44	19:32 19:29	07:08 18:17	08:03 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	20:11 (5) 22:01	04:55 21:41	05:23 21:41	06:15 20:42	19:29 19:27	07:10 18:15	08:05 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:10 (5) 22:01	04:55 21:39	05:24 21:39	06:17 20:39	19:27 19:24	07:12 18:13	08:07 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	20:09 (5) 22:01	04:55 21:38	05:26 21:38	06:19 20:37	19:23 19:22	07:13 18:11	08:09 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:08 (5) 22:01	04:56 21:36	05:27 21:36	20:28 (5) 20:35	19:22 19:19	07:15 17:09	07:11 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	20:07 (5) 22:01	04:56 21:35	05:29 21:35	20:25 (5) 20:32	19:19 19:17	07:17 17:06	07:13 16:15
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:06 (5) 22:01	04:56 21:33	05:30 21:33	20:24 (5) 20:30	19:17 19:14	07:19 17:04	07:14 16:14
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	20:15 (5) 20:21 (5)	20:05 (5) 22:01	04:57 21:32	05:32 21:32	20:22 (5) 20:28	19:14 19:12	07:21 17:02	07:16 16:13
29	08:18 17:00	07:08 19:54	07:08 20:52	05:56 21:41	20:13 (5) 20:22 (5)	20:04 (5) 22:00	04:58 21:30	05:34 21:30	20:21 (5) 20:25	19:12 19:09	07:22 17:00	07:18 16:12
30	08:17 17:02	07:06 19:56	07:06 20:54	05:54 21:43	20:12 (5) 20:24 (5)	20:03 (5) 22:00	04:58 21:28	05:35 21:28	20:20 (5) 20:23	19:09 19:07	07:24 16:58	07:20 16:11
31	08:15 17:04	07:04 19:58	07:04 20:53	05:54 21:44	20:11 (5) 21:44	20:02 (5) 22:00	04:57 21:26	05:37 21:26	20:20 (5) 20:21	19:07 19:06	07:22 16:56	07:22 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					365			108		287		
Sun reduction					0.38			0.32		0.34		
Oper. time red.					1.00			1.00		1.00		
Wind dir. red.					0.64			0.64		0.64		
Total reduction					0.23			0.22		0.22		
Total, real					6			23		63		

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AE - H31

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

		January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:19 (2)	08:14		09:34 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24					07:26		08:19		09:03 (2)	
	16:15	64	14:40 (1)	17:06	20	09:54 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54					16:54		16:10	63	14:24 (1)	
2	08:44		09:20 (2)	08:12		09:36 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26					07:26		08:21		09:04 (2)	
	16:16	64	14:41 (1)	17:08	16	09:52 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52					16:52		16:09	63	14:25 (1)	
3	08:44		09:19 (2)	08:10		09:40 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28					07:28		08:22		09:04 (2)	
	16:17	65	14:41 (1)	17:10	8	09:48 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50					16:50		16:08	63	14:25 (1)	
4	08:43		09:20 (2)	08:09			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30					07:32		08:24		09:05 (2)	
	16:18	65	14:41 (1)	17:12			18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48					16:48		16:08	64	14:26 (1)	
5	08:43		09:20 (2)	08:07			07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32					07:32		08:25		09:05 (2)	
	16:20	64	14:41 (1)	17:14			18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46					16:46		16:07	64	14:27 (1)	
6	08:43		09:20 (2)	08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34					07:35		08:27		09:06 (2)	
	16:21	65	14:42 (1)	17:16			18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44					16:44		16:07	65	14:28 (1)	
7	08:42		09:20 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36					07:36		08:28		09:07 (2)	
	16:22	65	14:42 (1)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43					16:43		16:06	64	14:28 (1)	
8	08:42		09:20 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38				09:10 (2)	08:29				09:08 (2)	
	16:24	64	14:41 (1)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	10			09:20 (2)	16:06	64	14:29 (1)		09:08 (2)	
9	08:41		09:21 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				09:07 (2)	08:30				09:08 (2)	
	16:25	63	14:42 (1)	17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16			09:23 (2)	16:05	65	14:30 (1)		09:09 (2)	
10	08:40		09:21 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42				09:05 (2)	08:32				09:09 (2)	
	16:27	64	14:42 (1)	17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	20			09:25 (2)	16:05	64	14:30 (1)		09:09 (2)	
11	08:40		09:21 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44				09:04 (2)	08:33				09:09 (2)	
	16:28	63	14:42 (1)	17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	23			09:27 (2)	16:05	64	14:30 (1)		09:09 (2)	
12	08:39		09:21 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46				09:02 (2)	08:34				09:10 (2)	
	16:30	62	14:41 (1)	17:28			18:23	20:20	21:15	21:56	21:53	21:04	19:52	18:38	16:34	26			09:28 (2)	16:05	63	14:31 (1)		09:11 (2)	
13	08:38		09:21 (2)	07:51			06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48				09:01 (2)	08:35				09:11 (2)	
	16:31	60	14:41 (1)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	28			09:29 (2)	16:05	63	14:32 (1)		09:12 (2)	
14	08:37		09:22 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				09:01 (2)	08:36				09:12 (2)	
	16:33	58	14:40 (1)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	29			09:30 (2)	16:05	64	14:33 (1)		09:13 (2)	
15	08:36		09:22 (2)	07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51				09:00 (2)	08:37				09:13 (2)	
	16:34	57	14:40 (1)	17:34			18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	31			09:31 (2)	16:05	62	14:33 (1)		09:13 (2)	
16	08:36		09:23 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53				09:02 (2)	08:38				09:13 (2)	
	16:36	53	14:39 (1)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	32			09:30 (2)	16:05	62	14:33 (1)		09:14 (2)	
17	08:34		09:22 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55				08:59 (2)	08:39				09:14 (2)	
	16:38	51	14:37 (1)	17:38			18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	33			09:32 (2)	16:05	62	14:34 (1)		09:15 (2)	
18	08:33		09:23 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				08:59 (2)	08:39				09:15 (2)	
	16:40	45	14:35 (1)	17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	34			09:33 (2)	16:05	62	14:35 (1)		09:16 (2)	
19	08:32		09:23 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				08:59 (2)	08:40				09:16 (2)	
	16:41	36	09:59 (2)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	34			09:33 (2)	16:05	61	14:35 (1)		09:16 (2)	
20	08:31		09:23 (2)	07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01				08:59 (2)	08:41				09:16 (2)	
	16:43	36	09:59 (2)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	35			09:34 (2)	16:06	61	14:35 (1)		09:17 (2)	
21	08:30		09:24 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				08:59 (2)	08:41				09:17 (2)	
	16:45	35	09:59 (2)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	35			09:34 (2)	16:06	61	14:36 (1)		09:17 (2)	
22	08:29		09:24 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04				08:59 (2)	08:42				09:17 (2)	
	16:47	35	09:59 (2)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	36			09:35 (2)	16:06	61	14:36 (1)		09:18 (2)	
23	08:27		09:25 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				08:59 (2)	08:42				09:18 (2)	
	16:49	34	09:59 (2)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	36			09:35 (2)	16:07	61	14:37 (1)		09:18 (2)	
24	08:26		09:25 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08				09:00 (2)	08:43				09:18 (2)	
	16:51	34	09:59 (2)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	45			14:12 (1)	16:08	61	14:37 (1)		09:18 (2)	
25	08:25		09:26 (2)	07:25			06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09				09:00 (2)	08:43				09:18 (2)	
	16:52	33	09:59 (2)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	51			14:15 (1)	16:08	61	14:37 (1)		09:19 (2)	
26	08:23		09:27 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11				09:01 (2)	08:44				09:19 (2)	
	16:54	32	09:59 (2)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15	53			14:17 (1)	16:09	63	14:39 (1)		09:19 (2)	
27	08:22		09:28 (2)	07:21			06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13				09:01 (2)	08:44				09:19 (2)	
	16:56	31	09:59 (2)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	57			14:19 (1)	16:10	62	14:39 (1)		09:19 (2)	
28	08:20		09:29 (2)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14				09:02 (2)	08:44				09:19 (2)	
	16:58	29	09:58 (2)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	58			14:20 (1)	16:11	63	14:39 (1)		09:19 (2)	
29	08:19		09:30 (2)				07:09	05:56	05:06	04:57	05:34	06:28	07:23	07:19	08:16				09:02 (2)	08:44				09:19 (2)	
	17:00	27	09:57 (2)				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:0											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AF - H32

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		08:14		09:10 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24								08:19		08:54 (2)	
	16:15		17:06	11	09:21 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54								16:10	7	09:01 (2)	
2	08:44		08:12		09:14 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26								08:21		08:56 (2)	
	16:16		17:08	3	09:17 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52								16:09	5	09:01 (2)	
3	08:44		08:10			07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28								08:22		08:57 (2)	
	16:17		17:10			18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50								16:08	2	08:59 (2)	
4	08:43		08:09			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30								08:24			
	16:18		17:12			18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48								16:08			
5	08:43		08:07			07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32								08:25			
	16:20		17:14			18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46								16:07			
6	08:43		08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34								08:27			
	16:21		17:16			18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44								16:07			
7	08:42		08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36								08:28			
	16:22		17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43								16:06			
8	08:42		08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38								08:29			
	16:24		17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41								16:06			
9	08:41		09:14 (2)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40							08:44 (2)	08:30			
	16:25	2	09:16 (2)	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	5							08:49 (2)	16:05		
10	08:41		09:13 (2)	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42								08:41 (2)	08:32		
	16:27	4	09:17 (2)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	11							08:52 (2)	16:05		
11	08:40		09:12 (2)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44								08:39 (2)	08:33		
	16:28	6	09:18 (2)	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	15							08:54 (2)	16:05		
12	08:39		09:11 (2)	07:53		06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46								08:38 (2)	08:34		
	16:30	8	09:19 (2)	17:28		18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	18							08:56 (2)	16:05		
13	08:38		09:10 (2)	07:51		06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48								08:37 (2)	08:35		
	16:31	10	09:20 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	20							08:57 (2)	16:05		
14	08:37		09:09 (2)	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49								08:36 (2)	08:36		
	16:33	12	09:21 (2)	17:32		18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	22							08:58 (2)	16:05		
15	08:37		09:08 (2)	07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51								08:36 (2)	08:37		
	16:34	14	09:22 (2)	17:34		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	22							08:58 (2)	16:05		
16	08:36		09:07 (2)	07:45		06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53								08:36 (2)	08:38		
	16:36	16	09:23 (2)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	23							08:59 (2)	16:05		
17	08:35		09:05 (2)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55								08:35 (2)	08:39		
	16:38	18	09:23 (2)	17:38		18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	24							08:59 (2)	16:05		
18	08:33		09:04 (2)	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57								08:35 (2)	08:39		
	16:40	20	09:24 (2)	17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	25							09:00 (2)	16:05		
19	08:32		09:03 (2)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59								08:35 (2)	08:40		
	16:41	22	09:25 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	25							09:00 (2)	16:05		
20	08:31		09:01 (2)	07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01								08:36 (2)	08:41		
	16:43	24	09:25 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	24							09:00 (2)	16:06		
21	08:30		09:01 (2)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02								08:36 (2)	08:41		
	16:45	25	09:26 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	25							09:01 (2)	16:06		
22	08:29		09:02 (2)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04								08:37 (2)	08:42		
	16:47	24	09:26 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	24							09:01 (2)	16:07		
23	08:27		09:01 (2)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06								08:39 (2)	08:42		
	16:49	25	09:26 (2)	17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	22							09:01 (2)	16:07		
24	08:26		09:01 (2)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08								08:41 (2)	08:43		
	16:51	25	09:26 (2)	17:52		18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	20							09:01 (2)	16:08		
25	08:25		09:02 (2)	07:25		06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:09								08:43 (2)	08:43		
	16:52	24	09:26 (2)	17:54		18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	18							09:01 (2)	16:08		
26	08:23		09:03 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11								08:45 (2)	08:44		
	16:54	23	09:26 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	16							09:01 (2)	16:09		
27	08:22		09:04 (2)	07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13								08:47 (2)	08:44		
	16:56	22	09:26 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:14	14							09:01 (2)	16:10		
28	08:20		09:05 (2)	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:15								08:49 (2)	08:44		
	16:58	21	09:26 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	12							09:01 (2)	16:11		
29	08:19		09:05 (2)			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16								08:50 (2)	08:44		
	17:00	20	09:25 (2)			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	10							09:00 (2)	16:11		
30	08:17		09:06 (2)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18								08:52 (2)	08:44		
	17:02	18	09:24 (2)			19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	9							09:01 (2)	16:12		
31	08:15		09:08 (2)			07:04		05:04		05:37	06:31		07:22											08:44	
	17:04	15	09:23 (2)			19:58		21:44		21:27	20:21		16:56											16:13	
Potential sun hours	250		273			367		420		494		512		460		382		328		259				233	
Total, worst case	398		14																	404				14	
Sun reduction	0.24		0.23																	0.27				0.21</	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AG - H33

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		11:18 (1)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		07:54 (2)	08:19						
	16:15	25	11:43 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	8	08:02 (2)	16:10						
2	08:44		11:19 (1)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		07:56 (2)	08:21						
	16:16	24	11:43 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	5	08:01 (2)	16:09						
3	08:44		11:20 (1)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		07:58 (2)	08:22						
	16:17	22	11:42 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	2	08:00 (2)	16:08						
4	08:43		11:22 (1)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30			08:24				11:17 (1)		
	16:18	20	11:42 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48			16:08	1			11:18 (1)		
5	08:43		11:23 (1)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32			08:25				11:12 (1)		
	16:20	18	11:41 (1)	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46			16:07	11			11:23 (1)		
6	08:43		11:25 (1)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34			08:27				11:11 (1)		
	16:21	15	11:40 (1)	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:45			16:07	15			11:26 (1)		
7	08:42		11:27 (1)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36			08:28				11:10 (1)		
	16:22	11	11:38 (1)	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43			16:06	18			11:28 (1)		
8	08:42		11:31 (1)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38			08:29				11:10 (1)		
	16:24	3	11:34 (1)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41			16:06	20			11:30 (1)		
9	08:41			07:59		08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47		07:41			08:30				11:09 (1)		
	16:25		17:22			18:32 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59		16:39			16:05	22			11:31 (1)		
10	08:41			07:57		08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49		07:42			08:32				11:08 (1)		
	16:27		17:24			18:33 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57		16:37			16:05	24			11:32 (1)		
11	08:40			07:55		08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51		07:44			08:33				11:08 (1)		
	16:28		17:26			18:34 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54		16:36			16:05	25			11:33 (1)		
12	08:39			07:53		08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52		07:46			08:34				11:09 (1)		
	16:30		17:28			18:34 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52		16:34			16:05	26			11:35 (1)		
13	08:38			07:51		08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54		07:48			08:35				09:42 (3)		
	16:31		17:30			18:35 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49		16:32			16:05	30			11:36 (1)		
14	08:37			07:49		08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56		07:50			08:36				09:41 (3)		
	16:33		17:32			18:34 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47		16:34			16:05	33			11:36 (1)		
15	08:36			07:47		08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58		07:52			08:37				09:41 (3)		
	16:35		17:34			18:34 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44		16:29			16:05	35			11:37 (1)		
16	08:36			07:45		08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59		07:54			08:38				09:40 (3)		
	16:36		17:36			18:34 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42		16:28			16:05	38			11:37 (1)		
17	08:35			07:43		08:11 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01		07:56			08:39				09:40 (3)		
	16:38		17:38			18:34 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39		16:27			16:05	40			11:38 (1)		
18	08:33			07:41		08:12 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03		07:57			08:39				09:40 (3)		
	16:40		17:40			18:34 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37		16:25			16:05	41			11:39 (1)		
19	08:32			07:39		08:12 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05		07:59			08:40				09:41 (3)		
	16:41		17:42			18:32 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34		16:22	4	08:55 (2)	16:23				11:40 (1)		
20	08:31			07:37		08:13 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06		08:01			08:41				09:40 (3)		
	16:43		17:44			18:31 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32		16:20	12	08:59 (2)	16:22				11:40 (1)		
21	08:30			07:34		08:15 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08		08:03			08:45				09:41 (3)		
	16:45		17:46			18:30 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29		16:18	16	09:01 (2)	16:20				11:41 (1)		
22	08:29			07:32		08:16 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10		08:05			08:43				09:41 (3)		
	16:47		17:48			18:26 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27		16:15	19	09:02 (2)	16:19				11:41 (1)		
23	08:27			07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12		08:07			08:42				09:42 (3)		
	16:49		17:50			18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13		16:18	21	09:03 (2)	16:18				11:42 (1)		
24	08:26			07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14		08:09			08:41				09:43 (3)		
	16:51		17:52			18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11		16:17	22	09:03 (2)	16:17				11:42 (1)		
25	08:25			07:25			06:18	06:05	05:11	04:56	05:27	06:21	07:15		07:11			08:43				09:43 (3)		
	16:52		17:54			18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09		16:16	24	09:04 (2)	16:16				11:42 (1)		
26	08:23			07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17		07:13			08:44				09:44 (3)		
	16:54		17:56			18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07		16:15	23	09:04 (2)	16:15				11:43 (1)		
27	08:22			07:21			06:14	06:01	05:08	04:56	05:31	06:24	07:19		07:15			08:44				09:45 (3)		
	16:56		17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04		16:14	21	09:04 (2)	16:14				11:43 (1)		
28	08:20			07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21		07:17			08:44				09:46 (3)		
	16:58		18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02		16:13	19	09:04 (2)	16:13				11:43 (1)		
29	08:19						07:09	05:56	05:06	04:58	05:34	06:28	07:23		07:19			08:44				09:47 (3)		
	17:00						19:55	20:52	21:42	22:01	21:30	20:26	19:10		16:16	16	09:03 (2)	16:12				11:43 (1)		
30	08:17						07:06	05:54	05:05	04:58	05:35	06:29	07:24		07:20			08:44				09:49 (3)		
	17:02						19:56	20:54	21:43	22:00	21:28	20:23	19:07		16:58	14	09:04 (2)	16:11				11:43 (1)		
31	08:15						07:04		05:04		05:37	06:31			07:22			08:44				11:16 (1)		
	17:04	</																						

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AH - H34

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:13 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:04 20:55	06:59 19:42	07:53 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:27 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:12 17:06	08:11 16:14	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:00	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AI - H35

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	08:01 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	07:14	07:40 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04	08:01 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	07:12	07:39 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06	08:01 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
4	08:43	08:09	07:09	07:39 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08	08:01 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	08:07	07:07	07:39 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
	16:20	17:14	18:10	08:00 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05	07:05	07:39 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12	07:59 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03	07:02	07:41 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13	07:59 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01	07:00	07:41 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15	07:57 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:06
9	08:41	07:59	06:58	07:43 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
	16:25	17:22	18:17	07:55 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06
10	08:41	07:57	06:55	07:46 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24	18:19	07:50 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55	06:53		06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
	16:28	17:26	18:21		20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
12	08:39	07:53	06:50		06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:34
	16:30	17:28	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
13	08:38	07:51	06:48		06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
	16:31	17:30	18:25		20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:05
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	06:59	07:54	08:38
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:07
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:43
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:08
25	08:25	07:26	06:19	07:51 (1)	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:43
	16:53	17:54	18:47	07:57 (1)	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:08
26	08:23	07:23	06:16	07:48 (1)	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:44
	16:54	17:56	18:49	07:59 (1)	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:09
27	08:22	07:21	06:14	07:46 (1)	06:01	05:08	04:57	05:31	06:24	07:19	07:15	08:44
	16:56	17:58	18:51	08:00 (1)	20:48	21:39	22:01	21:33	20:30	19:15	17:05	16:10
28	08:20	07:19	06:11	07:43 (1)	06:01	05:07	04:57	05:32	06:26	07:21	07:17	08:44
	16:58	18:00	18:53	08:00 (1)	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:11
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	07:21	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:13
31	08:16		07:04			05:04		05:37	06:31		07:22	08:44
	17:04		19:58			21:44		21:27	20:21		16:56	16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		48	176							230		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		7	31							44		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AJ - H36

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AK - H37

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AL - H38

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AM - H39

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AN - H40

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AO - H41

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
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14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AP - H42

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AQ - H43

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AR - H44

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AS - H45
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	07:25 (5)	05:52
	16:15	17:06	18:02	20:00	8 07:33 (5)	20:55
2	08:44	08:12	07:14	06:59	07:23 (5)	05:50
	16:16	17:08	18:04	20:02	11 07:34 (5)	20:57
3	08:44	08:10	07:12	06:56	07:20 (5)	05:48
	16:17	17:10	18:06	20:04	14 07:34 (5)	20:59
4	08:43	08:09	07:09	06:54	07:18 (5)	05:46
	16:18	17:12	18:08	20:06	17 07:35 (5)	21:01
5	08:43	08:07	07:07	06:52	07:15 (5)	05:44
	16:20	17:14	18:10	20:08	19 07:34 (5)	21:03
6	08:43	08:05	07:05	06:49	07:13 (5)	05:42
	16:21	17:16	18:11	20:09	22 07:35 (5)	21:04
7	08:42	08:03	07:02	06:47	07:11 (5)	05:40
	16:22	17:18	18:13	20:11	24 07:35 (5)	21:06
8	08:42	08:01	07:00	06:44	07:08 (5)	05:38
	16:24	17:20	18:15	20:13	26 07:34 (5)	21:08
9	08:41	07:59	06:57	06:42	07:06 (5)	05:36
	16:25	17:22	18:17	20:15	28 07:34 (5)	21:10
10	08:40	07:57	06:55	06:40	07:04 (5)	05:35
	16:27	17:24	18:19	20:17	28 07:32 (5)	21:12
11	08:40	07:55	06:53	06:37	07:05 (5)	05:33
	16:28	17:26	18:21	20:19	27 07:32 (5)	21:13
12	08:39	07:53	06:50	06:35	07:06 (5)	05:31
	16:30	17:28	18:23	20:20	25 07:31 (5)	21:15
13	08:38	07:51	06:48	06:32	07:07 (5)	05:29
	16:31	17:30	18:25	20:22	23 07:30 (5)	21:17
14	08:37	07:49	06:45	06:30	07:07 (5)	05:27
	16:33	17:32	18:27	20:24	20 07:27 (5)	21:18
15	08:36	07:47	06:43	06:28	07:09 (5)	05:26
	16:35	17:34	18:29	20:26	16 07:25 (5)	21:20
16	08:35	07:45	06:41	06:25	07:11 (5)	05:24
	16:36	17:36	18:30	20:28	12 07:23 (5)	21:22
17	08:34	07:43	06:38	06:23		05:22
	16:38	17:38	18:32	20:30		21:23
18	08:33	07:41	06:36	06:21		05:21
	16:40	17:40	18:34	20:32		21:25
19	08:32	07:39	06:33	06:18		05:19
	16:42	17:42	18:36	20:33		21:27
20	08:31	07:37	06:31	06:16		05:18
	16:43	17:44	18:38	20:35		21:28
21	08:30	07:34	06:28	06:14		05:16
	16:45	17:46	18:40	20:37		21:30
22	08:29	07:32	06:26	06:12		05:15
	16:47	17:48	18:42	20:39		21:31
23	08:27	07:30	06:23	06:09		05:13
	16:49	17:50	18:44	20:41		21:33
24	08:26	07:28	06:21	06:07		05:12
	16:51	17:52	18:45	20:43		21:34
25	08:25	07:25	06:18	06:05		05:11
	16:53	17:54	18:47	20:44		21:36
26	08:23	07:23	06:16	06:03		05:09
	16:54	17:56	18:49	20:46		21:37
27	08:22	07:21	06:14	06:01		05:08
	16:56	17:58	18:51	20:48		21:39
28	08:20	07:19	06:11	05:59		05:07
	16:58	18:00	18:53	20:50		21:40
29	08:19		07:09	05:56		05:06
	17:00		19:55	20:52		21:41
30	08:17		07:06	07:30 (5)		05:54
	17:02		19:56	1 07:31 (5)		20:54
31	08:15		07:04	07:27 (5)		05:04
	17:04		19:58	5 07:32 (5)		21:44
Potential sun hours	250	273	367	420		494
Total, worst case			6	320		510
Sun reduction			0.27	0.35		0.87
Oper. time red.			1.00	1.00		1.00
Wind dir. red.			0.67	0.67		0.67
Total reduction			0.18	0.24		0.25
Total, real			1	76		22

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AS - H45

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	06:09 (4)	06:33	07:04 (5)	07:26	07:24	08:19			
	22:00	21:25	11 06:20 (4)	20:18	27 07:31 (5)	19:05	16:54	16:10			
2	05:00	05:40	06:11 (4)	06:35	07:03 (5)	07:28	07:26	08:21			
	22:00	21:23	10 06:21 (4)	20:16	28 07:31 (5)	19:02	16:52	16:09			
3	05:00	05:42	06:12 (4)	06:37	07:04 (5)	07:30	07:28	08:22			
	21:59	21:21	9 06:21 (4)	20:14	28 07:32 (5)	19:00	16:50	16:09			
4	05:01	05:44	06:14 (4)	06:38	07:05 (5)	07:32	07:30	08:24			
	21:59	21:19	7 06:21 (4)	20:11	26 07:31 (5)	18:57	16:48	16:08			
5	05:02	05:46	06:16 (4)	06:40	07:07 (5)	07:33	07:32	08:25			
	21:58	21:17	6 06:22 (4)	20:09	24 07:31 (5)	18:55	16:46	16:07			
6	05:03	05:47	06:17 (4)	06:42	07:09 (5)	07:35	07:34	08:26			
	21:58	21:16	5 06:22 (4)	20:06	22 07:31 (5)	18:53	16:45	16:07			
7	05:04	05:49	06:19 (4)	06:44	07:10 (5)	07:37	07:36	08:28			
	21:57	21:14	3 06:22 (4)	20:04	20 07:30 (5)	18:50	16:43	16:06			
8	05:05	05:51	06:20 (4)	06:45	07:12 (5)	07:39	07:38	08:29			
	21:56	21:12	1 06:21 (4)	20:01	17 07:29 (5)	18:48	16:41	16:06			
9	05:06	05:52		06:47	07:14 (5)	07:41	07:40	08:30			
	21:55	21:10		19:59	15 07:29 (5)	18:45	16:39	16:06			
10	05:07	05:54		06:49	07:16 (5)	07:43	07:42	08:32			
	21:55	21:08		19:57	12 07:28 (5)	18:43	16:37	16:05			
11	05:08	05:56		06:51	07:17 (5)	07:44	07:44	08:33			
	21:54	21:06		19:54	9 07:26 (5)	18:41	16:36	16:05			
12	05:09	05:58		06:52	07:19 (5)	07:46	07:46	08:34			
	21:53	21:03		19:52	5 07:24 (5)	18:38	16:34	16:05			
13	05:11	05:59		06:54	07:21 (5)	07:48	07:47	08:35			
	21:52	21:01		19:49	2 07:23 (5)	18:36	16:32	16:05			
14	05:12	06:01		06:56		07:50	07:49	08:36			
	21:51	20:59		19:47		18:34	16:31	16:05			
15	05:13	06:03		06:58		07:52	07:51	08:37			
	21:50	20:57		19:44		18:31	16:29	16:05			
16	05:15	06:05		06:59		07:54	07:53	08:38			
	21:49	20:55		19:42		18:29	16:28	16:05			
17	05:16	06:06		07:01		07:56	07:55	08:39			
	21:47	20:53		19:39		18:27	16:26	16:05			
18	05:17	06:08		07:03		07:57	07:57	08:39			
	21:46	20:51		19:37		18:24	16:25	16:05			
19	05:19	06:10		07:05		07:59	07:59	08:40			
	21:45	20:48		19:34		18:22	16:23	16:05			
20	05:20	06:12		07:06		08:01	08:01	08:41			
	21:44	20:46		19:32		18:20	16:22	16:06			
21	05:21	06:13		07:08		08:03	08:02	08:41			
	21:42	20:44		19:29		18:18	16:21	16:06			
22	05:23	06:15		07:10		08:05	08:04	08:42			
	21:41	20:42		19:27		18:15	16:19	16:07			
23	05:24	06:17		07:12		08:07	08:06	08:42			
	21:39	20:39		19:24		18:13	16:18	16:07			
24	05:26	06:19		07:14		08:09	08:08	08:43			
	21:38	20:37		19:22		18:11	16:17	16:08			
25	05:27	06:21		07:15		07:11	08:09	08:43			
	21:36	20:35		19:19		17:09	16:16	16:08			
26	05:29	06:22		07:17		07:13	08:11	08:43			
	21:35	20:32		19:17		17:07	16:15	16:09			
27	05:31	06:24	07:13 (5)	07:19		07:15	08:13	08:44			
	21:33	20:30	12 07:25 (5)	19:15		17:05	16:14	16:10			
28	05:32	06:26	07:11 (5)	07:21		07:17	08:14	08:44			
	21:32	5 06:14 (4)	20:28	16 07:27 (5)	19:12	17:02	16:13	16:11			
29	05:34	06:07 (4)	06:28	07:08 (5)	07:23	07:18	08:16	08:44			
	21:30	10 06:17 (4)	20:25	20 07:28 (5)	19:10	17:00	16:12	16:12			
30	05:35	06:06 (4)	06:29	07:07 (5)	07:24	07:20	08:18	08:44			
	21:28	12 06:18 (4)	20:23	23 07:30 (5)	19:07	16:58	16:11	16:13			
31	05:37	06:08 (4)	06:31	07:06 (5)		07:22		08:44			
	21:27	11 06:19 (4)	20:21	25 07:31 (5)		16:56		16:14			
Potential sun hours	512		460		382		328	259	233		
Total, worst case	38		148		235						
Sun reduction	0.32		0.34		0.32						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.67		0.67		0.67						
Total reduction	0.22		0.23		0.22						
Total, real	8		34		51						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AT - H46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	06:18 (4) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	06:16 (4) 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	06:14 (4) 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	06:12 (4) 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	06:10 (4) 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	06:10 (4) 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	06:12 (4) 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	06:13 (4) 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	07:19 (5) 20:17	05:35 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	07:17 (5) 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	07:14 (5) 20:20	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	07:12 (5) 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	07:09 (5) 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	07:07 (5) 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	07:04 (5) 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	07:02 (5) 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:59 (5) 20:32	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:57 (5) 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:54 (5) 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:52 (5) 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:50 (5) 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:50 (5) 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:51 (5) 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:51 (5) 20:44	06:30 (4) 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:52 (5) 20:46	06:28 (4) 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:52 (5) 20:48	06:26 (4) 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	06:54 (5) 20:50	06:24 (4) 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	07:55 (5) 20:52	06:22 (4) 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	07:57 (5) 20:54	06:20 (4) 21:43	04:58 22:01
31	08:15 17:04		07:04 19:58	08:00 (5) 20:54	06:31 (4) 21:43	04:58 22:01
Potential sun hours	250	273	367	420	494	510
Total, worst case			515		38	114
Sun reduction			0.27		0.35	0.38
Oper. time red.			1.00		1.00	1.00
Wind dir. red.			0.66		0.68	0.68
Total reduction			0.18		0.24	0.26
Total, real			93		9	29

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AT - H46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (5) 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (5) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:56 (5) 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:26 (4) 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:46 21:17	06:23 (4) 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:20 (4) 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57	05:49 21:14	06:19 (4) 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:20 (4) 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:22 (4) 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55	05:54 21:08	06:24 (4) 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:25 (4) 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	05:09 21:53	05:58 21:03	06:27 (4) 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	06:28 (4) 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:30 (4) 19:47	07:45 (5) 18:34	07:50 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	06:32 (4) 19:44	07:43 (5) 18:31	07:52 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	06:33 (4) 19:42	07:42 (5) 18:29	07:54 16:28	08:38 16:05
17	05:16 21:47	06:06 20:53	06:35 (4) 19:39	07:41 (5) 18:27	07:56 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:39 (5) 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:38 (5) 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	07:37 (5) 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	07:37 (5) 18:18	08:03 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	07:36 (5) 18:15	08:05 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	07:38 (5) 18:13	08:07 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	07:40 (5) 18:11	08:09 16:17	08:43 16:08
25	05:27 21:36	06:21 20:35	07:15 19:19	07:42 (5) 18:09	07:11 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:43 (5) 18:07	17:13 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:45 (5) 18:05	07:15 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:47 (5) 18:03	07:17 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:49 (5) 18:01	07:18 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:51 (5) 17:58	07:20 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case		157	496	24		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.68	0.66	0.66		
Total reduction		0.23	0.21	0.19		
Total, real		36	106	5		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AU - H47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	07:01	07:25 (5)	05:52	05:03	05:34 (3)					
2	08:44	16:16	08:12	17:08	18:04	07:12	18:04	20:00	12 07:37 (5)	20:55	21:45	17 05:51 (3)					
3	08:44	16:17	08:10	17:10	18:06	07:12	18:06	20:00	14 07:37 (5)	20:57	21:47	17 05:50 (3)					
4	08:43	16:18	08:09	17:12	18:08	07:09	18:08	20:00	15 07:35 (5)	20:59	21:48	16 05:49 (3)					
5	08:43	16:20	08:07	17:14	18:10	07:07	18:10	20:00	17 07:35 (5)	21:01	21:49	15 05:49 (3)					
6	08:43	16:21	08:05	17:16	18:11	07:05	18:11	20:00	18 07:33 (5)	21:03	21:50	14 05:49 (3)					
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	20:00	15 07:32 (5)	21:04	21:51	13 05:48 (3)					
8	08:42	16:24	08:01	17:20	18:15	07:00	18:15	20:00	11 07:30 (5)	21:06	21:52	11 05:48 (3)					
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	20:00	4 07:25 (5)	21:08	21:53	10 05:47 (3)					
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	20:00		21:10	21:54	8 05:47 (3)					
11	08:40	16:28	07:55	17:26	18:21	06:53	18:21	20:00		21:11	21:54	8 05:47 (3)					
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	20:00		21:12	21:55	6 05:45 (3)					
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	20:00		21:13	21:56	2 05:44 (3)					
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	20:00		21:14	21:57						
15	08:36	16:35	07:47	17:34	18:29	06:43	18:29	20:00		21:15	21:58						
16	08:35	16:36	07:45	17:36	18:30	06:41	18:30	20:00		21:16	21:59						
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	20:00		21:17	22:00						
18	08:33	16:40	07:41	17:40	18:34	06:36	18:34	20:00		21:18	22:01						
19	08:32	16:42	07:39	17:42	18:36	06:33	18:36	20:00		21:19	22:02						
20	08:31	16:43	07:37	17:44	18:38	06:31	18:38	20:00		21:20	22:03						
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	20:00		21:21	22:04						
22	08:29	16:47	07:32	17:48	18:42	06:26	18:42	20:00		21:22	22:05						
23	08:27	16:49	07:30	17:50	18:44	06:23	18:44	20:00		21:23	22:06						
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45	20:00		21:24	22:07						
25	08:25	16:53	07:25	17:54	18:47	06:18	18:47	20:00		21:25	22:08						
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	20:00		21:26	22:09						
27	08:22	16:56	07:21	17:58	18:51	06:14	18:51	20:00		21:27	22:10						
28	08:20	16:58	07:19	18:00	18:53	06:11	18:53	20:00		21:28	22:11						
29	08:19	17:00			19:55	07:09	19:55	20:00		21:29	22:12						
30	08:17	17:02			19:56	07:06	19:56	20:00		21:30	22:13						
31	08:15	17:04			19:58	07:04	19:58	20:00		21:31	22:14						
Potential sun hours	250		273		367		420			494		510					
Total, worst case					22		106			138		129					
Sun reduction					0.27		0.35			0.38		0.32					
Oper. time red.					1.00		1.00			1.00		1.00					
Wind dir. red.					0.68		0.68			0.65		0.65					
Total reduction					0.18		0.24			0.25		0.21					
Total, real					4		25			34		27					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AU - H47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00	05:45 (3) 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	05:00 21:59	05:43 (3) 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	05:01 21:59	05:43 (3) 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:42 (3) 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:42 (3) 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57	05:42 (3) 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56	05:41 (3) 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55	05:41 (3) 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55	05:40 (3) 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54	05:40 (3) 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	05:10 21:53	05:42 (3) 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52	05:43 (3) 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	05:44 (3) 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	05:13 21:50	05:45 (3) 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	05:15 21:49	05:47 (3) 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	05:16 21:47	05:48 (3) 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46	05:49 (3) 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	05:51 (3) 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	05:52 (3) 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	05:53 (3) 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	05:55 (3) 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39	05:56 (3) 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	05:57 (3) 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:36	05:59 (3) 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:00 (3) 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:01 (3) 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:02 (3) 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	270		130			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.65		0.68			
Total reduction	0.21		0.22			
Total, real	57		28			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AV - H48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:17 (5) 21:03	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:19 (5) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:22 (5) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:01
31	08:15 17:04		07:04 19:58	05:52 20:56	05:04 21:44	04:59 22:01
Potential sun hours	250	273	367	420	494	510
Total, worst case			24	90	175	19
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.66	0.66
Total reduction			0.18	0.24	0.25	0.21
Total, real			4	21	44	4

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AV - H48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:37	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		08:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	193		115			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	41		25			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AW - H49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:44 (4) 20:55	05:03 20:29 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:47 (4) 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	19:12 (3) 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	19:14 (3) 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	16:49 (5) 18:15	07:00 20:13	05:38 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	16:47 (5) 18:17	06:57 20:15	05:36 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	16:46 (5) 18:19	06:55 20:17	05:34 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	16:45 (5) 18:21	06:52 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	16:43 (5) 18:23	17:53 (4) 20:20	06:35 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	16:43 (5) 18:25	17:49 (4) 20:22	06:32 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	16:43 (5) 18:27	17:46 (4) 20:24	06:30 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	16:43 (5) 18:28	17:45 (4) 20:26	06:28 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	16:43 (5) 18:30	17:43 (4) 20:28	06:25 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	16:43 (5) 18:32	17:42 (4) 20:30	06:23 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	16:43 (5) 18:34	17:40 (4) 20:31	06:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	16:44 (5) 18:36	17:40 (4) 20:33	06:18 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	16:45 (5) 18:38	17:39 (4) 20:35	06:16 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	16:46 (5) 18:40	17:38 (4) 20:37	06:14 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	16:48 (5) 18:41	17:37 (4) 20:39	06:12 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	16:59 (5) 18:43	17:38 (4) 20:41	06:09 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	06:21 18:45	18:12 (4) 20:42	06:07 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	18:18 (3) 20:44	06:05 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	17:37 (4) 20:46	06:03 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	18:22 (3) 20:48	06:01 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	17:39 (4) 20:50	05:58 21:40	04:57 22:01
29	08:18 17:00		07:08 19:54	18:39 (4) 20:52	05:56 21:41	04:57 22:01
30	08:17 17:02		07:06 19:56	18:41 (4) 20:53	05:55 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	18:42 (4) 19:30 (3)	05:54 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case		225	625	87	541	45
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.67	0.67	0.64	0.64
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		35	114	21	131	9

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AW - H49

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:34 (2) 20:53 (2)	06:33 20:18	07:26 19:05	18:30 (4) 16:15 (5)
2	04:59 22:00	05:40 21:23	20:35 (2) 20:52 (2)	06:35 20:16	07:28 19:02	18:36 (4) 16:23 (5)
3	05:00 21:59	05:42 21:21	20:35 (2) 20:50 (2)	06:36 20:13	07:30 19:00	16:52 16:50
4	05:01 21:59	05:44 21:19	20:36 (2) 20:48 (2)	06:38 20:11	07:31 18:57	16:52 (5) 16:48
5	05:02 21:58	05:45 21:17	20:36 (2) 20:46 (2)	06:40 20:09	07:33 18:55	16:46 16:46
6	05:03 21:58	05:47 21:15	20:38 (2) 20:45 (2)	06:42 20:06	07:35 18:52	16:46 16:44
7	05:04 21:57	05:49 21:13	20:41 (2) 20:43 (2)	06:43 20:04	07:37 18:50	16:36 16:43
8	05:05 21:56	05:50 20:42 (2)	06:45 20:01	19:09 (3) 19:18 (3)	07:39 18:48	16:41 16:41
9	05:06 21:55	05:52 20:40 (2)	06:47 19:59	19:06 (3) 19:20 (3)	07:41 18:45	16:40 16:39
10	05:07 21:55	05:54 20:39 (2)	06:49 19:56	18:40 (4) 19:21 (3)	07:42 18:43	16:39 16:37
11	05:08 21:54	05:56 20:38 (2)	06:50 19:54	18:37 (4) 19:22 (3)	07:44 18:40	16:37 16:35
12	05:09 21:53	05:57 20:37 (2)	06:52 19:51	18:34 (4) 19:22 (3)	07:46 18:38	16:35 16:34
13	05:10 21:52	05:59 20:37 (2)	06:54 19:49	18:32 (4) 19:22 (3)	07:48 18:36	16:34 16:32
14	05:12 21:51	06:01 20:36 (2)	06:56 19:47	18:30 (4) 19:18 (3)	07:50 18:33	16:32 16:31
15	05:13 21:50	06:03 20:35 (2)	06:58 19:44	18:28 (4) 19:16 (3)	07:52 18:31	16:31 16:29
16	05:14 21:49	06:04 20:34 (2)	06:59 19:42	18:27 (4) 19:14 (3)	07:54 18:29	16:29 16:27
17	05:16 21:47	06:06 20:35 (2)	07:01 19:39	18:26 (4) 19:11 (3)	07:55 18:26	16:27 16:26
18	05:17 21:46	06:08 20:34 (2)	07:03 19:37	18:25 (4) 19:08 (3)	07:57 18:24	16:26 16:24
19	05:18 21:45	06:10 20:33 (2)	07:05 19:34	18:25 (4) 19:06 (3)	07:59 18:22	16:24 16:23
20	05:20 21:44	06:12 20:34 (2)	07:06 19:32	18:24 (4) 19:04 (3)	08:01 18:20	16:23 16:22
21	05:21 21:42	06:13 20:33 (2)	07:08 19:29	18:23 (4) 18:58 (4)	08:03 18:17	16:22 16:20
22	05:23 21:41	06:15 20:32 (2)	07:10 19:27	18:23 (4) 18:57 (4)	08:05 18:15	16:20 16:19
23	05:24 21:39	06:17 20:33 (2)	07:12 19:24	18:23 (4) 18:56 (4)	08:07 18:13	16:19 16:18
24	05:26 21:38	06:19 20:32 (2)	07:13 19:22	18:23 (4) 18:54 (4)	08:09 18:11	16:18 16:17
25	05:27 21:36	06:20 20:33 (2)	07:15 19:19	18:23 (4) 18:51 (4)	07:11 17:09	16:17 16:16
26	05:29 21:35	06:22 20:32 (2)	07:17 19:17	18:23 (4) 18:48 (4)	07:13 17:06	16:16 16:14
27	05:30 21:33	06:24 20:32 (2)	07:19 19:14	18:24 (4) 18:46 (4)	07:14 17:04	16:14 16:13
28	05:32 21:32	06:26 20:33 (2)	07:21 19:12	18:25 (4) 18:44 (4)	07:16 17:02	16:13 16:12
29	05:34 21:30	06:27 20:32 (2)	07:22 19:09	18:27 (4) 18:41 (4)	07:18 17:00	16:12 16:12
30	05:35 21:28	06:29 20:33 (2)	07:24 19:07	18:27 (4) 18:38 (4)	07:20 16:58	16:13 16:11
31	05:37 21:26	06:31 20:34 (2)	07:22 19:07	18:22 18:38 (4)	07:22 16:58	16:14 (5) 16:25 (5)
Potential sun hours	512	460	382	328	259	233
Total, worst case	504	82	719	226	12	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.64	0.64	0.67	0.66	0.66	
Total reduction	0.21	0.22	0.22	0.19	0.18	
Total, real	104	18	155	44	2	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park IE-F91 RHH9 Sligo +353719161416 abyrrne / abyrrne@jodireland.com Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Assumptions for shadow calculations

Shadow receptor: AX - H50

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	12:52 (2) 08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:58 (1) 08:19
2 08:44	12:53 (2) 08:12		07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	16:22 (1) 16:10	13:28 (2)
3 08:44	12:53 (2) 08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	15:59 (1) 08:21	12:41 (2)
4 08:43	12:54 (2) 08:08		07:10	06:54	05:46	05:00	05:01	05:44	06:38	07:32	16:19 (1) 16:08	13:29 (2)
5 08:43	12:54 (2) 08:07		07:09	06:54	05:44	05:00	05:01	05:44	06:38	07:32	16:00 (1) 16:08	12:41 (2)
6 08:43	12:54 (2) 08:05		07:07	06:51	05:44	05:00	05:02	05:45	06:40	07:33	16:17 (1) 16:08	13:30 (2)
7 08:42	12:56 (2) 08:03		07:05	06:49	05:42	05:03	05:47	06:42	07:35	07:36	16:01 (1) 16:08	12:42 (2)
8 08:42	12:56 (2) 08:01		07:02	06:47	05:40	05:04	05:49	06:43	07:37	07:38	16:14 (1) 16:07	13:32 (2)
9 08:41	12:58 (2) 07:59		07:00	06:44	05:38	05:05	05:51	06:45	07:39	07:40	16:02 (1) 16:07	12:42 (2)
10 08:40	12:58 (2) 07:57		06:57	06:42	05:36	05:06	05:52	06:47	07:41	07:42	16:10 (1) 16:06	13:32 (2)
11 08:40	12:59 (2) 07:55		06:55	06:39	05:34	05:07	05:54	06:49	07:42	07:44	16:16 (1) 16:05	13:33 (2)
12 08:39	13:00 (2) 07:53		06:53	06:37	05:33	05:09	05:57	06:52	07:46	07:46	16:16 (1) 16:05	13:34 (2)
13 08:38	13:01 (2) 07:51		06:51	06:35	05:31	05:10	05:59	06:54	07:48	07:48	16:15 (1) 16:05	13:35 (2)
14 08:37	13:02 (2) 07:49		06:48	06:32	05:29	05:11	06:01	06:56	07:50	07:51	16:14 (1) 16:04	13:36 (2)
15 08:36	13:03 (2) 07:47		06:46	06:30	05:27	05:12	06:03	06:58	07:52	07:52	16:13 (1) 16:03	13:37 (2)
16 08:35	13:04 (2) 07:45		06:44	06:28	05:26	05:13	06:05	06:59	07:54	07:54	16:12 (1) 16:02	13:38 (2)
17 08:34	13:05 (2) 07:43		06:42	06:26	05:24	05:14	06:06	06:59	07:54	07:55	16:11 (1) 16:01	13:39 (2)
18 08:33	13:06 (2) 07:41		06:40	06:24	05:22	05:15	06:07	07:01	07:56	07:56	16:10 (1) 16:00	13:40 (2)
19 08:32	13:07 (2) 07:39		06:38	06:22	05:20	05:16	06:08	07:03	07:57	07:57	16:09 (1) 15:59	13:41 (2)
20 08:31	13:08 (2) 07:37		06:36	06:20	05:18	05:17	06:09	07:05	07:59	07:59	16:08 (1) 15:58	13:42 (2)
21 08:30	13:09 (2) 07:35		06:34	06:18	05:16	05:18	06:10	07:06	08:01	08:01	16:07 (1) 15:57	13:43 (2)
22 08:29	13:10 (2) 07:33		06:32	06:16	05:14	05:20	06:11	07:07	08:02	08:02	16:06 (1) 15:56	13:44 (2)
23 08:27	13:11 (2) 07:31		06:30	06:14	05:12	05:21	06:12	07:08	08:03	08:03	16:05 (1) 15:55	13:45 (2)
24 08:26	13:12 (2) 07:29		06:28	06:12	05:10	05:22	06:13	07:09	08:04	08:04	16:04 (1) 15:54	13:46 (2)
25 08:25	13:13 (2) 07:27		06:26	06:10	05:08	05:23	06:14	07:10	08:05	08:05	16:03 (1) 15:53	13:47 (2)
26 08:23	13:14 (2) 07:25		06:24	06:08	05:06	05:24	06:15	07:11	08:06	08:06	16:02 (1) 15:52	13:48 (2)
27 08:22	13:15 (2) 07:23		06:22	06:06	05:04	05:25	06:16	07:12	08:07	08:07	16:01 (1) 15:51	13:49 (2)
28 08:20	13:16 (2) 07:21		06:20	06:04	05:02	05:26	06:17	07:13	08:08	08:08	16:00 (1) 15:50	13:50 (2)
29 08:19	13:17 (2) 07:19		06:18	06:02	05:00	05:27	06:18	07:14	08:09	08:09	15:59 (1) 15:49	13:51 (2)
30 08:17	13:18 (2) 07:17		06:16	06:00	04:58	05:28	06:19	07:15	08:10	08:10	15:58 (1) 15:48	13:52 (2)
31 08:15	13:19 (2) 07:15		06:14	05:58	04:56	05:29	06:20	07:16	08:11	08:11	15:57 (1) 15:47	13:53 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	1021	317										
Sun reduction	0.24	0.23										
Oper. time red.	1.00	1.00										
Wind dir. red.	0.63	0.65										
Total reduction	0.15	0.15										
Total, real	156	48										

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AY - H51

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February	March	April	May	June	July	August	September	October	November	December		
1	08:44		08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19	08:54 (2)
	16:15		17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10	10 09:04 (2)
2	08:44		08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26		08:21	08:56 (2)
	16:16		17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09	8 09:04 (2)
3	08:44		08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22	08:57 (2)
	16:17		17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50		16:08	7 09:04 (2)
4	08:43		08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24	08:59 (2)
	16:18		17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48		16:08	5 09:04 (2)
5	08:43		08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25	09:00 (2)
	16:20		17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46		16:07	3 09:03 (2)
6	08:43	09:16 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:27	09:02 (2)
	16:21	2 09:18 (2)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44		16:07	2 09:04 (2)
7	08:42	09:15 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36		08:28	
	16:22	3 09:18 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43		16:06	
8	08:42	09:14 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38		08:29	
	16:24	5 09:19 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41		16:06	
9	08:41	09:14 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:30	
	16:25	7 09:21 (2)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39		16:05	
10	08:41	09:13 (2)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42		08:32	
	16:27	8 09:21 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37		16:05	
11	08:40	09:12 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44		08:33	
	16:28	10 09:22 (2)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36		16:05	
12	08:39	09:11 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:47 (2)	08:34	
	16:30	12 09:23 (2)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	3 08:50 (2)	16:05	
13	08:38	09:10 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:44 (2)	08:35	
	16:31	13 09:23 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	10 08:54 (2)	16:05	
14	08:37	09:09 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:42 (2)	08:36	
	16:33	15 09:24 (2)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	14 08:56 (2)	16:05	
15	08:37	09:08 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:41 (2)	08:37	
	16:34	17 09:25 (2)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16 08:57 (2)	16:05	
16	08:36	09:07 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:40 (2)	08:38	
	16:36	19 09:26 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	19 08:59 (2)	16:05	
17	08:35	09:05 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39 (2)	08:39	
	16:38	20 09:25 (2)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	20 08:59 (2)	16:05	
18	08:33	09:04 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39 (2)	08:39	
	16:40	22 09:26 (2)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	21 09:00 (2)	16:05	
19	08:32	09:03 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:39 (2)	08:40	
	16:41	24 09:27 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	22 09:01 (2)	16:05	
20	08:31	09:03 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:39 (2)	08:41	
	16:43	23 09:26 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	22 09:01 (2)	16:06	
21	08:30	09:04 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:39 (2)	08:41	
	16:45	23 09:27 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	23 09:02 (2)	16:06	
22	08:29	09:05 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:39 (2)	08:42	
	16:47	22 09:27 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	23 09:02 (2)	16:07	
23	08:27	09:05 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:39 (2)	08:42	
	16:49	22 09:27 (2)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	24 09:03 (2)	16:07	
24	08:26	09:05 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:41 (2)	08:43	
	16:51	21 09:26 (2)	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	22 09:03 (2)	16:08	
25	08:25	09:06 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09	08:43 (2)	08:43	
	16:52	20 09:26 (2)	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	20 09:03 (2)	16:08	
26	08:23	09:07 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:45 (2)	08:44	
	16:54	19 09:26 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	19 09:04 (2)	16:09	
27	08:22	09:09 (2)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13	08:47 (2)	08:44	
	16:56	16 09:25 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	16:14	17 09:04 (2)	16:10	
28	08:20	09:10 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:15	08:49 (2)	08:44	
	16:58	14 09:24 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	15 09:04 (2)	16:11	
29	08:19	09:12 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16	08:51 (2)	08:44	
	17:00	10 09:22 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	14 09:05 (2)	16:11	
30	08:17	09:16 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	08:52 (2)	08:44	
	17:02	2 09:18 (2)		19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	12 09:04 (2)	16:12	
31	08:15			07:04		05:04		05:37	06:31		07:22			08:44	
	17:04			19:58		21:44		21:27	20:21		16:56			16:13	
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	336	233	
Total, worst case	369												336	35	
Sun reduction	0.24												0.27	0.21	
Oper. time red.	1.00												1.00	1.00	
Wind dir. red.	0.61												0.61	0.61	
Total reduction	0.15												0.16	0.13	
Total, real	54												54	4	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AZ - H52

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		09:18 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24				06:33	07:26	07:24				08:19	09:00 (2)	
	16:15	19	09:37 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54				06:35	07:28	07:26				16:10	23	09:23 (2)
2	08:44		09:18 (2)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26				06:36	07:30	07:28				08:21		09:01 (2)
	16:16	20	09:38 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				06:37	07:32	07:30				16:09	23	09:24 (2)
3	08:44		09:17 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28				06:38	07:32	07:30				08:22		09:01 (2)
	16:17	21	09:38 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50				06:39	07:32	07:30				16:08	23	09:24 (2)
4	08:43		09:17 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30				06:40	07:33	07:32				08:24		09:01 (2)
	16:18	22	09:39 (2)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48				06:41	07:33	07:32				16:08	24	09:25 (2)
5	08:43		09:16 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32				06:42	07:35	07:34				08:25		09:01 (2)
	16:20	23	09:39 (2)	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46				06:43	07:36	07:35				16:07	24	09:25 (2)
6	08:43		09:16 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34				06:44	07:37	07:36				08:27		09:02 (2)
	16:21	24	09:40 (2)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44				06:45	07:38	07:37				16:07	24	09:26 (2)
7	08:42		09:16 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36				06:46	07:39	07:38				08:28		09:03 (2)
	16:22	24	09:40 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				06:47	07:40	07:39				16:06	23	09:26 (2)
8	08:42		09:17 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38				06:48	07:41	07:40				08:29		09:05 (2)
	16:24	24	09:41 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41				06:49	07:42	07:41				16:06	22	09:27 (2)
9	08:41		09:18 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				06:50	07:43	07:42				16:03		09:06 (2)
	16:25	23	09:41 (2)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39				06:51	07:44	07:43				16:05	21	09:27 (2)
10	08:41		09:18 (2)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42				06:52	07:45	07:44				16:03		09:07 (2)
	16:27	23	09:41 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37				06:53	07:46	07:45				16:05	20	09:27 (2)
11	08:40		09:18 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44				06:54	07:46	07:45				16:03		09:08 (2)
	16:28	23	09:41 (2)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36				06:55	07:47	07:46				16:05	19	09:27 (2)
12	08:39		09:19 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46				06:56	07:48	07:47				16:03		09:10 (2)
	16:30	23	09:42 (2)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34				06:57	07:49	07:48				16:05	18	09:28 (2)
13	08:38		09:19 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48				06:58	07:50	07:49				16:05		09:11 (2)
	16:31	23	09:42 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32				06:59	07:51	07:50				16:05	17	09:28 (2)
14	08:37		09:20 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				06:59	07:52	07:51				16:03		09:12 (2)
	16:33	22	09:42 (2)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31				07:00	07:53	07:52				16:05	17	09:29 (2)
15	08:37		09:21 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51				07:01	07:54	07:53				16:03		09:13 (2)
	16:34	21	09:42 (2)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				07:02	07:55	07:54				16:05	16	09:29 (2)
16	08:36		09:22 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53				07:03	07:56	07:55				16:03		09:13 (2)
	16:36	20	09:42 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28				07:04	07:57	07:56				16:05	16	09:29 (2)
17	08:35		09:22 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55				07:05	07:58	07:57				16:03		09:14 (2)
	16:38	19	09:41 (2)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26				07:06	07:59	07:58				16:05	15	09:29 (2)
18	08:33		09:23 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				07:07	07:60	07:59				16:03		09:15 (2)
	16:40	18	09:41 (2)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25				07:08	07:61	07:60				16:05	15	09:30 (2)
19	08:32		09:25 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				07:09	07:62	07:61				16:03		09:16 (2)
	16:41	16	09:41 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23				07:10	07:63	07:62				16:05	15	09:31 (2)
20	08:31		09:26 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01				07:11	07:64	07:63			09:05 (2)	08:41		09:16 (2)
	16:43	13	09:39 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22				07:12	07:65	07:64			09:11 (2)	16:06	14	09:30 (2)
21	08:30		09:28 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				07:13	07:66	07:65			09:03 (2)	08:41		09:17 (2)
	16:45	10	09:38 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20				07:14	07:67	07:66			09:13 (2)	16:06	14	09:31 (2)
22	08:29		09:31 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04				07:15	07:68	07:67			09:02 (2)	08:42		09:17 (2)
	16:47	6	09:37 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19				07:16	07:69	07:68			09:15 (2)	16:06	14	09:31 (2)
23	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				07:17	07:70	07:69			09:01 (2)	08:42		09:18 (2)
	16:49			17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18				07:18	07:71	07:70			09:17 (2)	16:07	14	09:32 (2)
24	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08				07:19	07:72	07:71			09:00 (2)	08:43		09:18 (2)
	16:51			17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17				07:20	07:73	07:72			09:18 (2)	16:08	14	09:32 (2)
25	08:25			07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11	08:09				07:21	07:74	07:73			09:00 (2)	08:43		09:18 (2)
	16:52			17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16				07:22	07:75	07:74			09:19 (2)	16:08	15	09:33 (2)
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11				07:23	07:76	07:75			09:00 (2)	08:44		09:19 (2)
	16:54			17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15				07:24	07:77	07:76			09:20 (2)	16:09	15	09:34 (2)
27	08:22			07:21	06:14	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13				07:25	07:78	07:77			09:00 (2)	08:44		09:19 (2)
	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:14				07:26	07:79	07:78			09:21 (2)	16:10	15	09:34 (2)
28																									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BA - H53

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:18 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: BB - H54
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	08:12 (1) 08:17 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:58	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:54	05:08 21:56	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:53	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:43 (1) 08:52 (1)	07:48 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:40 (1) 08:55 (1)	07:50 16:31
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:39 (1) 08:56 (1)	07:51 16:29
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	08:37 (1) 08:57 (1)	07:53 16:28
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	06:59 19:39	07:56 18:27	08:36 (1) 08:58 (1)	07:55 16:26
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:35 (1) 08:59 (1)	07:57 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	08:35 (1) 08:59 (1)	07:59 16:23
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:34 (1) 08:59 (1)	08:01 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:34 (1) 08:59 (1)	08:02 16:21
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:34 (1) 08:58 (1)	08:04 16:19
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:35 (1) 08:58 (1)	08:06 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:37 (1) 08:57 (1)	08:08 16:17
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:39 (1) 07:56 (1)	08:10 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	07:41 (1) 07:55 (1)	08:11 16:15
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	07:43 (1) 07:54 (1)	08:13 16:14
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	07:45 (1) 07:52 (1)	08:15 16:13
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	07:47 (1) 07:49 (1)	08:16 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58		08:18 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:14 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		292	5							299		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.64	0.64							0.64		
Total reduction		0.15	0.17							0.19		
Total, real		43	1							56		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BC - H55

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	09:21 (3) 11:16 (1)	08:14 17:06	07:16 18:02	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	09:22 (3) 11:16 (1)	08:12 17:08	07:14 18:04	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	09:22 (3) 11:16 (1)	08:10 17:10	07:12 18:06	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	09:23 (3) 11:17 (1)	08:09 17:12	07:09 18:08	05:46 20:56	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	09:24 (3) 11:16 (1)	08:07 17:14	07:07 18:10	05:44 20:58	05:02 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	09:25 (3) 11:17 (1)	08:05 17:16	07:05 18:11	05:42 20:59	05:03 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	09:25 (3) 11:17 (1)	08:03 17:18	07:02 18:13	05:40 20:59	05:04 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	09:26 (3) 11:17 (1)	08:01 17:20	07:00 18:15	05:38 20:59	05:05 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	09:28 (3) 11:17 (1)	07:59 17:22	06:57 18:17	05:36 20:59	05:04 21:54	05:02 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:41 16:27	09:29 (3) 11:17 (1)	07:57 17:24	06:55 18:19	05:34 20:59	05:06 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	09:30 (3) 11:17 (1)	07:55 17:26	06:53 18:21	05:33 20:59	05:08 21:56	05:08 21:56	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	09:31 (3) 11:17 (1)	07:53 17:28	06:50 18:23	05:31 20:59	05:09 21:56	05:09 21:56	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	09:33 (3) 11:16 (1)	07:51 17:30	06:48 18:25	05:29 20:59	05:11 21:57	05:11 21:57	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	09:35 (3) 11:16 (1)	07:49 17:32	06:45 18:27	05:27 20:59	05:12 21:58	05:12 21:58	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	09:35 (3) 11:16 (1)	07:47 17:34	06:43 18:29	05:26 20:59	05:13 21:58	05:13 21:58	06:03 20:57	06:58 19:44	07:52 18:31	07:52 16:29	08:37 16:05
16	08:36 16:36	09:35 (3) 11:15 (1)	07:45 17:36	06:41 18:30	05:24 20:59	05:14 21:59	05:14 21:59	06:05 20:55	06:59 19:42	07:54 18:29	07:54 16:28	08:38 16:05
17	08:35 16:38	09:35 (3) 11:15 (1)	07:43 17:38	06:38 18:32	05:22 20:59	05:14 21:59	05:14 21:59	06:06 20:53	07:01 19:39	07:56 18:27	07:56 16:26	08:39 16:05
18	08:33 16:40	09:35 (3) 11:15 (1)	07:41 17:40	06:36 18:34	05:21 20:59	05:17 21:59	05:17 21:59	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	09:35 (3) 11:15 (1)	07:39 17:42	06:33 18:36	05:19 20:59	05:19 21:59	05:19 21:59	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	09:35 (3) 11:15 (1)	07:37 17:44	06:31 18:38	05:18 20:59	05:18 21:59	05:18 21:59	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	09:35 (3) 11:15 (1)	07:34 17:46	06:28 18:40	05:16 20:59	05:16 21:59	05:16 21:59	06:13 20:44	07:08 19:29	08:03 18:18	08:03 16:20	08:42 16:06
22	08:29 16:47	09:35 (3) 11:15 (1)	07:32 17:48	06:26 18:42	05:15 20:59	05:15 21:59	05:15 21:59	06:15 20:42	07:10 19:27	08:05 18:15	08:05 16:19	08:42 16:07
23	08:27 16:49	09:35 (3) 11:15 (1)	07:30 17:50	06:23 18:44	05:13 20:59	05:13 21:59	05:13 21:59	06:17 20:39	07:12 19:24	08:07 18:13	08:07 16:18	08:42 16:07
24	08:26 16:51	09:35 (3) 11:15 (1)	07:28 17:52	06:21 18:45	05:12 20:59	05:12 21:59	05:12 21:59	06:19 20:37	07:14 19:22	08:09 18:11	08:09 16:17	08:43 16:07
25	08:25 16:52	09:35 (3) 11:15 (1)	07:25 17:54	06:18 18:47	05:11 20:59	05:11 21:59	05:11 21:59	06:21 20:35	07:15 19:19	08:11 18:09	08:11 16:16	08:43 16:07
26	08:23 16:54	09:35 (3) 11:15 (1)	07:23 17:56	06:16 18:49	05:09 20:59	05:09 21:59	05:09 21:59	06:22 20:33	07:17 19:17	08:13 18:09	08:13 16:15	08:44 16:07
27	08:22 16:56	09:35 (3) 11:15 (1)	07:21 17:58	06:14 18:51	05:08 20:59	05:08 21:59	05:08 21:59	06:24 20:30	07:19 19:15	08:15 18:09	08:15 16:14	08:44 16:07
28	08:20 16:58	09:35 (3) 11:15 (1)	07:19 18:00	06:11 18:53	05:07 20:59	05:07 21:59	05:07 21:59	06:26 20:28	07:21 19:12	08:17 18:09	08:17 16:13	08:44 16:07
29	08:19 17:00	09:35 (3) 11:15 (1)	07:17 18:02	06:09 19:00	05:06 20:59	05:06 21:59	05:06 21:59	06:28 20:26	07:23 19:10	08:19 18:09	08:19 16:12	08:44 16:07
30	08:17 17:02	09:35 (3) 11:15 (1)	07:15 18:04	06:07 19:02	05:05 20:59	05:05 21:59	05:05 21:59	06:29 20:23	07:24 19:07	08:20 18:09	08:20 16:11	08:44 16:07
31	08:15 17:04	09:35 (3) 11:15 (1)	07:13 18:06	06:05 19:04	05:04 20:59	05:04 21:59	05:04 21:59	06:31 20:21	07:22 19:07	08:21 18:09	08:21 16:11	08:44 16:07
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	992	197									307	2070
Sun reduction	0.24	0.23									0.27	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.60	0.64									0.60	0.60
Total reduction	0.15	0.15									0.16	0.12
Total, real	144	29									49	256

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BD - H56

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:27 (3)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24					07:24		08:19		09:20 (3)
	16:15	65	11:27 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54					16:54		11:09 (1)	43	16:10
2	08:44		09:28 (3)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26					07:26		08:21		09:19 (3)
	16:16	64	11:27 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52					16:52		16:09	47	11:10 (1)
3	08:44		09:28 (3)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28					07:28		08:22		09:18 (3)
	16:17	63	11:27 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50					16:50		16:08	51	11:11 (1)
4	08:43		09:30 (3)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30					07:30		08:24		09:18 (3)
	16:18	60	11:27 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48					16:48		16:08	54	11:12 (1)
5	08:43		09:30 (3)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32					07:32		08:25		09:17 (3)
	16:20	59	11:27 (1)	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46					16:46		16:07	56	11:12 (1)
6	08:43		09:31 (3)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34					07:34		08:27		09:18 (3)
	16:21	59	11:28 (1)	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		07:45					18:53		16:07	58	11:14 (1)
7	08:42		09:32 (3)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36					07:36		08:28		09:17 (3)
	16:22	56	11:27 (1)	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43					16:43		16:06	60	11:14 (1)
8	08:42		09:33 (3)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38					07:38		08:29		09:18 (3)
	16:24	54	11:27 (1)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41					16:41		16:06	60	11:15 (1)
9	08:41		09:35 (3)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40					07:40		08:30		09:17 (3)
	16:25	51	11:28 (1)	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39					16:39		16:05	62	11:16 (1)
10	08:41		09:36 (3)	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42					07:42		08:32		09:17 (3)
	16:27	47	11:27 (1)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37					16:37		16:05	64	11:16 (1)
11	08:40		09:38 (3)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44					07:44		08:33		09:17 (3)
	16:28	43	11:27 (1)	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36					16:36		16:05	65	11:17 (1)
12	08:39		09:41 (3)	07:53		06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46					07:46		08:34		09:18 (3)
	16:30	36	11:26 (1)	17:28		18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34					16:34		16:05	65	11:18 (1)
13	08:38		10:54 (1)	07:51		06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48					07:48		08:35		09:18 (3)
	16:31	32	11:26 (1)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:32		16:32					16:32		16:05	65	11:19 (1)
14	08:37		10:55 (1)	07:49		08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56		07:50			08:37 (2)	07:49					09:19 (3)
	16:33	30	11:25 (1)	17:32	2	08:17 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47		18:34	7	08:44 (2)	16:31						16:05
15	08:37		10:55 (1)	07:47		08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58		07:52			08:34 (2)	07:51					09:19 (3)
	16:35	28	11:25 (1)	17:34	6	08:19 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44		18:31	13	08:47 (2)	16:29						16:05
16	08:36		10:59 (1)	07:45		08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59		07:54			08:32 (2)	07:53					09:19 (3)
	16:36	25	11:24 (1)	17:36	9	08:20 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42		18:29	17	08:49 (2)	16:28						16:05
17	08:35		11:00 (1)	07:43		08:09 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01		07:56			08:31 (2)	07:55					09:19 (3)
	16:38	22	11:22 (1)	17:38	12	08:21 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39		18:27	19	08:50 (2)	16:26						16:05
18	08:33		11:03 (1)	07:41		08:07 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03		07:57			08:30 (2)	07:57					09:19 (3)
	16:40	17	11:20 (1)	17:40	14	08:21 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37		18:24	21	08:51 (2)	16:25						16:05
19	08:32		11:07 (1)	07:39		08:04 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05		07:59			08:29 (2)	07:59					09:21 (3)
	16:41	10	11:17 (1)	17:42	17	08:21 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34		18:22	22	08:51 (2)	16:23						16:05
20	08:31		10:57 (1)	07:37		08:02 (2)	06:31	06:16	05:17	04:50	05:24	06:16	07:06		08:01			08:29 (2)	07:51					09:20 (3)
	16:43		11:04 (1)	17:44	19	08:21 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32		18:20	23	08:52 (2)	16:22						16:06
21	08:30		10:57 (1)	07:34		08:00 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08		08:03			08:31 (2)	08:02					09:21 (3)
	16:45		11:06 (1)	17:46	21	08:21 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29		18:18	21	08:52 (2)	16:20						16:06
22	08:29		10:57 (1)	07:32		07:57 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10		08:05			08:33 (2)	08:04					09:21 (3)
	16:47		11:08 (1)	17:48	23	08:20 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27		18:15	18	08:51 (2)	16:19						16:07
23	08:27		10:58 (1)	07:30		07:58 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12		08:07			08:35 (2)	08:06			10:43 (1)		09:22 (3)
	16:49		11:09 (1)	17:50	22	08:20 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24		18:13	16	08:51 (2)	16:18			10:53 (1)			16:07
24	08:26		10:59 (1)	07:28		07:59 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14		08:09			08:37 (2)	08:08			10:40 (1)		09:23 (3)
	16:51		11:10 (1)	17:52	20	08:19 (2)	18:45	20:43	21:35	22:01	21:38	20:37	19:22		18:11	14	08:51 (2)	16:17			10:57 (1)			16:08
25	08:25		10:58 (1)	07:25		07:59 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15		07:11			07:39 (2)	08:09			10:38 (1)		09:23 (3)
	16:52		11:11 (1)	17:54	18	08:17 (2)	18:47	20:45	21:36	22:01	21:37	20:35	19:19		17:09	11	07:50 (2)	16:16			11:00 (1)			16:08
26	08:23		10:56 (1)	07:23		08:01 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17		07:13			07:41 (2)	08:11			10:37 (1)		09:24 (3)
	16:54		11:12 (1)	17:56	15	08:16 (2)	18:49	20:46	21:37	22:01	21:35	20:33	19:17		17:07	8	07:49 (2)	16:15			11:02 (1)			16:09
27	08:22		10:57 (1)	07:21		08:03 (2)	06:14	06:01	05:08	04:56	05:31	06:24	07:19		07:15			07:43 (2)	08:13			10:36 (1)		09:25 (3)
	16:56		11:13 (1)	17:58	11	08:14 (2)	18:51	20:48	21:39	22:01	21:33	20:30	19:15		17:04	5	07:48 (2)	16:14			11:04 (1)			16:10
28	08:20		10:59 (1)	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17					07:45 (2)	08:15			10:36 (1)		09:25 (3)
	16:58		11:14 (1)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02		1	07:46 (2)	16:13			29	11:05 (1)			16:11
29	08:19		10:58 (1)			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19					08:16				10:34 (1)		09:26 (3)
	17:00		11:15 (1)			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00					16:12			32	11:06 (1)		16:12
30	08:17		10:57 (1)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20					08:18				09:23 (3)		09:26 (3)
	17:02		11:16 (1)			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58					16:11			34	11:07 (1)		16:1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BE - H57

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 18:00 (1)	05:52 20:00	05:03 20:56	04:59 21:45	05:39 22:00	06:33 21:25	07:26 20:18	07:24 19:05	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 18:01 (1)	05:50 20:02	05:02 20:57	05:00 21:47	05:40 22:00	06:35 21:23	07:28 20:16	08:20 (1) 19:02	07:26 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 18:00 (1)	05:48 20:04	05:01 20:59	05:00 21:48	05:42 21:59	06:37 21:21	07:30 20:14	08:17 (1) 19:00	07:28 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 18:01 (1)	05:46 20:06	05:00 21:01	05:01 21:49	05:44 21:59	06:38 21:19	07:32 20:11	08:16 (1) 18:57	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 18:00 (1)	05:44 20:08	05:02 21:03	05:02 21:50	05:46 21:58	06:40 21:18	07:33 20:09	08:34 (1) 18:55	07:32 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 18:00 (1)	05:42 20:10	05:03 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:35 (1) 19:22	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 18:00 (1)	05:40 20:11	05:04 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:36 (1) 19:23	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 17:59 (1)	05:38 20:13	05:05 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	08:37 (1) 19:24	07:38 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 17:58 (1)	05:36 20:15	05:06 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:38 (1) 19:25	07:40 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 17:56 (1)	05:35 20:17	05:07 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:39 (1) 19:26	07:42 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 17:41 (1)	05:33 20:19	05:08 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:40 (1) 19:27	07:44 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 17:43 (1)	05:31 20:21	05:09 21:55	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:41 (1) 19:28	07:46 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 18:00 (1)	05:29 20:22	05:11 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:42 (1) 19:29	07:48 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	05:12 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:43 (1) 19:30	07:50 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	05:13 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:44 (1) 19:31	07:51 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	05:14 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	08:45 (1) 19:32	07:53 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	05:16 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	08:46 (1) 19:33	07:55 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	05:17 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:47 (1) 19:34	07:57 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	05:19 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	08:48 (1) 19:35	07:59 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:14 22:01	05:14 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:49 (1) 19:36	08:01 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:15 22:01	05:15 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:50 (1) 19:37	08:03 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	05:15 22:01	05:15 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:51 (1) 19:38	08:04 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	05:24 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:52 (1) 19:39	08:06 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	05:26 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:53 (1) 19:40	08:08 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	05:27 22:01	05:27 21:37	06:21 20:35	07:15 19:20	08:11 18:09	08:54 (1) 19:41	08:10 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	05:29 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:12 18:07	08:55 (1) 19:42	08:11 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	05:31 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:13 18:05	08:56 (1) 19:43	08:13 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	05:32 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:14 18:02	08:57 (1) 19:44	08:15 16:11
29	08:19 17:00	07:09 17:55	06:09 19:07	05:56 20:52	05:06 21:42	05:34 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:15 18:00	08:58 (1) 19:45	08:16 16:12
30	08:17 17:02	07:06 19:57	06:06 20:54	05:54 21:43	05:05 22:01	05:35 21:28	05:35 21:20	06:29 20:23	07:24 19:07	08:16 18:00	08:59 (1) 19:46	08:18 16:13
31	08:16 17:04	07:04 19:58	06:04 20:54	05:54 21:44	05:04 22:01	05:36 21:27	05:36 21:21	06:31 20:21	07:25 18:56	08:17 18:00	09:00 (1) 19:47	08:19 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction		34		237						269		
Oper. time red.		0.23		0.27						1.00		
Wind dir. red.		1.00		1.00						0.65		
Total reduction		0.65		0.65						0.19		
Total, real		0.15		0.18						0.19		
		5		42						51		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BF - H58

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	07:35 (1) 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:34 (1) 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:35 (1) 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:36 (1) 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:36 (1) 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:38 (1) 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:40 (1) 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:46 (1) 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:40 (1) 18:23	06:35 20:21	05:31 21:15	04:56 21:53	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:40 (1) 18:25	06:32 20:22	05:29 21:17	04:55 21:52	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	07:39 (1) 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	07:37 (1) 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	07:36 (1) 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	07:35 (1) 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	07:34 (1) 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:40 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	07:32 (1) 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	08:41 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	07:31 (1) 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	07:30 (1) 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	07:29 (1) 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	07:27 (1) 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	07:26 (1) 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	07:25 (1) 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	08:11 18:09	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	07:23 (1) 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:11 18:07	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	07:21 (1) 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:13 18:05	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	07:19 (1) 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:15 18:07	08:44 16:11
29	08:19 17:00	07:17 18:01	06:09 18:55	07:17 (1) 18:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:16 18:00	08:44 16:12
30	08:17 17:02	07:15 18:03	06:07 18:57	07:15 (1) 18:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	08:18 18:00	08:44 16:13
31	08:16 17:04	07:14 18:04	06:06 18:58	07:14 (1) 18:58	05:53 20:53	05:04 21:44	04:57 22:01	05:37 21:27	06:31 20:21	07:23 18:56	08:19 18:00	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		20	159							181		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		3	28							34		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BG - H59

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:23	07:23	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: BH - H60

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02		07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18		07:26 19:05	18	07:59 (1) 08:17 (1)	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04		06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16		07:28 19:02	19	07:57 (1) 08:16 (1)	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06		06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14		07:30 19:00	20	07:57 (1) 08:17 (1)	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	2	07:34 (1) 07:36 (1)	06:54 20:06	05:00 21:01	05:01 21:49	05:44 21:19	06:38 20:11		07:32 18:57	19	07:58 (1) 08:17 (1)	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	6	07:31 (1) 07:37 (1)	06:52 20:08	05:44 21:03	05:02 21:50	05:46 21:18	06:40 20:09		07:33 18:55	16	08:00 (1) 08:16 (1)	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	9	07:29 (1) 07:38 (1)	06:49 20:10	05:42 21:05	05:03 21:51	05:47 21:58	06:42 20:06		07:35 18:53	14	08:02 (1) 08:16 (1)	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	12	07:27 (1) 07:39 (1)	06:47 20:11	05:40 21:06	05:04 21:52	05:49 21:14	06:44 20:04		07:37 18:50	11	08:04 (1) 08:15 (1)	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	15	07:24 (1) 07:39 (1)	06:44 20:13	05:38 21:08	05:05 21:53	05:51 21:12	06:45 20:02		07:39 18:48	8	08:06 (1) 08:14 (1)	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	18	07:22 (1) 07:40 (1)	06:42 20:15	05:36 21:10	05:06 21:54	05:52 21:10	06:47 19:59		07:41 18:45	4	08:07 (1) 08:11 (1)	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	20	07:19 (1) 07:39 (1)	06:40 20:17	05:35 21:12	05:07 21:55	05:54 21:08	06:49 19:57		07:43 18:43		07:42 16:37	08:32 16:05	
11	08:40 16:28	07:55 17:26	06:53 18:21	20	07:19 (1) 07:39 (1)	06:37 20:19	05:33 21:13	05:08 21:54	05:56 21:06	06:51 19:54		07:45 18:41		07:44 16:36	08:33 16:05	
12	08:39 16:30	07:53 17:28	06:50 18:23	18	07:19 (1) 07:37 (1)	06:35 20:21	05:31 21:15	05:09 21:53	05:58 21:04	06:52 19:52		07:46 18:38		07:46 16:34	08:34 16:05	
13	08:38 16:31	07:51 17:30	06:48 18:25	17	07:20 (1) 07:37 (1)	06:33 20:22	05:29 21:17	05:11 21:52	05:59 21:02	06:54 19:49		07:48 18:36		07:48 16:32	08:35 16:05	
14	08:37 16:33	07:49 17:32	06:45 18:27	13	07:21 (1) 07:34 (1)	06:30 20:24	05:27 21:19	05:12 21:58	06:01 20:59	06:56 19:47		07:50 18:34		07:50 16:31	08:36 16:05	
15	08:37 16:35	07:47 17:34	06:43 18:29	9	07:23 (1) 07:32 (1)	06:28 20:26	05:26 21:20	05:13 21:58	06:03 20:57	06:58 19:44		07:52 18:31		07:51 16:29	08:37 16:05	
16	08:36 16:36	07:45 17:36	06:41 18:31		06:25 20:28	05:24 21:22	05:14 21:59	05:14 21:49	06:05 20:55	07:00 19:42		07:54 18:29		07:53 16:28	08:38 16:05	
17	08:35 16:38	07:43 17:38	06:38 18:32		06:23 20:30	05:22 21:24	05:16 21:59	05:16 21:48	06:06 20:53	07:01 19:39		07:56 18:27		07:55 16:26	08:39 16:05	
18	08:34 16:40	07:41 17:40	06:36 18:34		06:21 20:32	05:21 21:25	05:17 22:00	05:17 21:46	06:08 20:51	07:03 19:37		07:58 18:24		07:57 16:25	08:39 16:05	
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34	05:19 21:27	05:19 22:00	05:19 21:45	06:10 20:49	07:05 19:34		07:59 18:22		07:59 16:23	08:40 16:05	
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35	05:18 21:28	05:18 22:01	05:20 21:44	06:12 20:46	07:07 19:32		08:01 18:20		08:01 16:22	08:41 16:06	
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37	05:16 21:30	05:16 22:01	05:21 21:42	06:14 20:44	07:08 19:29		08:03 18:18		08:02 16:21	08:41 16:06	
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39	05:15 21:32	05:15 22:01	05:23 21:41	06:15 20:42	07:10 19:27		08:05 18:15		08:04 16:19	08:42 16:07	
23	08:27 16:49	07:30 17:50	06:23 18:44		06:10 20:41	05:13 21:33	05:13 22:01	05:24 21:40	06:17 20:40	07:12 19:24		08:07 18:13		08:06 16:18	08:43 16:07	
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43	05:12 21:35	05:12 22:01	05:26 21:38	06:19 20:37	07:14 19:22		08:09 18:11		08:08 16:17	08:43 16:08	
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45	05:11 21:36	05:11 22:01	05:27 21:37	06:21 20:35	07:15 19:20		07:11 17:09		08:10 16:16	08:43 16:08	
26	08:23 16:54	07:23 17:56	06:16 18:49		06:03 20:46	05:09 21:37	05:09 22:01	05:29 21:35	06:22 20:33	07:17 19:17		07:13 17:07		08:11 16:15	08:44 16:09	
27	08:22 16:56	07:21 17:58	06:14 18:51		06:01 20:48	05:08 21:39	05:08 22:01	05:31 21:33	06:24 20:30	07:19 19:15		07:15 17:05		08:13 16:14	08:44 16:10	
28	08:20 16:58	07:19 18:00	06:11 18:53		05:59 20:50	05:07 21:40	05:07 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:05 (1) 08:12 (1)	07:17 17:02		08:15 16:13	08:44 16:11	
29	08:19 17:00		07:09 19:55		05:56 20:52	05:06 21:42	05:06 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:02 (1) 08:14 (1)	07:19 17:00	12	08:16 16:12	08:44 16:12	
30	08:17 17:02		07:06 19:57		05:54 20:54	05:05 21:43	05:05 22:01	05:35 21:28	06:29 20:23	07:24 19:07	08:00 (1) 08:16 (1)	07:21 16:58	16	08:18 16:11	08:44 16:13	
31	08:16 17:04		07:04 19:58		05:04 21:44		05:04	05:37 21:27	06:31 20:21			07:23 16:56		08:19 16:14	08:44 16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case			159							35		129				
Sun reduction			0.27							0.32		0.29				
Oper. time red.			1.00							1.00		1.00				
Wind dir. red.			0.65							0.65		0.65				
Total reduction			0.18							0.21		0.19				
Total, real			28							7		24				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: BI - H61

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26		07:53 (1)	07:24	08:19
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	13	08:06 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	11	08:05 (1)	16:52	16:09
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	8	08:04 (1)	16:50	16:09
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	5	08:03 (1)	16:48	16:08
5	08:43	08:07	07:07		06:52	05:44	04:59	05:02	05:46	06:40		07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10		20:08	21:03	21:50	21:58	21:18	20:09		18:55	1	08:01 (1)	16:46	16:07
6	08:43	08:05	07:05		06:49	05:42	04:59	05:03	05:47	06:42		07:35			07:34	08:27
	16:21	17:16	18:12		20:10	21:05	21:51	21:58	21:16	20:06		18:53			16:45	16:07
7	08:42	08:03	07:02		06:47	05:40	04:58	05:04	05:49	06:44		07:37			07:36	08:28
	16:22	17:18	18:13		20:11	21:06	21:52	21:57	21:14	20:04		18:50			16:43	16:06
8	08:42	08:01	07:00		06:44	05:38	04:57	05:05	05:51	06:45		07:39			07:38	08:29
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:12	20:02		18:48			16:41	16:06
9	08:41	07:59	06:58		06:42	05:36	04:57	05:06	05:52	06:47		07:41			07:40	08:31
	16:25	17:22	18:17	3	07:25 (1)	20:15	21:10	21:54	21:10	19:59		18:45			16:39	16:06
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	06:49		07:43			07:42	08:32
	16:27	17:24	18:19	7	07:26 (1)	20:17	21:12	21:55	21:08	19:57		18:43			16:37	16:05
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	06:51		07:45			07:44	08:33
	16:28	17:26	18:21	10	07:27 (1)	20:19	21:13	21:56	21:54	19:54		18:41			16:36	16:05
12	08:39	07:53	06:50		07:14 (1)	06:35	05:31	04:56	05:09	06:52		07:46			07:46	08:34
	16:30	17:28	18:23	12	07:26 (1)	20:21	21:15	21:56	21:53	19:52		18:38			16:34	16:05
13	08:38	07:51	06:48		07:12 (1)	06:33	05:29	04:55	05:11	06:54		07:48			07:48	08:35
	16:31	17:30	18:25	15	07:27 (1)	20:22	21:17	21:57	21:52	19:49		18:36			16:32	16:05
14	08:37	07:49	06:45		07:09 (1)	06:30	05:27	04:55	05:12	06:01		07:50			07:50	08:36
	16:33	17:32	18:27	17	07:26 (1)	20:24	21:19	21:58	21:51	20:59		18:34			16:31	16:05
15	08:37	07:47	06:43		07:07 (1)	06:28	05:26	04:55	05:13	06:03		07:52			07:51	08:37
	16:35	17:34	18:29	19	07:26 (1)	20:26	21:20	21:58	21:50	20:57		18:31			16:29	16:05
16	08:36	07:45	06:41		07:06 (1)	06:25	05:24	04:55	05:15	06:05		07:54			07:53	08:38
	16:36	17:36	18:31	19	07:25 (1)	20:28	21:22	21:59	21:49	20:55		18:29			16:28	16:05
17	08:35	07:43	06:38		07:07 (1)	06:23	05:22	04:54	05:16	06:06		07:56			07:55	08:39
	16:38	17:38	18:32	17	07:24 (1)	20:30	21:24	21:59	21:48	20:53		18:27			16:26	16:05
18	08:34	07:41	06:36		07:08 (1)	06:21	05:21	04:54	05:17	06:08		07:58			07:57	08:39
	16:40	17:40	18:34	14	07:22 (1)	20:32	21:25	22:00	21:46	20:51		18:24			16:25	16:05
19	08:32	07:39	06:33		07:10 (1)	06:19	05:19	04:54	05:19	06:10		07:59			07:59	08:40
	16:42	17:42	18:36	10	07:20 (1)	20:34	21:27	22:00	21:45	20:49		18:34			16:23	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01			08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20			16:22	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03			08:02	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18			16:21	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05			08:04	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15			16:19	16:07
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07			08:06	08:43
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13			16:18	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14					08:08	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	8	08:03 (1)	18:11		16:17	16:08
25	08:25	07:26	06:19		06:05	05:11	04:56	05:28	06:21	07:15		07:52 (1)	07:11		08:10	08:43
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	13	08:05 (1)	17:09		16:16	16:08
26	08:23	07:23	06:16		06:03	05:10	04:56	05:29	06:22	07:17		07:50 (1)	07:13		08:11	08:44
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	15	08:05 (1)	17:07		16:15	16:09
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:48 (1)	07:15		08:13	08:44
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	18	08:06 (1)	17:05		16:14	16:10
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:48 (1)	07:17		08:15	08:44
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	19	08:07 (1)	17:02		16:13	16:11
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:49 (1)	07:19		08:16	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	18	08:07 (1)	17:00		16:12	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		07:51 (1)	07:21		08:18	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	16	08:07 (1)	16:58		16:11	16:13
31	08:16		07:04			05:04		05:37	06:31			07:23				08:44
	17:04		19:58			21:44		21:27	20:21			16:56				16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case				143							107		38			
Sun reduction				0.27							0.32		0.29			
Oper. time red.				1.00							1.00		1.00			
Wind dir. red.				0.66							0.66		0.66			
Total reduction				0.18							0.21		0.19			
Total, real				26							23		7			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: BJ - H62

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (3) 20:00	07:01 20:56	07:04 (1) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (3) 20:02	06:59 20:57	07:05 (1) 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (3) 20:04	06:56 20:59	07:06 (1) 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	07:34 (3) 20:06	06:54 21:01	07:07 (1) 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	07:31 (3) 20:08	06:52 21:03	07:09 (1) 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	07:29 (3) 20:09	06:49 21:05	07:12 (1) 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	07:26 (3) 20:11	06:47 21:06	07:16 (1) 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	07:27 (3) 20:13	06:44 21:08	07:25 (1) 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	07:28 (3) 20:15	06:42 21:10	07:08 (1) 21:54
10	08:41 16:27	07:57 17:24	06:55 18:19	07:29 (3) 20:17	06:40 21:12	07:06 (1) 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	07:31 (3) 20:19	06:37 21:13	07:05 (1) 21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	07:42 (3) 20:21	06:35 21:15	07:04 (1) 21:57
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	07:04 (1) 21:17	05:29 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	07:02 (1) 21:19	05:27 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	07:02 (1) 21:20	05:26 21:58
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	07:02 (1) 21:22	05:24 21:59
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	07:00 (1) 21:24	05:22 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	07:00 (1) 21:25	05:21 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	07:00 (1) 21:27	05:19 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	07:00 (1) 21:28	05:18 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	07:00 (1) 21:30	05:16 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	06:59 (1) 21:31	05:15 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	07:00 (1) 21:33	05:13 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	07:00 (1) 21:34	05:12 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:45	07:00 (1) 21:36	05:11 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	07:01 (1) 21:37	05:09 22:01
27	08:22 16:56	07:21 17:58	07:46 (3) 18:51	06:01 20:48	07:01 (1) 21:39	05:08 22:01
28	08:20 16:58	07:19 18:00	07:43 (3) 18:53	05:59 20:50	07:02 (1) 21:40	05:07 22:01
29	08:19 17:00		07:48 (3) 19:55	05:56 20:52	07:02 (1) 21:42	05:06 22:01
30	08:17 17:02		07:06 19:57	05:54 20:54	07:03 (1) 21:43	05:05 22:00
31	08:15 17:04		07:04 19:58		05:04 21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case		6	173	1102	170	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.65	0.67	0.67	
Total reduction		0.15	0.18	0.24	0.26	
Total, real		1	30	262	44	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: BJ - H62

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:04 (1) 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:05 (1) 19:02	08:10 (3) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:37 20:14	07:06 (1) 19:00	08:07 (3) 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:38 20:11	07:06 (1) 18:57	08:05 (3) 16:48	08:24 16:08
5	05:02 21:58	05:46 21:18	06:40 20:09	07:08 (1) 18:55	08:04 (3) 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:10 (1) 18:53	08:03 (3) 16:45	08:27 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:11 (1) 18:50	08:04 (3) 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:14 (1) 18:48	08:05 (3) 16:41	08:29 16:06
9	05:06 21:56	05:52 21:10	06:47 19:59	07:20 (1) 18:45	08:07 (3) 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:57	07:25 (1) 18:43	08:24 (3) 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:11 (3) 16:36	08:33 16:05
12	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:13 (3) 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	08:15 (3) 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:22 (3) 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:20 (3) 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21	07:26 19:05	07:22 16:56	08:19 16:10	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case		1027		259	187	
Sun reduction		0.34		0.32	0.29	
Oper. time red.		1.00		1.00	1.00	
Wind dir. red.		0.67		0.67	0.65	
Total reduction		0.23		0.22	0.19	
Total, real		236		56	35	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: BK - H63

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	05:51 (1)	04:59	05:39	06:09 (1)	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	21:45	5 05:56 (1)	22:00	21:25	1 06:10 (1)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02		05:00	05:41		06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:47		22:00	21:23		20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:57	05:48	05:01		05:01	05:42		06:37	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48		21:59	21:21		20:14	19:00	16:50	16:09
4	08:43	08:09	07:09	06:54	05:46	05:00		05:01	05:44		06:38	07:32	07:30	08:24
	16:18	17:12	18:08	20:06	21:01	21:49		21:59	21:19		20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	04:59		05:02	05:46		06:40	07:33	07:32	08:25
	16:20	17:14	18:10	20:08	21:03	21:50		21:58	21:18		20:09	18:55	16:47	16:07
6	08:43	08:05	07:05	06:49	05:42	04:59		05:03	05:47		06:42	07:35	07:34	08:27
	16:21	17:16	18:12	20:09	21:05	21:51		21:58	21:16		20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58		05:04	05:49		06:44	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52		21:57	21:14		20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	04:57		05:05	05:51		06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53		21:56	21:12		20:01	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36	04:57		05:06	05:52		06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54		21:56	21:10		19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35	04:56		05:07	05:54		06:49	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12	21:55		21:55	21:08		19:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33	04:56		05:08	06:00 (1)	05:56	06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13	21:56		21:54	3 06:03 (1)	21:06	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	04:56		05:10	05:57 (1)	05:58	06:52	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	21:15	2 06:00 (1)	21:56	21:53	8 06:05 (1)	21:04	19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29	05:57 (1)	04:55	05:11	05:56 (1)	05:59	06:54	07:48	07:48	08:35
	16:31	17:30	18:25	20:22	21:17	4 06:01 (1)	21:57	21:52	10 06:06 (1)	21:01	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27	05:55 (1)	04:55	05:12	05:55 (1)	06:01	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:19	6 06:01 (1)	21:58	21:51	12 06:07 (1)	20:59	19:47	18:34	16:31	16:05
15	08:37	07:47	06:43	06:28	05:26	05:54 (1)	04:55	05:13	05:55 (1)	06:03	06:58	07:52	07:51	08:37
	16:35	17:34	18:29	20:26	21:20	8 06:02 (1)	21:58	21:50	14 06:09 (1)	20:57	19:44	18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24	05:52 (1)	04:55	05:15	05:55 (1)	06:05	07:00	07:54	07:53	08:38
	16:36	17:36	18:31	20:28	21:22	10 06:02 (1)	21:59	21:49	15 06:10 (1)	20:55	19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22	05:51 (1)	04:54	05:16	05:54 (1)	06:06	07:01	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21:24	12 06:03 (1)	21:59	21:48	16 06:10 (1)	20:53	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21	05:49 (1)	04:54	05:17	05:53 (1)	06:08	07:03	07:58	07:57	08:39
	16:40	17:40	18:34	20:32	21:25	13 06:02 (1)	22:00	21:46	18 06:11 (1)	20:51	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19	05:48 (1)	04:54	05:19	05:53 (1)	06:10	07:05	07:59	07:59	08:40
	16:42	17:42	18:36	20:34	21:27	15 06:03 (1)	22:00	21:45	19 06:12 (1)	20:48	19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	06:16	05:18	05:46 (1)	04:55	05:20	05:53 (1)	06:12	07:07	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	21:28	16 06:02 (1)	22:00	21:44	19 06:12 (1)	20:46	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	05:45 (1)	04:55	05:22	05:53 (1)	06:14	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30	17 06:02 (1)	22:01	21:42	19 06:12 (1)	20:44	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	05:44 (1)	04:55	05:23	05:55 (1)	06:15	07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	21:31	18 06:02 (1)	22:01	21:41	18 06:13 (1)	20:42	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13	05:43 (1)	04:55	05:24	05:56 (1)	06:17	07:12	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	21:33	19 06:02 (1)	22:01	21:40	17 06:13 (1)	20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	05:43 (1)	04:55	05:26	05:57 (1)	06:19	07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	21:35	18 06:01 (1)	22:01	21:38	15 06:12 (1)	20:37	19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11	05:43 (1)	04:56	05:28	05:59 (1)	06:21	07:15	07:11	08:09	08:43
	16:53	17:54	18:47	20:45	21:36	18 06:01 (1)	22:01	21:37	14 06:13 (1)	20:35	19:20	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:10	05:44 (1)	04:56	05:29	06:00 (1)	06:22	07:17	07:13	08:11	08:44
	16:55	17:56	18:49	20:46	21:37	17 06:01 (1)	22:01	21:35	13 06:13 (1)	20:33	19:17	17:07	16:15	16:09
27	08:22	07:21	06:14	06:01	05:08	05:45 (1)	04:57	05:31	06:02 (1)	06:24	07:19	07:15	08:13	08:44
	16:56	17:58	18:51	20:48	21:39	15 06:00 (1)	22:01	21:33	11 06:13 (1)	20:30	19:15	17:05	16:14	16:10
28	08:20	07:19	06:11	05:59	05:07	05:45 (1)	04:57	05:32	06:03 (1)	06:26	07:21	07:17	08:15	08:44
	16:58	18:00	18:53	20:50	21:40	15 06:00 (1)	22:01	21:32	9 06:12 (1)	20:28	19:12	17:02	16:13	16:11
29	08:19		07:09	05:56	05:06	05:46 (1)	04:58	05:34	06:05 (1)	06:28	07:23	07:19	08:16	08:44
	17:00		19:55	20:52	21:42	13 05:59 (1)	22:01	21:30	7 06:12 (1)	20:26	19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05	05:47 (1)	04:58	05:36	06:06 (1)	06:29	07:24	07:21	08:18	08:44
	17:02		19:57	20:54	21:43	11 05:58 (1)	22:00	21:28	5 06:11 (1)	20:23	19:07	16:58	16:11	16:13
31	08:15		07:04		05:04	05:48 (1)		05:37	06:08 (1)	06:31		07:22		08:44
	17:04		19:58		21:44	9 05:57 (1)		21:27	3 06:11 (1)	20:21		16:56		16:14
Potential sun hours	250	273	367	420	494	510		512	460		382	328	259	233
Total, worst case					256	5		265	1					
Sun reduction					0.38	0.32		0.32	0.34					
Oper. time red.					1.00	1.00		1.00	1.00					
Wind dir. red.					0.66	0.66		0.66	0.66					
Total reduction					0.25	0.21		0.21	0.23					
Total, real					64	1		57	0					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BL - H64

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:40 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BM - H65

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: BN - H66
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March			April			May	June	July	August			September			October			November	December	
1	08:44	08:14	07:16			07:01			05:52	05:03	04:59	05:39			06:33			07:26			07:59 (3)	07:24	08:19
	16:15	17:06	18:02			20:00			20:56	21:45	22:00	21:25			20:18	34	07:08 (1)	19:05	14	08:13 (3)	16:54	16:10	
2	08:44	08:12	07:14			06:59	07:23 (1)		05:50	05:02	05:00	05:40			06:35			07:28			07:57 (3)	07:26	08:21
	16:16	17:08	18:04			20:02	13	07:36 (1)	20:57	21:47	22:00	21:23			20:16	34	07:42 (1)	19:02	17	08:14 (3)	16:52	16:09	
3	08:44	08:10	07:12			06:56	07:20 (1)		05:48	05:01	05:00	05:42			06:37			07:30			07:56 (3)	07:28	08:22
	16:17	17:10	18:06			20:04	18	07:38 (1)	20:59	21:48	21:59	21:21			20:14	34	07:42 (1)	19:00	19	08:15 (3)	16:50	16:09	
4	08:43	08:09	07:09	07:34 (3)		06:54	07:18 (1)		05:46	05:00	05:01	05:44			06:38			07:32			07:58 (3)	07:30	08:24
	16:18	17:12	18:08	3	07:37 (3)	20:06	22	07:40 (1)	21:01	21:49	21:59	21:19			20:11	32	07:40 (1)	18:57	17	08:15 (3)	16:48	16:08	
5	08:43	08:07	07:07	07:31 (3)		06:52	07:15 (1)		05:44	04:59	05:02	05:46			06:40			07:33			08:00 (3)	07:32	08:25
	16:20	17:14	18:10	6	07:37 (3)	20:08	26	07:41 (1)	21:03	21:50	21:58	21:18			20:09	30	07:39 (1)	18:55	15	08:15 (3)	16:46	16:07	
6	08:43	08:05	07:05	07:29 (3)		06:49	07:13 (1)		05:42	04:59	05:03	05:47			06:42			07:35			08:02 (3)	07:34	08:27
	16:21	17:16	18:11	9	07:38 (3)	20:09	29	07:42 (1)	21:05	21:51	21:58	21:16			20:06	29	07:38 (1)	18:53	13	08:15 (3)	16:45	16:07	
7	08:42	08:03	07:02	07:27 (3)		06:47	07:13 (1)		05:40	04:58	05:04	05:49			06:44			07:37			08:04 (3)	07:36	08:28
	16:22	17:18	18:13	12	07:39 (3)	20:11	30	07:43 (1)	21:06	21:52	21:57	21:14			20:04	26	07:36 (1)	18:50	10	08:14 (3)	16:43	16:06	
8	08:42	08:01	07:00	07:24 (3)		06:44	07:11 (1)		05:38	04:57	05:05	05:51			06:45			07:39			08:06 (3)	07:38	08:29
	16:24	17:20	18:15	14	07:38 (3)	20:13	32	07:43 (1)	21:08	21:53	21:56	21:12			20:01	23	07:35 (1)	18:48	8	08:14 (3)	16:41	16:06	
9	08:41	07:59	06:57	07:22 (3)		06:42	07:10 (1)		05:36	04:57	05:06	05:52			06:47			07:41			08:07 (3)	07:40	08:30
	16:25	17:22	18:17	16	07:38 (3)	20:15	34	07:44 (1)	21:10	21:54	21:56	21:10			19:59	19	07:33 (1)	18:45	5	08:12 (3)	16:39	16:06	
10	08:41	07:57	06:55	07:19 (3)		06:40	07:10 (1)		05:35	04:56	05:07	05:54			06:49			07:16			08:09 (3)	07:42	08:32
	16:27	17:24	18:19	18	07:37 (3)	20:17	34	07:44 (1)	21:12	21:55	21:55	21:08			19:57	14	07:30 (1)	18:43	2	08:11 (3)	16:37	16:05	
11	08:40	07:55	06:53	07:19 (3)		06:37	07:09 (1)		05:33	04:56	05:08	05:56			06:51			07:20			07:44	08:33	
	16:28	17:26	18:21	17	07:36 (3)	20:19	34	07:43 (1)	21:13	21:56	21:54	21:06			19:54	3	07:23 (1)	18:41			16:36	16:05	
12	08:39	07:53	06:50	07:19 (3)		06:35	07:09 (1)		05:31	04:56	05:09	05:58			06:52			07:34			07:46	08:34	
	16:30	17:28	18:23	15	07:34 (3)	20:21	35	07:44 (1)	21:15	21:56	21:53	21:04			19:52			18:38			16:34	16:05	
13	08:38	07:51	06:48	07:21 (3)		06:32	07:09 (1)		05:29	04:55	05:11	05:59			06:54			07:48			07:48	08:35	
	16:31	17:30	18:25	12	07:33 (3)	20:22	35	07:44 (1)	21:17	21:57	21:52	21:01			19:49			18:36			16:32	16:05	
14	08:37	07:49	06:45	07:24 (3)		06:30	07:08 (1)		05:27	04:55	05:12	06:01			06:56			07:50			07:49	08:36	
	16:33	17:32	18:27	4	07:28 (3)	20:24	35	07:43 (1)	21:19	21:58	21:51	20:59			19:47			18:34			16:31	16:05	
15	08:37	07:47	06:43			06:28	07:08 (1)		05:26	04:55	05:13	06:03			06:58			07:52			07:51	08:37	
	16:35	17:34	18:29			20:26	34	07:42 (1)	21:20	21:58	21:50	20:57			19:44			18:31			16:29	16:05	
16	08:36	07:45	06:41			06:25	07:08 (1)		05:24	04:55	05:14	06:05			06:59			07:54			07:53	08:38	
	16:36	17:36	18:30			20:28	34	07:42 (1)	21:22	21:59	21:49	20:55			19:42			18:29			16:28	16:05	
17	08:35	07:43	06:38			06:23	07:08 (1)		05:22	04:54	05:16	06:06			07:01			07:56			07:55	08:39	
	16:38	17:38	18:32			20:30	32	07:40 (1)	21:24	21:59	21:48	20:53			19:39			18:27			16:26	16:05	
18	08:33	07:41	06:36			06:21	07:09 (1)		05:21	04:54	05:17	06:08	07:26 (1)		07:03			07:58			07:57	08:39	
	16:40	17:40	18:34			20:32	31	07:40 (1)	21:25	22:00	21:46	20:51	6	07:32 (1)	19:37			18:24			16:25	16:05	
19	08:32	07:39	06:33			06:19	07:09 (1)		05:19	04:54	05:19	06:09	07:05 (1)		07:02			07:59			07:59	08:40	
	16:42	17:42	18:36			20:33	30	07:39 (1)	21:27	22:00	21:45	20:48	14	07:35 (1)	19:34			18:22			16:23	16:05	
20	08:31	07:37	06:31			06:16	07:10 (1)		05:18	04:54	05:20	06:12	07:19 (1)		07:07			08:01			08:01	08:41	
	16:43	17:44	18:38			20:35	28	07:38 (1)	21:28	22:00	21:44	20:46	19	07:38 (1)	19:32			18:20			16:22	16:06	
21	08:30	07:34	06:28			06:14	07:11 (1)		05:16	04:55	05:21	06:14	07:17 (1)		07:08			08:03			08:02	08:41	
	16:45	17:46	18:40			20:37	25	07:36 (1)	21:30	22:01	21:42	20:44	23	07:40 (1)	19:29			18:18			16:21	16:06	
22	08:29	07:32	06:26			06:12	07:12 (1)		05:15	04:55	05:23	06:15	07:15 (1)		07:10			08:05			08:04	08:42	
	16:47	17:48	18:42			20:39	22	07:34 (1)	21:31	22:01	21:41	20:42	25	07:40 (1)	19:27			18:15			16:19	16:07	
23	08:27	07:30	06:23			06:09	07:14 (1)		05:13	04:55	05:24	06:17	07:14 (1)		07:12			08:07			08:06	08:42	
	16:49	17:50	18:44			20:41	18	07:32 (1)	21:33	22:01	21:40	20:39	28	07:42 (1)	19:24			18:13			16:18	16:07	
24	08:26	07:28	06:21			06:07	07:16 (1)		05:12	04:55	05:26	06:19	07:13 (1)		07:14			08:09			08:08	08:43	
	16:51	17:52	18:45			20:43	13	07:29 (1)	21:35	22:01	21:38	20:37	30	07:43 (1)	19:25			18:11			16:17	16:08	
25	08:25	07:26	06:18			06:05			05:11	04:56	05:27	06:21	07:12 (1)		07:12			07:11			08:09	08:43	
	16:53	17:54	18:47			20:45			21:36	22:01	21:37	20:35	32	07:44 (1)	19:37			17:09			16:16	16:08	
26	08:23	07:23	06:16			06:03			05:09	04:56	05:29	06:23	07:11 (1)		07:17			07:13			08:11	08:44	
	16:54	17:56	18:49			20:46			21:37	22:01	21:35	20:33	32	07:43 (1)	19:17			17:07			16:15	16:09	
27	08:22	07:21	06:14			06:01			05:08	04:57	05:31	06:24	07:10 (1)		07:19			07:15			08:13	08:44	
	16:56	17:58	18:51			20:48			21:39	22:01	21:33	20:30	34	07:44 (1)	19:15			17:05			16:14	16:10	
28	08:20	07:19	06:11			05:59			05:07	04:57	05:32	06:26	07:10 (1)		07:21			07:17			08:15	08:44	
	16:58	18:00	18:53			20:50			21:40	22:01	21:32	20:28	34	07:44 (1)	19:12			17:02			16:13	16:11	
29	08:19		07:09			05:56			05:06	04:58	05:34	06:28	07:09 (1)		07:23			07:19			08:16	08:44	
	17:00		19:55			20:52			21:42	22:01	21:30	20:26	34	07:43 (1)	19:10			17:00			16:12	16:12	
30	08:17		07:06			05:54			05:05	04:58	05:35	06:29	07:09 (1)		07:24			08:02 (3)			07:21	08:18	08:44
	17:02		19:57			20:54			21:43	22:00	21:28	20:23	35	07:44 (1)	19:07	10	08:12 (3)	16:58			16:11	16:13	
31	08:15		07:04						05:04		05:37	06:31	07:09 (1)					07:22				08:44	
	17:04		19:58						21:44		21:27	20:21	35	07:44 (1)				16:56				16:14	
Potential sun hours	250	273	367			420			494	510	512	460			382			328			259	233	
Total, worst case				126		644			0.35						381			288			120		
Sun reduction				0.27		0.35									0.34			0.32			0.29		
Oper. time red.				1.00		1.00									1.00			1.00			1.00		
Wind dir. red.				0.65		0.68									0.68			0.67			0.65		
Total																							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BO - H67

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BP - H68

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: BQ - H69

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		10:50 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24									08:19		10:46 (2)	
2	16:15	55	15:36 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54									16:10	39	15:24 (1)	
	08:44		10:51 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26									08:21		10:45 (2)	
3	16:16	54	15:37 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52									16:09	43	15:25 (1)	
	08:44		10:52 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28									08:22		10:43 (2)	
4	16:17	54	15:37 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50									16:08	47	15:25 (1)	
	08:43		10:53 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30									08:24		10:42 (2)	
5	16:18	53	15:38 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48									16:08	49	15:25 (1)	
	08:43		10:54 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32									08:25		10:41 (2)	
6	16:20	51	15:38 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46									16:07	50	15:25 (1)	
	08:43		10:55 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34									08:27		10:41 (2)	
7	16:21	51	15:39 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44									16:07	52	15:26 (1)	
	08:42		10:56 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36									08:28		10:41 (2)	
8	16:22	51	15:40 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43									16:06	51	15:25 (1)	
	08:42		10:57 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38									08:29		10:41 (2)	
9	16:24	49	15:40 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41									16:06	53	15:26 (1)	
	08:41		11:00 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40									08:30		10:41 (2)	
10	16:25	46	15:41 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39									16:05	53	15:26 (1)	
	08:40		11:01 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42									08:32		10:40 (2)	
11	16:26	45	15:42 (1)	17:24	18:19	20:17	21:12	21:55	21:08	19:56	18:43	16:37										16:05	54	15:26 (1)	
	08:40		11:04 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44									08:33		10:40 (2)	
12	16:28	39	15:42 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36									16:05	55	15:26 (1)	
	08:39		11:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46							15:04 (1)	08:34		10:40 (2)		
13	16:30	30	15:43 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	3								15:07 (1)	16:05	55	15:26 (1)
	08:38		11:14 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47									15:00 (1)	08:35		10:41 (2)
14	16:31	29	15:43 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	11								15:11 (1)	16:05	55	15:27 (1)
	08:37		11:14 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49									14:57 (1)	08:36		10:41 (2)
15	16:33	30	15:44 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16								15:13 (1)	16:05	55	15:27 (1)
	08:36		15:15 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51									14:56 (1)	08:37		10:42 (2)
16	16:34	29	15:44 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	19								15:15 (1)	16:05	54	15:27 (1)
	08:35		15:15 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53									14:55 (1)	08:38		10:41 (2)
17	16:36	30	15:45 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	21								15:16 (1)	16:05	54	15:26 (1)
	08:34		15:15 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55									14:54 (1)	08:39		10:42 (2)
18	16:38	29	15:44 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	23								15:17 (1)	16:05	54	15:27 (1)
	08:33		15:16 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57									14:54 (1)	08:39		10:42 (2)
19	16:40	29	15:45 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	24								15:18 (1)	16:05	54	15:27 (1)
	08:32		15:17 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59									14:53 (1)	08:40		10:43 (2)
20	16:41	28	15:45 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	26								15:19 (1)	16:05	54	15:28 (1)
	08:31		15:17 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01									14:53 (1)	08:41		10:43 (2)
21	16:43	28	15:45 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	27								15:20 (1)	16:06	53	15:27 (1)
	08:30		15:18 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02									14:53 (1)	08:41		10:43 (2)
22	16:45	27	15:45 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	27								15:20 (1)	16:06	54	15:28 (1)
	08:29		15:18 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04									14:53 (1)	08:42		10:43 (2)
23	16:47	27	15:45 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	28								15:21 (1)	16:06	54	15:28 (1)
	08:27		15:19 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06									14:53 (1)	08:42		10:45 (2)
24	16:49	26	15:45 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	28								15:21 (1)	16:07	53	15:29 (1)
	08:26		15:20 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08									14:53 (1)	08:43		10:45 (2)
25	16:51	24	15:44 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	29								15:22 (1)	16:08	53	15:29 (1)
	08:25		15:21 (1)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09									14:53 (1)	08:43		10:45 (2)
26	16:52	23	15:44 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	29								15:22 (1)	16:08	54	15:30 (1)
	08:23		15:22 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11									14:54 (1)	08:43		10:46 (2)
27	16:54	21	15:43 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15	29								15:23 (1)	16:09	54	15:31 (1)
	08:22		15:24 (1)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13									14:54 (1)	08:44		10:47 (2)
28	16:56	19	15:43 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	29								15:23 (1)	16:10	54	15:32 (1)
	08:20		15:26 (1)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14									14:55 (1)	08:44		10:47 (2)
29	16:58	15	15:41 (1)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	29								15:24 (1)	16:11	55	15:33 (1)
	08:19		15:28 (1)		07:09	05:56	05:06	04:57	05:34	06:28	07:22	07:18	08:16									14:54 (1)	08:44		10:48 (2)
30	17:00	11	15:39 (1)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	29								15:23 (1)	16:11	55	15:34 (1)
	08:17		15:32 (1)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18									14:55 (1)	08:44		10:49 (2)
31	17:02	3	15:35 (1)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	29								15:24 (1)	16:12	55	15:35 (1)
	08:15				07:04																				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BR - H70

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December				
1	08:44		12:24 (2)	08:14		16:25 (1)	07:16		07:01	05:52	05:03	04:59	05:39		06:33	07:26				07:24		15:50 (1)	08:19		12:14 (2)		
	16:15	49	13:13 (2)	17:06		16:34 (1)	18:02		20:00	20:55	21:45	22:00	21:25		20:18	19:05				16:54	25	16:15 (1)	16:10	43	12:57 (2)		
2	08:44		12:25 (2)	08:12		16:24 (1)	07:14		06:59	05:50	05:02	04:59	05:40		06:35	07:28				07:26		15:50 (1)	08:21		12:14 (2)		
	16:16	49	13:14 (2)	17:08		16:37 (1)	18:04		20:02	20:57	21:47	22:00	21:23		20:16	19:02				16:52	25	16:15 (1)	16:09	44	12:58 (2)		
3	08:44		12:25 (2)	08:10		16:23 (1)	07:12		06:56	05:48	05:01	05:00	05:42		06:36	07:30				07:28		15:50 (1)	08:22		12:13 (2)		
	16:17	49	13:14 (2)	17:10		16:39 (1)	18:06		20:04	20:59	21:48	21:59	21:21		20:13	19:00				16:50	25	16:15 (1)	16:08	45	12:58 (2)		
4	08:43		12:26 (2)	08:08		16:22 (1)	07:09		06:54	05:46	05:00	05:01	05:44		06:38	07:32				07:30		15:50 (1)	08:24		12:13 (2)		
	16:18	48	13:14 (2)	17:12		16:41 (1)	18:08		20:06	21:01	21:49	21:59	21:19		20:11	18:57				16:48	24	16:14 (1)	16:08	46	12:59 (2)		
5	08:43		12:26 (2)	08:07		16:21 (1)	07:07		06:51	05:44	04:59	05:02	05:45		06:40	07:33				07:32		15:50 (1)	08:25		12:13 (2)		
	16:19	48	13:14 (2)	17:14		16:43 (1)	18:09		20:08	21:03	21:50	21:58	21:17		20:09	18:55				16:46	24	16:14 (1)	16:07	46	12:59 (2)		
6	08:43		12:27 (2)	08:05		16:21 (1)	07:05		06:49	05:42	04:59	05:03	05:47		06:42	07:35				07:34		15:51 (1)	08:26		12:14 (2)		
	16:21	48	13:15 (2)	17:16		16:44 (1)	18:11		20:09	21:04	21:51	21:58	21:16		20:06	18:52				16:44	21	16:12 (1)	16:07	47	13:01 (2)		
7	08:42		12:28 (2)	08:03		16:20 (1)	07:02		06:47	05:40	04:58	05:04	05:49		06:43	07:37				07:36		15:52 (1)	08:28		12:13 (2)		
	16:22	46	13:14 (2)	17:18		16:45 (1)	18:13		20:11	21:06	21:52	21:57	21:14		20:04	18:50				16:43	18	16:10 (1)	16:06	48	13:01 (2)		
8	08:42		12:28 (2)	08:01		16:20 (1)	07:00		06:44	05:38	04:57	05:05	05:51		06:45	07:39				07:38		15:53 (1)	08:29		12:13 (2)		
	16:24	46	13:14 (2)	17:20		16:45 (1)	18:15		20:13	21:08	21:53	21:56	21:12		20:01	18:48				16:41	15	16:08 (1)	16:06	48	13:01 (2)		
9	08:41		12:30 (2)	07:59		16:20 (1)	06:57		06:42	05:36	04:57	05:06	05:52		06:47	07:41				07:40		15:55 (1)	08:30		12:14 (2)		
	16:25	45	13:15 (2)	17:22		16:45 (1)	18:17		20:15	21:10	21:54	21:56	21:10		19:59	18:45				16:39	12	16:07 (1)	16:05	49	13:03 (2)		
10	08:40		12:31 (2)	07:57		16:20 (1)	06:55		06:39	05:34	04:56	05:07	05:54		06:49	07:42				07:42		15:56 (1)	08:32		12:14 (2)		
	16:26	44	13:15 (2)	17:24		16:46 (1)	18:19		20:17	21:12	21:55	21:55	21:08		19:56	18:43				16:37	9	16:05 (1)	16:05	49	13:03 (2)		
11	08:40		12:32 (2)	07:55		16:21 (1)	06:53		06:37	05:33	04:56	05:08	05:56		06:51	07:44				07:44		15:59 (1)	08:33		12:14 (2)		
	16:28	42	13:14 (2)	17:26		16:46 (1)	18:21		20:19	21:13	21:56	21:54	21:06		19:54	18:40				16:36	4	16:03 (1)	16:05	49	13:03 (2)		
12	08:39		12:32 (2)	07:53		16:21 (1)	06:50		06:35	05:31	04:55	05:09	05:57		06:52	07:46				07:46		16:04 (1)	08:34		12:14 (2)		
	16:30	42	13:14 (2)	17:28		16:45 (1)	18:23		20:20	21:15	21:56	21:53	21:03		19:52	18:38				16:34		16:05 (1)	16:05	50	13:04 (2)		
13	08:38		12:34 (2)	07:51		16:21 (1)	06:48		06:32	05:29	04:55	05:10	05:59		06:54	07:48				07:47		16:05 (1)	16:05		12:15 (2)		
	16:31	40	13:14 (2)	17:30		16:44 (1)	18:25		20:22	21:17	21:57	21:52	21:01		19:49	18:36				16:32		16:05 (1)	16:05	50	13:05 (2)		
14	08:37		12:35 (2)	07:49		16:21 (1)	06:45		06:30	05:27	04:55	05:12	06:01		06:56	07:50				07:49		16:05 (1)	16:05		12:15 (2)		
	16:33	39	13:14 (2)	17:32		16:44 (1)	18:27		20:24	21:18	21:58	21:51	20:59		19:47	18:33				16:31		16:05 (1)	16:05	51	13:06 (2)		
15	08:36		12:36 (2)	07:47		16:23 (1)	06:43		06:28	05:26	04:55	05:13	06:03		06:58	07:52				07:51		16:05 (1)	16:05		12:15 (2)		
	16:34	37	13:13 (2)	17:34		16:43 (1)	18:28		20:26	21:20	21:58	21:50	20:57		19:44	18:31				16:29		16:05 (1)	16:05	51	13:06 (2)		
16	08:35		12:38 (2)	07:45		16:24 (1)	06:40		06:25	05:24	04:54	05:14	06:05		06:59	07:54				07:53		16:05 (1)	16:05		12:15 (2)		
	16:36	35	13:13 (2)	17:36		16:42 (1)	18:30		20:28	21:22	21:59	21:49	20:55		19:42	18:29				16:27		16:05 (1)	16:05	51	13:06 (2)		
17	08:34		12:38 (2)	07:43		16:26 (1)	06:38		06:23	05:22	04:54	05:16	06:06		07:01	07:56				07:55		16:05 (1)	16:05		12:16 (2)		
	16:38	33	13:11 (2)	17:38		16:40 (1)	18:32		20:30	21:23	21:59	21:47	20:53		19:39	18:26				16:26		16:05 (1)	16:05	51	13:07 (2)		
18	08:33		12:40 (2)	07:41		16:28 (1)	06:36		06:21	05:21	04:54	05:17	06:08		07:03	07:57				07:57		16:05 (1)	16:05		12:16 (2)		
	16:40	31	13:11 (2)	17:40		16:37 (1)	18:34		20:32	21:25	22:00	21:46	20:51		19:37	18:24				16:25		16:05 (1)	16:05	52	13:08 (2)		
19	08:32		12:43 (2)	07:39		16:33 (1)	06:33		06:18	05:19	04:54	05:18	06:10		07:05	07:59				07:59		16:05 (1)	16:05		12:17 (2)		
	16:41	27	13:10 (2)	17:42		16:36 (1)	18:36		20:33	21:27	22:00	21:45	20:48		19:34	18:22				16:23		16:05 (1)	16:05	51	13:08 (2)		
20	08:31		12:44 (2)	07:37		16:31 (1)	06:16		06:16	05:18	04:54	05:20	06:12		07:06	08:01				08:01		12:26 (2)	08:41		12:17 (2)		
	16:43	23	13:07 (2)	17:44		16:38 (1)	18:38		20:35	21:28	22:00	21:44	20:46		19:32	18:20				16:22	11	12:37 (2)	16:06	51	13:08 (2)		
21	08:30		12:47 (2)	07:34		16:28 (1)	06:14		06:14	05:16	04:54	05:21	06:13		07:08	08:03				08:02		12:23 (2)	08:41		12:18 (2)		
	16:45	19	13:06 (2)	17:46		16:40 (1)	18:40		20:37	21:30	22:01	21:42	20:44		19:29	18:17				16:20	18	12:41 (2)	16:06	51	13:09 (2)		
22	08:29		12:51 (2)	07:32		16:26 (1)	06:12		06:12	05:15	04:55	05:23	06:15		07:10	08:05				08:04		12:20 (2)	08:42		12:18 (2)		
	16:47	11	13:02 (2)	17:48		16:42 (1)	18:42		20:39	21:31	22:01	21:41	20:42		19:27	18:15				16:19	23	12:43 (2)	16:06	51	13:09 (2)		
23	08:27		12:53 (2)	07:30		16:23 (1)	06:09		06:13	05:13	04:55	05:24	06:17		07:12	08:07				08:06		12:19 (2)	08:42		12:19 (2)		
	16:49		17:50			16:43 (1)	18:43		20:41	21:33	22:01	21:39	20:39		19:24	18:13				16:18	27	12:46 (2)	16:07	51	13:10 (2)		
24	08:26		12:54 (2)	07:28		16:21 (1)	06:07		06:10	05:12	04:55	05:26	06:19		07:14	08:09				16:17		12:17 (2)	08:43		12:19 (2)		
	16:50		17:52			16:45 (1)	18:45		20:43	21:34	22:01	21:38	20:37		19:22	18:11				16:17	11	17:08 (1)	16:17	31	12:48 (2)		
25	08:25		12:55 (2)	07:25		16:18 (1)	06:05		06:11	05:11	04:55	05:27	06:20		07:15	08:11				15:55 (1)	08:09	12:17 (2)	08:43		12:19 (2)		
	16:52		17:54			16:47 (1)	18:44		21:36	22:01	22:01	21:36	20:35		19:19	17:09				15:16 (1)	18:16	12:49 (2)	16:08	52	13:11 (2)		
26	08:21		12:56 (2)	07:23		16:15 (1)	06:03		06:09	05:10	04:56	05:29	06:22		07:17	08:13				15:53 (1)	08:11	12:16 (2)	08:43		12:21 (2)		
	16:54		17:56			16:49 (1)	18:46		21:37	22:01	22:01	21:35	20:32		19:17	17:07				19:19	16:12 (1)	16:14	35	12:51 (2)	16:09	51	13:12 (2)
27	08:22		12:57 (2)	07:21		16:13 (1)	06:01		06:08	05:06	04:56	05:30	06:24		07:19	08:15				15:52 (1)	08:13	12:15 (2)	08:44		12:21 (2)		
	16:56		17:58			16:51 (1)	18:48		21:39	22:01	21:33	20:30	20:														

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BS - H71

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44		13:35 (2)	08:14		13:54 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26					07:24		08:19		13:21 (2)			
	16:15	58	14:33 (2)	17:06	43	14:37 (2)	17:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05					16:54		16:10	59	14:20 (2)			
2	08:44		13:36 (2)	08:12		13:56 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28					07:26		08:21		13:21 (2)			
	16:16	58	14:34 (2)	17:08	39	14:35 (2)	17:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02					16:52		16:09	59	14:20 (2)			
3	08:44		13:36 (2)	08:10		13:58 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30					07:28		08:22		13:22 (2)			
	16:17	58	14:34 (2)	17:10	36	14:34 (2)	17:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00					16:50		16:08	59	14:21 (2)			
4	08:43		13:36 (2)	08:08		14:00 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31					07:30		13:39 (2)	08:24	13:23 (2)			
	16:18	59	14:35 (2)	17:12	32	14:32 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57					16:48	15	13:54 (2)	16:08	59	14:22 (2)		
5	08:43		13:36 (2)	08:07		14:02 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33					07:32		13:34 (2)	08:25	13:22 (2)			
	16:19	59	14:35 (2)	17:14	28	14:30 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55					16:46	24	13:58 (2)	16:07	59	14:21 (2)		
6	08:43		13:37 (2)	08:05		14:05 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35					07:34		13:31 (2)	08:26	13:23 (2)			
	16:22	59	14:36 (2)	17:16	22	14:27 (2)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52					07:36	29	14:00 (2)	16:07	59	14:22 (2)		
7	08:42		13:37 (2)	08:03		14:10 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37					07:36		13:29 (2)	08:28	13:23 (2)			
	16:22	59	14:36 (2)	17:18	13	14:23 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50					16:43	33	14:02 (2)	16:06	59	14:22 (2)		
8	08:42		13:37 (2)	08:01		14:06 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39					07:38		13:27 (2)	08:29	13:24 (2)			
	16:24	60	14:37 (2)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48						16:41	37	14:04 (2)	16:06	58	14:22 (2)		
9	08:41		13:39 (2)	07:59		14:07 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41					07:40		13:27 (2)	08:30	13:25 (2)			
	16:25	59	14:38 (2)	17:22		18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45						16:39	39	14:06 (2)	16:05	58	14:23 (2)		
10	08:40		13:39 (2)	07:57		14:08 (2)	06:55	06:39	05:34	04:56	05:07	05:50	06:49	07:42					07:42		13:25 (2)	08:32	13:25 (2)			
	16:26	59	14:38 (2)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43						16:37	42	14:07 (2)	16:05	58	14:23 (2)		
11	08:40		13:39 (2)	07:55		14:09 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44					07:44		13:24 (2)	08:33	13:25 (2)			
	16:28	59	14:38 (2)	17:26		18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40						16:35	45	14:09 (2)	16:05	59	14:24 (2)		
12	08:39		13:40 (2)	07:53		16:58 (1)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46					07:46		13:23 (2)	08:34	13:26 (2)			
	16:30	59	14:39 (2)	17:28	1	16:59 (1)	06:43	20:20	21:15	21:56	21:53	21:03	19:52	18:38					16:34	46	14:09 (2)	16:05	60	14:28 (3)		
13	08:38		13:40 (2)	07:51		16:53 (1)	06:48	06:32	05:29	04:55	05:10	05:59	06:53	07:48					07:47		13:22 (2)	08:35	13:26 (2)			
	16:31	59	14:39 (2)	17:30	7	17:00 (1)	06:45	20:22	21:17	21:57	21:52	21:01	19:49	18:32					07:48	48	14:10 (2)	16:06	65	14:31 (2)		
14	08:37		13:40 (2)	07:49		16:52 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50					17:29 (1)	07:49		13:21 (2)	08:36	13:27 (2)		
	16:33	59	14:39 (2)	17:32	10	17:02 (1)	06:43	20:24	21:18	21:58	21:51	20:59	19:47	18:33	6				17:35 (1)	16:31	50	14:11 (2)	16:04	66	14:33 (3)	
15	08:36		13:41 (2)	07:47		16:50 (1)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52					17:25 (1)	07:51		13:21 (2)	08:37	13:27 (2)		
	16:34	59	14:40 (2)	17:34	15	17:05 (1)	06:43	20:26	21:20	21:58	21:50	20:57	19:44	18:31	13				17:38 (1)	16:29	51	14:12 (2)	16:05	66	14:33 (3)	
16	08:35		13:41 (2)	07:45		16:50 (1)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54					17:23 (1)	07:53		13:20 (2)	08:38	13:28 (2)		
	16:36	58	14:39 (2)	17:36	17	17:07 (1)	06:40	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16				17:39 (1)	16:27	53	14:13 (2)	16:05	67	14:35 (3)	
17	08:34		13:41 (2)	07:43		16:49 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56					17:21 (1)	07:55		13:20 (2)	08:39	13:28 (2)		
	16:38	59	14:40 (2)	17:38	20	17:09 (1)	06:38	20:30	21:23	21:59	21:47	20:53	19:39	18:26	19				17:40 (1)	16:26	53	14:13 (2)	16:05	68	14:36 (3)	
18	08:33		13:42 (2)	07:41		16:48 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57					17:20 (1)	07:57		13:19 (2)	08:39	13:29 (2)		
	16:40	58	14:40 (2)	17:40	23	17:11 (1)	06:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	21				17:41 (1)	16:24	55	14:14 (2)	16:05	68	14:37 (3)	
19	08:32		13:43 (2)	07:39		16:48 (1)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59					17:19 (1)	07:59		13:19 (2)	08:40	13:30 (2)		
	16:41	58	14:41 (2)	17:42	23	17:11 (1)	06:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	23				17:42 (1)	16:23	55	14:14 (2)	16:05	68	14:38 (3)	
20	08:31		13:43 (2)	07:36		16:48 (1)	06:31	06:14	05:18	04:54	05:19	06:12	07:06	08:00					17:19 (1)	07:56		13:19 (2)	08:41	13:31 (2)		
	16:43	57	14:40 (2)	17:44	23	17:11 (1)	06:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	23				17:42 (1)	16:22	56	14:15 (2)	16:06	68	14:38 (3)	
21	08:30		13:44 (2)	07:34		16:48 (1)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03					17:18 (1)	08:02		13:19 (2)	08:41	13:31 (2)		
	16:45	56	14:40 (2)	17:46	23	17:11 (1)	06:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	24				17:42 (1)	16:20	57	14:16 (2)	16:06	68	14:39 (3)	
22	08:29		13:44 (2)	07:32		16:48 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05					17:18 (1)	08:04		13:19 (2)	08:42	13:31 (2)		
	16:47	56	14:40 (2)	17:48		17:10 (1)	06:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	24				17:42 (1)	16:19	57	14:16 (2)	16:06	68	14:39 (3)	
23	08:27		13:45 (2)	07:30		16:48 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07					17:18 (1)	08:06		13:19 (2)	08:42	13:32 (2)		
	16:49	55	14:40 (2)	17:50	22	17:10 (1)	06:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	23				17:41 (1)	16:18	58	14:17 (2)	16:07	68	14:40 (3)	
24	08:26		13:45 (2)	07:28		16:49 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09					17:18 (1)	08:08		13:19 (2)	08:43	13:32 (2)		
	16:50	55	14:40 (2)	17:52	21	17:10 (1)	06:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	23				17:41 (1)	16:17	58	14:17 (2)	16:08	68	14:40 (3)	
25	08:25		13:47 (2)	07:25		16:50 (1)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11					16:19 (1)	08:09		13:19 (2)	08:43	13:32 (2)		
	16:52	53	14:40 (2)	17:54	18	17:08 (1)	06:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	19				16:18 (1)	16:16	59	14:18 (2)	16:08	68	14:40 (3)	
26	08:23		13:47 (2)	07:23		16:51 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13					16:19 (1)	08:11		13:20 (2)	08:43	13:32 (2)		
	16:54	53	14:40 (2)	17:56	16	17:07 (1)	06:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	17				16:36 (1)	16:14	58	14:18 (2)	16:09	68	14:40 (3)	
27	08:22		13:48 (2)	07:21		16:54 (1)	06:14	06:01	05:08	04:56	05:30	06:24	07:19	07:15					16:20 (1)	08:12		13:20 (2)	08:44	13:33 (2)		
	16:56	51	14:39 (2)	17:58	11	17:05 (1)	06:48	20:49	21:39	22:01	21:33	20:30	19:14	17:04	14				16:34 (1)	16:13	59	14:19 (2)	16:10	68	14:41 (3)	
28	08:20		13:49 (2)	07:19		16:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17						16:21 (1)	08:14		13:21 (2)	08:44	13:34 (2)		
	16:58	50	14:39 (2)	18:00		18:53																				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BT - H72

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	16:12 (2) 16:34 (2)	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	15:37 (2) 16:11 (2)	08:19 16:10	15:26 (3) 15:34 (3)
2	08:44 16:16	08:12 17:08	16:11 (2) 16:36 (2)	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	15:37 (2) 16:10 (2)	08:21 16:09	15:26 (3) 15:32 (3)
3	08:44 16:17	08:10 17:10	16:10 (2) 16:37 (2)	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	15:37 (2) 16:10 (2)	08:22 16:08	15:27 (3) 15:32 (3)
4	08:43 16:18	08:08 17:12	16:09 (2) 16:38 (2)	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	15:38 (2) 16:09 (2)	08:24 16:08	15:28 (3) 15:32 (3)
5	08:43 16:19	08:07 17:14	16:09 (2) 16:39 (2)	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	15:38 (2) 16:09 (2)	08:25 16:07	15:28 (3) 15:30 (3)
6	08:43 16:21	08:05 17:16	16:08 (2) 16:39 (2)	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	15:39 (2) 16:08 (2)	08:26 16:07	15:26 (3) 15:29 (2)
7	08:42 16:22	15:43 (3) 17:18	08:03 16:40 (2)	06:03 18:13	06:03 20:11	06:03 21:06	05:04 21:52	05:04 21:57	05:43 21:14	07:37 20:04	07:36 18:50	07:36 16:43	15:39 (2) 16:08 (2)	08:28 16:06	15:29 (2) 15:26 (3)
8	08:42 16:24	15:43 (3) 17:20	08:01 16:40 (2)	06:01 18:15	06:01 20:13	06:01 21:08	05:05 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	15:40 (2) 16:07 (2)	08:29 16:06	15:26 (3) 15:24 (3)
9	08:41 16:25	15:44 (3) 17:22	07:59 16:41 (2)	06:57 18:17	06:57 20:15	06:57 21:10	05:06 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	15:42 (2) 16:07 (2)	08:30 16:05	15:24 (3) 15:22 (3)
10	08:40 16:26	15:49 (3) 17:24	07:57 16:40 (2)	06:55 18:19	06:55 20:17	06:55 21:11	05:07 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	15:43 (2) 16:05 (2)	08:31 16:05	15:23 (3) 15:21 (3)
11	08:40 16:28	15:43 (3) 17:26	07:55 16:41 (2)	06:53 18:21	06:53 20:19	06:53 21:13	05:08 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:35	15:44 (2) 16:03 (2)	08:33 16:05	15:22 (3) 15:20 (3)
12	08:39 16:30	15:52 (3) 17:28	07:53 16:41 (2)	06:50 18:23	06:50 20:20	06:50 21:15	05:09 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	15:46 (2) 16:01 (2)	08:34 16:05	15:20 (3) 15:18 (3)
13	08:38 16:31	15:54 (3) 17:31	07:51 16:40 (2)	06:48 18:25	06:48 20:22	06:48 21:17	05:05 21:57	05:05 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	15:49 (2) 15:58 (2)	08:35 16:04	15:19 (3) 15:17 (3)
14	08:37 16:33	15:55 (3) 17:32	07:49 16:40 (2)	06:45 18:27	06:45 20:24	06:45 21:18	05:02 21:58	05:02 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	15:58 (3) 15:32 (3)	08:36 16:04	15:18 (3) 15:16 (3)
15	08:36 16:34	15:57 (3) 17:34	07:47 16:40 (2)	06:43 18:28	06:43 20:26	06:43 21:20	05:03 21:58	05:03 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	15:35 (3) 15:24 (3)	08:37 16:05	15:15 (3) 15:13 (3)
16	08:35 16:36	15:59 (3) 17:36	07:45 16:40 (2)	06:40 18:30	06:40 20:28	06:40 21:22	05:04 21:59	05:04 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	15:35 (3) 15:23 (3)	08:38 16:05	15:14 (3) 15:12 (3)
17	08:34 16:38	15:43 (3) 17:38	07:45 16:41 (2)	06:38 18:32	06:38 20:23	06:38 21:23	05:16 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	15:23 (3) 15:38 (3)	08:38 16:05	15:13 (3) 15:11 (3)
18	08:33 16:40	16:02 (3) 17:40	07:43 16:37 (2)	06:38 18:34	06:38 20:31	06:38 21:25	05:16 21:59	05:16 21:46	06:06 20:51	07:01 19:37	07:55 18:24	07:55 16:24	15:38 (3) 15:22 (3)	08:39 16:05	15:12 (3) 15:10 (3)
19	08:32 16:41	16:05 (3) 17:42	07:41 16:36 (2)	06:35 18:36	06:35 20:33	06:35 21:27	05:17 22:00	05:17 21:45	06:08 20:48	07:03 19:34	07:59 18:22	07:59 16:23	15:39 (3) 15:40 (3)	08:40 16:05	15:11 (3) 15:09 (3)
20	08:31 16:43	16:06 (3) 17:44	07:39 16:34 (2)	06:31 18:38	06:31 20:35	06:31 21:28	05:18 22:00	05:18 21:44	06:10 20:46	07:05 19:32	07:59 18:20	16:50 (2) 17:00 (2)	15:41 (3) 15:43 (3)	08:41 16:06	15:10 (3) 15:08 (3)
21	08:30 16:45	16:07 (3) 17:46	07:38 16:32 (2)	06:28 18:40	06:28 20:37	06:28 21:30	05:19 22:01	05:19 21:42	06:11 20:44	07:06 19:29	07:59 18:17	16:47 (2) 17:03 (2)	15:42 (2) 16:04 (2)	08:42 16:20	15:09 (3) 15:07 (3)
22	08:29 16:47	16:06 (3) 17:48	07:37 16:30 (2)	06:26 18:42	06:26 20:39	06:26 21:31	05:20 22:01	05:20 21:41	06:12 20:42	07:08 19:27	07:59 18:15	16:44 (2) 17:05 (2)	15:42 (2) 16:06 (2)	08:43 16:19	15:08 (3) 15:06 (3)
23	08:27 16:49	16:03 (3) 17:50	07:30 16:33 (2)	06:23 18:43	06:23 20:41	06:23 21:33	05:13 22:01	05:13 21:39	06:17 20:39	07:12 19:24	08:07 18:13	07:12 16:41 (2)	16:42 (2) 17:06 (2)	08:06 16:18	15:07 (3) 15:05 (3)
24	08:26 16:50	16:03 (3) 17:52	07:28 16:30 (2)	06:21 18:45	06:21 20:43	06:21 21:34	05:12 22:01	05:12 21:38	06:19 20:37	07:13 19:22	08:09 18:11	07:13 16:41 (2)	16:42 (2) 17:07 (2)	08:08 16:17	15:06 (3) 15:04 (3)
25	08:25 16:52	16:02 (3) 17:54	07:25 16:28 (2)	06:19 18:46	06:19 20:44	06:19 21:36	05:11 22:01	05:11 21:36	06:17 20:35	07:15 19:19	08:11 17:09	16:41 (2) 16:08 (2)	16:42 (2) 16:16 (2)	08:09 16:19	15:03 (3) 15:01 (3)
26	08:23 16:54	16:01 (3) 17:56	07:23 16:26 (2)	06:17 18:49	06:17 20:46	06:17 21:37	05:09 22:01	05:09 21:35	06:22 20:32	07:17 19:17	08:13 17:06	16:41 (2) 16:09 (2)	16:42 (2) 16:14 (2)	08:11 16:19	15:01 (3) 14:59 (3)
27	08:22 16:56	16:00 (3) 17:58	07:21 16:24 (2)	06:15 18:51	06:15 20:48	06:15 21:39	05:08 22:01	05:08 21:33	06:24 20:30	07:19 19:14	08:15 17:04	16:40 (2) 16:09 (2)	16:43 (2) 16:13 (2)	08:14 16:10	15:00 (3) 14:58 (3)
28	08:20 16:58	16:00 (3) 18:00	07:18 16:21 (2)	06:11 18:53	06:11 20:50	06:11 21:40	05:07 22:01	05:07 21:32	06:26 20:28	07:21 19:12	08:16 17:02	16:40 (2) 16:09 (2)	16:44 (2) 16:12 (2)	08:15 16:10	14:56 (3) 14:54 (3)
29	08:19 17:00	16:17 (2) 16:27 (2)	07:16 16:20 (2)	06:10 18:54	06:10 20:52	06:10 21:41	05:06 22:01	05:06 21:30	06:27 20:25	07:22 19:09	08:17 17:00	16:40 (2) 16:09 (2)	16:45 (2) 16:11 (2)	08:16 16:10	14:53 (3) 14:51 (3)
30	08:17 17:02	16:14 (2) 16:29 (2)	07:15 16:23 (2)	06:09 18:56	06:09 20:54	06:09 21:43	05:05 22:00	05:05 21:28	06:29 20:23	07:24 19:07	08:18 16:58	16:40 (2) 16:10 (2)	16:46 (2) 16:11 (2)	08:18 16:10	14:50 (3) 14:48 (3)
31	08:15 17:04	16:13 (2) 16:31 (2)	07:14 16:24 (2)	06:08 18:58	06:08 20:54	06:08 21:44	05:04 22:00	05:04 21:27	06:31 20:21	07:22 19:07	08:19 16:56	16:40 (2) 16:10 (2)	16:47 (2) 16:11 (2)	08:19 16:10	14:47 (3) 14:45 (3)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	25		
Total, worst case	333	603											318	603	25
Sun reduction	0.24	0.23											0.29	0.27	0.21
Oper. time red.	1.00	1.00											1.00	1.00	1.00
Wind dir. red.	0.66	0.66											0.66	0.66	0.66
Total reduction	0.16	0.15											0.19	0.18	0.14
Total, real	53	92											61	106	3

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: BU - H73

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	08:14	15:58 (2) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:29 (2) 08:19	
16:15	17:06	16:28 (2) 18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	29 15:58 (2) 16:10	
2 08:44	08:12	15:58 (2) 07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	15:28 (2) 08:21	
16:16	17:08	16:28 (2) 18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	30 15:58 (2) 16:09	
3 08:44	08:10	15:58 (2) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	15:28 (2) 08:22	
16:17	17:10	16:29 (2) 18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	31 15:59 (2) 16:08	
4 08:43	08:08	15:57 (2) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	15:27 (2) 08:24	
16:18	17:12	16:29 (2) 18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	32 15:59 (2) 16:08	
5 08:43	08:07	15:57 (2) 07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	15:27 (2) 08:25	
16:19	17:14	16:29 (2) 18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	32 15:59 (2) 16:07	
6 08:43	08:05	15:57 (2) 07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	15:27 (2) 08:26	
16:21	17:16	16:29 (2) 18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	32 15:59 (2) 16:07	
7 08:42	08:03	15:58 (2) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	15:27 (2) 08:28	
16:22	17:18	16:29 (2) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	32 15:59 (2) 16:06	
8 08:42	08:01	15:58 (2) 07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	15:27 (2) 08:29	
16:24	17:20	16:29 (2) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	31 15:58 (2) 16:06	
9 08:41	07:59	15:59 (2) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	15:29 (2) 08:30	
16:25	17:22	16:29 (2) 18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	30 15:59 (2) 16:05	
10 08:40	07:57	15:59 (2) 06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	15:29 (2) 08:32	
16:26	17:24	16:28 (2) 18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	30 15:59 (2) 16:05	
11 08:40	07:55	16:00 (2) 06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	15:30 (2) 08:33	
16:28	17:26	16:28 (2) 18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	28 15:58 (2) 16:05	
12 08:39	07:53	16:01 (2) 06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	15:30 (2) 08:34	
16:30	17:28	16:27 (2) 18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	27 15:57 (2) 16:05	
13 08:38	07:51	16:01 (2) 06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	15:31 (2) 08:35	
16:31	17:30	16:25 (2) 18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	26 15:57 (2) 16:04	
14 08:37	07:49	16:03 (2) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	15:32 (2) 08:36	
16:33	17:32	16:24 (2) 18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	24 15:56 (2) 16:04	
15 08:36	07:47	16:05 (2) 06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	15:33 (2) 08:37	
16:34	17:34	16:23 (2) 18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	22 15:55 (2) 16:04	
16 08:35	07:45	16:08 (2) 06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	15:34 (2) 08:38	
16:36	17:36	16:20 (2) 18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	20 15:54 (2) 16:05	
17 08:34	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	15:36 (2) 08:38	
16:38	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16 15:52 (2) 16:05	
18 08:33	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	15:38 (2) 08:39	
16:40	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	12 15:50 (2) 16:05	
19 08:32	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	15:41 (2) 08:40	
16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	7 15:48 (2) 16:05	
20 08:31	07:36	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	15:41 (2) 08:41	
16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	15:41 (2) 08:41	
21 08:30	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	15:41 (2) 08:41	
16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	15:41 (2) 08:41	
22 08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	15:41 (2) 08:41	
16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	15:41 (2) 08:41	
23 08:27	16:07 (2) 07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	15:41 (2) 08:41	
16:49	7 16:14 (2) 17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	15:41 (2) 08:41	
24 08:26	16:04 (2) 07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	15:41 (2) 08:41	
16:50	12 16:16 (2) 17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	15:41 (2) 08:41	
25 08:25	16:03 (2) 07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	15:40 (2) 08:09	15:41 (2) 08:41	
16:52	16 16:19 (2) 17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	7 15:47 (2) 16:16	15:41 (2) 08:41	
26 08:23	16:01 (2) 07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	15:36 (2) 08:11	15:41 (2) 08:41	
16:54	20 16:21 (2) 17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	15 15:51 (2) 16:14	15:41 (2) 08:41	
27 08:22	16:00 (2) 07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	15:34 (2) 08:13	15:41 (2) 08:41	
16:56	22 16:22 (2) 17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	19 15:53 (2) 16:13	15:41 (2) 08:41	
28 08:20	16:00 (2) 07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	15:32 (2) 08:14	15:41 (2) 08:41	
16:58	24 16:24 (2) 18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	22 15:54 (2) 16:12	15:41 (2) 08:41	
29 08:19	15:59 (2)	07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	15:31 (2) 08:16	15:41 (2) 08:41	
17:00	26 16:25 (2)	19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	24 15:55 (2) 16:11	15:41 (2) 08:41	
30 08:17	15:58 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	15:29 (2) 08:18	15:41 (2) 08:41	
17:02	28 16:26 (2)	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	27 15:56 (2) 16:11	15:41 (2) 08:41	
31 08:15	15:58 (2)	07:04		05:04		05:37	06:31		07:22	15:28 (2)	15:41 (2) 08:41	
17:04	28 16:26 (2)	19:58		21:44		21:27	20:21		16:56	29 15:57 (2)	15:41 (2) 08:41	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	183	437								143	491	
Sun reduction	0.24	0.23								0.29	0.27	
Oper. time red.	1.00	1.00								1.00	1.00	
Wind dir. red.	0.66	0.66								0.66	0.66	
Total reduction	0.16	0.15								0.19	0.18	
Total, real	29	67								28	86	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BV - H74

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BW - H75

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
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15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BX - H76

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: BY - H77
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		09:03 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24										08:19
	16:15		17:06	16	09:19 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54										16:10
2	08:44		08:12		09:04 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26										08:21
	16:16		17:08	13	09:17 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52										16:09
3	08:44		08:10		09:07 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28										08:22
	16:17		17:10	8	09:15 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50										16:08
4	08:43		08:09			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30										08:24
	16:18		17:12			18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48										16:08
5	08:43		08:07			07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32										08:25
	16:20		17:14			18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46										16:07
6	08:43		08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34										08:27
	16:21		17:16			18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44										16:07
7	08:42		08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36										08:28
	16:22		17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43										16:06
8	08:42		08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38								08:37 (2)		08:29
	16:24		17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	9							08:46 (2)		16:06
9	08:41		07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40								08:35 (2)		08:30
	16:25		17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	13							08:48 (2)		16:05
10	08:41		07:57			06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42								08:33 (2)		08:32
	16:27		17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	17							08:50 (2)		16:05
11	08:40		07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44								08:32 (2)		08:33
	16:28		17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	19							08:51 (2)		16:05
12	08:39		07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46								08:32 (2)		08:34
	16:30		17:28			18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	20							08:52 (2)		16:05
13	08:38		09:10 (2)			06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48								08:31 (2)		08:35
	16:31	3	09:13 (2)			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	22							08:53 (2)		16:05
14	08:37		09:09 (2)			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49								08:31 (2)		08:36
	16:33	5	09:14 (2)			18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	22							08:53 (2)		16:05
15	08:37		09:08 (2)			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51								08:30 (2)		08:37
	16:34	7	09:15 (2)			18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	24							08:54 (2)		16:05
16	08:36		09:07 (2)			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53								08:30 (2)		08:38
	16:36	9	09:16 (2)			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	24							08:54 (2)		16:05
17	08:35		09:05 (2)			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55								08:30 (2)		08:39
	16:38	12	09:17 (2)			18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	24							08:54 (2)		16:05
18	08:33		09:04 (2)			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57								08:30 (2)		08:39
	16:40	14	09:18 (2)			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	25							08:55 (2)		16:05
19	08:32		09:03 (2)			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59								08:31 (2)		08:40
	16:41	16	09:19 (2)			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	24							08:55 (2)		16:05
20	08:31		09:01 (2)			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01								08:33 (2)		08:41
	16:43	18	09:19 (2)			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	22							08:55 (2)		16:06
21	08:30		09:00 (2)			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02								08:35 (2)		08:41
	16:45	20	09:20 (2)			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	20							08:55 (2)		16:06
22	08:29		08:59 (2)			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04								08:37 (2)		08:42
	16:47	22	09:21 (2)			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	18							08:55 (2)		16:07
23	08:27		08:57 (2)			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06								08:39 (2)		08:42
	16:49	24	09:21 (2)			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	16							08:55 (2)		16:07
24	08:26		08:56 (2)			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08								08:41 (2)		08:43
	16:51	25	09:21 (2)			18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	14							08:55 (2)		16:08
25	08:25		08:57 (2)			06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:09								08:43 (2)		08:43
	16:52	24	09:21 (2)			18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	12							08:55 (2)		16:08
26	08:23		08:57 (2)			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11								08:45 (2)		08:44
	16:54	24	09:21 (2)			18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	10							08:55 (2)		16:09
27	08:22		08:58 (2)			06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13								08:47 (2)		08:44
	16:56	24	09:22 (2)			18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	16:14	7							08:54 (2)		16:10
28	08:20		08:59 (2)			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:15								08:49 (2)		08:44
	16:58	22	09:21 (2)			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	5							08:54 (2)		16:11
29	08:19		08:59 (2)			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16								08:50 (2)		08:44
	17:00	22	09:21 (2)			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	3							08:53 (2)		16:11
30	08:17		09:00 (2)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18								08:52 (2)		08:44
	17:02	20	09:20 (2)			19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	1							08:53 (2)		16:12
31	08:15		09:02 (2)			07:04		05:04		05:37	06:31		07:22											08:44
	17:04	18	09:20 (2)			19:58		21:44		21:27	20:21		16:56											16:13
Potential sun hours	250		273			367	420	494	510	512	460	382	328	259										233
Total, worst case	329		37												371									
Sun reduction	0.24		0.23												0.27									
Oper. time red.	1.00		1.00												1.00									
Wind dir. red.	0.61		0.61												0.61									
Total reduction	0.15		0.14																					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BZ - H78

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	12:22 (1) 08:14	08:42 (2) 07:16	07:01 05:52	05:03 04:59	05:39 06:33	07:26 07:24	07:56 (2) 08:19					
2 08:44	12:24 (1) 08:12	08:40 (2) 07:14	06:59 05:50	05:02 05:00	05:40 06:35	07:28 07:26	07:56 (2) 08:21					
3 08:44	12:25 (1) 08:10	08:38 (2) 07:12	06:56 05:48	05:01 05:00	05:42 06:36	07:30 07:28	07:58 (2) 08:22					
4 08:43	12:27 (1) 08:09	08:36 (2) 07:09	06:54 05:46	05:00 05:01	05:44 06:38	07:32 07:30	08:00 (2) 08:24					
5 08:43	12:28 (1) 08:07	08:34 (2) 07:07	06:52 05:44	04:59 05:02	05:45 06:40	07:33 07:32	08:02 (2) 08:25					
6 08:43	12:31 (1) 08:05	08:32 (2) 07:05	06:49 05:42	04:59 05:03	05:47 06:42	07:35 07:34	08:04 (2) 08:27					
7 08:42	12:36 (1) 08:03	08:30 (2) 07:02	06:47 05:40	04:58 05:04	05:49 06:44	07:37 07:36	08:06 (2) 08:28					
8 08:42	12:38 (1) 08:01	08:28 (2) 07:00	06:44 05:38	04:57 05:05	05:51 06:45	07:39 07:38	08:09 (2) 08:29					
9 08:41	17:20	08:54 (2) 07:15	06:42 05:36	04:57 05:06	05:52 06:47	07:41 07:40	08:11 (2) 08:30					
10 08:40	17:22	08:54 (2) 07:17	06:40 05:34	04:56 05:07	05:54 06:49	07:43 07:42	08:13 (2) 08:32					
11 08:40	17:24	08:54 (2) 07:19	06:37 05:33	04:56 05:08	05:56 06:51	07:44 07:44	08:15 (2) 08:33					
12 08:39	17:26	08:54 (2) 07:21	06:35 05:31	04:55 05:09	05:58 06:52	07:46 07:46	08:18 (2) 08:34					
13 08:38	17:28	08:54 (2) 07:23	06:32 05:29	04:55 05:11	05:59 06:54	07:48 07:48	08:20 (2) 08:36					
14 08:37	17:30	08:54 (2) 07:25	06:30 05:27	04:55 05:12	06:01 06:56	07:50 07:49	08:22 (2) 08:38					
15 08:36	17:32	08:54 (2) 07:27	06:28 05:26	04:55 05:13	06:03 06:58	07:52 07:51	08:24 (2) 08:40					
16 08:36	17:34	08:54 (2) 07:29	06:26 05:24	04:54 05:14	06:05 06:59	07:54 07:53	08:26 (2) 08:42					
17 08:35	17:36	08:54 (2) 07:31	06:23 05:22	04:54 05:16	06:06 07:01	07:56 07:55	08:28 (2) 08:44					
18 08:33	17:38	08:54 (2) 07:33	06:21 05:21	04:54 05:17	06:08 07:03	07:57 07:57	08:30 (2) 08:46					
19 08:32	17:40	08:54 (2) 07:35	06:18 05:19	04:54 05:18	06:10 07:05	07:59 07:59	08:32 (2) 08:48					
20 08:31	17:42	08:54 (2) 07:37	06:16 05:18	04:54 05:20	06:12 07:06	08:01 08:01	08:34 (2) 08:50					
21 08:30	17:44	08:54 (2) 07:39	06:14 05:16	04:54 05:21	06:13 07:08	08:03 08:02	08:36 (2) 08:52					
22 08:29	17:46	08:54 (2) 07:41	06:12 05:15	04:55 05:23	06:15 07:10	08:05 08:04	08:38 (2) 08:54					
23 08:27	17:48	08:54 (2) 07:43	06:10 05:13	04:55 05:24	06:17 07:12	08:07 08:06	08:40 (2) 08:56					
24 08:26	17:50	08:54 (2) 07:45	06:08 05:12	04:55 05:26	06:19 07:14	08:09 08:08	08:42 (2) 08:58					
25 08:25	17:52	08:54 (2) 07:47	06:06 05:11	04:56 05:27	06:21 07:15	08:11 08:10	08:44 (2) 09:00					
26 08:23	17:54	08:54 (2) 07:49	06:04 05:10	04:56 05:28	06:23 07:17	08:13 08:12	08:46 (2) 09:02					
27 08:22	17:56	08:54 (2) 07:51	06:02 05:08	04:56 05:30	06:25 07:19	08:15 08:14	08:48 (2) 09:04					
28 08:20	17:58	08:54 (2) 07:53	06:00 05:07	04:57 05:32	06:27 07:21	08:17 08:16	08:50 (2) 09:06					
29 08:19	18:00	08:54 (2) 07:55	05:58 05:06	04:58 05:34	06:29 07:23	08:19 08:18	08:52 (2) 09:08					
30 08:17		08:54 (2) 07:57	05:56 05:05	04:58 05:36	06:31 07:25	08:21 08:20	08:54 (2) 09:10					
31 08:15		08:54 (2) 07:59	05:54 05:04	04:58 05:38	06:33 07:27	08:23 08:22	08:56 (2) 09:12					
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	114	376										
Sun reduction	0.24	0.23										
Oper. time red.	1.00	1.00										
Wind dir. red.	0.62	0.62										
Total reduction	0.15	0.14										
Total, real	17	54										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CA - H79

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15 35	12:03 (1) 12:38 (1) 17:06	08:14 17:06	07:16 18:02	05:52 20:00	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:54 (2) 08:13 (2) 16:10	08:19 17:16
2	08:44 16:16 35	12:04 (1) 12:39 (1) 17:08	08:12 17:08	07:14 18:04	06:59 20:02	05:50 21:47	05:02 22:00	05:00 21:23	05:40 20:16	06:35 19:02	07:28 16:52 16	08:21 16:09 20
3	08:44 16:17 33	12:05 (1) 12:38 (1) 17:10	08:10 17:10	07:12 18:06	06:56 20:04	05:48 21:48	05:01 21:59	05:00 21:21	05:42 20:14	06:36 19:00	07:30 16:50 13	08:22 16:08 24
4	08:43 16:18 32	12:06 (1) 12:38 (1) 17:12	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 20:11	06:38 18:57	07:32 16:48 10	08:24 16:08 26
5	08:43 16:20 31	12:07 (1) 12:38 (1) 17:14	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:58	05:02 21:18	05:45 20:09	06:40 18:55	07:33 16:46 6	08:25 16:07 27
6	08:43 16:21 29	12:09 (1) 12:39 (1) 17:16	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	05:03 21:51	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:44 2	08:27 16:07 29
7	08:42 16:22 28	12:09 (1) 12:37 (1) 17:18	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 18:50	07:37 16:43	08:28 16:06 31
8	08:42 16:24 26	12:11 (1) 12:37 (1) 17:20	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 16:41	08:29 16:06 32
9	08:41 16:25 24	12:13 (1) 12:37 (1) 17:22	07:59 17:22	06:57 18:17	06:42 20:15	05:52 21:10	05:06 21:54	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05 33
10	08:40 16:27 21	12:14 (1) 12:35 (1) 17:24	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05 34
11	08:40 16:28 17	12:17 (1) 12:34 (1) 17:26	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 16:36	08:33 16:05 35
12	08:39 16:30 13	12:19 (1) 12:32 (1) 17:28	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 16:34	08:34 16:05 36
13	08:38 16:31 13	12:20 (1) 12:30 (1) 17:30	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 16:32	08:35 16:05 37
14	08:37 16:33 13	12:21 (1) 12:32 (1) 17:32	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 16:31	08:36 16:05 37
15	08:36 16:35 13	12:22 (1) 12:33 (1) 17:34	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 16:29	08:37 16:05 37
16	08:36 16:36 13	12:23 (1) 12:34 (1) 17:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 16:28	08:38 16:05 38
17	08:35 16:38 13	12:24 (1) 12:35 (1) 17:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 16:26	08:39 16:05 38
18	08:33 16:40 13	12:25 (1) 12:36 (1) 17:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 21:56	05:17 21:46	06:08 20:51	07:03 19:37	07:57 16:25	08:39 16:05 39
19	08:32 16:41 13	12:26 (1) 12:37 (1) 17:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 21:56	05:18 21:45	06:10 20:48	07:05 19:34	07:59 16:23	08:40 16:05 39
20	08:31 16:43 13	12:27 (1) 12:38 (1) 17:44	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 21:56	05:20 21:44	06:12 20:46	06:12 19:32	08:01 16:22	08:41 16:06 39
21	08:30 16:45 13	12:28 (1) 12:39 (1) 17:46	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 21:56	05:21 21:42	06:13 20:44	08:03 19:29	08:02 16:20	08:41 16:06 39
22	08:29 16:47 13	12:29 (1) 12:40 (1) 17:48	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 21:56	05:23 21:41	06:15 20:42	08:05 19:27	08:04 16:19	08:42 16:07 39
23	08:27 16:49 13	12:30 (1) 12:41 (1) 17:50	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 21:56	05:24 21:40	06:17 20:39	08:07 19:24	08:06 16:18	08:42 16:07 38
24	08:26 16:51 13	12:31 (1) 12:42 (1) 17:52	07:28 17:52	06:20 18:45	06:07 20:43	05:12 21:34	04:55 21:56	05:26 21:38	06:19 20:37	07:14 19:22	08:09 16:17	08:43 16:08 38
25	08:25 16:52 13	12:32 (1) 12:43 (1) 17:54	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 21:56	05:27 21:37	06:21 20:35	07:15 19:19	07:11 16:16	08:43 16:08 39
26	08:23 16:54 13	12:33 (1) 12:44 (1) 17:56	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 21:56	05:29 21:35	06:22 20:33	07:17 19:17	07:13 16:15	08:44 16:09 39
27	08:22 16:56 13	12:34 (1) 12:45 (1) 17:58	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 21:56	05:31 21:33	06:24 20:30	07:19 19:15	07:15 16:14	08:44 16:10 38
28	08:20 16:58 13	12:35 (1) 12:46 (1) 17:59	07:19 17:59	06:11 18:53	05:58 20:50	05:07 21:40	04:57 21:56	05:32 21:32	06:26 20:28	07:21 19:12	07:17 16:13	08:44 16:11 38
29	08:19 17:00 13	12:36 (1) 12:47 (1) 18:00	07:17 18:00	06:09 18:55	05:56 20:52	05:06 21:42	04:58 21:56	05:34 21:30	06:28 20:25	07:23 19:10	07:19 16:12	08:44 16:11 37
30	08:17 17:02 13	12:37 (1) 12:48 (1) 18:02	07:15 18:02	06:07 18:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:11	08:44 16:12 37
31	08:15 17:04 13	12:38 (1) 12:49 (1) 18:04	07:13 18:04	06:04 18:58	05:04 21:44	05:04 21:56	05:37 21:27	06:31 20:21	07:22 16:56	07:22 16:56	07:22 16:56	08:44 16:13 36
Potential sun hours	250	273	367	420	494	510	512	460	382	328	290	233
Total, worst case	324	352									78	1064
Sun reduction	0.24	0.23									0.27	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.62	0.63									0.63	0.62
Total reduction	0.15	0.15									0.17	0.13
Total, real	49	51									13	137

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CB - H80

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		11:46 (1)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		07:54 (2)	08:19		11:40 (1)				
	16:15	36	12:22 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	11	08:05 (2)	16:10	21	12:01 (1)				
2	08:44		11:47 (1)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		07:56 (2)	08:21		11:39 (1)				
	16:16	36	12:23 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	8	08:04 (2)	16:09	24	12:03 (1)				
3	08:44		11:47 (1)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		07:58 (2)	08:22		11:38 (1)				
	16:17	35	12:22 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	4	08:02 (2)	16:08	26	12:04 (1)				
4	08:43		11:48 (1)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30			08:24		11:38 (1)				
	16:18	35	12:23 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48			16:08	28	12:06 (1)				
5	08:43		11:49 (1)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32			16:08		11:37 (1)				
	16:20	33	12:22 (1)	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46			16:07	30	12:07 (1)				
6	08:43		11:51 (1)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34			16:07		11:37 (1)				
	16:21	31	12:22 (1)	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:44			16:07	31	12:08 (1)				
7	08:42		11:52 (1)	08:03		08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44		07:37			16:06		11:36 (1)				
	16:22	30	12:22 (1)	17:18	1	08:31 (2)	07:13	20:11	21:06	21:52	21:57	21:14	20:04		16:43			16:06	33	12:09 (1)				
8	08:42		11:53 (1)	08:01		08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45		07:38			16:05		11:37 (1)				
	16:24	28	12:21 (1)	17:20	5	08:33 (2)	07:15	20:13	21:08	21:53	21:56	21:12	20:01		16:41			16:06	34	12:11 (1)				
9	08:41		11:55 (1)	07:59		08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47		07:41			16:05		11:36 (1)				
	16:25	26	12:21 (1)	17:22	9	08:35 (2)	07:17	20:15	21:10	21:54	21:56	21:10	19:59		16:39			16:05	35	12:11 (1)				
10	08:41		11:56 (1)	07:57		08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49		07:43			16:04		11:36 (1)				
	16:27	24	12:20 (1)	17:24	12	08:36 (2)	07:19	20:17	21:12	21:55	21:55	21:08	19:57		16:37			16:05	36	12:12 (1)				
11	08:40		11:58 (1)	07:55		08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51		07:44			16:04		11:36 (1)				
	16:28	21	12:19 (1)	17:26	15	08:37 (2)	07:21	20:19	21:13	21:56	21:54	21:06	19:54		16:36			16:05	36	12:12 (1)				
12	08:39		12:00 (1)	07:53		08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52		07:46			16:04		11:37 (1)				
	16:30	17	12:17 (1)	17:28	18	08:38 (2)	07:23	20:21	21:15	21:56	21:53	21:04	19:52		16:38			16:05	37	12:14 (1)				
13	08:38		12:03 (1)	07:51		08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54		07:48			16:04		11:37 (1)				
	16:31	12	12:15 (1)	17:30	20	08:38 (2)	07:25	20:22	21:17	21:57	21:52	21:01	19:49		16:36			16:05	38	12:15 (1)				
14	08:37			07:49		08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56		07:50			16:04		11:37 (1)				
	16:33			17:32	23	08:38 (2)	07:27	20:24	21:19	21:58	21:51	20:59	19:47		16:33			16:05	38	12:15 (1)				
15	08:36			07:47		08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58		07:52			16:04		11:37 (1)				
	16:35			17:34	25	08:38 (2)	07:29	20:26	21:20	21:58	21:50	20:57	19:44		16:31			16:05	39	12:16 (1)				
16	08:36			07:45		08:12 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59		07:54			16:04		11:37 (1)				
	16:36			17:36	26	08:38 (2)	07:30	20:28	21:22	21:59	21:49	20:55	19:42		16:29			16:05	41	12:16 (1)				
17	08:35			07:43		08:12 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01		07:56			16:04		11:37 (1)				
	16:38			17:38	26	08:38 (2)	07:32	20:30	21:24	21:59	21:48	20:53	19:39		16:27			16:05	45	12:17 (1)				
18	08:33			07:41		08:13 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03		07:57			16:04		11:37 (1)				
	16:40			17:40	25	08:38 (2)	07:34	20:32	21:25	22:00	21:46	20:51	19:37		18:24	11	08:50 (2)	16:25		11:36 (1)				
19	08:32			07:39		08:12 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05		07:59			16:05	46	12:18 (1)				
	16:41			17:42	25	08:37 (2)	07:36	20:33	21:27	22:00	21:45	20:48	19:34		18:22	17	09:04 (2)	16:23		11:36 (1)				
20	08:31			07:37		08:13 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06		08:01			16:04		11:36 (1)				
	16:43			17:44	23	08:36 (2)	07:38	20:35	21:28	22:00	21:44	20:46	19:32		18:20	19	09:05 (2)	16:22		11:36 (1)				
21	08:30			07:34		08:14 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08		08:03			16:04		11:36 (1)				
	16:45			17:46	21	08:35 (2)	07:40	20:37	21:30	22:01	21:42	20:44	19:29		18:18	22	09:06 (2)	16:20		11:36 (1)				
22	08:29			07:32		08:15 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10		08:05			16:04		11:36 (1)				
	16:47			17:48	18	08:33 (2)	07:42	20:39	21:31	22:01	21:41	20:42	19:27		18:15	24	09:07 (2)	16:19		11:36 (1)				
23	08:27			07:30		08:17 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12		08:07			16:04		11:36 (1)				
	16:49			17:50	15	08:32 (2)	07:43	20:41	21:33	22:01	21:40	20:39	19:24		18:13	25	09:07 (2)	16:18		11:36 (1)				
24	08:26			07:28		08:20 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14		08:09			16:04		11:36 (1)				
	16:51			17:52	9	08:29 (2)	07:45	20:43	21:34	22:01	21:38	20:37	19:22		18:11	26	09:08 (2)	16:17		11:36 (1)				
25	08:25			07:25		08:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11		07:41			16:04		11:36 (1)				
	16:52			17:54		08:17	06:04	05:10	04:56	05:28	06:22	07:16	07:12		07:41			16:04		11:36 (1)				
26	08:23			07:23		08:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13		07:41			16:04		11:36 (1)				
	16:54			17:56		08:19	06:06	05:12	04:57	05:30	06:24	07:18	07:14		07:41			16:04		11:36 (1)				
27	08:22			07:21		08:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15		07:43			16:04		11:36 (1)				
	16:56			17:58		08:21	06:08	05:14	04:59	05:32	06:26	07:20	07:16		07:45			16:04		11:36 (1)				
28	08:20			07:19		08:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17		07:47			16:04		11:36 (1)				
	16:58			18:00		08:23	06:10	05:16	04:59	05:34	06:28	07:23	07:19		07:47			16:04		11:36 (1)				
29	08:19					08:12	05:56	05:06	04:58	05:34	06:28	07:23	07:19		07:47			16:04		11:36 (1)				
	17:00					08:25	06:13	05:19	04:59	05:36	06:30	07:24	07:20		07:49			16:04		11:36 (1)				
30	08:17					08:17	05:54	05:05	04:58	05:35	06:29	07:24	07:20		07:50			16:04		11:36 (1)				
	17:02					08:28	06:16	05:22	04:59	05:38	06:32	07:26	07:22		07:52			16:04		11:36 (1)				
31	08:15					08:29	06:17	05:23	04:59	05:39	06:33	07:27	07:23		07:53			16:04		11:36 (1)				
	17:04					08:30	06:18	05:24	04:59	05:40	06:34	07:28	07:24		07:54			16:04		11:36 (1)				
Potential sun hours	250		273			367	420	494	510	512	460	382	328		295			259		1194				
Total, worst case	364		316												0.29									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CC - H81

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		14:52 (4)	08:14		16:27 (3)	07:16		17:11 (2)	07:01		05:52			05:03		
	16:15	26	15:18 (4)	17:06	7	16:34 (3)	18:02	23	17:34 (2)	20:00		20:55			21:45		
2	08:44		14:53 (4)	08:12		16:27 (3)	07:14		17:09 (2)	06:59		05:50			05:02		
	16:16	26	15:19 (4)	17:08	10	16:37 (3)	18:04	27	17:36 (2)	20:02		20:57			21:46		
3	08:44		14:53 (4)	08:10		16:26 (3)	07:12		17:08 (2)	06:56		05:48			05:01		
	16:17	25	15:18 (4)	17:10	13	16:39 (3)	18:06	30	17:38 (2)	20:04		20:59			21:48		
4	08:43		14:54 (4)	08:08		16:26 (3)	07:09		17:08 (2)	06:54		05:46			05:00		
	16:18	25	15:19 (4)	17:12	15	16:41 (3)	18:07	33	17:41 (2)	20:06		21:01			21:49		
5	08:43		14:54 (4)	08:07		16:26 (3)	07:07		17:07 (2)	06:51		05:44			04:59		
	16:19	25	15:19 (4)	17:14	17	16:43 (3)	18:09	33	17:40 (2)	20:07		21:03			21:50		
6	08:43		14:56 (4)	08:05		16:26 (3)	07:04		17:07 (2)	06:49		05:42			04:58		
	16:21	23	15:19 (4)	17:16	19	16:45 (3)	18:11	34	17:41 (2)	20:09		21:04			21:51		
7	08:42		14:56 (4)	08:03		16:27 (3)	07:02		17:06 (2)	06:47		05:40			04:58		
	16:22	23	15:19 (4)	17:18	20	16:47 (3)	18:13	34	17:40 (2)	20:11		21:06			21:52		
8	08:42		14:57 (4)	08:01		16:27 (3)	07:00		17:06 (2)	06:44		05:38			04:57		
	16:24	21	15:18 (4)	17:20	21	16:48 (3)	18:15	34	17:40 (2)	20:13		21:08			21:53		
9	08:41		14:59 (4)	07:59		16:28 (3)	06:57		17:05 (2)	06:42		05:36			04:57		
	16:25	20	15:19 (4)	17:22	19	16:47 (3)	18:17	35	17:40 (2)	20:15		21:10			21:54		
10	08:40		15:00 (4)	07:57		16:29 (3)	06:55		17:06 (2)	06:39		05:34			04:56		
	16:26	19	15:19 (4)	17:24	18	16:47 (3)	18:19	33	17:39 (2)	20:17		21:11			21:55		
11	08:40		15:01 (4)	07:55		16:30 (3)	06:53		17:06 (2)	06:37		05:33			04:56		
	16:28	17	15:18 (4)	17:26	16	16:46 (3)	18:21	33	17:39 (2)	20:19		21:13			21:55		
12	08:39		15:02 (4)	07:53		16:32 (3)	06:50		17:06 (2)	06:35		05:31			04:55		
	16:30	15	15:17 (4)	17:28	12	16:44 (3)	18:23	32	17:38 (2)	20:20		21:15			21:56		
13	08:38		15:04 (4)	07:51		16:34 (3)	06:48		17:07 (2)	06:32		05:29			04:55		
	16:31	12	15:16 (4)	17:30	7	16:41 (3)	18:25	30	17:37 (2)	20:22		21:17			21:57		
14	08:37		15:07 (4)	07:49		06:45			17:08 (2)	06:30		05:27			04:55		
	16:33	8	15:15 (4)	17:32		18:27	27	17:35 (2)	20:24			21:18			21:58		
15	08:36			07:47		06:43			17:09 (2)	06:28		05:26			04:54		
	16:34			17:34		18:28	25	17:34 (2)	20:26			21:20			21:58		
16	08:35			07:45		06:40			17:10 (2)	06:25		05:24			04:54		
	16:36			17:36		18:30	22	17:32 (2)	20:28			21:22			21:59		
17	08:34			07:43		06:38			17:12 (2)	06:23		05:22			04:54		
	16:38			17:38		18:32	18	17:30 (2)	20:30			21:23			21:59		
18	08:33			07:41		06:35			17:15 (2)	06:21		05:21			04:54		
	16:40			17:40		18:34	11	17:26 (2)	20:31			21:25			22:00		
19	08:32			07:39		06:33			06:18			05:19			04:54		
	16:41			17:42		18:36			20:33			21:27			22:00		
20	08:31			07:36		06:31			06:16			05:18			04:54		
	16:43			17:44		18:38			20:35			21:28			22:00		
21	08:30			07:34		06:28			06:14			05:16			04:54		
	16:45			17:46		18:40			20:37			21:30			22:01		
22	08:29			07:32		06:26			06:12			05:15			04:55		
	16:47			17:48		18:42			20:39			21:31			22:01		
23	08:27			07:30		06:23			06:09			05:13			04:55		
	16:49			17:50		18:43			20:41			21:33			22:01		
24	08:26			07:28		06:21			06:07			05:12			04:55		
	16:50			17:52		18:45			20:43			21:34			22:01		
25	08:24			07:25		17:19 (2)	06:18		06:05			05:11			04:55		
	16:52			17:54	7	17:26 (2)	18:47		20:44			21:36			22:01		
26	08:23			07:23		17:16 (2)	06:16		06:03			05:09			04:56		
	16:54			17:56	12	17:28 (2)	18:49		20:46			21:37			22:01		
27	08:22			07:21		17:14 (2)	06:13		06:00			05:08			04:56		
	16:56			17:58	17	17:31 (2)	18:51		20:48			21:39			22:01		
28	08:20			07:18		17:12 (2)	06:11		05:58			05:07			04:57		
	16:58			18:00	20	17:32 (2)	18:53		20:50			21:40			22:01		
29	08:19					07:08			05:56			05:06			04:57		
	17:00					19:54			20:52			21:41			22:01		
30	08:17		16:28 (3)			07:06			05:54			05:05			04:58		
	17:02	1	16:29 (3)			19:56			20:54			21:43			22:00		
31	08:15		16:27 (3)			07:04						05:04					
	17:04	4	16:31 (3)			19:58						21:44					
Potential sun hours		250			273		367			420		494			510		
Total, worst case		290			250		514										
Sun reduction		0.24			0.23		0.27										
Oper. time red.		1.00			1.00		1.00										
Wind dir. red.		0.65			0.66		0.68										
Total reduction		0.16			0.15		0.18										
Total, real		45			38		94										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: CC - H81

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:45 (2) 18:16 (2)	07:24 16:17 (3)	15:58 (3) 16:10	08:19 17	14:43 (4) 15:00 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:45 (2) 18:17 (2)	07:26 16:52	15:57 (3) 16:17 (3)	08:21 19	14:42 (4) 15:01 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:44 (2) 18:17 (2)	07:28 16:50	15:57 (3) 16:18 (3)	08:22 20	14:42 (4) 15:02 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:43 (2) 18:17 (2)	07:30 16:48	15:56 (3) 16:17 (3)	08:24 21	14:42 (4) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:43 (2) 18:17 (2)	07:32 16:46	15:56 (3) 16:15 (3)	08:25 23	14:41 (4) 15:04 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:43 (2) 18:17 (2)	07:34 16:44	15:56 (3) 16:12 (3)	08:26 23	14:42 (4) 15:05 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:42 (2) 18:16 (2)	07:36 16:43	15:56 (3) 16:10 (3)	08:28 25	14:41 (4) 15:06 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:42 (2) 18:16 (2)	07:38 16:41	15:56 (3) 16:08 (3)	08:29 25	14:41 (4) 15:06 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:42 (2) 18:15 (2)	07:40 16:39	15:57 (3) 16:07 (3)	08:30 25	14:42 (4) 15:07 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:42 (2) 18:14 (2)	07:42 16:37	15:58 (3) 16:05 (3)	08:31 26	14:42 (4) 15:08 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:43 (2) 18:11 (2)	07:44 16:35	15:59 (3) 16:03 (3)	08:33 26	14:42 (4) 15:08 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:44 (2) 18:09 (2)	07:45 16:34	16:00 (3) 16:01 (3)	08:34 27	14:42 (4) 15:09 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:44 (2) 18:07 (2)	07:47 16:32	16:05 (3) 16:05	08:35 27	14:42 (4) 15:09 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:46 (2) 18:04 (2)	07:49 16:31	16:06 (3) 16:04	08:36 28	14:42 (4) 15:10 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:47 (2) 18:02 (2)	07:51 16:29	16:05 (3) 16:04	08:37 27	14:43 (4) 15:10 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:50 (2) 17:59 (2)	07:53 16:27	16:06 (3) 16:05	08:38 28	14:43 (4) 15:11 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:54 (2) 17:57 (2)	07:55 16:26	16:07 (3) 16:05	08:38 28	14:44 (4) 15:12 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:57 (2) 16:24	07:57 16:24	16:08 (3) 16:05	08:39 28	14:44 (4) 15:12 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:59 16:23	07:59 16:23	16:09 (3) 16:05	08:40 28	14:45 (4) 15:13 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	18:00 16:22	08:00 16:22	16:10 (3) 16:06	08:41 28	14:45 (4) 15:13 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	18:02 16:20	08:02 16:20	16:11 (3) 16:06	08:42 28	14:46 (4) 15:14 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	18:04 16:19	08:04 16:19	16:12 (3) 16:06	08:42 28	14:46 (4) 15:14 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	18:06 16:18	08:06 16:18	16:13 (3) 16:07	08:42 28	14:47 (4) 15:15 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	18:08 16:17	08:08 16:17	16:14 (3) 16:08	08:43 28	14:47 (4) 15:15 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	18:00 (2) 18:07 (2)	07:11 17:09	08:09 16:16	16:15 (3) 16:08	08:43 28	14:47 (4) 15:15 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	17:55 (2) 18:11 (2)	07:13 17:06	08:11 16:14	16:16 (3) 16:09	08:43 29	14:47 (4) 15:16 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	17:52 (2) 18:13 (2)	07:15 17:04	08:13 16:13	16:17 (3) 16:10	08:44 28	14:49 (4) 15:17 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	17:50 (2) 18:15 (2)	07:16 17:02	08:14 16:12	14:47 (4) 14:55 (4)	08:44 28	14:49 (4) 15:17 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	17:49 (2) 18:16 (2)	07:18 17:00	08:16 16:11	14:44 (4) 14:56 (4)	08:44 28	14:50 (4) 15:18 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:47 (2) 18:16 (2)	07:20 16:58	08:18 16:13	14:43 (4) 14:58 (4)	08:44 27	14:50 (4) 15:17 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	17:22 16:15 (3)	08:19 16:13	14:50 (4) 16:13	08:44 27	14:50 (4) 15:17 (4)
Potential sun hours	512	460	382	328	259	233			
Total, worst case			125	491	199	807			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.68	0.68	0.65	0.65			
Total reduction			0.22	0.20	0.17	0.13			
Total, real			27	97	35	108			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CD - H82

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:04 (5)	07:16	16:43 (4)	07:01		05:52		19:39 (2)	05:03					
	16:15			17:06	5 16:09 (5)	18:02	9 16:52 (4)	20:00		20:55	26	20:05 (2)	21:45					
2	08:44			08:12		07:14		06:59		05:50		19:40 (2)	05:02					
	16:16			17:08		18:04		20:02		20:57	24	20:04 (2)	21:46					
3	08:44			08:10		07:12		06:56		05:48		19:41 (2)	05:01					
	16:17			17:10		18:06		20:04		20:59	21	20:02 (2)	21:48					
4	08:43			08:08		07:09		17:36 (3)	06:54	05:46		19:42 (2)	05:00					
	16:18			17:12		18:07	5 17:41 (3)	20:06		21:01	19	20:01 (2)	21:49					
5	08:43			08:07	16:38 (4)	07:07	17:34 (3)	06:51		05:44		19:44 (2)	04:59					
	16:19			17:14	5 16:43 (4)	18:09	8 17:42 (3)	20:07		21:03	14	19:58 (2)	21:50					
6	08:43			08:05	16:37 (4)	07:04	17:34 (3)	06:49		05:42		19:47 (2)	04:59					
	16:21			17:16	8 16:45 (4)	18:11	11 17:45 (3)	20:09		21:04	8	19:55 (2)	21:51					
7	08:42			08:03	16:35 (4)	07:02	17:32 (3)	06:47		05:40			04:58					
	16:22			17:18	12 16:47 (4)	18:13	14 17:46 (3)	20:11		21:06			21:52					
8	08:42			08:01	16:34 (4)	07:00	17:32 (3)	06:44		05:38			04:57					
	16:24			17:20	16 16:50 (4)	18:15	16 17:48 (3)	20:13		21:08			21:53					
9	08:41			07:59	16:33 (4)	06:57	17:31 (3)	06:42		05:36			04:57					
	16:25			17:22	19 16:52 (4)	18:17	19 17:50 (3)	20:15		21:10			21:54					
10	08:40			07:57	16:32 (4)	06:55	17:32 (3)	06:39		05:34			04:56					
	16:26			17:24	22 16:54 (4)	18:19	20 17:52 (3)	20:17		21:11			21:55					
11	08:40			07:55	16:32 (4)	06:52	17:32 (3)	06:37		05:33			04:56					
	16:28			17:26	24 16:56 (4)	18:21	22 17:54 (3)	20:19		21:13			21:55					
12	08:39			07:53	16:30 (4)	06:50	17:32 (3)	06:35		05:31			04:55					
	16:30			17:28	28 16:58 (4)	18:23	21 17:53 (3)	20:20		21:15			21:56					
13	08:38		15:53 (5)	07:51	16:30 (4)	06:48	17:33 (3)	06:32		05:29			04:55					
	16:31	2	15:55 (5)	17:30	30 17:00 (4)	18:25	19 17:52 (3)	20:22	5	19:54 (2)			21:57					
14	08:37		15:53 (5)	07:49	16:30 (4)	06:45	17:34 (3)	06:30		19:46 (2)			04:55					
	16:33	4	15:57 (5)	17:32	32 17:02 (4)	18:27	16 17:50 (3)	20:24	10	19:56 (2)			21:58					
15	08:36		15:53 (5)	07:47	16:30 (4)	06:43	17:36 (3)	06:28		19:44 (2)			04:54					
	16:34	6	15:59 (5)	17:34	35 17:05 (4)	18:28	13 17:49 (3)	20:26	14	19:58 (2)			21:58					
16	08:35		15:52 (5)	07:45	16:30 (4)	06:40	17:38 (3)	06:25		19:43 (2)			04:54					
	16:36	8	16:00 (5)	17:36	37 17:07 (4)	18:30	7 17:45 (3)	20:28	17	20:00 (2)			21:59					
17	08:34		15:52 (5)	07:43	16:30 (4)	06:38		06:23		19:41 (2)			04:54					
	16:38	11	16:03 (5)	17:38	37 17:07 (4)	18:32		20:30	20	20:01 (2)			21:59					
18	08:33		15:52 (5)	07:41	16:29 (4)	06:35		06:21		19:40 (2)			04:54					
	16:40	13	16:05 (5)	17:40	37 17:06 (4)	18:34		20:31	23	20:03 (2)			22:00					
19	08:32		15:53 (5)	07:39	16:29 (4)	06:33		06:18		19:39 (2)			04:54					
	16:41	14	16:07 (5)	17:42	37 17:06 (4)	18:36		20:33	26	20:05 (2)			22:00					
20	08:31		15:52 (5)	07:36	16:30 (4)	06:31		06:16		19:38 (2)			04:54					
	16:43	16	16:08 (5)	17:44	36 17:06 (4)	18:38		20:35	29	20:07 (2)			22:00					
21	08:30		15:53 (5)	07:34	16:31 (4)	06:28		06:14		19:37 (2)			04:54					
	16:45	18	16:11 (5)	17:46	35 17:06 (4)	18:40		20:37	31	20:08 (2)			22:01					
22	08:29		15:52 (5)	07:32	16:30 (4)	06:26		06:12		19:37 (2)			04:55					
	16:47	20	16:12 (5)	17:48	34 17:04 (4)	18:42		20:39	32	20:09 (2)			22:01					
23	08:27		15:53 (5)	07:30	16:31 (4)	06:23		06:09		19:36 (2)			04:55					
	16:49	22	16:15 (5)	17:50	33 17:04 (4)	18:43		20:41	33	20:09 (2)			22:01					
24	08:26		15:53 (5)	07:28	16:33 (4)	06:21		06:07		19:36 (2)			04:55					
	16:50	22	16:15 (5)	17:52	30 17:03 (4)	18:45		20:43	33	20:09 (2)			22:01					
25	08:24		15:54 (5)	07:25	16:33 (4)	06:18		06:05		19:36 (2)			04:55					
	16:52	22	16:16 (5)	17:54	28 17:01 (4)	18:47		20:44	33	20:09 (2)			22:01					
26	08:23		15:54 (5)	07:23	16:35 (4)	06:16		06:03		19:37 (2)			04:56					
	16:54	21	16:15 (5)	17:56	25 17:00 (4)	18:49		20:46	32	20:09 (2)			22:01					
27	08:22		15:55 (5)	07:21	16:37 (4)	06:13		06:01		19:37 (2)			04:56					
	16:56	20	16:15 (5)	17:58	22 16:59 (4)	18:51		20:48	31	20:08 (2)			22:01					
28	08:20		15:56 (5)	07:18	16:38 (4)	06:11		05:58		19:37 (2)			04:57					
	16:58	19	16:15 (5)	18:00	17 16:55 (4)	18:53		20:50	30	20:07 (2)			22:01					
29	08:18		15:57 (5)			07:08		05:56		19:38 (2)			04:57					
	17:00	17	16:14 (5)			19:54		20:52	29	20:07 (2)			22:01					
30	08:17		15:58 (5)			07:06		05:54		19:38 (2)			04:58					
	17:02	15	16:13 (5)			19:56		20:54	28	20:06 (2)			22:00					
31	08:15		16:00 (5)			07:04				05:04								
	17:04	11	16:11 (5)			19:58				21:44								
Potential sun hours	250			273		367		420		494			510					
Total, worst case		281		644		200		456		112								
Sun reduction		0.24		0.23		0.27		0.35		0.38								
Oper. time red.		1.00		1.00		1.00		1.00		1.00								
Wind dir. red.		0.66		0.66		0.68		0.65		0.65								
Total reduction		0.16		0.15		0.18		0.23		0.25								
Total, real		45		99		37		104		28								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: CD - H82

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:11 (3) 16:54	16:02 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:10 (3) 16:52	16:03 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:10 (3) 16:50	16:04 (4) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:09 (3) 16:48	16:05 (4) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:09 (3) 16:46	16:07 (4) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	18:09 (3) 16:44	16:08 (4) 16:07
7	05:04 21:57	05:49 21:13	19:56 (2) 20:07 (2)	06:43 20:04	18:08 (3) 16:43	16:08 16:06
8	05:05 21:56	05:50 21:12	19:53 (2) 20:08 (2)	06:45 20:01	18:09 (3) 16:41	16:08 16:06
9	05:06 21:55	05:52 21:10	19:51 (2) 20:11 (2)	06:47 19:59	18:10 (3) 16:39	16:09 16:05
10	05:07 21:55	05:54 21:07	19:49 (2) 20:11 (2)	06:49 19:56	18:11 (3) 16:37	15:34 (5) 16:05
11	05:08 21:54	05:56 21:05	19:48 (2) 20:12 (2)	06:50 19:54	18:14 (3) 16:35	15:41 (5) 16:05
12	05:09 21:53	05:57 21:03	19:47 (2) 20:14 (2)	06:52 19:51	18:11 (3) 16:34	15:30 (5) 16:05
13	05:10 21:52	05:59 21:01	19:45 (2) 20:14 (2)	06:54 19:49	17:14 (4) 16:32	15:29 (5) 16:05
14	05:12 21:51	06:01 20:59	19:45 (2) 20:14 (2)	06:56 19:47	17:10 (4) 16:31	15:28 (5) 16:04
15	05:13 21:50	06:03 20:57	19:45 (2) 20:15 (2)	06:58 19:44	17:08 (4) 16:29	15:28 (5) 16:05
16	05:14 21:49	06:04 20:55	19:43 (2) 20:15 (2)	06:59 19:42	17:06 (4) 16:27	15:27 (5) 16:05
17	05:16 21:47	06:06 20:53	19:43 (2) 20:15 (2)	07:01 19:39	17:05 (4) 16:26	15:27 (5) 16:05
18	05:17 21:46	06:08 20:51	19:43 (2) 20:15 (2)	07:03 19:37	17:03 (4) 16:24	15:27 (5) 16:05
19	05:18 21:45	06:10 20:48	19:42 (2) 20:15 (2)	07:05 19:34	17:02 (4) 16:23	15:27 (5) 16:05
20	05:20 21:44	06:12 20:46	19:42 (2) 20:15 (2)	07:06 19:32	17:01 (4) 16:22	15:27 (5) 16:06
21	05:21 21:42	06:13 20:44	19:42 (2) 20:15 (2)	07:08 19:29	17:01 (4) 16:20	15:28 (5) 16:06
22	05:23 21:41	06:15 20:42	19:42 (2) 20:12 (2)	07:10 19:27	17:00 (4) 16:19	15:28 (5) 16:06
23	05:24 21:39	06:17 20:39	19:42 (2) 20:10 (2)	07:12 19:24	17:00 (4) 16:18	15:29 (5) 16:07
24	05:26 21:38	06:19 20:37	19:43 (2) 20:09 (2)	07:13 19:22	16:59 (4) 16:17	15:29 (5) 16:08
25	05:27 21:36	06:20 20:35	19:43 (2) 20:06 (2)	07:15 19:19	15:59 (4) 16:16	15:30 (5) 16:08
26	05:29 21:35	06:22 20:32	19:43 (2) 20:04 (2)	07:17 19:17	15:59 (4) 16:14	15:31 (5) 16:09
27	05:30 21:33	06:24 20:30	19:45 (2) 20:02 (2)	07:19 19:14	15:59 (4) 16:13	15:32 (5) 16:10
28	05:32 21:32	06:26 20:28	19:45 (2) 19:59 (2)	18:17 (3) 19:12	15:59 (4) 17:02	15:33 (5) 16:11
29	05:34 21:30	06:27 20:25	19:47 (2) 19:57 (2)	18:15 (3) 19:09	16:00 (4) 16:29	15:33 (5) 16:12
30	05:35 21:28	06:29 20:23	19:50 (2) 19:55 (2)	18:12 (3) 19:07	17:00 16:27	16:00 (4) 16:11
31	05:37 21:26	06:31 20:21		18:31 (3) 16:58	17:22 16:25	16:00 (4) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		576	47	728	367	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.68	0.66	0.66	
Total reduction		0.22	0.22	0.19	0.18	
Total, real		127	10	141	64	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CE - H83

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44 16:15	08:14 17:06	16:24 (5) 11 16:35 (5)	07:16 18:02	17 17:34 (4)	07:01 20:00		05:52 20:55	20 20:26 (2)	05:03 21:45	
2	08:44 16:16	08:12 17:08	16:23 (5) 14 16:37 (5)	07:14 18:04	17 17:15 (4)	06:59 20:02		05:50 20:57	20 20:05 (2)	05:02 21:46	
3	08:43 16:17	08:10 17:10	16:23 (5) 16 16:39 (5)	07:12 18:06	24 17:38 (4)	06:56 20:04		05:48 20:59	25 20:04 (2)	05:01 21:48	
4	08:43 16:18	08:08 17:12	16:23 (5) 18 16:41 (5)	07:09 18:07	27 17:41 (4)	06:54 20:06		05:46 21:01	26 20:04 (2)	05:00 21:49	
5	08:43 16:19	08:07 17:14	16:23 (5) 20 16:43 (5)	07:07 18:09	30 17:42 (4)	06:51 20:07		05:44 21:03	29 20:32 (2)	04:59 21:50	
6	08:42 16:21	08:05 17:16	16:23 (5) 22 16:45 (5)	07:04 18:11	33 17:45 (4)	06:49 20:09		05:42 21:04	29 20:32 (2)	04:59 21:51	
7	08:42 16:22	08:03 17:18	16:23 (5) 22 16:45 (5)	07:02 18:13	35 17:46 (4)	06:47 20:11		05:40 21:06	29 20:32 (2)	04:58 21:52	
8	08:42 16:24	08:01 17:20	16:24 (5) 21 16:45 (5)	07:00 18:15	36 17:47 (4)	06:44 20:13		05:38 21:08	28 20:32 (2)	04:57 21:53	
9	08:41 16:25	07:59 17:22	16:24 (5) 20 16:44 (5)	06:57 18:17	35 17:46 (4)	06:42 20:15		05:36 21:10	29 20:32 (2)	04:57 21:54	
10	08:40 16:26	07:57 17:24	16:25 (5) 19 16:44 (5)	06:55 18:19	35 17:46 (4)	06:39 20:17		05:34 21:11	29 20:31 (2)	04:56 21:55	
11	08:40 16:28	07:55 17:26	16:26 (5) 17 16:43 (5)	06:52 18:21	34 17:46 (4)	06:37 20:19		05:33 21:13	28 20:32 (2)	04:56 21:55	
12	08:39 16:30	07:53 17:28	16:27 (5) 14 16:41 (5)	06:50 18:23	34 17:45 (4)	06:35 20:20		05:31 21:15	27 20:31 (2)	04:55 21:56	
13	08:38 16:31	07:51 17:30	16:30 (5) 9 16:39 (5)	06:48 18:25	32 17:44 (4)	06:32 20:22		05:29 21:17	25 20:30 (2)	04:55 21:57	
14	08:37 16:33	07:49 17:32	06:45 18:27	31 17:43 (4)	06:30 20:24	05:27 21:18		05:27 21:18	24 20:30 (2)	04:55 21:57	
15	08:36 16:34	07:47 17:34	06:43 18:28	31 17:43 (4)	06:28 20:26	05:26 21:20		05:26 21:20	23 20:29 (2)	04:55 21:58	
16	08:35 16:36	07:45 17:36	06:40 18:30	32 18:04 (3)	06:25 20:28	05:24 21:22		05:24 21:22	20 20:28 (2)	04:54 21:59	
17	08:34 16:38	07:43 17:38	06:38 18:32	31 18:06 (3)	06:23 20:30	05:22 21:23		05:22 21:23	19 20:27 (2)	04:54 21:59	
18	08:33 16:40	07:41 17:40	06:35 18:34	29 18:07 (3)	06:21 20:31	05:21 21:25		05:21 21:25	16 20:26 (2)	04:54 22:00	
19	08:32 16:41	07:39 17:42	06:33 18:36	26 18:10 (3)	06:18 20:33	05:19 21:27		05:19 21:27	13 20:25 (2)	04:54 22:00	
20	08:31 16:43	07:36 17:44	06:31 18:38	17 18:11 (3)	06:16 20:35	05:18 21:28		05:18 21:28	8 20:22 (2)	04:54 22:00	
21	08:30 16:45	07:34 17:46	06:28 18:40	18 18:13 (3)	06:14 20:37	05:16 21:30		05:16 21:30		04:54 22:01	
22	08:28 16:47	07:32 17:48	06:26 18:41	21 18:15 (3)	06:12 20:39	05:15 21:31		05:15 21:31		04:55 22:01	
23	08:27 16:49	07:30 17:50	06:23 18:43	20 18:15 (3)	06:09 20:41	05:13 21:33		05:13 21:33		04:55 22:01	
24	08:26 16:50	07:28 17:52	06:21 18:45	19 18:14 (3)	06:07 20:42	05:12 21:34		05:12 21:34		04:55 22:01	
25	08:24 16:52	07:25 17:54	06:18 18:47	17 18:13 (3)	06:05 20:44	05:11 21:36		05:11 21:36		04:55 22:01	
26	08:23 16:54	07:23 17:56	17:23 (4) 5 17:28 (4)	06:16 18:49	13 18:10 (3)	06:03 20:46	20:13 (2) 4 20:17 (2)	05:09 21:37		04:56 22:01	
27	08:22 16:56	07:21 17:58	06:13 17:31 (4)	06:13 18:51	7 18:07 (3)	06:01 20:48	20:11 (2) 8 20:19 (2)	05:08 21:39		04:56 22:01	
28	08:20 16:58	07:18 18:00	06:11 17:32 (4)	06:11 18:53		05:58 20:50	20:09 (2) 12 20:21 (2)	05:07 21:40		04:57 22:01	
29	08:18 17:00	16:26 (5) 2 16:28 (5)		07:08 19:54		05:56 20:52	20:08 (2) 14 20:22 (2)	05:06 21:41		04:57 22:01	
30	08:17 17:02	16:25 (5) 5 16:30 (5)		07:06 19:56		05:54 20:53	20:07 (2) 17 20:24 (2)	05:05 21:43		04:58 22:00	
31	08:15 17:04	16:24 (5) 8 16:32 (5)		07:04 19:58		05:04 21:44		05:04 21:44			
Potential sun hours	250	273	367	420	494	510					
Total, worst case	15	252	705	55	468						
Sun reduction	0.24	0.23	0.27	0.35	0.38						
Oper. time red.	1.00	1.00	1.00	1.00	1.00						
Wind dir. red.	0.66	0.66	0.68	0.65	0.65						
Total reduction	0.16	0.15	0.18	0.23	0.25						
Total, real	2	39	129	13	115						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CE - H83

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	20:15 (2) 20:41 (2)	06:33 20:18	07:26 19:05	17:50 (4) 16:54	07:24 18	15:55 (5) 16:13 (5)	08:19 16:10
2	04:59 22:00	05:40 21:23	20:15 (2) 20:42 (2)	06:35 20:16	07:28 19:02	17:50 (4) 18:24 (4)	07:26 20	15:54 (5) 16:14 (5)	08:21 16:09
3	05:00 21:59	05:42 21:21	20:14 (2) 20:42 (2)	06:36 20:13	07:30 19:00	17:49 (4) 18:24 (4)	07:28 21	15:53 (5) 16:14 (5)	08:22 16:08
4	05:01 21:59	05:44 21:19	20:14 (2) 20:42 (2)	06:38 20:11	07:31 18:57	17:49 (4) 18:24 (4)	07:30 22	15:53 (5) 16:15 (5)	08:24 16:08
5	05:02 21:58	05:45 21:17	20:13 (2) 20:42 (2)	06:40 20:09	07:33 18:55	17:48 (4) 18:24 (4)	07:32 22	15:53 (5) 16:15 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	20:13 (2) 20:42 (2)	06:42 20:06	07:35 18:52	17:48 (4) 18:24 (4)	07:34 19	15:53 (5) 16:12 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	20:14 (2) 20:43 (2)	06:43 20:04	07:37 18:50	17:47 (4) 18:21 (4)	07:36 17	15:53 (5) 16:10 (5)	08:28 16:06
8	05:05 21:56	05:50 21:12	20:13 (2) 20:41 (2)	06:45 20:01	07:39 18:48	17:47 (4) 18:18 (4)	07:38 15	15:53 (5) 16:08 (5)	08:29 16:06
9	05:06 21:55	05:52 21:10	20:13 (2) 20:39 (2)	06:47 19:59	07:41 18:45	17:48 (4) 18:16 (4)	07:40 13	15:53 (5) 16:06 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	20:13 (2) 20:37 (2)	06:49 19:56	07:42 18:43	17:48 (4) 18:14 (4)	07:42 10	15:55 (5) 16:05 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	20:14 (2) 20:35 (2)	06:50 19:54	07:44 18:40	17:49 (4) 18:11 (4)	07:44 7	15:56 (5) 16:03 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	20:15 (2) 20:34 (2)	06:52 19:51	07:46 18:38	17:50 (4) 18:09 (4)	07:45 4	15:57 (5) 16:01 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01	20:15 (2) 20:31 (2)	06:54 19:49	07:48 18:36	17:51 (4) 18:07 (4)	07:47 1	15:58 (5) 15:59 (5)	08:35 16:05
14	05:12 21:51	06:01 20:59	20:16 (2) 20:29 (2)	06:56 19:47	07:50 18:33	17:52 (4) 18:04 (4)	07:49 12	08:36 16:31	16:04
15	05:13 21:50	06:03 20:57	20:17 (2) 20:28 (2)	06:58 19:44	07:52 18:31	17:54 (4) 18:02 (4)	07:51 8	08:37 16:29	16:05
16	05:14 21:49	06:04 20:55	20:18 (2) 20:25 (2)	06:59 19:42	07:54 18:29	17:56 (4) 17:59 (4)	07:53 3	08:38 16:27	16:05
17	05:16 21:47	06:06 20:53	20:20 (2) 20:23 (2)	07:01 19:39	07:55 18:26	17:55 (4) 18:26	07:55 12	08:38 16:26	16:05
18	05:17 21:46	06:08 20:50	07:03 19:37	18:58 (3) 19:00 (3)	18:26 18:24	17:57 (4) 18:24	07:57 16	08:39 16:24	16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	18:43 (3) 19:01 (3)	07:59 18:22	17:59 (4) 18:22	07:59 18	08:40 16:23	16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	18:42 (3) 19:02 (3)	08:01 18:20	17:58 (4) 18:20	08:00 20	08:41 16:22	16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	18:40 (3) 19:01 (3)	08:03 18:17	18:03 (4) 18:17	08:02 21	08:41 16:20	16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	18:39 (3) 18:58 (3)	08:05 18:15	18:04 (4) 18:15	08:04 19	08:42 16:19	16:06
23	05:24 21:39	20:27 (2) 20:30 (2)	06:17 20:39	07:12 19:24	18:39 (3) 18:13	08:07 18:13	08:06 17	08:42 16:18	16:07
24	05:26 21:38	20:23 (2) 20:33 (2)	06:19 20:37	07:13 19:22	18:06 (4) 18:54 (3)	08:09 18:11	08:08 23	08:43 16:17	16:08
25	05:27 21:36	20:22 (2) 20:36 (2)	06:20 20:35	07:15 19:19	18:01 (4) 18:51 (3)	07:11 17:09	08:09 29	08:43 16:16	16:08
26	05:29 21:35	20:20 (2) 20:37 (2)	06:22 20:32	07:17 19:17	17:58 (4) 18:48 (3)	07:13 17:06	08:11 31	08:43 16:14	16:09
27	05:30 21:33	20:18 (2) 20:37 (2)	06:24 20:30	07:19 19:14	17:56 (4) 18:46 (3)	07:15 17:04	08:13 32	08:44 16:13	16:10
28	05:32 21:32	20:18 (2) 20:39 (2)	06:26 20:28	07:21 19:12	17:55 (4) 18:44 (3)	07:16 17:02	08:14 30	08:44 16:12	16:11
29	05:34 21:30	20:16 (2) 20:39 (2)	06:27 20:25	07:22 19:09	17:53 (4) 18:23 (4)	07:18 17:00	15:58 (5) 11	08:16 16:12	16:11
30	05:35 21:28	20:16 (2) 20:40 (2)	06:29 20:23	07:24 19:07	17:51 (4) 18:23 (4)	07:20 16:58	15:56 (5) 15	08:18 16:11	16:12
31	05:37 21:26	20:16 (2) 20:41 (2)	06:31 20:21	07:22 16:56	15:55 (5) 16:12 (5)	07:22 16:12 (5)	15:55 (5) 17	08:44 16:13	16:13
Potential sun hours	512	460	382	328	259	233			
Total, worst case	156	364	334	452	189				
Sun reduction	0.32	0.34	0.32	0.29	0.27				
Oper. time red.	1.00	1.00	1.00	1.00	1.00				
Wind dir. red.	0.65	0.65	0.68	0.68	0.66				
Total reduction	0.21	0.22	0.22	0.20	0.17				
Total, real	33	80	72	89	33				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CF - H84

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	16:19 (5) 18:02	07:16 17:34 (4)	07:01 20:00	20:06 (2) 21:45
2	08:44 16:16	08:12 17:08	16:19 (5) 18:04	07:14 17:36 (4)	06:59 20:02	20:05 (2) 21:46
3	08:43 16:17	08:10 17:10	16:19 (5) 18:06	07:12 17:38 (4)	06:56 20:04	20:04 (2) 21:48
4	08:43 16:18	08:08 17:12	16:19 (5) 18:07	07:09 17:41 (4)	06:54 20:06	20:04 (2) 21:49
5	08:43 16:19	08:07 17:14	16:19 (5) 18:09	07:07 17:42 (4)	06:51 20:07	20:03 (2) 21:50
6	08:42 16:21	08:05 17:16	16:19 (5) 18:11	07:04 17:44 (4)	06:49 20:09	20:03 (2) 21:51
7	08:42 16:22	08:03 17:18	16:20 (5) 18:13	07:02 17:43 (4)	06:47 20:11	20:04 (2) 21:52
8	08:42 16:24	08:01 17:20	16:21 (5) 18:15	07:00 17:43 (4)	06:44 20:13	20:03 (2) 21:53
9	08:41 16:25	07:59 17:22	16:22 (5) 18:17	06:57 17:42 (4)	06:42 20:15	20:03 (2) 21:54
10	08:40 16:26	07:57 17:24	16:23 (5) 18:19	06:55 17:42 (4)	06:39 20:17	20:03 (2) 21:55
11	08:40 16:28	07:55 17:26	16:25 (5) 18:21	06:52 17:42 (4)	06:37 20:19	20:04 (2) 21:55
12	08:39 16:30	07:53 17:28	16:27 (5) 18:23	06:50 17:40 (4)	06:35 20:20	20:04 (2) 21:56
13	08:38 16:31	07:51 17:30	16:33 (5) 18:25	06:48 17:39 (4)	06:32 20:22	20:04 (2) 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 18:00 (3)	06:24 20:24	20:05 (2) 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 18:02 (3)	06:28 20:26	20:05 (2) 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 18:04 (3)	06:25 20:28	20:07 (2) 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 18:06 (3)	06:23 20:30	20:07 (2) 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 18:07 (3)	06:21 20:31	20:08 (2) 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 18:10 (3)	06:18 20:33	20:10 (2) 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 18:11 (3)	06:16 20:35	20:11 (2) 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 18:13 (3)	06:14 20:37	20:13 (2) 22:01
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 18:14 (3)	06:12 20:39	20:17 (2) 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 18:13 (3)	06:09 20:41	20:20 (2) 22:01
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 18:11 (3)	06:07 20:42	20:21 (2) 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 18:10 (3)	06:05 20:44	20:22 (2) 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 18:08 (3)	06:03 20:46	20:24 (2) 22:01
27	08:22 16:56	16:21 (5) 17:58	07:21 17:13 (4)	06:13 17:31 (4)	06:01 20:48	20:11 (2) 21:39
28	08:20 16:58	16:21 (5) 18:00	07:18 17:11 (4)	06:11 18:53	05:58 20:50	20:10 (2) 21:40
29	08:18 17:00	16:20 (5) 16:28 (5)	07:18 19:54	07:08 20:52	05:56 20:22 (2)	20:08 (2) 21:41
30	08:17 17:02	16:19 (5) 16:30 (5)	07:16 19:56	07:06 20:53	05:54 20:24 (2)	20:07 (2) 21:43
31	08:15 17:04	16:19 (5) 16:32 (5)	07:16 19:58	07:04 21:44	05:54 21:44	20:04 21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case	39	278	718	53	515	
Sun reduction	0.24	0.23	0.27	0.35	0.38	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.66	0.66	0.68	0.64	0.64	
Total reduction	0.16	0.15	0.18	0.23	0.25	
Total, real	6	43	132	12	127	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CF - H84

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	28	20:14 (2) 20:42 (2)	06:33 20:18		07:26 19:05	17:46 (4) 18:19 (4)	07:24 16:54	15:52 (5) 16:08 (5)	08:19 16:10
2	04:59 22:00	05:40 21:23	29	20:14 (2) 20:43 (2)	06:35 20:16		07:28 19:02	17:45 (4) 18:19 (4)	07:26 16:52	15:51 (5) 16:09 (5)	08:21 16:09
3	05:00 21:59	05:42 21:21	30	20:13 (2) 20:43 (2)	06:36 20:13		07:30 19:00	17:45 (4) 18:20 (4)	07:28 16:50	15:50 (5) 16:10 (5)	08:22 16:08
4	05:01 21:59	05:44 21:19	30	20:13 (2) 20:43 (2)	06:38 20:11		07:31 18:57	17:44 (4) 18:20 (4)	07:30 16:48	15:49 (5) 16:10 (5)	08:24 16:08
5	05:02 21:58	05:45 21:17	30	20:13 (2) 20:43 (2)	06:40 20:09		07:33 18:55	17:44 (4) 18:20 (4)	07:32 16:46	15:49 (5) 16:11 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	30	20:13 (2) 20:43 (2)	06:42 20:06		07:35 18:52	17:43 (4) 18:20 (4)	07:34 16:44	15:49 (5) 16:11 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	30	20:13 (2) 20:43 (2)	06:43 20:04		07:37 18:50	17:42 (4) 18:19 (4)	07:36 16:43	15:48 (5) 16:10 (5)	08:28 16:06
8	05:05 21:56	05:50 21:12	28	20:13 (2) 20:41 (2)	06:45 20:01		07:39 18:48	17:42 (4) 18:18 (4)	07:38 16:41	15:48 (5) 16:08 (5)	08:29 16:06
9	05:06 21:55	05:52 21:10	26	20:13 (2) 20:39 (2)	06:47 19:59		07:41 18:45	17:42 (4) 18:16 (4)	07:40 16:39	15:49 (5) 16:06 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	24	20:13 (2) 20:37 (2)	06:49 19:56		07:42 18:43	17:42 (4) 18:14 (4)	07:42 16:37	15:50 (5) 16:05 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	21	20:14 (2) 20:35 (2)	06:50 19:54		07:44 18:40	17:42 (4) 18:11 (4)	07:44 16:35	15:50 (5) 16:03 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	19	20:15 (2) 20:34 (2)	06:52 19:51		07:46 18:38	17:43 (4) 18:09 (4)	07:45 16:34	15:51 (5) 16:01 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01	16	20:15 (2) 20:31 (2)	06:54 19:49		07:48 18:36	17:44 (4) 18:07 (4)	07:47 16:32	15:52 (5) 15:59 (5)	08:35 16:05
14	05:12 21:51	06:01 20:59	13	20:16 (2) 20:29 (2)	06:56 19:47		07:50 18:33	17:44 (4) 18:04 (4)	07:49 16:31	15:53 (5) 15:58 (5)	08:36 16:04
15	05:13 21:50	06:03 20:57	10	20:18 (2) 20:28 (2)	06:58 19:44		07:52 18:31	17:45 (4) 18:02 (4)	07:51 16:29	15:54 (5) 15:56 (5)	08:37 16:05
16	05:14 21:49	06:04 20:55	7	20:18 (2) 20:25 (2)	06:59 19:42		07:54 18:29	17:44 (4) 17:59 (4)	07:53 16:27		08:38 16:05
17	05:16 21:47	06:06 20:53	2	20:21 (2) 20:23 (2)	07:01 19:39	18:46 (3) 18:55 (3)	07:55 18:26	17:49 (4) 17:57 (4)	07:55 16:26		08:38 16:05
18	05:17 21:46	06:08 20:50			07:03 19:37	18:43 (3) 18:57 (3)	07:57 18:24	17:51 (4) 17:55 (4)	07:57 16:24		08:39 16:05
19	05:18 21:45	06:10 20:48			07:05 19:34	18:41 (3) 18:59 (3)	07:59 18:22		07:59 16:23		08:40 16:05
20	05:20 21:44	06:12 20:46			07:06 19:32	18:40 (3) 18:59 (3)	08:01 18:20		08:00 16:22		08:41 16:06
21	05:21 21:42	06:13 20:44			07:08 19:29	18:38 (3) 18:59 (3)	08:03 18:17		08:02 16:20		08:41 16:06
22	05:23 21:41	20:24 (2) 20:32 (2)	8	06:15 20:42	07:10 19:27	18:57 (3) 18:58 (3)	08:05 18:15		08:04 16:19		08:42 16:06
23	05:24 21:39	20:23 (2) 20:35 (2)	12	06:17 20:39	07:12 19:24	18:37 (3) 18:56 (3)	08:07 18:13		08:06 16:18		08:42 16:07
24	05:26 21:38	20:21 (2) 20:36 (2)	15	06:19 20:37	07:13 19:22	18:37 (3) 18:54 (3)	08:09 18:11		08:08 16:17		08:43 16:08
25	05:27 21:36	20:20 (2) 20:38 (2)	18	06:20 20:35	07:15 19:19	18:02 (4) 18:51 (3)	07:11 17:09		08:09 16:16		08:43 16:08
26	05:29 21:35	20:18 (2) 20:39 (2)	21	06:22 20:32	07:17 19:17	17:57 (4) 18:48 (3)	07:13 17:06		08:11 16:14		08:43 16:09
27	05:30 21:33	20:17 (2) 20:39 (2)	22	06:24 20:30	07:19 19:14	17:54 (4) 18:46 (3)	07:15 17:04		08:13 16:13		08:44 16:10
28	05:32 21:32	20:17 (2) 20:40 (2)	23	06:26 20:28	07:21 19:12	17:52 (4) 18:44 (3)	07:16 17:02		08:14 16:12		08:44 16:11
29	05:34 21:30	20:15 (2) 20:41 (2)	26	06:27 20:25	07:22 19:09	17:50 (4) 18:41 (3)	07:18 17:00		08:16 16:12		08:44 16:11
30	05:35 21:28	20:15 (2) 20:42 (2)	27	06:29 20:23	07:24 19:07	17:48 (4) 18:18 (4)	07:20 16:58	15:56 (5) 16:04 (5)	08:18 16:11		08:44 16:12
31	05:37 21:26	20:15 (2) 20:43 (2)	28	06:31 20:21			07:22 16:56	15:53 (5) 16:06 (5)			08:44 16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case		200		373		306		510		230	
Sun reduction		0.32		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.64		0.64		0.68		0.68		0.66	
Total reduction		0.21		0.22		0.22		0.20		0.17	
Total, real		42		82		66		101		40	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CG - H85

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44 16:15	08:14 17:06	21	16:35 (5) 18:02	07:16 18:02	31	17:03 (4) 17:34 (4)	07:01 20:00	05:52 20:55	20:06 (2) 20:26 (2)	05:03 21:45
2	08:44 16:16	08:12 17:08	23	16:14 (5) 16:37 (5)	07:14 18:04	34	17:02 (4) 17:36 (4)	06:59 20:02	05:50 20:57	20:05 (2) 20:27 (2)	05:02 21:46
3	08:43 16:17	08:10 17:10	23	16:14 (5) 16:37 (5)	07:12 18:06	36	17:02 (4) 17:38 (4)	06:56 20:04	05:48 20:59	20:04 (2) 20:29 (2)	05:01 21:48
4	08:43 16:18	08:08 17:12	22	16:15 (5) 16:37 (5)	07:09 18:07	38	17:02 (4) 17:40 (4)	06:54 20:06	05:46 21:01	20:03 (2) 20:30 (2)	05:00 21:49
5	08:43 16:19	08:07 17:14	22	16:15 (5) 16:37 (5)	07:07 18:09	38	17:01 (4) 17:39 (4)	06:51 20:07	05:44 21:03	20:03 (2) 20:32 (2)	04:59 21:50
6	08:42 16:21	08:05 17:16	20	16:16 (5) 16:36 (5)	07:04 18:11	38	17:01 (4) 17:39 (4)	06:49 20:09	05:42 21:04	20:02 (2) 20:33 (2)	04:59 21:51
7	08:42 16:22	08:03 17:18	18	16:17 (5) 16:35 (5)	07:02 18:13	38	17:00 (4) 17:38 (4)	06:47 20:11	05:40 21:06	20:03 (2) 20:34 (2)	04:58 21:52
8	08:42 16:24	08:01 17:20	17	16:18 (5) 16:35 (5)	07:00 18:15	37	17:01 (4) 17:38 (4)	06:44 20:13	05:38 21:08	20:03 (2) 20:34 (2)	04:57 21:53
9	08:41 16:25	07:59 17:22	14	16:19 (5) 16:33 (5)	06:57 18:17	36	17:01 (4) 17:37 (4)	06:42 20:15	05:36 21:10	20:02 (2) 20:33 (2)	04:57 21:54
10	08:40 16:26	07:57 17:24	9	16:22 (5) 16:31 (5)	06:55 18:19	34	17:02 (4) 17:36 (4)	06:39 20:17	05:34 21:11	20:02 (2) 20:33 (2)	04:56 21:55
11	08:40 16:28	07:55 17:26		06:52 18:21	18:19 18:21	33	17:03 (4) 17:36 (4)	06:37 20:19	05:33 21:13	20:03 (2) 20:33 (2)	04:56 21:55
12	08:39 16:30	07:53 17:28		06:50 18:23	18:23 18:23	31	17:03 (4) 17:34 (4)	06:35 20:20	05:31 21:15	20:03 (2) 20:33 (2)	04:55 21:56
13	08:38 16:31	07:51 17:30		06:48 18:25	18:25 18:25	29	17:05 (4) 17:58 (3)	06:32 20:22	05:29 21:17	20:03 (2) 20:32 (2)	04:55 21:57
14	08:37 16:33	07:49 17:32		06:45 18:27	18:27 18:27	31	17:05 (4) 18:00 (3)	06:30 20:24	05:27 21:18	20:04 (2) 20:32 (2)	04:55 21:58
15	08:36 16:34	07:47 17:34		06:43 18:28	18:28 18:28	29	17:08 (4) 18:02 (3)	06:28 20:26	05:26 21:20	20:04 (2) 20:31 (2)	04:55 21:58
16	08:35 16:36	07:45 17:36		06:40 18:30	18:30 18:30	27	17:10 (4) 18:04 (3)	06:25 20:28	05:24 21:22	20:05 (2) 20:31 (2)	04:54 21:59
17	08:34 16:38	07:43 17:38		06:38 18:32	18:32 18:32	17	17:16 (4) 18:06 (3)	06:23 20:30	05:22 21:23	20:06 (2) 20:30 (2)	04:54 21:59
18	08:33 16:40	07:41 17:40		06:35 18:34	18:34 18:34	16	17:51 (3) 18:07 (3)	06:21 20:31	05:21 21:25	20:07 (2) 20:29 (2)	04:54 22:00
19	08:32 16:41	07:39 17:42		06:33 18:36	18:36 18:36	19	17:51 (3) 18:10 (3)	06:18 20:33	05:19 21:27	20:08 (2) 20:29 (2)	04:54 22:00
20	08:31 16:43	07:36 17:44		06:31 18:38	18:38 18:38	21	17:50 (3) 18:11 (3)	06:16 20:35	05:18 21:28	20:09 (2) 20:27 (2)	04:54 22:00
21	08:30 16:45	07:34 17:46	2	17:16 (4) 17:18 (4)	06:28 18:40	22	17:51 (3) 18:13 (3)	06:14 20:37	05:16 21:30	20:11 (2) 20:26 (2)	04:54 22:01
22	08:29 16:47	07:32 17:48	7	17:12 (4) 17:19 (4)	06:26 18:42	21	17:50 (3) 18:11 (3)	06:12 20:39	05:15 21:31	20:13 (2) 20:25 (2)	04:55 22:01
23	08:27 16:49	07:30 17:50	12	17:10 (4) 17:22 (4)	06:23 18:43	18	17:52 (3) 18:10 (3)	06:09 20:41	05:13 21:33	20:14 (2) 20:22 (2)	04:55 22:01
24	08:26 16:50	07:28 17:52	15	17:09 (4) 17:24 (4)	06:21 18:45	16	17:52 (3) 18:08 (3)	06:07 20:42	05:12 21:34		04:55 22:01
25	08:24 16:52	07:25 17:54	20	17:06 (4) 17:26 (4)	06:18 18:47	13	17:54 (3) 18:07 (3)	06:05 20:44	05:11 21:36		04:55 22:01
26	08:23 16:54	07:23 17:56	22	17:06 (4) 17:28 (4)	06:16 18:49	5	17:58 (3) 18:03 (3)	06:03 20:46	05:09 21:37		04:56 22:01
27	08:22 16:56	07:21 17:58	26	17:05 (4) 17:31 (4)	06:13 18:51		06:01 20:48	20:11 (2) 20:19 (2)	05:08 21:39		04:56 22:01
28	08:20 16:58	07:18 18:00	29	17:03 (4) 17:32 (4)	06:11 18:53		05:58 20:50	20:10 (2) 20:21 (2)	05:07 21:40		04:57 22:01
29	08:18 17:00	16:14 (5) 16:28 (5)			07:08 19:54		05:56 20:52	20:08 (2) 20:22 (2)	05:06 21:41		04:57 22:01
30	08:17 17:02	16:14 (5) 16:30 (5)			07:06 19:56		05:54 20:53	20:07 (2) 20:24 (2)	05:05 21:43		04:58 22:00
31	08:15 17:04	16:13 (5) 16:32 (5)			07:04 19:58				05:04 21:44		
Potential sun hours	250	273		367		420		494		510	
Total, worst case	76	322		708		53		568			
Sun reduction	0.24	0.23		0.27		0.35		0.38			
Oper. time red.	1.00	1.00		1.00		1.00		1.00			
Wind dir. red.	0.66	0.67		0.68		0.64		0.64			
Total reduction	0.16	0.16		0.18		0.23		0.25			
Total, real	12	50		130		12		140			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CG - H85

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	20:13 (2) 20:43 (2)	06:33 20:18		07:26 19:05	17:42 (4) 18:12 (4)	07:24 16:54	15:51 (5) 16:01 (5)	08:19 16:10	
2	04:59 22:00	05:40 21:23	20:13 (2) 20:44 (2)	06:35 20:16		07:28 19:02	17:41 (4) 18:13 (4)	07:26 16:52	15:49 (5) 16:03 (5)	08:21 16:09	
3	05:00 21:59	05:42 21:21	20:13 (2) 20:43 (2)	06:36 20:13		07:30 19:00	17:40 (4) 18:14 (4)	07:28 16:50	15:47 (5) 16:04 (5)	08:22 16:08	
4	05:01 21:59	05:44 21:19	20:13 (2) 20:44 (2)	06:38 20:11		07:31 18:57	17:39 (4) 18:15 (4)	07:30 16:48	15:46 (5) 16:05 (5)	08:24 16:08	
5	05:02 21:58	05:45 21:17	20:12 (2) 20:43 (2)	06:40 20:09		07:33 18:55	17:38 (4) 18:15 (4)	07:32 16:46	15:45 (5) 16:06 (5)	08:25 16:07	
6	05:03 21:58	05:47 21:15	20:12 (2) 20:43 (2)	06:42 20:06		07:35 18:52	17:38 (4) 18:15 (4)	07:34 16:44	15:45 (5) 16:06 (5)	08:26 16:07	
7	05:04 21:57	05:49 21:13	20:13 (2) 20:43 (2)	06:43 20:04		07:37 18:50	17:36 (4) 18:14 (4)	07:36 16:43	15:44 (5) 16:07 (5)	08:28 16:06	
8	05:05 21:56	05:51 21:12	20:12 (2) 20:41 (2)	06:45 20:01		07:39 18:48	17:36 (4) 18:14 (4)	07:38 16:41	15:44 (5) 16:07 (5)	08:29 16:06	
9	05:06 21:55	05:52 21:10	20:13 (2) 20:39 (2)	06:47 19:59		07:41 18:45	17:36 (4) 18:14 (4)	07:40 16:39	15:44 (5) 16:06 (5)	08:30 16:05	
10	05:07 21:55	05:54 21:07	20:13 (2) 20:37 (2)	06:49 19:56		07:42 18:43	17:36 (4) 18:14 (4)	07:42 16:37	15:45 (5) 16:05 (5)	08:31 16:05	
11	05:08 21:54	05:56 21:05	20:14 (2) 20:35 (2)	06:50 19:54		07:44 18:40	17:36 (4) 18:11 (4)	07:44 16:35	15:45 (5) 16:03 (5)	08:33 16:05	
12	05:09 21:53	05:57 21:03	20:14 (2) 20:34 (2)	06:52 19:51		07:46 18:38	17:36 (4) 18:09 (4)	07:45 16:34	15:46 (5) 16:01 (5)	08:34 16:05	
13	05:10 21:52	05:59 21:01	20:15 (2) 20:31 (2)	06:54 19:49		07:48 18:36	17:36 (4) 18:07 (4)	07:47 16:32	15:46 (5) 15:59 (5)	08:35 16:05	
14	05:12 21:51	06:01 20:59	20:16 (2) 20:29 (2)	06:56 19:47		07:50 18:33	17:37 (4) 18:04 (4)	07:49 16:31	15:47 (5) 15:58 (5)	08:36 16:04	
15	05:13 21:50	06:03 20:57	20:17 (2) 20:28 (2)	06:58 19:44		07:52 18:31	17:37 (4) 18:02 (4)	07:51 16:29	15:47 (5) 15:56 (5)	08:37 16:05	
16	05:14 21:49	06:04 20:55	20:19 (2) 20:25 (2)	06:59 19:42		07:54 18:29	17:38 (4) 17:59 (4)	07:53 16:27	15:48 (5) 15:54 (5)	08:38 16:05	
17	05:16 21:47	06:06 20:53	20:22 (2) 20:23 (2)	07:01 19:39		07:55 18:26	17:39 (4) 17:57 (4)	07:55 16:26	15:50 (5) 15:52 (5)	08:38 16:05	
18	05:17 21:46	06:08 20:50	07:03 19:37	18:42 (3) 18:53 (3)		07:57 18:24	17:40 (4) 17:55 (4)	07:57 16:24	15:53 (5) 16:24	08:39 16:05	
19	05:18 21:45	06:10 20:48	07:05 19:34	18:40 (3) 18:55 (3)		07:59 18:22	17:42 (4) 17:52 (4)	07:59 16:23	15:54 (5) 16:23	08:40 16:05	
20	05:20 21:44	20:27 (2) 20:30 (2)	06:12 20:46	07:06 19:32	18:38 (3) 18:57 (3)	08:01 18:20	17:44 (4) 17:50 (4)	08:00 16:22	15:55 (5) 16:22	08:41 16:06	
21	05:21 21:42	20:23 (2) 20:33 (2)	06:13 20:44	07:08 19:29	18:36 (3) 18:57 (3)	08:03 18:17	17:42 (4) 17:44 (4)	08:02 16:20	15:56 (5) 16:20	08:41 16:06	
22	05:23 21:41	20:21 (2) 20:35 (2)	06:15 20:42	07:10 19:27	18:35 (3) 18:57 (3)	08:05 18:15	17:42 (4) 17:44 (4)	08:04 16:19	15:57 (5) 16:19	08:42 16:06	
23	05:24 21:39	20:20 (2) 20:37 (2)	06:17 20:39	07:12 19:24	18:35 (3) 18:56 (3)	08:07 18:13	17:42 (4) 17:44 (4)	08:06 16:18	15:58 (5) 16:18	08:42 16:07	
24	05:26 21:38	20:19 (2) 20:38 (2)	06:19 20:37	07:13 19:22	18:34 (3) 18:54 (3)	08:09 18:11	17:42 (4) 17:44 (4)	08:08 16:17	15:59 (5) 16:17	08:43 16:08	
25	05:27 21:36	20:18 (2) 20:40 (2)	06:20 20:35	07:15 19:19	18:33 (3) 18:51 (3)	07:11 17:09	17:42 (4) 17:44 (4)	08:09 16:16	15:59 (5) 16:16	08:43 16:08	
26	05:29 21:35	20:17 (2) 20:40 (2)	06:22 20:32	07:17 19:17	18:33 (3) 18:48 (3)	07:13 17:06	17:42 (4) 17:44 (4)	08:11 16:14	15:59 (5) 16:14	08:43 16:09	
27	05:30 21:33	20:16 (2) 20:40 (2)	06:24 20:30	07:19 19:14	17:53 (4) 18:46 (3)	07:15 17:04	17:42 (4) 17:44 (4)	08:13 16:13	15:59 (5) 16:13	08:44 16:10	
28	05:32 21:32	20:15 (2) 20:41 (2)	06:26 20:28	07:21 19:12	17:49 (4) 18:44 (3)	07:16 17:02	17:42 (4) 17:44 (4)	08:14 16:12	15:59 (5) 16:12	08:44 16:11	
29	05:34 21:30	20:14 (2) 20:42 (2)	06:27 20:25	07:22 19:09	17:47 (4) 18:41 (3)	07:18 17:00	17:42 (4) 17:44 (4)	08:16 16:12	15:59 (5) 16:12	08:44 16:11	
30	05:35 21:28	20:14 (2) 20:42 (2)	06:29 20:23	07:24 19:07	17:44 (4) 18:38 (3)	07:20 16:58	17:42 (4) 17:44 (4)	08:18 16:11	15:59 (5) 16:11	08:44 16:12	
31	05:37 21:26	20:14 (2) 20:43 (2)	06:31 20:21	07:22 16:56	17:42 (4) 18:38 (3)	07:22 16:58	17:42 (4) 17:44 (4)	08:18 16:11	15:59 (5) 16:11	08:44 16:12	
Potential sun hours	512	460	382	328	259	264	233				
Total, worst case	243	381	277	579	264	233					
Sun reduction	0.32	0.34	0.32	0.29	0.27	0.23					
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00					
Wind dir. red.	0.64	0.64	0.67	0.68	0.66	0.66					
Total reduction	0.21	0.22	0.22	0.20	0.18	0.18					
Total, real	51	84	60	115	46	46					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CH - H86

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	08:14	16:08 (5)	07:16	16:54 (4)	07:01	05:52	20:06 (2)	05:03		
	16:15	17:06	23 16:31 (5)	18:02	40 17:34 (4)	20:00	20:55	20 20:26 (2)	21:45		
2	08:44	08:12	16:09 (5)	07:14	16:53 (4)	06:59	05:50	20:05 (2)	05:02		
	16:16	17:08	22 16:31 (5)	18:04	40 17:33 (4)	20:02	20:57	22 20:27 (2)	21:46		
3	08:44	08:10	16:09 (5)	07:12	16:53 (4)	06:56	05:48	20:04 (2)	05:01		
	16:17	17:10	22 16:31 (5)	18:06	41 17:34 (4)	20:04	20:59	25 20:29 (2)	21:48		
4	08:43	08:08	16:10 (5)	07:09	16:54 (4)	06:54	05:46	20:04 (2)	05:00		
	16:18	17:12	20 16:30 (5)	18:07	40 17:34 (4)	20:06	21:01	26 20:30 (2)	21:49		
5	08:43	08:07	16:11 (5)	07:07	16:53 (4)	06:51	05:44	20:03 (2)	04:59		
	16:19	17:14	19 16:30 (5)	18:09	40 17:33 (4)	20:07	21:03	29 20:32 (2)	21:50		
6	08:42	08:05	16:12 (5)	07:04	16:54 (4)	06:49	05:42	20:02 (2)	04:59		
	16:21	17:16	17 16:29 (5)	18:11	38 17:32 (4)	20:09	21:04	31 20:33 (2)	21:51		
7	08:42	08:03	16:13 (5)	07:02	16:53 (4)	06:47	05:40	20:03 (2)	04:58		
	16:22	17:18	14 16:27 (5)	18:13	38 17:31 (4)	20:11	21:06	32 20:35 (2)	21:52		
8	08:42	08:01	16:16 (5)	07:00	16:54 (4)	06:44	05:38	20:03 (2)	04:57		
	16:24	17:20	9 16:25 (5)	18:15	37 17:31 (4)	20:13	21:08	32 20:35 (2)	21:53		
9	08:41	07:59		06:57	16:54 (4)	06:42	05:36	20:02 (2)	04:57		
	16:25	17:22		18:17	35 17:29 (4)	20:15	21:10	33 20:35 (2)	21:54		
10	08:40	07:57		06:55	16:56 (4)	06:39	05:34	20:02 (2)	04:56		
	16:26	17:24		18:19	32 17:28 (4)	20:17	21:11	32 20:34 (2)	21:55		
11	08:40	07:55		06:52	16:57 (4)	06:37	05:33	20:03 (2)	04:56		
	16:28	17:26		18:21	30 17:27 (4)	20:19	21:13	32 20:35 (2)	21:55		
12	08:39	07:53		06:50	16:58 (4)	06:35	05:31	20:02 (2)	04:55		
	16:30	17:28		18:23	29 17:56 (3)	20:20	21:15	32 20:34 (2)	21:56		
13	08:38	07:51		06:48	17:00 (4)	06:32	05:29	20:02 (2)	04:55		
	16:31	17:30		18:25	29 17:58 (3)	20:22	21:17	32 20:34 (2)	21:57		
14	08:37	07:49		06:45	17:02 (4)	06:30	05:27	20:03 (2)	04:55		
	16:33	17:32		18:27	28 18:00 (3)	20:24	21:18	31 20:34 (2)	21:58		
15	08:36	07:47		06:43	17:07 (4)	06:28	05:26	20:03 (2)	04:55		
	16:34	17:34		18:28	21 18:02 (3)	20:26	21:20	30 20:33 (2)	21:58		
16	08:35	07:45		06:40	17:48 (3)	06:25	05:24	20:04 (2)	04:54		
	16:36	17:36		18:30	16 18:04 (3)	20:28	21:22	29 20:33 (2)	21:59		
17	08:34	07:43		06:38	17:48 (3)	06:23	05:22	20:04 (2)	04:54		
	16:38	17:38		18:32	18 18:06 (3)	20:30	21:23	28 20:32 (2)	21:59		
18	08:33	07:41	17:07 (4)	06:35	17:47 (3)	06:21	05:21	20:05 (2)	04:54		
	16:40	17:40	4 17:11 (4)	18:34	20 18:07 (3)	20:31	21:25	27 20:32 (2)	22:00		
19	08:32	07:39	17:04 (4)	06:33	17:48 (3)	06:18	05:19	20:06 (2)	04:54		
	16:41	17:42	9 17:13 (4)	18:36	22 18:10 (3)	20:33	21:27	26 20:32 (2)	22:00		
20	08:31	07:36	17:03 (4)	06:31	17:47 (3)	06:16	05:18	20:07 (2)	04:54		
	16:43	17:44	13 17:16 (4)	18:38	23 18:10 (3)	20:35	21:28	23 20:30 (2)	22:00		
21	08:30	07:34	17:01 (4)	06:28	17:48 (3)	06:14	05:16	20:08 (2)	04:54		
	16:45	17:46	17 17:18 (4)	18:40	22 18:10 (3)	20:37	21:30	22 20:30 (2)	22:01		
22	08:29	16:09 (5)	07:32	16:59 (4)	06:26	17:48 (3)	06:12	05:15	20:09 (2)	04:55	
	16:47	3 16:12 (5)	17:48	20 17:19 (4)	18:42	20 18:08 (3)	20:39	21:31	20 20:29 (2)	22:01	
23	08:27	16:09 (5)	07:30	16:58 (4)	06:23	17:50 (3)	06:09	05:13	20:10 (2)	04:55	
	16:49	6 16:15 (5)	17:50	24 17:22 (4)	18:43	17 18:07 (3)	20:41	21:33	17 20:27 (2)	22:01	
24	08:26	16:08 (5)	07:28	16:57 (4)	06:21	17:51 (3)	06:07	05:12	20:11 (2)	04:55	
	16:50	9 16:17 (5)	17:52	27 17:24 (4)	18:45	13 18:04 (3)	20:43	21:34	15 20:26 (2)	22:01	
25	08:24	16:08 (5)	07:25	16:56 (4)	06:18	17:54 (3)	06:05	05:11	20:13 (2)	04:55	
	16:52	11 16:19 (5)	17:54	30 17:26 (4)	18:47	8 18:02 (3)	20:44	21:36	12 20:25 (2)	22:01	
26	08:23	16:07 (5)	07:23	16:55 (4)	06:16		06:03	05:09	20:16 (2)	04:56	
	16:54	14 16:21 (5)	17:56	33 17:28 (4)	18:49		20:46		6 20:22 (2)	22:01	
27	08:22	16:07 (5)	07:21	16:55 (4)	06:13		06:01	20:13 (2)	05:08		
	16:56	16 16:23 (5)	17:58	36 17:31 (4)	18:51		20:48	6 20:19 (2)	21:39		
28	08:20	16:08 (5)	07:18	16:54 (4)	06:11		05:58	20:11 (2)	05:07		
	16:58	18 16:26 (5)	18:00	38 17:32 (4)	18:53		20:50	10 20:21 (2)	21:40		
29	08:18	16:07 (5)		07:08			05:56	20:09 (2)	05:06		
	17:00	21 16:28 (5)		19:54			20:52	13 20:22 (2)	21:41		
30	08:17	16:07 (5)		07:06			05:54	20:08 (2)	05:05		
	17:02	23 16:30 (5)		19:56			20:53	16 20:24 (2)	21:43		
31	08:15	16:07 (5)		07:04				05:04			
	17:04	24 16:31 (5)		19:58				21:44			
Potential sun hours	250		273		367		420		494		510
Total, worst case	145		397		697		45		664		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.67		0.67		0.64		0.64		
Total reduction	0.16		0.16		0.18		0.23		0.25		
Total, real	23		62		128		10		163		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CH - H86

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1 04:59		05:39	20:13 (2) 06:33	07:26	17:38 (4) 07:24	08:19
22:00		21:25 32	20:45 (2) 20:18	19:05 29	18:36 (3) 16:54	16:10
2 04:59		05:40	20:13 (2) 06:35	07:28	17:36 (4) 07:26	08:21
22:00		21:23 32	20:45 (2) 20:16	19:02 29	18:05 (4) 16:52	16:09
3 05:00		05:42	20:12 (2) 06:36	07:30	17:34 (4) 07:28	15:45 (5) 08:22
21:59		21:21 33	20:45 (2) 20:13	19:00 32	18:06 (4) 16:50	15:55 (5) 16:08
4 05:01		05:44	20:13 (2) 06:38	07:31	17:33 (4) 07:30	15:43 (5) 08:24
21:59		21:19 32	20:45 (2) 20:11	18:57 34	18:07 (4) 16:48	15:57 (5) 16:08
5 05:02		05:45	20:12 (2) 06:40	07:33	17:32 (4) 07:32	15:41 (5) 08:25
21:58		21:17 32	20:44 (2) 20:09	18:55 35	18:07 (4) 16:46	15:58 (5) 16:07
6 05:03		05:47	20:12 (2) 06:42	07:35	17:31 (4) 07:34	15:40 (5) 08:26
21:58		21:15 33	20:45 (2) 20:06	18:52 37	18:08 (4) 16:44	15:59 (5) 16:07
7 05:04		05:49	20:13 (2) 06:43	07:37	17:29 (4) 07:36	15:39 (5) 08:28
21:57		21:13 30	20:43 (2) 20:04	18:50 38	18:07 (4) 16:43	16:00 (5) 16:06
8 05:05		05:51	20:13 (2) 06:45	07:39	17:28 (4) 07:38	15:39 (5) 08:29
21:56		21:12 28	20:41 (2) 20:01	18:48 40	18:08 (4) 16:41	16:01 (5) 16:06
9 05:06		05:52	20:13 (2) 06:47	07:41	17:28 (4) 07:40	15:38 (5) 08:30
21:55		21:10 26	20:39 (2) 19:59	18:45 40	18:08 (4) 16:39	16:01 (5) 16:05
10 05:07		05:54	20:13 (2) 06:49	07:42	17:27 (4) 07:42	15:39 (5) 08:31
21:55		21:07 24	20:37 (2) 19:56	18:43 41	18:08 (4) 16:37	16:02 (5) 16:05
11 05:08		05:56	20:14 (2) 06:50	07:44	17:27 (4) 07:44	15:39 (5) 08:33
21:54		21:05 21	20:35 (2) 19:54	18:40 41	18:08 (4) 16:35	16:02 (5) 16:05
12 05:09		05:57	20:15 (2) 06:52	07:46	17:27 (4) 07:45	15:39 (5) 08:34
21:53		21:03 19	20:34 (2) 19:51	18:38 40	18:07 (4) 16:34	16:01 (5) 16:05
13 05:10		05:59	20:15 (2) 06:54	07:48	17:27 (4) 07:47	15:39 (5) 08:35
21:52		21:01 16	20:31 (2) 19:49	18:36 40	18:07 (4) 16:32	15:59 (5) 16:05
14 05:12		06:01	20:17 (2) 06:56	07:50	17:27 (4) 07:49	15:39 (5) 08:36
21:51		20:59 12	20:29 (2) 19:47	18:33 37	18:04 (4) 16:31	15:58 (5) 16:04
15 05:13		06:03	20:19 (2) 06:58	07:52	17:27 (4) 07:51	15:40 (5) 08:37
21:50		20:57 9	20:28 (2) 19:44	18:31 35	18:02 (4) 16:29	15:56 (5) 16:05
16 05:14		06:04	20:20 (2) 06:59	07:54	17:28 (4) 07:53	15:40 (5) 08:38
21:49		20:55 5	20:25 (2) 19:42	18:29 31	17:59 (4) 16:27	15:54 (5) 16:05
17 05:16		06:06	07:01	07:55	17:28 (4) 07:55	15:41 (5) 08:38
21:47		20:53	19:39	18:26 29	17:57 (4) 16:26	15:52 (5) 16:05
18 05:17		20:24 (2) 06:08	07:03	07:57	17:29 (4) 07:57	15:42 (5) 08:39
21:46	9	20:33 (2) 20:51	19:37 6	18:42 (3) 18:24	17:55 (4) 16:24	15:51 (5) 16:05
19 05:18		20:22 (2) 06:10	07:05	18:39 (3) 07:59	17:30 (4) 07:59	15:43 (5) 08:40
21:45	13	20:35 (2) 20:48	19:34 12	18:51 (3) 18:22	17:52 (4) 16:23	15:49 (5) 16:05
20 05:20		20:21 (2) 06:12	07:06	18:37 (3) 08:01	17:31 (4) 08:00	15:44 (5) 08:41
21:44	16	20:37 (2) 20:46	19:32 16	18:53 (3) 18:20	17:50 (4) 16:22	15:47 (5) 16:06
21 05:21		20:20 (2) 06:13	07:08	18:34 (3) 08:03	17:32 (4) 08:02	15:41 (5) 08:41
21:42	18	20:38 (2) 20:44	19:29 19	18:53 (3) 18:17	17:48 (4) 16:20	15:42 (5) 16:06
22 05:23		20:18 (2) 06:15	07:10	18:33 (3) 08:05	17:34 (4) 08:04	15:42 (5) 08:42
21:41	21	20:39 (2) 20:42	19:27 21	18:54 (3) 18:15	17:45 (4) 16:19	15:44 (5) 16:06
23 05:24		20:18 (2) 06:17	07:12	18:32 (3) 08:07	17:36 (4) 08:06	15:42 (5) 08:42
21:39	23	20:41 (2) 20:39	19:24 23	18:55 (3) 18:13	17:43 (4) 16:18	15:43 (5) 16:07
24 05:26		20:17 (2) 06:19	07:13	18:31 (3) 08:09	17:39 (4) 08:08	15:43 (5) 08:43
21:38	24	20:41 (2) 20:37	19:22 23	18:54 (3) 18:11	17:41 (4) 16:17	15:44 (5) 16:08
25 05:27		20:16 (2) 06:20	07:15	18:30 (3) 07:11	17:36 (4) 08:09	15:43 (5) 08:43
21:36	26	20:42 (2) 20:35	19:19 21	18:51 (3) 17:09	17:41 (4) 16:16	15:44 (5) 16:08
26 05:29		20:15 (2) 06:22	07:17	18:30 (3) 07:13	17:38 (4) 08:11	15:44 (5) 08:43
21:35	27	20:42 (2) 20:32	19:17 18	18:48 (3) 17:06	17:38 (4) 16:14	15:44 (5) 16:09
27 05:30		20:14 (2) 06:24	07:19	18:30 (3) 07:15	17:36 (4) 08:13	15:44 (5) 08:44
21:33	29	20:43 (2) 20:30	19:14 16	18:46 (3) 17:04	17:36 (4) 16:13	15:44 (5) 16:10
28 05:32		20:14 (2) 06:26	07:21	18:30 (3) 07:16	17:36 (4) 08:14	15:44 (5) 08:44
21:32	30	20:44 (2) 20:28	19:12 14	18:44 (3) 17:02	17:36 (4) 16:12	15:44 (5) 16:11
29 05:34		20:13 (2) 06:27	07:22	17:44 (4) 07:18	17:36 (4) 08:16	15:44 (5) 08:44
21:30	31	20:44 (2) 20:25	19:09 25	18:41 (3) 17:00	17:36 (4) 16:12	15:44 (5) 16:11
30 05:35		20:13 (2) 06:29	07:24	17:40 (4) 07:20	17:36 (4) 08:18	15:44 (5) 08:44
21:28	31	20:44 (2) 20:23	19:07 28	18:38 (3) 16:58	17:36 (4) 16:11	15:44 (5) 16:12
31 05:37		20:14 (2) 06:31	07:22	17:40 (4) 07:22	17:36 (4) 08:18	15:44 (5) 08:44
21:26	31	20:45 (2) 20:21	19:07 28	18:38 (3) 16:58	17:36 (4) 16:11	15:44 (5) 16:12
Potential sun hours	512	460	382	328	259	233
Total, worst case	329	384	242	711	292	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.64	0.64	0.67	0.67	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.18	
Total, real	69	84	52	140	51	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CI - H87

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CJ - H88

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:22 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CK - H89

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CL - H90

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CM - H91

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CN - H92

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24	16:13	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CO - H93

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CP - H94

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CQ - H95

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
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18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CR - H96

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CS - H97

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CT - H98

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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Total, worst case												
Sun reduction												
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Total reduction												
Total, real												

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CU - H99

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:04	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	04:59 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:11 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:00	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: CV - H100

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:14 (4) 21:25	05:39 20:18	06:33 19:05	07:26 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	21:11 (4) 21:59	21:14 (4) 21:23	05:40 20:16	06:35 19:02	07:28 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	21:10 (4) 21:59	21:14 (4) 21:21	05:42 20:13	06:36 19:00	07:30 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:10 (4) 21:59	21:14 (4) 21:19	05:44 20:11	06:38 18:57	07:31 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	21:10 (4) 21:58	21:15 (4) 21:17	05:45 20:09	06:40 18:55	07:33 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:09 (4) 21:57	21:16 (4) 21:15	05:47 20:06	06:42 18:52	07:35 16:44	08:26 16:07
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10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:09 (4) 21:54	21:18 (4) 21:07	05:54 19:56	06:49 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:09 (4) 21:54	21:20 (4) 21:50	05:56 19:54	06:50 18:40	07:44 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:09 (4) 21:53	21:21 (4) 21:03	05:57 19:51	06:52 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:09 (4) 21:52	21:22 (4) 21:01	05:59 19:49	06:54 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:09 (4) 21:51	21:23 (4) 21:03	06:01 19:46	06:56 18:33	07:50 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:10 (4) 21:50	21:24 (4) 21:04	06:03 19:44	06:57 18:31	07:52 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:10 (4) 21:48	21:25 (4) 21:06	06:04 19:42	06:59 18:29	07:54 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:10 (4) 21:47	21:26 (4) 21:07	06:06 19:39	07:01 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:10 (4) 21:46	21:27 (4) 21:06	06:08 19:37	07:03 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:10 (4) 21:45	21:28 (4) 21:08	06:10 19:34	07:05 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:10 (4) 21:43	21:30 (4) 21:06	06:12 19:32	07:06 18:20	08:01 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:11 (4) 21:42	21:32 (4) 21:04	06:13 19:29	07:08 18:17	08:03 16:20	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:11 (4) 21:39	21:36 (4) 21:06	06:17 19:24	07:12 18:13	08:07 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:11 (4) 21:38	21:38 (4) 21:07	06:19 19:22	07:13 18:11	08:09 16:17	08:43 16:08
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26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:12 (4) 21:35	21:42 (4) 21:08	06:22 19:17	07:17 17:06	08:11 16:15	08:43 16:09
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:13 (4) 21:31	21:46 (4) 21:08	06:26 19:12	07:21 17:02	08:14 16:12	08:44 16:11
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30	08:17 17:02	07:06 19:56	07:06 20:53	05:54 21:43	05:05 22:00	04:58 22:00	21:13 (4) 21:28	21:50 (4) 21:23	06:29 19:07	07:24 16:58	08:20 16:11	08:44 16:12
31	08:15 17:04	07:04 19:58	07:04 20:54	05:04 21:44	05:04 21:44	05:04 21:44	05:37 21:26	06:31 20:21	07:22 16:56	07:22 16:56	08:44 16:13	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case							308		68			
Sun reduction							0.32		0.32			
Oper. time red.							1.00		1.00			
Wind dir. red.							0.61		0.61			
Total reduction							0.19		0.20			
Total, real							60		13			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: CW - H101

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:18 (4) 21:25	05:39 20:18	06:33 19:05	07:26 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:19 (4) 21:23	05:40 20:16	06:35 19:02	07:28 16:52	08:21 16:09
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15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:14 (4) 21:50	05:13 20:57	06:03 19:44	06:57 18:31	07:52 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:14 (4) 21:48	05:14 20:55	06:04 19:42	06:59 18:29	07:54 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:14 (4) 21:47	05:16 20:53	06:06 19:39	07:01 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:14 (4) 21:46	05:17 20:50	06:08 19:37	07:03 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:15 (4) 21:45	05:18 20:48	06:10 19:34	07:05 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:15 (4) 21:43	05:20 20:46	06:12 19:32	07:06 18:20	08:01 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:15 (4) 21:42	05:21 20:44	06:13 19:29	07:08 18:17	08:03 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:16 (4) 21:41	05:23 20:41	06:15 19:27	07:10 18:15	08:05 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:16 (4) 21:39	05:24 20:39	06:17 19:24	07:12 18:13	08:07 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:15 (4) 21:38	05:26 20:37	06:19 19:22	07:13 18:11	08:09 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:16 (4) 21:36	05:27 20:35	06:20 19:19	07:15 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:16 (4) 21:35	05:29 20:32	06:22 19:17	07:17 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:16 (4) 21:33	05:30 20:30	06:24 19:14	07:19 17:04	08:14 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:17 (4) 21:31	05:32 20:28	06:26 19:12	07:21 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:58 22:00	21:18 (4) 21:30	05:34 20:25	06:27 19:09	07:22 17:00	08:18 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	21:17 (4) 21:28	05:35 21:28	06:29 20:23	07:24 19:07	08:17 16:58	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26		06:31 20:21	07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case						183						
Sun reduction						0.32						
Oper. time red.						1.00						
Wind dir. red.						0.61						
Total reduction						0.19						
Total, real						36						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: CX - H102

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	19:53 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:55	20:12 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	19:54 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	20:11 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48	19:55 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	20:10 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46	19:57 (5)	05:00	05:01	05:44	06:38	07:31	07:30	08:23	
	16:18	17:12	18:07	20:06	21:01	20:08 (5)	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44	20:00 (5)	04:59	05:02	05:45	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:02	20:04 (5)	21:50	21:58	21:17	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04		21:51	21:57	21:15	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:13	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38		04:57	05:05	05:51	20:08 (5)	06:45	07:39	08:29	
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:11	7 20:15 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	20:06 (5)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	12 20:18 (5)	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	20:03 (5)	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	16 20:19 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:02 (5)	06:50	07:44	07:43	08:33
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	18 20:20 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:57	20:02 (5)	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	19 20:21 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	20:00 (5)	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	21 20:21 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	20:00 (5)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	22 20:22 (5)	19:47	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	20:00 (5)	06:58	07:52	07:51	08:37
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	22 20:22 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	19:59 (5)	06:59	07:54	07:53	08:37
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	23 20:22 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06	19:59 (5)	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	23 20:22 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	20:02 (5) 05:21		04:54	05:17	06:08	19:59 (5)	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31	1 20:03 (5) 21:25		21:59	21:46	20:50	23 20:22 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	19:59 (5) 05:19		04:54	05:18	06:10	19:58 (5)	07:05	07:59	07:59	08:40
	16:41	17:42	18:36	20:33	6 20:05 (5) 21:27		22:00	21:45	20:48	21 20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:57 (5) 05:18		04:54	05:20	06:12	19:59 (5)	07:06	08:01	08:00	08:41
	16:43	17:44	18:38	20:35	10 20:07 (5) 21:28		22:00	21:43	20:46	18 20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:55 (5) 05:16		04:54	05:21	06:13	20:00 (5)	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	13 20:08 (5) 21:30		22:00	21:42	20:44	15 20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:54 (5) 05:15		04:55	05:23	06:15	20:00 (5)	07:10	08:05	08:04	08:42
	16:47	17:48	18:41	20:39	16 20:10 (5) 21:31		22:01	21:41	20:42	12 20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:53 (5) 05:13		04:55	05:24	06:17	20:01 (5)	07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	19 20:12 (5) 21:33		22:01	21:39	20:39	9 20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:53 (5) 05:12		04:55	05:26	06:19	20:03 (5)	07:13	08:09	08:07	08:43
	16:51	17:52	18:45	20:42	20 20:13 (5) 21:34		22:01	21:38	20:37	6 20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:52 (5) 05:11		04:56	05:27	06:20	20:05 (5)	07:15	07:11	08:09	08:43
	16:52	17:54	18:47	20:44	23 20:15 (5) 21:36		22:01	21:36	20:35	1 20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:52 (5) 05:09		04:56	05:29	06:22		07:17	07:13	08:11	08:43
	16:54	17:56	18:49	20:46	23 20:15 (5) 21:37		22:01	21:35	20:32		19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	19:52 (5) 05:08		04:56	05:30	06:24		07:19	07:14	08:13	08:43
	16:56	17:58	18:51	20:48	23 20:15 (5) 21:39		22:01	21:33	20:30		19:14	17:04	16:13	16:10
28	08:20	07:18	06:11	05:58	19:52 (5) 05:07		04:57	05:32	06:26		07:21	07:16	08:14	08:44
	16:58	18:00	18:53	20:50	23 20:15 (5) 21:40		22:01	21:32	20:28		19:12	17:02	16:13	16:11
29	08:18		07:08	05:56	19:52 (5) 05:06		04:58	05:34	06:28		07:22	07:18	08:16	08:44
	17:00		19:54	20:52	22 20:14 (5) 21:41		22:00	21:30	20:25		19:09	17:00	16:12	16:11
30	08:17		07:06	05:54	19:53 (5) 05:05		04:58	05:35	06:29		07:24	07:20	08:17	08:44
	17:02		19:56	20:53	20 20:13 (5) 21:43		22:00	21:28	20:23		19:07	16:58	16:11	16:12
31	08:15		07:04		05:04			05:37	06:31			07:22		08:44
	17:04		19:58		21:44			21:26	20:21			16:56		16:13
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case				219	66				288					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.65	0.65				0.65					
Total reduction				0.23	0.25				0.22					
Total, real				50	16				64					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: CY - H103
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	20:04 (5)	05:03	04:59	05:39	20:16 (5)	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:55	20:26 (5)	21:45	22:00	21:25	19	20:35 (5)	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	20:04 (5)	05:02	05:00	05:40	20:16 (5)	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	20:27 (5)	21:46	22:00	21:23	20	20:36 (5)	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48	20:03 (5)	05:01	05:00	05:42	20:14 (5)	06:36	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	20:28 (5)	21:48	21:59	21:21	22	20:36 (5)	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46	20:03 (5)	05:00	05:01	05:44	20:14 (5)	06:38	07:31	07:30	08:23		
	16:18	17:12	18:07	20:06	21:01	20:28 (5)	21:49	21:59	21:19	23	20:37 (5)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44	20:03 (5)	04:59	05:02	05:45	20:13 (5)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:03	20:28 (5)	21:50	21:58	21:17	24	20:37 (5)	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42	20:03 (5)	04:59	05:03	05:47	20:13 (5)	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	20:27 (5)	21:51	21:57	21:15	24	20:37 (5)	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40	20:04 (5)	04:58	05:04	05:49	20:13 (5)	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	20:28 (5)	21:52	21:57	21:13	25	20:38 (5)	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38	20:04 (5)	04:57	05:05	05:51	20:12 (5)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	20:27 (5)	21:53	21:56	21:11	25	20:37 (5)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36	20:04 (5)	04:57	05:06	05:52	20:13 (5)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	20:26 (5)	21:54	21:55	21:09	24	20:37 (5)	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34	20:04 (5)	04:56	05:07	05:54	20:12 (5)	06:49	07:42	07:42	08:31		
	16:27	17:24	18:19	20:17	21:11	20:25 (5)	21:54	21:54	21:07	25	20:37 (5)	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33	20:06 (5)	04:56	05:08	05:56	20:12 (5)	06:50	07:44	07:43	08:33		
	16:28	17:26	18:21	20:18	21:13	20:25 (5)	21:55	21:54	21:05	23	20:35 (5)	19:54	18:40	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31	20:06 (5)	04:55	05:09	05:58	20:13 (5)	06:52	07:46	07:45	08:34		
	16:30	17:28	18:23	20:20	21:15	20:24 (5)	21:56	21:53	21:03	21	20:34 (5)	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29	20:07 (5)	04:55	05:11	05:59	20:13 (5)	06:54	07:48	07:47	08:35		
	16:31	17:30	18:25	20:22	21:17	20:23 (5)	21:57	21:52	21:01	18	20:31 (5)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27	20:09 (5)	04:55	05:12	06:01	20:14 (5)	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:18	20:22 (5)	21:57	21:51	20:59	15	20:29 (5)	19:47	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26	20:11 (5)	04:55	05:13	06:03	20:15 (5)	06:58	07:52	07:51	08:37		
	16:34	17:34	18:28	20:26	21:20	20:19 (5)	21:58	21:50	20:57	13	20:28 (5)	19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	20:15 (5)	06:59	07:54	07:53	08:37		
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	10	20:25 (5)	19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06	20:17 (5)	07:01	07:55	07:55	08:38		
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	6	20:23 (5)	19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21		04:54	05:17	06:08	20:21 (5)	07:03	07:57	07:57	08:39		
	16:40	17:40	18:34	20:31	21:25		21:59	21:46	20:50	1	20:22 (5)	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:18	05:19		04:54	05:18	06:10		07:05	07:59	07:59	08:40		
	16:41	17:42	18:36	20:33	21:27		22:00	21:45	20:48		19:34	18:22	16:23	16:05		
20	08:31	07:36	06:31	06:16	05:18		04:54	05:20	06:12		07:06	08:01	08:00	08:41		
	16:43	17:44	18:38	20:35	21:28		22:00	21:43	20:46		19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16		04:54	05:21	06:13		07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	21:30		22:00	21:42	20:44		19:29	18:17	16:20	16:06		
22	08:28	07:32	06:26	06:12	05:15		04:55	05:23	06:15		07:10	08:05	08:04	08:42		
	16:47	17:48	18:41	20:39	21:31		22:01	21:41	20:42		19:27	18:15	16:19	16:07		
23	08:27	07:30	06:23	06:09	05:13		04:55	05:24	06:17		07:12	08:07	08:06	08:42		
	16:49	17:50	18:43	20:41	21:33		22:01	21:39	20:39		19:24	18:13	16:18	16:07		
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26	06:19		07:13	08:09	08:07	08:43		
	16:51	17:52	18:45	20:42	21:34		22:01	21:38	20:37		19:22	18:11	16:17	16:08		
25	08:24	07:25	06:18	06:05	20:13 (5)	05:11	04:56	05:27	06:20		07:15	07:11	08:09	08:43		
	16:52	17:54	18:47	20:44	20:15 (5)	21:36	22:01	21:36	20:35		19:19	17:09	16:16	16:08		
26	08:23	07:23	06:16	06:03	20:10 (5)	05:09	04:56	05:29	06:22		07:17	07:13	08:11	08:43		
	16:54	17:56	18:49	20:46	20:17 (5)	21:37	22:01	21:35	20:32		19:17	17:06	16:15	16:09		
27	08:21	07:21	06:13	06:01	20:08 (5)	05:08	04:56	05:30	06:24		07:19	07:14	08:13	08:43		
	16:56	17:58	18:51	20:48	20:19 (5)	21:39	22:01	21:33	20:30		19:14	17:04	16:14	16:10		
28	08:20	07:18	06:11	05:58	20:07 (5)	05:07	04:57	05:32	20:24 (5)	06:26	07:21	07:16	08:14	08:44		
	16:58	18:00	18:53	20:50	20:21 (5)	21:40	22:01	21:32	20:28 (5)	4	20:28 (5)	20:28	19:12	17:02	16:13	16:11
29	08:18		07:08	05:56	20:06 (5)	05:06	04:58	05:34	20:21 (5)	06:28	07:22	07:18	08:16	08:44		
	17:00		19:54	20:52	20:22 (5)	21:41	22:00	21:30	20:31 (5)	10	20:31 (5)	20:25	19:09	17:00	16:12	16:11
30	08:17		07:06	05:54	20:05 (5)	05:05	04:58	05:35	20:19 (5)	06:29	07:24	07:20	08:17	08:44		
	17:02		19:56	20:53	20:24 (5)	21:43	22:00	21:28	20:33 (5)	14	20:33 (5)	20:23	19:07	16:58	16:11	16:12
31	08:15		07:04			05:04		05:37	20:18 (5)	06:31		07:22		08:44		
	17:04		19:58		21:44		21:26	20:34 (5)	20:21			16:56		16:13		
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233		
Total, worst case					308			44		338						
Sun reduction					0.38			0.32		0.34						
Oper. time red.					1.00			1.00		1.00						
Wind dir. red.					0.65			0.65		0.65						
Total reduction					0.23			0.21		0.22						
Total, real					16			9		75						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: CZ - H104
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December					
1	08:44	08:14	07:16	07:01	05:52	20:04 (5)	05:03	04:59	05:39	20:12 (5)	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:55	22	20:26 (5)	21:45	22:00	21:25	26	20:38 (5)	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50		20:03 (5)	05:02	05:00	05:40		20:12 (5)	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	24	20:27 (5)	21:46	22:00	21:23	27	20:39 (5)	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48		20:02 (5)	05:01	05:00	05:42		20:11 (5)	06:36	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	27	20:29 (5)	21:48	21:59	21:21	28	20:39 (5)	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46		20:02 (5)	05:00	05:01	05:44		20:11 (5)	06:38	07:31	07:30	08:24	
	16:18	17:12	18:07	20:06	21:01	27	20:29 (5)	21:49	21:59	21:19	29	20:40 (5)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44		20:01 (5)	04:59	05:02	05:45		20:11 (5)	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:03	28	20:29 (5)	21:50	21:58	21:17	28	20:39 (5)	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42		20:01 (5)	04:59	05:03	05:47		20:11 (5)	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04	28	20:29 (5)	21:51	21:57	21:15	28	20:39 (5)	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40		20:02 (5)	04:58	05:04	05:49		20:11 (5)	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	28	20:30 (5)	21:52	21:57	21:13	29	20:40 (5)	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38		20:01 (5)	04:57	05:05	05:51		20:11 (5)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	29	20:30 (5)	21:53	21:56	21:11	28	20:39 (5)	20:01	18:48	16:41	16:09	
9	08:41	07:59	06:57	06:42	05:36		20:01 (5)	04:57	05:06	05:52		20:11 (5)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	28	20:29 (5)	21:54	21:55	21:09	28	20:39 (5)	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34		20:01 (5)	04:56	05:07	05:54		20:11 (5)	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11	27	20:28 (5)	21:55	21:54	21:07	26	20:37 (5)	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33		20:02 (5)	04:56	05:08	05:56		20:12 (5)	06:50	07:44	07:43	08:33	
	16:28	17:26	18:21	20:18	21:13	27	20:29 (5)	21:55	21:54	21:05	23	20:35 (5)	19:54	18:40	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		20:02 (5)	04:55	05:09	05:58		20:12 (5)	06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15	26	20:28 (5)	21:56	21:53	21:03	22	20:34 (5)	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29		20:02 (5)	04:55	05:11	05:59		20:12 (5)	06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17	25	20:27 (5)	21:57	21:52	21:01	19	20:31 (5)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		20:04 (5)	04:55	05:12	06:01		20:14 (5)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18	23	20:27 (5)	21:57	21:51	20:59	15	20:29 (5)	19:47	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26		20:04 (5)	04:55	05:13	06:03		20:15 (5)	06:58	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20	22	20:26 (5)	21:58	21:50	20:57	13	20:28 (5)	19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24		20:05 (5)	04:54	05:14	06:05		20:16 (5)	06:59	07:54	07:53	08:38	
	16:36	17:36	18:30	20:28	21:22	20	20:25 (5)	21:59	21:48	20:55	9	20:25 (5)	19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22		20:06 (5)	04:54	05:16	06:06		20:19 (5)	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23	18	20:24 (5)	21:59	21:47	20:53	4	20:23 (5)	19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21		20:08 (5)	04:54	05:17	06:08		07:03	07:57	07:57	08:39		
	16:40	17:40	18:34	20:31	21:25	15	20:23 (5)	21:59	21:46	20:50		19:37	18:24	16:25	16:05		
19	08:32	07:39	06:33	06:18	05:19		20:10 (5)	04:54	05:18	06:10		07:05	07:59	07:59	08:40		
	16:41	17:42	18:36	20:33	21:27	12	20:22 (5)	22:00	21:45	20:48		19:34	18:22	16:23	16:05		
20	08:31	07:36	06:31	06:16	05:18		20:12 (5)	04:54	05:20	06:12		07:06	08:01	08:00	08:41		
	16:43	17:44	18:38	20:35	21:28	6	20:18 (5)	22:00	21:43	20:46		19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16			04:54	05:21	06:13		07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	21:30			22:00	21:42	20:44		19:29	18:17	16:20	16:06		
22	08:28	07:32	06:26	06:12	05:15			04:55	05:23	06:15		07:10	08:05	08:04	08:42		
	16:47	17:48	18:42	20:39	21:31			22:01	21:41	20:42		19:27	18:15	16:19	16:07		
23	08:27	07:30	06:23	06:09	05:13			04:55	05:24	06:17		07:12	08:07	08:06	08:42		
	16:49	17:50	18:43	20:41	21:33			22:01	21:39	20:39		19:24	18:13	16:18	16:07		
24	08:26	07:28	06:21	06:07	05:12			04:55	05:26		20:21 (5)	06:19	07:13	08:09	08:07	08:43	
	16:51	17:52	18:45	20:42	21:34			22:01	21:38	9		20:30 (5)	20:37	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	05:11			04:56	05:27		20:19 (5)	06:20	07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	21:36			22:01	21:36	14		20:33 (5)	20:35	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:09			04:56	05:28		20:18 (5)	06:22	07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	5	20:12 (5)	21:37	22:01	21:35	16		20:34 (5)	20:32	19:17	17:07	16:15	16:09
27	08:21	07:21	06:13	06:01	05:08		20:17 (5)	04:56	05:31		20:17 (5)	06:24	07:19	07:14	08:13	08:44	
	16:56	17:58	18:51	20:48	10	20:19 (5)	21:39	22:01	21:33	18		20:35 (5)	20:30	19:14	17:04	16:14	16:10
28	08:20	07:18	06:11	05:58	05:07		20:07 (5)	04:57	05:32		20:15 (5)	06:26	07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	14	20:21 (5)	21:40	22:01	21:32	21		20:36 (5)	20:28	19:12	17:02	16:13	16:11
29	08:18		07:09	05:56	05:06		20:06 (5)	04:58	05:34		20:15 (5)	06:28	07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	16	20:22 (5)	21:41	22:00	21:30	22		20:37 (5)	20:25	19:09	17:00	16:12	16:11
30	08:17		07:06	05:54	05:05		20:05 (5)	04:58	05:35		20:14 (5)	06:29	07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	19	20:24 (5)	21:43	22:00	21:28	23		20:37 (5)	20:23	19:07	16:58	16:11	16:12
31	08:15		07:04		05:04			05:37	06:20		20:13 (5)	06:31		07:22	08:11	08:44	
	17:04		19:58		21:44			21:26	21:25	25		20:38 (5)	20:21		16:56		16:13
Potential sun hours	250	273	367	420	494			510	512	460			382	328	259	233	
Total, worst case				64	462				148	382							
Sun reduction				0.35	0.38				0.32	0.34							
Oper. time red.				1.00	1.00				1.00	1.00							
Wind dir. red.				0.65	0.65				0.65	0.65							
Total reduction				0.23	0.25				0.21	0.22							
Total, real				15	114				31	84							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DA - H105

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	21:04 (5) 04:59	21:04 (5) 05:39	06:33 07:26	07:24 08:19	07:24 08:19	08:19
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	21:03 (5) 05:00	21:05 (5) 05:40	06:35 07:28	07:26 08:21	07:26 08:21	08:21
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	21:02 (5) 05:00	21:05 (5) 05:42	06:36 07:30	07:28 08:22	07:28 08:22	08:22
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:01 (5) 05:01	21:05 (5) 05:44	06:38 07:31	07:30 08:24	07:30 08:24	08:24
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	21:02 (5) 05:02	21:06 (5) 05:45	06:40 07:33	07:32 08:25	07:32 08:25	08:25
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:01 (5) 05:03	21:07 (5) 05:47	06:42 07:35	07:34 08:26	07:34 08:26	08:26
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:00 (5) 05:04	21:08 (5) 05:49	06:43 07:37	07:36 08:28	07:36 08:28	08:28
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:00 (5) 05:05	21:08 (5) 05:51	06:45 07:39	07:38 08:29	07:38 08:29	08:29
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:00 (5) 05:06	21:09 (5) 05:52	06:47 07:41	07:40 08:30	07:40 08:30	08:30
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	21:19 (5) 05:07	21:10 (5) 05:54	06:49 07:42	07:42 08:31	07:42 08:31	08:31
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	21:00 (5) 05:08	21:12 (5) 05:56	06:50 07:44	07:44 08:33	07:44 08:33	08:33
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:00 (5) 05:09	21:13 (5) 05:58	06:52 07:46	07:45 08:34	07:45 08:34	08:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	20:59 (5) 05:11	21:15 (5) 05:59	06:54 07:48	07:47 08:35	07:47 08:35	08:35
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:00 (5) 05:12	21:01 (5) 05:59	06:56 07:50	07:49 08:36	07:49 08:36	08:36
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:00 (5) 05:13	21:03 (5) 05:59	06:58 07:52	07:51 08:37	07:51 08:37	08:37
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:00 (5) 05:14	21:05 (5) 05:59	06:59 07:54	07:53 08:38	07:53 08:38	08:38
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:00 (5) 05:16	21:06 (5) 05:59	07:01 07:55	07:55 08:38	07:55 08:38	08:38
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:00 (5) 05:17	21:08 (5) 05:59	07:03 07:57	07:57 08:39	07:57 08:39	08:39
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	21:00 (5) 05:18	21:04 (5) 05:59	07:05 07:59	07:59 08:40	07:59 08:40	08:40
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:00 (5) 05:20	21:06 (5) 05:59	07:06 07:59	08:00 08:41	08:00 08:41	08:41
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	21:00 (5) 05:21	21:08 (5) 05:59	07:08 07:59	08:03 08:42	08:03 08:42	08:42
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	21:01 (5) 05:23	21:10 (5) 05:59	07:10 07:59	08:05 08:44	08:05 08:44	08:44
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:01 (5) 05:24	21:12 (5) 05:59	07:12 07:59	08:07 08:44	08:07 08:44	08:44
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:01 (5) 05:26	21:14 (5) 05:59	07:13 07:59	08:09 08:44	08:09 08:44	08:44
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:02 (5) 05:27	21:16 (5) 05:59	07:15 07:59	08:11 08:44	08:11 08:44	08:44
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:03 (5) 05:31	21:20 (5) 05:59	07:19 07:59	08:14 08:44	08:14 08:44	08:44
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30	08:17 17:02	07:06 18:00	05:54 18:56	05:05 20:53	05:05 21:43	04:58 22:00	21:05 (5) 05:35	21:26 (5) 05:59	07:24 07:59	08:18 08:44	08:18 08:44	08:44
31	08:15 17:04	07:04 18:00	05:54 18:58	05:05 20:54	05:05 21:44	21:06 (5) 21:09 (5)	21:27 (5) 05:37	21:28 (5) 05:59	07:25 07:59	08:19 08:44	08:19 08:44	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					3	590	170					
Sun reduction					0.38	0.32	0.32					
Oper. time red.					1.00	1.00	1.00					
Wind dir. red.					0.61	0.61	0.61					
Total reduction					0.23	0.19	0.20					
Total, real					1	114	33					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DB - H106

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DC - H107

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DD - H108

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:04	19:16	07:01	18:45 (5)	20:00	05:52	19:19 (5)	20:55	05:03	20:41 (3)	
2	08:44	16:16	08:12	17:08	18:04	07:14	18:04	19:16	34	18:45 (5)	20:00	05:52	19:19 (5)	20:55	21:45	21:06 (3)	
3	08:43	16:17	08:10	17:10	18:06	07:12	18:04	19:16	34	18:45 (5)	20:00	05:52	19:19 (5)	20:55	21:45	21:06 (3)	
4	08:43	16:18	08:08	17:12	18:07	07:09	18:04	19:16	32	18:45 (5)	20:00	05:52	19:17 (5)	20:59	21:48	21:07 (3)	
5	08:43	16:20	08:07	17:14	18:09	07:07	18:04	19:16	32	18:45 (5)	20:00	05:52	19:17 (5)	20:59	21:49	21:07 (3)	
6	08:42	16:21	08:05	17:16	18:11	07:04	18:04	19:16	30	18:45 (5)	20:00	05:52	19:15 (5)	21:03	21:50	21:07 (3)	
7	08:42	16:22	08:03	17:18	18:13	07:02	18:04	19:16	27	18:45 (5)	20:00	05:52	19:14 (5)	21:04	21:51	21:07 (3)	
8	08:41	16:24	08:01	17:20	18:15	07:00	18:04	19:16	25	18:45 (5)	20:00	05:52	19:12 (5)	21:06	21:52	21:06 (3)	
9	08:41	16:25	07:59	17:22	18:17	06:57	18:04	19:16	21	18:45 (5)	20:00	05:52	19:10 (5)	21:08	21:53	21:07 (3)	
10	08:40	16:27	07:57	17:24	18:19	06:55	18:04	19:16	17	18:45 (5)	20:00	05:52	19:08 (5)	21:10	21:54	21:07 (3)	
11	08:40	16:28	07:55	17:26	18:21	06:52	18:04	19:16	10	19:04 (5)	21:11	21:55	19:04 (5)	21:11	21:55	21:06 (3)	
12	08:39	16:30	07:53	17:28	18:23	06:50	18:04	19:16				05:33			21:55	21:07 (3)	
13	08:38	16:31	07:51	17:30	18:25	06:48	18:04	19:16				05:31			21:56	21:07 (3)	
14	08:37	16:33	07:49	17:32	18:27	06:45	18:04	19:16				05:29			21:57	21:06 (3)	
15	08:36	16:34	07:47	17:34	18:28	06:43	18:04	19:16				05:27	20:46 (3)	04:55	21:57	21:06 (3)	
16	08:35	16:36	07:45	17:36	18:30	06:40	18:04	19:16				05:26	20:44 (3)	04:55	21:57	21:06 (3)	
17	08:34	16:38	07:43	17:38	18:32	06:38	18:04	19:16				05:24	20:42 (3)	04:54	21:58	21:07 (3)	
18	08:33	16:40	07:41	17:40	18:34	06:35	18:04	19:16				05:22	20:40 (3)	04:54	21:59	21:07 (3)	
19	08:32	16:41	07:39	17:42	18:36	06:33	18:04	19:16				05:21	20:38 (3)	04:54	21:59	21:07 (3)	
20	08:31	16:43	07:36	17:44	18:38	06:31	18:04	19:16				05:19	20:36 (3)	04:54	21:59	21:07 (3)	
21	08:30	16:45	07:34	17:46	18:40	06:28	18:04	19:16				05:18	20:34 (3)	04:54	21:59	21:07 (3)	
22	08:28	16:47	07:32	17:48	18:42	06:26	18:04	19:16				05:16	20:32 (3)	04:54	21:59	21:07 (3)	
23	08:27	16:49	07:30	17:50	18:43	06:23	18:04	19:16				05:15	20:30 (3)	04:55	21:59	21:07 (3)	
24	08:26	16:51	07:28	17:52	18:45	06:21	18:04	19:16				05:13	20:28 (3)	04:55	21:59	21:07 (3)	
25	08:24	16:52	07:25	17:54	18:47	06:18	18:04	19:16				05:12	20:26 (3)	04:55	21:59	21:07 (3)	
26	08:23	16:54	07:23	17:56	18:49	06:16	18:04	19:16				05:11	20:24 (3)	04:56	21:59	21:07 (3)	
27	08:22	16:56	07:21	17:58	18:51	06:13	18:04	19:16				05:10	20:22 (3)	04:56	21:59	21:07 (3)	
28	08:20	16:58	07:18	18:00	18:53	06:11	18:04	19:16				05:09	20:20 (3)	04:57	21:59	21:07 (3)	
29	08:18	17:00			18:55	06:09	18:04	19:16				05:08	20:18 (3)	04:57	21:59	21:07 (3)	
30	08:17	17:02			18:57	06:07	18:04	19:16				05:07	20:16 (3)	04:58	21:59	21:07 (3)	
31	08:15	17:04			19:00	06:05	18:04	19:16				05:06	20:14 (3)	04:58	21:59	21:07 (3)	
Potential sun hours	250		273		367		420					494		510			
Total, worst case					344		262					314		638			
Sun reduction					0.27		0.35					0.38		0.32			
Oper. time red.					1.00		1.00					1.00		1.00			
Wind dir. red.					0.68		0.68					0.63		0.63			
Total reduction					0.18		0.24					0.24		0.20			
Total, real					63		62					75		127			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DD - H108

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July			August		September		October		November		December	
1	04:59		20:49 (3)	05:39		06:33		07:26		07:24		08:19	
	22:00	22	21:11 (3)	21:25		20:18		19:05		16:54		16:10	
2	05:00		20:50 (3)	05:40		06:35		18:53 (5)		07:28		07:26	
	22:00	22	21:12 (3)	21:23		20:16	10	19:03 (5)		19:02		16:52	
3	05:00		20:49 (3)	05:42		06:36		18:49 (5)		07:30		07:28	
	21:59	22	21:11 (3)	21:21		20:13	17	19:06 (5)		19:00		16:50	
4	05:01		20:49 (3)	05:44		06:38		18:46 (5)		07:31		07:30	
	21:59	23	21:12 (3)	21:19		20:11	21	19:07 (5)		18:57		16:48	
5	05:02		20:49 (3)	05:45		06:40		18:44 (5)		07:33		07:32	
	21:58	23	21:12 (3)	21:17		20:09	25	19:09 (5)		18:55		16:46	
6	05:03		20:49 (3)	05:47		06:42		18:43 (5)		07:35		07:34	
	21:57	24	21:13 (3)	21:15		20:06	27	19:10 (5)		18:52		16:44	
7	05:04		20:49 (3)	05:49		06:43		18:41 (5)		07:37		07:36	
	21:57	24	21:13 (3)	21:13		20:04	29	19:10 (5)		18:50		16:43	
8	05:05		20:49 (3)	05:51		06:45		18:40 (5)		07:39		07:38	
	21:56	25	21:14 (3)	21:11		20:01	31	19:11 (5)		18:48		16:41	
9	05:06		20:49 (3)	05:52		06:47		18:39 (5)		07:41		07:40	
	21:55	25	21:14 (3)	21:09		19:59	32	19:11 (5)		18:45		16:39	
10	05:07		20:49 (3)	05:54		06:49		18:37 (5)		07:42		07:42	
	21:55	26	21:15 (3)	21:07		19:56	34	19:11 (5)		18:43		16:37	
11	05:08		20:49 (3)	05:56		06:50		18:37 (5)		07:44		07:44	
	21:54	26	21:15 (3)	21:05		19:54	34	19:11 (5)		18:40		16:36	
12	05:09		20:49 (3)	05:58		06:52		18:37 (5)		07:46		07:45	
	21:53	26	21:15 (3)	21:03		19:51	34	19:11 (5)		18:38		16:34	
13	05:11		20:49 (3)	05:59		06:54		18:36 (5)		07:48		07:47	
	21:52	26	21:15 (3)	21:01		19:49	35	19:11 (5)		18:36		16:32	
14	05:12		20:49 (3)	06:01		06:56		18:35 (5)		07:50		07:49	
	21:51	26	21:15 (3)	20:59		19:47	35	19:10 (5)		18:33		16:31	
15	05:13		20:49 (3)	06:03		06:58		18:35 (5)		07:52		07:51	
	21:50	26	21:15 (3)	20:57		19:44	35	19:10 (5)		18:31		16:29	
16	05:14		20:50 (3)	06:05		06:59		18:36 (5)		07:54		07:53	
	21:49	25	21:15 (3)	20:55		19:42	33	19:09 (5)		18:29		16:27	
17	05:16		20:49 (3)	06:06		07:01		18:35 (5)		07:55		07:55	
	21:47	25	21:14 (3)	20:53		19:39	33	19:08 (5)		18:26		16:26	
18	05:17		20:49 (3)	06:08		07:03		18:36 (5)		07:57		07:57	
	21:46	23	21:12 (3)	20:50		19:37	31	19:07 (5)		18:24		16:25	
19	05:18		20:49 (3)	06:10		07:05		18:36 (5)		07:59		07:59	
	21:45	22	21:11 (3)	20:48		19:34	30	19:06 (5)		18:22		16:23	
20	05:20		20:50 (3)	06:12		07:06		18:37 (5)		08:01		08:00	
	21:44	20	21:10 (3)	20:46		19:32	27	19:04 (5)		18:20		16:22	
21	05:21		20:50 (3)	06:13		07:08		18:38 (5)		08:03		08:02	
	21:42	19	21:09 (3)	20:44		19:29	23	19:01 (5)		18:17		16:20	
22	05:23		20:50 (3)	06:15		07:10		18:39 (5)		08:05		08:04	
	21:41	17	21:07 (3)	20:42		19:27	20	18:59 (5)		18:15		16:19	
23	05:24		20:51 (3)	06:17		07:12		18:42 (5)		08:07		08:06	
	21:39	16	21:07 (3)	20:39		19:24	14	18:56 (5)		18:13		16:18	
24	05:26		20:51 (3)	06:19		07:13		18:46 (5)		08:09		08:08	
	21:38	14	21:05 (3)	20:37		19:22	7	18:53 (5)		18:11		16:17	
25	05:27		20:52 (3)	06:20		07:15				07:11		08:09	
	21:36	12	21:04 (3)	20:35		19:19				17:09		16:16	
26	05:29		20:52 (3)	06:22		07:17				07:13		08:11	
	21:35	10	21:02 (3)	20:32		19:17				17:07		16:15	
27	05:30		20:54 (3)	06:24		07:19				07:15		08:13	
	21:33	7	21:01 (3)	20:30		19:14				17:04		16:13	
28	05:32		20:54 (3)	06:26		07:21				07:16		08:14	
	21:32	5	20:59 (3)	20:28		19:12				17:02		16:13	
29	05:34		20:56 (3)	06:28		07:22				07:18		08:16	
	21:30	2	20:58 (3)	20:25		19:09				17:00		16:12	
30	05:35			06:29		07:24				07:20		08:18	
	21:28			20:23		19:07				16:58		16:11	
31	05:37			06:31						07:22			
	21:26			20:21						16:56			
Potential sun hours	512			460		382			328		259		233
Total, worst case		583				617							
Sun reduction		0.32				0.32							
Oper. time red.		1.00				1.00							
Wind dir. red.		0.63				0.68							
Total reduction		0.20				0.22							
Total, real		118				134							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DE - H109

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:39 (5) 20:55	05:52 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:50 (5) 20:57	20:55 21:46
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	20:57 20:59	21:46 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	20:59 21:01	21:48 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	21:01 21:03	21:49 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	21:03 21:04	21:50 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	21:04 21:06	21:51 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	21:06 21:08	21:52 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	21:08 21:10	21:53 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	21:10 21:11	21:54 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	17:46 (5) 20:19	21:11 21:13	21:55 21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	17:41 (5) 20:20	21:13 21:15	21:56 21:57
13	08:38 16:31	07:51 17:30	06:48 18:25	17:39 (5) 20:22	21:15 21:17	21:57 21:58
14	08:37 16:33	07:49 17:32	06:45 18:27	17:36 (5) 20:24	21:17 21:18	21:58 21:59
15	08:36 16:34	07:47 17:34	06:43 18:28	17:35 (5) 20:26	21:18 21:20	22:00 22:01
16	08:35 16:36	07:45 17:36	06:40 18:30	17:33 (5) 20:28	21:20 21:22	22:01 22:02
17	08:34 16:38	07:43 17:38	06:38 18:32	17:33 (5) 20:30	21:22 21:23	22:02 22:03
18	08:33 16:40	07:41 17:40	06:35 18:34	17:31 (5) 20:31	21:23 21:25	22:03 22:04
19	08:32 16:41	07:39 17:42	06:33 18:36	17:31 (5) 20:33	21:25 21:27	22:04 22:05
20	08:31 16:43	07:36 17:44	06:31 18:38	17:30 (5) 20:35	21:27 21:28	22:05 22:06
21	08:30 16:45	07:34 17:46	06:28 18:40	17:30 (5) 20:37	21:28 21:30	22:06 22:07
22	08:28 16:47	07:32 17:48	06:26 18:42	17:29 (5) 20:39	21:30 21:31	22:07 22:08
23	08:27 16:49	07:30 17:50	06:23 18:43	17:29 (5) 20:41	21:31 21:33	22:08 22:09
24	08:26 16:51	07:28 17:52	06:21 18:45	17:29 (5) 20:42	21:32 21:34	22:09 22:10
25	08:24 16:52	07:25 17:54	06:18 18:47	17:29 (5) 20:44	21:33 21:36	22:10 22:11
26	08:23 16:54	07:23 17:56	06:16 18:49	17:30 (5) 20:46	21:36 21:37	22:11 22:12
27	08:22 16:56	07:21 17:58	06:13 18:51	17:30 (5) 20:48	21:37 21:39	22:12 22:13
28	08:20 16:58	07:18 18:00	06:11 18:53	17:31 (5) 20:50	21:40 21:41	22:13 22:14
29	08:18 17:00		07:09 19:54	18:32 (5) 20:52	21:42 21:45	22:14 22:15
30	08:17 17:02		07:06 19:56	18:34 (5) 20:53	21:44 21:47	22:15 22:16
31	08:15 17:04		07:04 19:58	18:35 (5) 20:53	21:46 21:49	22:16 22:17
Potential sun hours	250	273	367	420	494	510
Total, worst case			583	11	500	74
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.67	0.63	0.63
Total reduction			0.18	0.24	0.24	0.20
Total, real			106	3	121	15

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DE - H109

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December	
1	04:59		05:39		20:38 (3)	06:33		07:26	18:19 (5)	07:24	08:19	
	22:00		21:25	15	20:53 (3)	20:18		19:05	17	18:36 (5)	16:10	
2	05:00		05:40		20:39 (3)	06:35		07:28		18:22 (5)	08:21	
	22:00		21:23	13	20:52 (3)	20:16		19:02	11	18:33 (5)	16:09	
3	05:00		05:42		20:40 (3)	06:36		07:30			08:22	
	21:59		21:21	10	20:50 (3)	20:13		19:00			16:08	
4	05:01		05:44		20:41 (3)	06:38		07:31			08:24	
	21:59		21:19	7	20:48 (3)	20:11		18:57			16:08	
5	05:02		05:45		20:41 (3)	06:40		07:33			08:25	
	21:58		21:17	5	20:46 (3)	20:09		18:55			16:07	
6	05:03		20:47 (3)		05:47	20:43 (3)	06:42	07:35		07:34	08:26	
	21:57	4	20:51 (3)	2	21:15	20:06		18:52		16:44	16:07	
7	05:04		20:45 (3)		05:49		06:43	07:37		07:36	08:28	
	21:57	8	20:53 (3)		21:13		20:04	18:50		16:43	16:06	
8	05:05		20:44 (3)		05:51		06:45	07:39		07:38	08:29	
	21:56	10	20:54 (3)		21:11		20:01	18:48		16:41	16:06	
9	05:06		20:43 (3)		05:52		06:47	07:41		07:40	08:30	
	21:55	13	20:56 (3)		21:09		19:59	18:45		16:39	16:05	
10	05:07		20:42 (3)		05:54		06:49	07:42		07:42	08:31	
	21:55	15	20:57 (3)		21:07		19:56	18:43		16:37	16:05	
11	05:08		20:42 (3)		05:56		06:50	18:31 (5)	07:44	07:44	08:33	
	21:54	16	20:58 (3)		21:05		19:54	10	18:41 (5)	18:40	16:05	
12	05:09		20:41 (3)		05:58		06:52	18:28 (5)	07:46	07:45	08:34	
	21:53	17	20:58 (3)		21:03		19:51	17	18:45 (5)	18:38	16:05	
13	05:11		20:40 (3)		05:59		06:54	18:25 (5)	07:48	07:47	08:35	
	21:52	19	20:59 (3)		21:01		19:49	22	18:47 (5)	18:36	16:05	
14	05:12		20:39 (3)		06:01		06:56	18:23 (5)	07:50	07:49	08:36	
	21:51	21	21:00 (3)		20:59		19:47	24	18:47 (5)	18:33	16:05	
15	05:13		20:39 (3)		06:03		06:58	18:21 (5)	07:52	07:51	08:37	
	21:50	21	21:00 (3)		20:57		19:44	27	18:48 (5)	18:31	16:05	
16	05:14		20:39 (3)		06:05		06:59	18:20 (5)	07:54	07:53	08:38	
	21:49	23	21:02 (3)		20:55		19:42	29	18:49 (5)	18:29	16:05	
17	05:16		20:39 (3)		06:06		07:01	18:18 (5)	07:55	07:55	08:38	
	21:47	23	21:02 (3)		20:53		19:39	31	18:49 (5)	18:26	16:05	
18	05:17		20:38 (3)		06:08		07:03	18:17 (5)	07:57	07:57	08:39	
	21:46	24	21:02 (3)		20:50		19:37	33	18:50 (5)	18:24	16:05	
19	05:18		20:37 (3)		06:10		07:05	18:16 (5)	07:59	07:59	08:40	
	21:45	25	21:02 (3)		20:48		19:34	34	18:50 (5)	18:22	16:05	
20	05:20		20:38 (3)		06:12		07:06	18:16 (5)	08:01	08:00	08:41	
	21:44	25	21:03 (3)		20:46		19:32	34	18:50 (5)	18:20	16:06	
21	05:21		20:37 (3)		06:13		07:08	18:15 (5)	08:03	08:02	08:41	
	21:42	26	21:03 (3)		20:44		19:29	34	18:49 (5)	18:17	16:06	
22	05:23		20:37 (3)		06:15		07:10	18:14 (5)	08:05	08:04	08:42	
	21:41	26	21:03 (3)		20:42		19:27	35	18:49 (5)	18:15	16:07	
23	05:24		20:37 (3)		06:17		07:12	18:14 (5)	08:07	08:06	08:42	
	21:39	27	21:04 (3)		20:39		19:24	35	18:49 (5)	18:13	16:07	
24	05:26		20:37 (3)		06:19		07:13	18:15 (5)	08:09	08:08	08:43	
	21:38	27	21:04 (3)		20:37		19:22	34	18:49 (5)	18:11	16:08	
25	05:27		20:37 (3)		06:20		07:15	18:14 (5)	07:11	08:09	08:43	
	21:36	27	21:04 (3)		20:35		19:19	33	18:47 (5)	17:09	16:08	
26	05:29		20:37 (3)		06:22		07:17	18:14 (5)	07:13	08:11	08:43	
	21:35	25	21:02 (3)		20:32		19:17	32	18:46 (5)	17:07	16:09	
27	05:30		20:37 (3)		06:24		07:19	18:15 (5)	07:15	08:13	08:44	
	21:33	24	21:01 (3)		20:30		19:14	30	18:45 (5)	17:04	16:10	
28	05:32		20:37 (3)		06:26		07:21	18:16 (5)	07:16	08:14	08:44	
	21:32	22	20:59 (3)		20:28		19:12	28	18:44 (5)	17:02	16:11	
29	05:34		20:38 (3)		06:28		07:22	18:17 (5)	07:18	08:16	08:44	
	21:30	20	20:58 (3)		20:25		19:09	24	18:41 (5)	17:00	16:11	
30	05:35		20:38 (3)		06:29		07:24	18:17 (5)	07:20	08:18	08:44	
	21:28	18	20:56 (3)		20:23		19:07	21	18:38 (5)	16:58	16:12	
31	05:37		20:38 (3)		06:31				07:22		08:44	
	21:26	17	20:55 (3)		20:21				16:56		16:13	
Potential sun hours	512		460			382		328		259	233	
Total, worst case		523		52			567		28			
Sun reduction		0.32		0.34			0.32		0.29			
Oper. time red.		1.00		1.00			1.00		1.00			
Wind dir. red.		0.63		0.63			0.67		0.67			
Total reduction		0.21		0.22			0.22		0.20			
Total, real		107		11			122		6			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DF - H110

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May		June	
1	08:44	08:14	07:16		07:01	05:52	20:22 (3)	05:03	20:44 (4)
	16:15	17:06	18:02		20:00	20:55	4	20:26 (3)	26 21:10 (4)
2	08:44	08:12	07:14		06:59	05:50	20:20 (3)	05:02	20:45 (4)
	16:16	17:08	18:04		20:02	20:57	7	20:27 (3)	27 21:12 (4)
3	08:43	08:10	07:12		06:56	05:48	20:18 (3)	05:01	20:44 (4)
	16:17	17:10	18:06		20:04	20:59	11	20:29 (3)	29 21:13 (4)
4	08:43	08:08	07:09		06:54	05:46	20:17 (3)	05:00	20:43 (4)
	16:18	17:12	18:07		20:06	21:01	13	20:30 (3)	31 21:14 (4)
5	08:43	08:07	07:07	17:37 (5)	06:51	05:44	20:16 (3)	04:59	20:43 (4)
	16:20	17:14	18:09	4 17:41 (5)	20:07	21:03	16	20:32 (3)	32 21:15 (4)
6	08:42	08:05	07:04	17:32 (5)	06:49	05:42	20:16 (3)	04:59	20:43 (4)
	16:21	17:16	18:11	13 17:45 (5)	20:09	21:04	17	20:33 (3)	33 21:16 (4)
7	08:42	08:03	07:02	17:28 (5)	06:47	05:40	20:16 (3)	04:58	20:42 (4)
	16:22	17:18	18:13	18 17:46 (5)	20:11	21:06	20	20:36 (3)	34 21:16 (4)
8	08:42	08:01	07:00	17:27 (5)	06:44	05:38	20:15 (3)	04:57	20:42 (4)
	16:24	17:20	18:15	21 17:48 (5)	20:13	21:08	22	20:37 (3)	36 21:18 (4)
9	08:41	07:59	06:57	17:25 (5)	06:42	05:36	20:15 (3)	04:57	20:43 (4)
	16:25	17:22	18:17	25 17:50 (5)	20:15	21:10	24	20:39 (3)	36 21:19 (4)
10	08:40	07:57	06:55	17:24 (5)	06:39	05:34	20:14 (3)	04:56	20:42 (4)
	16:27	17:24	18:19	28 17:52 (5)	20:17	21:11	26	20:40 (3)	37 21:19 (4)
11	08:40	07:55	06:52	17:23 (5)	06:37	05:33	20:15 (3)	04:56	20:42 (4)
	16:28	17:26	18:21	30 17:53 (5)	20:19	21:13	27	20:42 (3)	38 21:20 (4)
12	08:39	07:53	06:50	17:22 (5)	06:35	05:31	20:15 (3)	04:55	20:42 (4)
	16:30	17:28	18:23	31 17:53 (5)	20:20	21:15	27	20:42 (3)	39 21:21 (4)
13	08:38	07:51	06:48	17:21 (5)	06:32	05:29	20:14 (3)	04:55	20:42 (4)
	16:31	17:30	18:25	33 17:54 (5)	20:22	21:17	27	20:41 (3)	39 21:21 (4)
14	08:37	07:49	06:45	17:20 (5)	06:30	05:27	20:15 (3)	04:55	20:42 (4)
	16:33	17:32	18:27	33 17:53 (5)	20:24	21:18	26	20:41 (3)	40 21:22 (4)
15	08:36	07:47	06:43	17:20 (5)	06:28	05:26	20:15 (3)	04:55	20:42 (4)
	16:34	17:34	18:28	34 17:54 (5)	20:26	21:20	26	20:41 (3)	40 21:22 (4)
16	08:35	07:45	06:40	17:19 (5)	06:25	05:24	20:16 (3)	04:54	20:42 (4)
	16:36	17:36	18:30	34 17:53 (5)	20:28	21:22	25	20:41 (3)	41 21:23 (4)
17	08:34	07:43	06:38	17:20 (5)	06:23	05:22	20:16 (3)	04:54	20:42 (4)
	16:38	17:38	18:32	33 17:53 (5)	20:30	21:23	24	20:40 (3)	41 21:23 (4)
18	08:33	07:41	06:35	17:19 (5)	06:21	05:21	20:17 (3)	04:54	20:43 (4)
	16:40	17:40	18:34	33 17:52 (5)	20:31	21:25	23	20:40 (3)	41 21:24 (4)
19	08:32	07:39	06:33	17:20 (5)	06:18	05:19	20:18 (3)	04:54	20:43 (4)
	16:41	17:42	18:36	32 17:52 (5)	20:33	21:27	21	20:39 (3)	41 21:24 (4)
20	08:31	07:36	06:31	17:20 (5)	06:16	05:18	20:18 (3)	04:54	20:43 (4)
	16:43	17:44	18:38	30 17:50 (5)	20:35	21:28	20	20:38 (3)	41 21:24 (4)
21	08:30	07:34	06:28	17:21 (5)	06:14	05:16	20:20 (3)	04:54	20:43 (4)
	16:45	17:46	18:40	28 17:49 (5)	20:37	21:30	17	20:37 (3)	41 21:24 (4)
22	08:28	07:32	06:26	17:21 (5)	06:12	05:15	20:21 (3)	04:55	20:44 (4)
	16:47	17:48	18:42	26 17:47 (5)	20:39	21:31	16	20:37 (3)	41 21:25 (4)
23	08:27	07:30	06:23	17:23 (5)	06:09	05:13	20:22 (3)	04:55	20:44 (4)
	16:49	17:50	18:43	23 17:46 (5)	20:41	21:33	13	20:35 (3)	41 21:25 (4)
24	08:26	07:28	06:21	17:24 (5)	06:07	05:12	20:24 (3)	04:55	20:44 (4)
	16:51	17:52	18:45	20 17:44 (5)	20:42	21:34	13	21:01 (4)	41 21:25 (4)
25	08:24	07:25	06:18	17:27 (5)	06:05	05:11	20:27 (3)	04:56	20:44 (4)
	16:52	17:54	18:47	14 17:41 (5)	20:44	21:36	12	21:02 (4)	41 21:25 (4)
26	08:23	07:23	06:16	17:32 (5)	06:03	05:09	20:51 (4)	04:56	20:44 (4)
	16:54	17:56	18:49	4 17:36 (5)	20:46	21:37	13	21:04 (4)	41 21:25 (4)
27	08:22	07:21	06:13		06:01	05:08	20:49 (4)	04:56	20:44 (4)
	16:56	17:58	18:51		20:48	21:39	16	21:05 (4)	40 21:24 (4)
28	08:20	07:18	06:11		05:58	05:07	20:48 (4)	04:57	20:45 (4)
	16:58	18:00	18:53		20:50	21:40	18	21:06 (4)	40 21:25 (4)
29	08:18		07:09		05:56	05:06	20:47 (4)	04:58	20:46 (4)
	17:00		19:54		20:52	21:41	20	21:07 (4)	39 21:25 (4)
30	08:17		07:06		05:54	05:05	20:46 (4)	04:58	20:46 (4)
	17:02		19:56		20:53	21:43	22	21:08 (4)	38 21:24 (4)
31	08:15		07:04			05:04	20:45 (4)		
	17:04		19:58			21:44	24	21:09 (4)	
Potential sun hours	250	273	367		420	494		510	
Total, worst case			547			590		1125	
Sun reduction			0.27			0.38		0.32	
Oper. time red.			1.00			1.00		1.00	
Wind dir. red.			0.68			0.63		0.61	
Total reduction			0.18			0.24		0.20	
Total, real			100			143		219	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DF - H110

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00 38	20:46 (4) 21:24 (4) 21:25	05:39 27	20:25 (3) 20:18	06:33 20:25 (3) 06:35	07:26 19:05 32 18:32 (5) 16:54 16:10
2	05:00 22:00 37	20:47 (4) 21:24 (4) 21:23	05:40 27	20:25 (3) 20:16	06:35 20:52 (3) 20:16	07:28 19:02 31 18:32 (5) 16:52 16:09
3	05:00 21:59 36	20:47 (4) 21:23 (4) 21:21	05:42 25	20:25 (3) 20:13	06:36 20:50 (3) 20:13	07:30 19:00 30 18:01 (5) 07:28 16:50 16:08
4	05:01 21:59 36	20:47 (4) 21:23 (4) 21:19	05:44 23	20:25 (3) 20:11	06:38 20:48 (3) 20:11	07:31 18:57 27 18:02 (5) 16:48 16:08
5	05:02 21:58 35	20:48 (4) 21:23 (4) 21:17	05:45 21	20:25 (3) 20:09	06:40 20:46 (3) 20:09	07:33 18:55 23 18:03 (5) 16:46 16:07
6	05:03 21:57 33	20:49 (4) 21:22 (4) 21:15	05:47 20	20:25 (3) 20:06	06:42 20:45 (3) 20:06	07:35 18:52 19 18:05 (5) 16:44 16:07
7	05:04 21:57 32	20:50 (4) 21:22 (4) 21:13	05:49 17	20:26 (3) 20:04	06:43 20:43 (3) 20:04	07:37 18:50 15 18:06 (5) 16:43 16:06
8	05:05 21:56 31	20:50 (4) 21:21 (4) 21:11	05:51 15	20:26 (3) 20:01	06:45 20:41 (3) 20:01	07:39 18:48 9 18:09 (5) 16:38 16:06
9	05:06 21:55 30	20:51 (4) 21:21 (4) 21:09	05:52 12	20:27 (3) 19:59	06:47 20:39 (3) 19:59	07:41 18:45 18:39 18:18 (5) 16:40 16:05
10	05:07 21:55 28	20:52 (4) 21:20 (4) 21:07	05:54 10	20:27 (3) 19:56	06:49 20:37 (3) 19:56	07:42 18:43 18:37 18:18 (5) 16:39 16:05
11	05:08 21:54 27	20:52 (4) 21:19 (4) 21:05	05:56 6	20:29 (3) 19:54	06:50 20:35 (3) 19:54	07:44 18:40 18:36 18:18 (5) 16:37 16:05
12	05:09 21:53 25	20:53 (4) 21:18 (4) 21:03	05:58 3	20:31 (3) 19:51	06:52 20:34 (3) 19:51	07:46 18:38 18:32 18:18 (5) 16:35 16:05
13	05:11 21:52 23	20:54 (4) 21:17 (4) 21:01	05:59 19:49	06:54 19:49	06:54 19:49	07:48 18:36 18:30 18:18 (5) 16:32 16:05
14	05:12 21:51 21	20:55 (4) 21:16 (4) 20:59	06:01 19:47	06:56 19:47	06:56 19:47	07:50 18:33 18:26 18:18 (5) 16:32 16:05
15	05:13 21:50 19	20:56 (4) 21:15 (4) 20:57	06:03 19:44	06:58 19:44	06:58 19:44	07:52 18:31 18:24 18:18 (5) 16:29 16:05
16	05:14 21:49 17	20:58 (4) 21:15 (4) 20:55	06:05 19:42	06:59 19:42	06:59 19:42	07:54 18:29 18:22 18:18 (5) 16:27 16:05
17	05:16 21:47 14	21:00 (4) 21:14 (4) 20:53	06:06 19:39	07:01 19:39	07:01 19:39	07:55 18:26 18:19 18:18 (5) 16:26 16:05
18	05:17 21:46 11	21:01 (4) 21:12 (4) 20:50	06:08 19:37	07:03 19:37	07:03 19:37	07:57 18:24 18:17 18:18 (5) 16:25 16:05
19	05:18 21:45 14	20:35 (3) 21:11 (4) 20:48	06:10 19:34	07:05 19:34	07:05 19:34	07:59 18:22 18:15 18:18 (5) 16:23 16:05
20	05:20 21:44 12	20:33 (3) 20:45 (3) 20:46	06:12 19:32	07:06 19:32	07:06 19:32	08:01 18:20 18:13 18:18 (5) 16:22 16:06
21	05:21 21:42 15	20:31 (3) 20:46 (3) 20:44	06:13 19:29	07:08 19:29	07:08 19:29	08:03 18:17 18:10 18:18 (5) 16:20 16:06
22	05:23 21:41 17	20:30 (3) 20:47 (3) 20:42	06:15 19:27	07:10 19:27	07:10 19:27	08:05 18:15 18:08 18:18 (5) 16:20 16:07
23	05:24 21:39 18	20:30 (3) 20:48 (3) 20:39	06:17 19:24	07:12 19:24	07:12 19:24	08:07 18:13 18:06 18:18 (5) 16:19 16:07
24	05:26 21:38 21	20:28 (3) 20:49 (3) 20:37	06:19 19:22	07:13 19:22	07:13 19:22	08:09 18:11 18:04 18:18 (5) 16:18 16:08
25	05:27 21:36 22	20:28 (3) 20:50 (3) 20:35	06:20 19:19	07:15 19:19	07:15 19:19	08:11 16:16 18:02 (5) 18:18 (5) 16:16 16:08
26	05:29 21:35 23	20:27 (3) 20:50 (3) 20:32	06:22 19:17	07:17 19:17	07:17 19:17	08:13 16:16 18:02 (5) 18:18 (5) 16:16 16:08
27	05:30 21:33 24	20:27 (3) 20:51 (3) 20:30	06:24 19:14	07:19 19:14	07:19 19:14	08:15 16:13 18:01 (5) 18:18 (5) 16:15 16:10
28	05:32 21:32 25	20:26 (3) 20:51 (3) 20:28	06:26 19:12	07:21 19:12	07:21 19:12	08:16 16:13 18:01 (5) 18:18 (5) 16:14 16:11
29	05:34 21:30 26	20:26 (3) 20:52 (3) 20:25	06:28 19:09	07:22 19:09	07:22 19:09	08:18 16:12 18:01 (5) 18:18 (5) 16:15 16:11
30	05:35 21:28 27	20:25 (3) 20:52 (3) 20:23	06:29 19:07	07:24 19:07	07:24 19:07	08:20 16:11 18:00 (5) 18:18 (5) 16:16 16:12
31	05:37 21:26 27	20:26 (3) 20:53 (3) 20:21	06:31 19:07	07:26 19:07	07:26 19:07	08:22 16:13 18:00 (5) 18:18 (5) 16:17 16:12
Potential sun hours	512	460	382	328	259	233
Total, worst case	764	206	367	186		
Sun reduction	0.32	0.34	0.32	0.29		
Oper. time red.	1.00	1.00	1.00	1.00		
Wind dir. red.	0.62	0.64	0.68	0.68		
Total reduction	0.20	0.22	0.22	0.20		
Total, real	153	45	79	37		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DG - H111

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	05:52	19:58 (2) 05:03
	16:15	17:06	18:02	20:00	20:55	11 20:09 (2) 21:45
2	08:44	08:12	07:14	06:59	05:50	20:02 (2) 05:02
	16:16	17:08	18:04	20:02	20:57	3 20:05 (2) 21:46
3	08:43	08:10	07:11	06:56	05:48	05:01
	16:17	17:10	18:05	20:04	20:59	21:48
4	08:43	08:08	07:09	06:54	05:46	05:00
	16:18	17:12	18:07	20:06	21:01	21:49
5	08:43	08:07	07:07	17:40 (4) 06:51	05:44	04:59
	16:19	17:14	18:09	2 17:42 (4) 20:07	21:03	21:50
6	08:42	08:05	07:04	17:38 (4) 06:49	05:42	04:58
	16:21	17:16	18:11	7 17:45 (4) 20:09	21:04	21:51
7	08:42	08:03	07:02	17:36 (4) 06:47	05:40	04:58
	16:22	17:18	18:13	10 17:46 (4) 20:11	21:06	21:52
8	08:41	08:01	07:00	17:36 (4) 06:44	05:38	04:57
	16:24	17:20	18:15	12 17:48 (4) 20:13	21:08	21:53
9	08:41	07:59	06:57	17:34 (4) 06:42	05:36	04:57
	16:25	17:22	18:17	16 17:50 (4) 20:15	21:10	21:54
10	08:40	07:57	06:55	17:34 (4) 06:39	05:34	04:56
	16:26	17:24	18:19	18 17:52 (4) 20:17	21:11	21:55
11	08:40	07:55	06:52	17:34 (4) 06:37	05:33	04:56
	16:28	17:26	18:21	21 17:55 (4) 20:18	21:13	21:55
12	08:39	07:53	06:50	17:33 (4) 06:35	05:31	04:55
	16:30	17:28	18:23	23 17:56 (4) 20:20	21:15	21:56
13	08:38	07:51	06:48	17:34 (4) 06:32	05:29	04:55
	16:31	17:30	18:25	24 17:58 (4) 20:22	21:17	21:57
14	08:37	07:49	06:45	17:33 (4) 06:30	05:27	04:55
	16:33	17:32	18:27	25 17:58 (4) 20:24	21:18	21:57
15	08:36	07:47	06:43	17:34 (4) 06:28	05:26	04:54
	16:34	17:34	18:28	23 17:57 (4) 20:26	21:20	21:58
16	08:35	07:45	06:40	17:34 (4) 06:25	05:24	04:54
	16:36	17:36	18:30	21 17:55 (4) 20:28	21:22	21:59
17	08:34	07:43	06:38	17:35 (4) 06:23	20:00 (2) 05:22	04:54
	16:38	17:38	18:32	19 17:54 (4) 20:30	1 20:01 (2) 21:23	21:59
18	08:33	07:41	06:35	17:36 (4) 06:21	19:58 (2) 05:21	04:54
	16:40	17:40	18:34	16 17:52 (4) 20:31	5 20:03 (2) 21:25	22:00
19	08:32	07:39	06:33	17:39 (4) 06:18	19:57 (2) 05:19	04:54
	16:41	17:42	18:36	11 17:50 (4) 20:33	8 20:05 (2) 21:27	22:00
20	08:31	07:36	06:31	06:16	19:56 (2) 05:18	04:54
	16:43	17:44	18:38	20:35	11 20:07 (2) 21:28	22:00
21	08:30	07:34	06:28	06:14	19:54 (2) 05:16	04:54
	16:45	17:46	18:40	20:37	14 20:08 (2) 21:30	22:00
22	08:28	07:32	06:26	06:11	19:54 (2) 05:15	04:55
	16:47	17:48	18:41	20:39	16 20:10 (2) 21:31	22:01
23	08:27	07:30	06:23	06:09	19:54 (2) 05:13	04:55
	16:49	17:50	18:43	20:41	18 20:12 (2) 21:33	22:01
24	08:26	07:28	06:21	06:07	19:54 (2) 05:12	04:55
	16:50	17:52	18:45	20:42	20 20:14 (2) 21:34	22:01
25	08:24	07:25	06:18	06:05	19:54 (2) 05:11	04:55
	16:52	17:54	18:47	20:44	21 20:15 (2) 21:36	22:01
26	08:23	07:23	06:16	06:03	19:54 (2) 05:09	04:56
	16:54	17:56	18:49	20:46	21 20:15 (2) 21:37	22:01
27	08:22	07:21	06:13	06:00	19:54 (2) 05:08	04:56
	16:56	17:58	18:51	20:48	20 20:14 (2) 21:39	22:01
28	08:20	07:18	06:11	05:58	19:55 (2) 05:07	04:57
	16:58	18:00	18:53	20:50	18 20:13 (2) 21:40	22:01
29	08:18		07:08	05:56	19:56 (2) 05:06	04:57
	17:00		19:54	20:52	16 20:12 (2) 21:41	22:01
30	08:17		07:06	05:54	19:57 (2) 05:05	04:58
	17:02		19:56	20:53	14 20:11 (2) 21:43	22:00
31	08:15		07:04			05:04
	17:04		19:58			21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case			248	203	14	
Sun reduction			0.27	0.35	0.38	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.68	0.65	0.65	
Total reduction			0.18	0.23	0.25	
Total, real			45	46	3	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DG - H111

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:12 (4) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:12 (4) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:12 (4) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:12 (4) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:12 (4) 16:46	08:25 16:07
6	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	18:13 (4) 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	18:13 (4) 16:43	08:28 16:06
8	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	18:14 (4) 16:41	08:29 16:06
9	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	18:18 (4) 16:39	08:30 16:05
10	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	20:09 (2) 19:54	06:50 18:40	07:44 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	20:06 (2) 19:51	06:52 18:38	07:45 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	20:04 (2) 19:49	06:54 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	20:03 (2) 19:46	06:56 18:33	07:49 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	20:02 (2) 19:44	06:57 18:31	07:51 16:29	08:37 16:04
16	05:14 21:49	06:04 20:55	20:01 (2) 19:42	06:59 18:29	07:53 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	20:00 (2) 19:39	07:01 18:26	07:55 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:00 (2) 19:37	07:03 18:24	07:57 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	19:59 (2) 19:34	07:05 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	19:59 (2) 19:32	07:06 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	20:00 (2) 19:29	07:08 18:17	08:03 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	19:59 (2) 19:27	07:10 18:15	08:05 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	20:12 (2) 19:24	07:12 18:13	08:07 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	20:10 (2) 19:22	07:13 18:32 (4)	08:09 18:11	08:43 16:08
25	05:27 21:36	06:20 20:35	20:09 (2) 19:19	07:15 18:20 (4)	07:11 17:09	08:09 16:08
26	05:29 21:35	06:22 20:32	20:06 (2) 19:17	14 18:34 (4)	07:13 17:07	08:11 16:09
27	05:30 21:33	06:24 20:30	20:03 (2) 19:14	18 18:36 (4)	07:14 17:04	08:13 16:10
28	05:32 21:32	06:26 20:28	07:19 19:12	21 18:37 (4)	07:16 17:02	08:14 16:10
29	05:34 21:30	06:27 20:25	07:21 19:09	23 18:38 (4)	07:18 17:00	08:16 16:11
30	05:35 21:28	06:29 20:23	07:22 19:07	24 18:38 (4)	07:20 16:58	08:17 16:12
31	05:37 21:26	06:31 20:21	07:24 19:05	25 18:38 (4)	07:22 16:56	08:19 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		223	133	118		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.68	0.68		
Total reduction		0.22	0.22	0.20		
Total, real		49	29	23		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DH - H112

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:33 (5)	08:14	16:14 (4)	07:16		07:01	05:52		19:48 (2)	05:03
	16:15	4	15:37 (5)	17:06	21	16:35 (4)	18:02	20:00	38	20:26 (2)	21:45
2	08:44	15:34 (5)	08:12	16:13 (4)	07:14		06:59	05:50		19:48 (2)	05:02
	16:16	5	15:39 (5)	17:08	24	16:37 (4)	18:04	20:02	38	20:26 (2)	21:46
3	08:44	15:33 (5)	08:10	16:13 (4)	07:12		17:34 (3)	06:56		19:47 (2)	05:01
	16:17	6	15:39 (5)	17:10	26	16:39 (4)	18:06	20:04	39	20:26 (2)	21:48
4	08:43	15:34 (5)	08:08	16:12 (4)	07:09		17:33 (3)	06:54		19:47 (2)	05:00
	16:18	7	15:41 (5)	17:12	29	16:41 (4)	18:07	20:06	39	20:26 (2)	21:49
5	08:43	15:33 (5)	08:07	16:12 (4)	07:07		17:31 (3)	06:51		19:47 (2)	04:59
	16:19	9	15:42 (5)	17:14	31	16:43 (4)	18:09	20:07	39	20:26 (2)	21:50
6	08:43	15:34 (5)	08:05	16:11 (4)	07:04		17:31 (3)	06:49		19:47 (2)	04:59
	16:21	10	15:44 (5)	17:16	34	16:45 (4)	18:11	20:09	38	20:25 (2)	21:51
7	08:42	15:34 (5)	08:03	16:11 (4)	07:02		17:30 (3)	06:47		19:48 (2)	04:58
	16:22	11	15:45 (5)	17:18	36	16:47 (4)	18:13	20:11	38	20:26 (2)	21:52
8	08:42	15:34 (5)	08:01	16:10 (4)	07:00		17:30 (3)	06:44		19:47 (2)	04:57
	16:24	12	15:46 (5)	17:20	40	16:50 (4)	18:15	20:13	38	20:25 (2)	21:53
9	08:41	15:35 (5)	07:59	16:10 (4)	06:57		17:29 (3)	06:42		19:47 (2)	04:57
	16:25	14	15:49 (5)	17:22	42	16:52 (4)	18:17	20:15	38	20:25 (2)	21:54
10	08:40	15:35 (5)	07:57	16:10 (4)	06:55		17:29 (3)	06:39		19:48 (2)	04:56
	16:26	15	15:50 (5)	17:24	44	16:54 (4)	18:19	20:17	36	20:24 (2)	21:55
11	08:40	15:35 (5)	07:55	16:10 (4)	06:53		17:30 (3)	06:37		19:49 (2)	04:56
	16:28	17	15:52 (5)	17:26	46	16:56 (4)	18:21	20:19	35	20:24 (2)	21:55
12	08:39	15:35 (5)	07:53	16:09 (4)	06:50		17:29 (3)	06:35		19:49 (2)	04:55
	16:30	19	15:54 (5)	17:28	46	16:55 (4)	18:23	20:20	34	20:23 (2)	21:56
13	08:38	15:36 (5)	07:51	16:09 (4)	06:48		17:30 (3)	06:32		19:49 (2)	04:55
	16:31	19	15:55 (5)	17:30	46	16:55 (4)	18:25	20:22	33	20:22 (2)	21:57
14	08:37	15:36 (5)	07:49	16:10 (4)	06:45		17:30 (3)	06:30		19:50 (2)	04:55
	16:33	21	15:57 (5)	17:32	45	16:55 (4)	18:27	20:24	32	20:22 (2)	21:58
15	08:36	15:36 (5)	07:47	16:10 (4)	06:43		17:32 (3)	06:28		19:51 (2)	04:55
	16:34	23	15:59 (5)	17:34	45	16:55 (4)	18:28	20:26	30	20:21 (2)	21:58
16	08:35	15:36 (5)	07:45	16:11 (4)	06:40		17:33 (3)	06:25		19:52 (2)	04:54
	16:36	24	16:00 (5)	17:36	44	16:55 (4)	18:30	20:28	28	20:20 (2)	21:59
17	08:34	15:37 (5)	07:43	16:11 (4)	06:38		17:37 (3)	06:23		19:52 (2)	04:54
	16:38	24	16:01 (5)	17:38	44	16:55 (4)	18:32	20:30	27	20:19 (2)	21:59
18	08:33	15:37 (5)	07:41	16:11 (4)	06:35		17:45 (3)	06:21		19:54 (2)	04:54
	16:40	24	16:01 (5)	17:40	42	16:53 (4)	18:34	20:31	24	20:18 (2)	22:00
19	08:32	15:38 (5)	07:39	16:12 (4)	06:33		17:48 (3)	06:18		19:56 (2)	04:54
	16:41	24	16:02 (5)	17:42	41	16:53 (4)	18:36	20:33	22	20:18 (2)	22:00
20	08:31	15:38 (5)	07:36	16:13 (4)	06:31		17:50 (3)	06:16		19:57 (2)	04:54
	16:43	23	16:01 (5)	17:44	40	16:53 (4)	18:38	20:35	19	20:16 (2)	22:00
21	08:30	15:39 (5)	07:34	16:14 (4)	06:28		17:59 (2)	06:14		19:59 (2)	04:54
	16:45	22	16:01 (5)	17:46	38	16:52 (4)	18:40	20:37	15	20:14 (2)	22:01
22	08:29	15:40 (5)	07:32	16:14 (4)	06:26		17:57 (2)	06:12		20:01 (2)	04:55
	16:47	21	16:01 (5)	17:48	36	16:50 (4)	18:42	20:39	12	20:13 (2)	22:01
23	08:27	15:41 (5)	07:30	16:16 (4)	06:23		17:55 (2)	06:09		20:05 (2)	04:55
	16:49	20	16:01 (5)	17:50	33	16:49 (4)	18:43	20:41	2	20:07 (2)	22:01
24	08:26	15:42 (5)	07:28	16:17 (4)	06:21		17:53 (2)	06:07		19:53 (2)	04:55
	16:50	18	16:00 (5)	17:52	31	16:48 (4)	18:45	20:43		20:14 (2)	22:01
25	08:24	15:44 (5)	07:25	16:19 (4)	06:18		17:52 (2)	06:05		19:52 (2)	04:55
	16:52	16	16:00 (5)	17:54	26	16:45 (4)	18:47	20:44	23	20:15 (2)	22:01
26	08:23	15:45 (5)	07:23	16:21 (4)	06:16		17:51 (2)	06:03		19:51 (2)	04:56
	16:54	13	15:58 (5)	17:56	22	16:43 (4)	18:49	20:46	26	20:17 (2)	22:01
27	08:22	15:47 (5)	07:21	16:25 (4)	06:13		17:50 (2)	06:01		19:50 (2)	04:56
	16:56	12	16:23 (4)	17:58	15	16:40 (4)	18:51	20:48	29	20:19 (2)	22:01
28	08:20	16:19 (4)	07:18		06:11		17:58 (2)	05:58		19:50 (2)	04:57
	16:58	7	16:26 (4)	18:00		18:53		20:50	31	20:21 (2)	22:01
29	08:18	16:17 (4)			07:09		17:56 (2)	05:56		19:49 (2)	04:57
	17:00	11	16:28 (4)		19:54		17:52 (2)	05:54	33	20:22 (2)	22:01
30	08:17	16:16 (4)			07:06		17:48 (2)	05:54		19:48 (2)	04:58
	17:02	14	16:30 (4)		19:56		17:44 (2)	05:54	36	20:24 (2)	22:00
31	08:15	16:14 (4)			07:04		17:40 (2)	05:54		19:44 (2)	04:58
	17:04	18	16:32 (4)		19:58		17:36 (2)	05:54		19:40 (2)	04:57
Potential sun hours	250		273		367		420		494		510
Total, worst case	483		967		251		242		694		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.66		0.68		0.65		0.65		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	77		148		46		55		171		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DH - H112

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25 35	19:59 (2) 20:34 (2) 20:18	07:26 19:05 25	18:08 (3) 18:33 (3) 16:54	07:24 16:23 (4) 16:10 17
2	04:59 22:00	05:40 21:23 36	19:59 (2) 20:35 (2) 20:16	07:28 19:02 25	18:08 (3) 18:33 (3) 16:52	16:23 (4) 16:21 (4) 16:09 16
3	05:00 21:59	05:42 21:21 36	19:58 (2) 20:34 (2) 20:13	07:30 19:00 24	18:07 (3) 18:31 (3) 16:50	16:22 (4) 16:19 (4) 16:08 14
4	05:01 21:59	05:44 21:19 37	19:58 (2) 20:35 (2) 20:11	07:31 18:57 22	18:07 (3) 18:29 (3) 16:48	16:24 (4) 16:17 (4) 16:08 13
5	05:02 21:58	05:45 21:17 38	19:57 (2) 20:35 (2) 20:09	07:33 18:55 19	18:07 (3) 18:26 (3) 16:46	16:25 (4) 16:15 (4) 16:07 11
6	05:03 21:58	05:47 21:15 38	19:57 (2) 20:35 (2) 20:06	07:35 18:52 17	18:07 (3) 18:24 (3) 16:44	16:26 (4) 16:12 (4) 16:07 10
7	05:04 21:57	05:49 21:13 39	19:57 (2) 20:36 (2) 20:04	07:37 18:50 15	18:06 (3) 18:21 (3) 16:43	16:27 (4) 16:10 (4) 16:06 8
8	05:05 21:56	05:51 21:12 39	19:56 (2) 20:35 (2) 20:01	07:39 18:48 12	18:06 (3) 18:18 (3) 16:41	16:28 (4) 16:08 (4) 16:06 7
9	05:06 21:55	05:52 21:10 39	19:56 (2) 20:35 (2) 19:59	07:41 18:45 9	18:07 (3) 18:16 (3) 16:39	16:29 (4) 16:06 (4) 16:05 7
10	05:07 21:55	05:54 21:08 38	19:56 (2) 20:34 (2) 19:56	07:42 18:43 6	18:08 (3) 18:14 (3) 16:37	16:30 (4) 16:05 (4) 16:05 5
11	05:08 21:54	05:56 21:05 39	19:56 (2) 20:35 (2) 19:54	07:44 18:40 2	18:09 (3) 18:11 (3) 16:35	16:31 (4) 16:03 (4) 16:05 4
12	05:09 21:53	05:57 21:03 38	19:56 (2) 20:34 (2) 19:51	07:46 18:38	16:35 (4) 16:34	16:32 (4) 16:01 (4) 16:05 3
13	05:10 21:52	05:59 21:01 35	19:56 (2) 20:31 (2) 19:49	07:48 18:36	16:36 (4) 16:32	16:33 (4) 15:59 (4) 16:05 3
14	05:12 21:51	06:01 20:59 32	19:57 (2) 20:29 (2) 19:47	07:50 18:33 8	16:37 (4) 17:01 (4) 16:31	16:34 (4) 15:51 (4) 16:05 1
15	05:13 21:50	06:03 20:57 31	19:57 (2) 20:28 (2) 19:44	07:52 18:31 18	16:38 (4) 17:14 (4) 16:29	16:35 (4) 15:56 (4) 16:05 12
16	05:14 21:49	06:04 20:55 28	19:57 (2) 20:25 (2) 19:42	07:54 18:29 24	16:39 (4) 17:16 (4) 16:27	16:36 (4) 15:57 (4) 16:05 13
17	05:16 21:47	06:06 20:53 25	19:58 (2) 20:23 (2) 19:39	07:55 18:26 28	16:40 (4) 17:18 (4) 16:26	16:37 (4) 15:58 (4) 16:05 16
18	05:17 21:46	06:08 20:51 23	19:59 (2) 20:22 (2) 19:37	07:57 18:24 32	16:41 (4) 17:20 (4) 16:24	16:38 (4) 15:59 (4) 16:05 18
19	05:18 21:45	06:10 20:48 20	19:59 (2) 20:19 (2) 19:34	07:59 18:22 35	16:42 (4) 17:21 (4) 16:23	16:39 (4) 15:55 (4) 16:05 20
20	05:20 21:44	06:12 20:46 16	20:01 (2) 20:17 (2) 19:32	08:01 18:20 37	16:43 (4) 17:22 (4) 16:22	16:40 (4) 15:56 (4) 16:06 21
21	05:21 21:42	20:13 (2) 20:21 (2) 20:44	06:13 20:03 (2) 07:08	08:03 18:17 38	16:44 (4) 17:22 (4) 16:20	16:41 (4) 15:57 (4) 16:06 23
22	05:23 21:41	20:09 (2) 20:23 (2) 20:42	06:15 20:04 (2) 07:10	08:05 18:15 40	16:45 (4) 17:23 (4) 16:19	16:42 (4) 15:58 (4) 16:06 23
23	05:24 21:39	20:08 (2) 20:26 (2) 20:39	06:17 20:07 (2) 07:12	08:07 18:13 42	16:46 (4) 17:24 (4) 16:18	16:43 (4) 15:59 (4) 16:07 24
24	05:26 21:38	20:06 (2) 20:27 (2) 20:37	06:19 20:07 (2) 07:12	08:09 18:11 43	16:47 (4) 17:24 (4) 16:17	16:44 (4) 15:59 (4) 16:08 24
25	05:27 21:36	20:06 (2) 20:29 (2) 20:35	06:20 20:06 (2) 07:15	07:11 17:09 44	16:48 (4) 16:24 (4) 16:16	16:45 (4) 15:59 (4) 16:08 24
26	05:29 21:35	20:04 (2) 20:29 (2) 20:32	06:22 20:03 (2) 07:17	18:21 (3) 17:17 44	16:49 (4) 16:24 (4) 16:16	16:46 (4) 15:59 (4) 16:08 25
27	05:30 21:33	20:03 (2) 20:31 (2) 20:30	06:24 20:02 (2) 07:19	18:23 (3) 18:16 (3) 07:15	16:50 (4) 16:25 (4) 16:13	16:47 (4) 15:59 (4) 16:09 25
28	05:32 21:32	20:02 (2) 20:31 (2) 20:28	06:26 20:01 (2) 07:21	18:24 (3) 18:13 (3) 07:16	16:51 (4) 16:26 (4) 16:12	16:48 (4) 15:59 (4) 16:10 22
29	05:34 21:30	20:01 (2) 20:31 (2) 20:25	06:28 20:00 (2) 07:22	18:25 (3) 18:12 (3) 07:18	16:52 (4) 16:27 (4) 16:12	16:49 (4) 15:59 (4) 16:11 20
30	05:35 21:28	20:00 (2) 20:33 (2) 20:23	06:29 20:00 (2) 07:23	18:26 (3) 18:09 (3) 07:20	16:53 (4) 16:28 (4) 16:11	16:50 (4) 15:59 (4) 16:12 19
31	05:37 21:27	20:00 (2) 20:34 (2) 20:21	06:31 20:01 (2) 07:24	18:27 (3) 18:32 (3) 07:22	16:54 (4) 16:29 (4) 16:12	16:51 (4) 16:04 (4) 16:13 2
Potential sun hours	512	460	382	328	259	233
Total, worst case	263	685	74	837	695	124
Sun reduction	0.32	0.34	0.32	0.29	0.27	0.21
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.65	0.65	0.68	0.66	0.66	0.66
Total reduction	0.21	0.22	0.22	0.19	0.17	0.14
Total, real	55	151	16	162	121	17

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DI - H113

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44			08:14			07:16		16:35 (4)	07:01			05:52		19:49 (2)	05:03		
	16:15			17:06			18:02	26	17:01 (4)	20:00			20:55	35	20:24 (2)	21:45		
2	08:44			08:12			07:14		16:36 (4)	06:59			05:50		19:49 (2)	05:02		
	16:16			17:08			18:04	22	16:58 (4)	20:02			20:57	35	20:24 (2)	21:46		
3	08:44			08:10			07:12		16:40 (4)	06:56			05:48		19:48 (2)	05:01		
	16:17			17:10			18:06	15	16:55 (4)	20:04			20:59	36	20:24 (2)	21:48		
4	08:43			08:08		16:39 (4)	07:09			06:54			05:46		19:48 (2)	05:00		
	16:18			17:12	2	16:41 (4)	18:07			20:06			21:01	35	20:23 (2)	21:49		
5	08:43			08:07		16:37 (4)	07:07		17:41 (3)	06:51			05:44		19:48 (2)	04:59		
	16:19			17:14	6	16:43 (4)	18:09	1	17:42 (3)	20:07			21:03	35	20:23 (2)	21:50		
6	08:43			08:05		16:35 (4)	07:04		17:39 (3)	06:49			05:42		19:48 (2)	04:59		
	16:21			17:16	10	16:45 (4)	18:11	6	17:45 (3)	20:09			21:04	34	20:22 (2)	21:51		
7	08:42			08:03		16:34 (4)	07:02		17:38 (3)	06:47			05:40		19:50 (2)	04:58		
	16:22			17:18	13	16:47 (4)	18:13	8	17:46 (3)	20:11			21:06	33	20:23 (2)	21:52		
8	08:42			08:01		16:33 (4)	07:00		17:37 (3)	06:44			05:38		19:50 (2)	04:57		
	16:24			17:20	17	16:50 (4)	18:15	11	17:48 (3)	20:13			21:08	32	20:22 (2)	21:53		
9	08:41			07:59		16:32 (4)	06:57		17:36 (3)	06:42			05:36		19:50 (2)	04:57		
	16:25			17:22	20	16:52 (4)	18:17	14	17:50 (3)	20:15			21:10	31	20:21 (2)	21:54		
10	08:40		15:49 (5)	07:57		16:31 (4)	06:55		17:36 (3)	06:39			05:34		19:50 (2)	04:56		
	16:26	1	15:50 (5)	17:24	23	16:54 (4)	18:19	16	17:52 (3)	20:17			21:11	30	20:20 (2)	21:55		
11	08:40		15:49 (5)	07:55		16:31 (4)	06:52		17:36 (3)	06:37			05:33		19:52 (2)	04:56		
	16:28	3	15:52 (5)	17:26	25	16:56 (4)	18:21	19	17:55 (3)	20:19			21:13	28	20:20 (2)	21:55		
12	08:39		15:49 (5)	07:53		16:29 (4)	06:50		17:35 (3)	06:35			05:31		19:52 (2)	04:55		
	16:30	5	15:54 (5)	17:28	29	16:58 (4)	18:23	21	17:56 (3)	20:20			21:15	27	20:19 (2)	21:56		
13	08:38		15:49 (5)	07:51		16:29 (4)	06:48		17:35 (3)	06:32			05:29		19:53 (2)	04:55		
	16:31	6	15:55 (5)	17:30	31	17:00 (4)	18:25	23	17:58 (3)	20:22			21:17	24	20:17 (2)	21:57		
14	08:37		15:49 (5)	07:49		16:28 (4)	06:45		17:35 (3)	06:30			05:27		19:55 (2)	04:55		
	16:33	8	15:57 (5)	17:32	34	17:02 (4)	18:27	23	17:58 (3)	20:24			21:18	22	20:17 (2)	21:58		
15	08:36		15:49 (5)	07:47		16:28 (4)	06:43		17:36 (3)	06:28			05:26		19:56 (2)	04:55		
	16:34	10	15:59 (5)	17:34	37	17:05 (4)	18:28	22	17:58 (3)	20:26			21:20	19	20:15 (2)	21:58		
16	08:35		15:48 (5)	07:45		16:28 (4)	06:40		17:36 (3)	06:25			05:24		19:58 (2)	04:54		
	16:36	12	16:00 (5)	17:36	39	17:07 (4)	18:30	20	17:56 (3)	20:28			21:22	16	20:14 (2)	21:59		
17	08:34		15:48 (5)	07:43		16:28 (4)	06:38		17:38 (3)	06:23			05:22		20:00 (2)	04:54		
	16:38	15	16:03 (5)	17:38	41	17:09 (4)	18:32	16	17:54 (3)	20:30			21:23	11	20:11 (2)	21:59		
18	08:33		15:49 (5)	07:41		16:27 (4)	06:35		17:40 (3)	06:21			05:21			04:54		
	16:40	16	16:05 (5)	17:40	42	17:09 (4)	18:34	11	17:51 (3)	20:31			21:25			22:00		
19	08:32		15:49 (5)	07:39		16:27 (4)	06:33			06:18		20:04 (2)	05:19			04:54		
	16:41	18	16:07 (5)	17:42	42	17:09 (4)	18:36			20:33	1	20:05 (2)	21:27			22:00		
20	08:31		15:49 (5)	07:36		16:28 (4)	06:31			06:16		20:01 (2)	05:18			04:54		
	16:43	19	16:08 (5)	17:44	41	17:09 (4)	18:38			20:35	6	20:07 (2)	21:28			22:00		
21	08:30		15:49 (5)	07:34		16:28 (4)	06:28			06:14		19:57 (2)	05:16			04:54		
	16:45	22	16:11 (5)	17:46	41	17:09 (4)	18:40			20:37	11	20:08 (2)	21:30			22:01		
22	08:29		15:49 (5)	07:32		16:28 (4)	06:26			06:12		19:56 (2)	05:15			04:55		
	16:47	23	16:12 (5)	17:48	40	17:08 (4)	18:42			20:39	14	20:10 (2)	21:31			22:01		
23	08:27		15:50 (5)	07:30		16:29 (4)	06:23			06:09		19:54 (2)	05:13			04:55		
	16:49	23	16:13 (5)	17:50	39	17:08 (4)	18:43			20:41	18	20:12 (2)	21:33			22:01		
24	08:26		15:50 (5)	07:28		16:29 (4)	06:21			06:07		19:53 (2)	05:12			04:55		
	16:50	23	16:13 (5)	17:52	38	17:07 (4)	18:45			20:43	21	20:14 (2)	21:34			22:01		
25	08:24		15:51 (5)	07:25		16:30 (4)	06:18			06:05		19:52 (2)	05:11			04:55		
	16:52	22	16:13 (5)	17:54	36	17:06 (4)	18:47			20:44	23	20:15 (2)	21:36			22:01		
26	08:23		15:52 (5)	07:23		16:31 (4)	06:16			06:03		19:51 (2)	05:09			04:56		
	16:54	21	16:13 (5)	17:56	34	17:05 (4)	18:49			20:46	26	20:17 (2)	21:37			22:01		
27	08:22		15:52 (5)	07:21		16:32 (4)	06:13			06:01		19:51 (2)	05:08			04:56		
	16:56	20	16:12 (5)	17:58	32	17:04 (4)	18:51			20:48	28	20:19 (2)	21:39			22:01		
28	08:20		15:54 (5)	07:18		16:33 (4)	06:11			05:58		19:50 (2)	05:07			04:57		
	16:58	18	16:12 (5)	18:00	29	17:02 (4)	18:53			20:50	31	20:21 (2)	21:40			22:01		
29	08:18		15:55 (5)				07:08			05:56		19:49 (2)	05:06			04:57		
	17:00	16	16:11 (5)				19:54			20:52	33	20:22 (2)	21:41			22:01		
30	08:17		15:56 (5)				07:06			05:54		19:49 (2)	05:05			04:58		
	17:02	14	16:10 (5)				19:56			20:54	35	20:24 (2)	21:43			22:00		
31	08:15		15:58 (5)				07:04						05:04					
	17:04	10	16:08 (5)				19:58						21:44					
Potential sun hours	250			273			367			420			494			510		
Total, worst case		325		741			274		247		483							
Sun reduction		0.24		0.23			0.27		0.35		0.38							
Oper. time red.		1.00		1.00			1.00		1.00		1.00							
Wind dir. red.		0.66		0.66			0.67		0.65		0.65							
Total reduction		0.16		0.15			0.18		0.23		0.25							
Total, real		52		114			50		56		119							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DI - H113

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:02 (2) 20:29 (2)	06:33 20:18	07:26 19:05	18:14 (3) 16:54
2	04:59 22:00	05:40 21:23	20:02 (2) 20:31 (2)	06:35 20:16	18:14 (3) 19:02	16:23 (4) 16:22 (4)
3	05:00 21:59	05:42 21:21	20:00 (2) 20:31 (2)	06:36 20:13	18:13 (3) 19:00	16:03 (4) 16:50
4	05:01 21:59	05:44 21:19	20:00 (2) 20:32 (2)	06:38 20:11	18:13 (3) 18:57	16:04 (4) 16:48
5	05:02 21:58	05:45 21:17	19:59 (2) 20:31 (2)	06:40 20:09	07:32 18:55	16:05 (4) 16:46
6	05:03 21:58	05:47 21:15	19:59 (2) 20:32 (2)	06:42 20:06	07:34 18:52	16:07 (4) 16:44
7	05:04 21:57	05:49 21:13	19:59 (2) 20:33 (2)	06:43 20:04	07:36 18:50	16:12 (4) 16:43
8	05:05 21:56	05:51 21:12	19:58 (2) 20:32 (2)	06:45 20:01	07:38 18:48	16:15 (4) 16:41
9	05:06 21:55	05:52 21:10	19:58 (2) 20:33 (2)	06:47 19:59	07:40 18:45	16:16 (4) 16:39
10	05:07 21:55	05:54 21:07	19:57 (2) 20:32 (2)	06:49 19:56	07:42 18:43	16:17 (4) 16:37
11	05:08 21:54	05:56 21:05	19:57 (2) 20:32 (2)	06:50 19:54	07:44 18:40	16:18 (4) 16:35
12	05:09 21:53	05:57 21:03	19:57 (2) 20:33 (2)	06:52 19:51	07:45 18:38	16:19 (4) 16:34
13	05:10 21:52	05:59 21:01	19:57 (2) 20:31 (2)	06:54 19:49	07:47 18:36	16:20 (4) 16:32
14	05:12 21:51	06:01 20:59	19:57 (2) 20:29 (2)	06:56 19:47	07:49 18:33	16:21 (4) 16:31
15	05:13 21:50	06:03 20:57	19:58 (2) 20:28 (2)	06:58 19:44	07:51 18:31	16:22 (4) 16:29
16	05:14 21:49	06:04 20:55	19:57 (2) 20:25 (2)	06:59 19:42	07:53 18:29	16:30 (4) 16:27
17	05:16 21:47	06:06 20:53	19:58 (2) 20:23 (2)	07:01 19:39	07:55 18:26	16:31 (4) 16:26
18	05:17 21:46	06:08 20:51	19:59 (2) 20:22 (2)	07:03 19:37	07:57 18:24	16:32 (4) 16:24
19	05:18 21:45	06:10 20:48	19:59 (2) 20:19 (2)	07:05 19:34	07:59 18:22	16:33 (4) 16:23
20	05:20 21:44	06:12 20:46	20:00 (2) 20:17 (2)	07:06 19:32	08:01 18:20	16:34 (4) 16:22
21	05:21 21:42	06:13 20:44	20:01 (2) 20:15 (2)	07:08 19:29	08:03 18:17	16:35 (4) 16:20
22	05:23 21:41	06:15 20:42	20:02 (2) 20:12 (2)	07:10 19:27	08:05 18:15	16:36 (4) 16:19
23	05:24 21:39	06:17 20:39	20:05 (2) 20:10 (2)	07:12 19:24	08:07 18:13	16:37 (4) 16:18
24	05:26 21:38	06:19 20:37		07:13 19:22	08:09 18:11	16:38 (4) 16:17
25	05:27 21:36	06:20 20:35		07:15 19:19	08:11 18:09	16:39 (4) 16:16
26	05:29 21:35	20:12 (2) 20:20 (2)	06:22 20:32	07:17 19:17	08:13 18:07	16:40 (4) 16:14
27	05:30 21:33	20:09 (2) 20:22 (2)	06:24 20:30	07:19 19:14	08:15 18:05	16:41 (4) 16:13
28	05:32 21:32	20:07 (2) 20:25 (2)	06:26 20:28	07:21 19:12	08:17 18:03	16:42 (4) 16:12
29	05:34 21:30	20:05 (2) 20:26 (2)	06:27 20:25	07:22 19:09	08:18 18:01	16:43 (4) 16:11
30	05:35 21:28	20:05 (2) 20:28 (2)	06:29 20:23	07:24 19:07	08:19 18:00	16:44 (4) 16:10
31	05:37 21:26	20:04 (2) 20:29 (2)	06:31 20:21		07:22 16:56	16:11 16:25 (4)
Potential sun hours	512	460	382	328	259	233
Total, worst case	108	631	111	841	410	5
Sun reduction	0.32	0.34	0.32	0.29	0.27	0.21
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.65	0.65	0.68	0.66	0.66	0.66
Total reduction	0.21	0.22	0.22	0.19	0.18	0.14
Total, real	23	140	24	163	72	1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DJ - H114

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:03 (5)	07:16	16:41 (4)	07:01		05:52	19:50 (2)	05:03						
	16:15			17:06	15 16:18 (5)	18:02	32 17:13 (4)	20:00		20:55	34 20:24 (2)	21:45						
2	08:44			08:12	16:05 (5)	07:14	16:41 (4)	06:59		05:50	19:50 (2)	05:02						
	16:16			17:08	11 16:16 (5)	18:04	30 17:11 (4)	20:02		20:57	33 20:23 (2)	21:46						
3	08:44			08:10	16:08 (5)	07:12	16:43 (4)	06:56		05:48	19:50 (2)	05:01						
	16:17			17:10	5 16:13 (5)	18:06	26 17:09 (4)	20:04		20:59	33 20:23 (2)	21:48						
4	08:43			08:08		07:09	16:45 (4)	06:54		05:46	19:50 (2)	05:00						
	16:18			17:12		18:07	23 17:08 (4)	20:06		21:01	33 20:23 (2)	21:49						
5	08:43			08:07		07:07	16:47 (4)	06:51		05:44	19:50 (2)	04:59						
	16:19			17:14		18:09	17 17:04 (4)	20:07		21:03	32 20:22 (2)	21:50						
6	08:43			08:05		07:04	16:52 (4)	06:49		05:42	19:50 (2)	04:59						
	16:21			17:16		18:11	8 17:00 (4)	20:09		21:04	31 20:21 (2)	21:51						
7	08:42			08:03		07:02	17:43 (3)	06:47		05:40	19:51 (2)	04:58						
	16:22			17:18		18:13	3 17:46 (3)	20:11		21:06	31 20:22 (2)	21:52						
8	08:42			08:01		07:00	17:42 (3)	06:44		05:38	19:52 (2)	04:57						
	16:24			17:20		18:15	6 17:48 (3)	20:13		21:08	29 20:21 (2)	21:53						
9	08:41			07:59	16:48 (4)	06:57	17:40 (3)	06:42		05:36	19:52 (2)	04:57						
	16:25			17:22	4 16:52 (4)	18:17	10 17:50 (3)	20:15		21:10	28 20:20 (2)	21:54						
10	08:40			07:57	16:46 (4)	06:55	17:40 (3)	06:39		05:34	19:53 (2)	04:56						
	16:26			17:24	8 16:54 (4)	18:19	12 17:52 (3)	20:17		21:11	26 20:19 (2)	21:55						
11	08:40			07:55	16:44 (4)	06:52	17:40 (3)	06:37		05:33	19:54 (2)	04:56						
	16:28			17:26	12 16:56 (4)	18:21	15 17:55 (3)	20:19		21:13	24 20:18 (2)	21:55						
12	08:39			07:53	16:42 (4)	06:50	17:39 (3)	06:35		05:31	19:55 (2)	04:55						
	16:30			17:28	16 16:58 (4)	18:23	17 17:56 (3)	20:20		21:15	22 20:17 (2)	21:56						
13	08:38			07:51	16:41 (4)	06:48	17:39 (3)	06:32		05:29	19:56 (2)	04:55						
	16:31			17:30	19 17:00 (4)	18:25	19 17:58 (3)	20:22		21:17	19 20:15 (2)	21:57						
14	08:37			07:49	16:40 (4)	06:45	17:38 (3)	06:30		05:27	19:58 (2)	04:55						
	16:33			17:32	22 17:02 (4)	18:27	22 18:00 (3)	20:24		21:18	16 20:14 (2)	21:58						
15	08:36	15:57 (5)	07:47	16:40 (4)	06:43	17:39 (3)	06:28			05:26	20:00 (2)	04:55						
	16:34	2 15:59 (5)	17:34	25 17:05 (4)	18:28	23 18:02 (3)	20:26			21:20	11 20:11 (2)	21:58						
16	08:35	15:56 (5)	07:45	16:39 (4)	06:40	17:39 (3)	06:25			05:24		04:54						
	16:36	4 16:00 (5)	17:36	28 17:07 (4)	18:30	21 18:00 (3)	20:28			21:22		21:59						
17	08:34	15:56 (5)	07:43	16:39 (4)	06:38	17:40 (3)	06:23			05:22		04:54						
	16:38	7 16:03 (5)	17:38	30 17:09 (4)	18:32	19 17:59 (3)	20:30			21:23		21:59						
18	08:33	15:56 (5)	07:41	16:38 (4)	06:35	17:41 (3)	06:21			05:21		04:54						
	16:40	9 16:05 (5)	17:40	33 17:11 (4)	18:34	16 17:57 (3)	20:31			21:25		22:00						
19	08:32	15:57 (5)	07:39	16:38 (4)	06:33	17:43 (3)	06:18	20:04 (2)	05:19			04:54						
	16:41	10 16:07 (5)	17:42	35 17:13 (4)	18:36	12 17:55 (3)	20:33	1 20:05 (2)	21:27			22:00						
20	08:31	15:56 (5)	07:36	16:38 (4)	06:31		06:16	20:01 (2)	05:18			04:54						
	16:43	12 16:08 (5)	17:44	38 17:16 (4)	18:38		20:35	6 20:07 (2)	21:28			22:00						
21	08:30	15:56 (5)	07:34	16:38 (4)	06:28		06:14	19:58 (2)	05:16			04:54						
	16:45	15 16:11 (5)	17:46	40 17:18 (4)	18:40		20:37	10 20:08 (2)	21:30			22:01						
22	08:29	15:56 (5)	07:32	16:37 (4)	06:26		06:12	19:56 (2)	05:15			04:55						
	16:47	16 16:12 (5)	17:48	40 17:17 (4)	18:42		20:39	14 20:10 (2)	21:31			22:01						
23	08:27	15:56 (5)	07:30	16:37 (4)	06:23		06:09	19:55 (2)	05:13			04:55						
	16:49	19 16:15 (5)	17:50	40 17:17 (4)	18:43		20:41	17 20:12 (2)	21:33			22:01						
24	08:26	15:56 (5)	07:28	16:38 (4)	06:21		06:07	19:54 (2)	05:12			04:55						
	16:50	21 16:17 (5)	17:52	39 17:17 (4)	18:45		20:43	20 20:14 (2)	21:34			22:01						
25	08:24	15:57 (5)	07:25	16:38 (4)	06:18		06:05	19:53 (2)	05:11			04:55						
	16:52	22 16:19 (5)	17:54	38 17:16 (4)	18:47		20:44	22 20:15 (2)	21:36			22:01						
26	08:23	15:57 (5)	07:23	16:38 (4)	06:16		06:03	19:52 (2)	05:09			04:56						
	16:54	23 16:20 (5)	17:56	38 17:16 (4)	18:49		20:46	25 20:17 (2)	21:37			22:01						
27	08:22	15:57 (5)	07:21	16:39 (4)	06:13		06:01	19:51 (2)	05:08			04:56						
	16:56	23 16:20 (5)	17:58	36 17:15 (4)	18:51		20:48	28 20:19 (2)	21:39			22:01						
28	08:20	15:59 (5)	07:18	16:39 (4)	06:11		05:58	19:51 (2)	05:07			04:57						
	16:58	21 16:20 (5)	18:00	34 17:13 (4)	18:53		20:50	30 20:21 (2)	21:40			22:01						
29	08:18	15:59 (5)			07:08		05:56	19:51 (2)	05:06			04:57						
	17:00	20 16:19 (5)			19:54		20:52	31 20:22 (2)	21:41			22:01						
30	08:17	16:00 (5)			07:06		05:54	19:50 (2)	05:05			04:58						
	17:02	19 16:19 (5)			19:56		20:54	34 20:24 (2)	21:43			22:00						
31	08:15	16:01 (5)			07:04				05:04									
	17:04	17 16:18 (5)			19:58				21:44									
Potential sun hours	250		273		367		420		494			510						
Total, worst case	260		606		331		238		402									
Sun reduction	0.24		0.23		0.27		0.35		0.38									
Oper. time red.	1.00		1.00		1.00		1.00		1.00									
Wind dir. red.	0.66		0.67		0.67		0.65		0.65									
Total reduction	0.16		0.15		0.18		0.23		0.25									
Total, real	42		94		60		54		99									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DJ - H114

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1 04:59	05:39	20:05 (2) 06:33	07:26	18:18 (3) 07:24	16:16 (4) 08:19	
22:00	21:25	23 20:28 (2) 20:18	19:05	18 18:36 (3) 16:54	7 16:23 (4) 16:10	
2 04:59	05:40	20:04 (2) 06:35	07:28	18:18 (3) 07:26	16:18 (4) 08:21	
22:00	21:23	25 20:29 (2) 20:16	19:02	15 18:33 (3) 16:52	3 16:21 (4) 16:09	
3 05:00	05:42	20:03 (2) 06:36	07:30	18:18 (3) 07:28	08:22	
21:59	21:21	26 20:29 (2) 20:13	19:00	13 18:31 (3) 16:50	16:08	
4 05:01	05:44	20:02 (2) 06:38	07:31	18:18 (3) 07:30	08:24	
21:59	21:19	28 20:30 (2) 20:11	18:57	11 18:29 (3) 16:48	16:08	
5 05:02	05:45	20:01 (2) 06:40	07:33	18:19 (3) 07:32	08:25	
21:58	21:17	29 20:30 (2) 20:09	18:55	7 18:26 (3) 16:46	16:07	
6 05:03	05:47	20:01 (2) 06:42	07:35	18:20 (3) 07:34	08:26	
21:58	21:15	30 20:31 (2) 20:06	18:52	4 18:24 (3) 16:44	16:07	
7 05:04	05:49	20:00 (2) 06:43	07:37	18:20 (3) 07:36	08:28	
21:57	21:13	32 20:32 (2) 20:04	18:50	1 18:21 (3) 16:43	16:06	
8 05:05	05:51	19:59 (2) 06:45	07:39	17:24 (4) 07:38	15:37 (5) 08:29	
21:56	21:12	33 20:32 (2) 20:01	18:48	14 17:38 (4) 16:41	6 15:43 (5) 16:06	
9 05:06	05:52	19:59 (2) 06:47	07:41	17:21 (4) 07:40	15:34 (5) 08:30	
21:55	21:10	33 20:32 (2) 19:59	18:45	20 17:41 (4) 16:39	12 15:46 (5) 16:05	
10 05:07	05:54	19:58 (2) 06:49	07:42	17:18 (4) 07:42	15:34 (5) 08:31	
21:55	21:07	34 20:32 (2) 19:56	18:43	25 17:43 (4) 16:37	15 15:49 (5) 16:05	
11 05:08	05:56	19:58 (2) 06:50	07:44	17:16 (4) 07:44	15:32 (5) 08:33	
21:54	21:05	34 20:32 (2) 19:54	18:40	28 17:44 (4) 16:35	18 15:50 (5) 16:05	
12 05:09	05:57	19:59 (2) 06:52	07:46	17:14 (4) 07:45	15:32 (5) 08:34	
21:53	21:03	33 20:32 (2) 19:51	18:38	31 17:45 (4) 16:34	19 15:51 (5) 16:05	
13 05:10	05:59	19:58 (2) 06:54	07:48	17:13 (4) 07:47	15:31 (5) 08:35	
21:52	21:01	33 20:31 (2) 19:49	18:36	33 17:46 (4) 16:32	20 15:51 (5) 16:05	
14 05:12	06:01	19:58 (2) 06:56	07:50	17:12 (4) 07:49	15:30 (5) 08:36	
21:51	20:59	31 20:29 (2) 19:47	18:33	35 17:47 (4) 16:31	22 15:52 (5) 16:04	
15 05:13	06:03	19:59 (2) 06:58	07:52	17:11 (4) 07:51	15:30 (5) 08:37	
21:50	20:57	29 20:28 (2) 19:44	18:31	36 17:47 (4) 16:29	22 15:52 (5) 16:05	
16 05:14	06:04	19:58 (2) 06:59	07:54	17:10 (4) 07:53	15:30 (5) 08:38	
21:49	20:55	27 20:25 (2) 19:42	18:29	38 17:48 (4) 16:27	23 15:53 (5) 16:05	
17 05:16	06:06	19:59 (2) 07:01	07:55	17:10 (4) 07:55	15:30 (5) 08:38	
21:47	20:53	24 20:23 (2) 19:39	18:26	38 17:48 (4) 16:26	22 15:52 (5) 16:05	
18 05:17	06:08	20:00 (2) 07:03	07:57	17:09 (4) 07:57	15:30 (5) 08:39	
21:46	20:51	22 20:22 (2) 19:37	18:24	39 17:48 (4) 16:24	21 15:51 (5) 16:05	
19 05:18	06:10	20:00 (2) 07:05	07:59	17:09 (4) 07:59	15:30 (5) 08:40	
21:45	20:48	19 20:19 (2) 19:34	18:22	39 17:48 (4) 16:23	19 15:49 (5) 16:05	
20 05:20	06:12	20:01 (2) 07:06	08:01	17:08 (4) 08:00	15:31 (5) 08:41	
21:44	20:46	16 20:17 (2) 19:32	18:20	40 17:48 (4) 16:22	16 15:47 (5) 16:06	
21 05:21	06:13	20:02 (2) 07:08	08:03	17:08 (4) 08:02	15:31 (5) 08:41	
21:42	20:44	13 20:15 (2) 19:29	18:17	40 17:48 (4) 16:20	15 15:46 (5) 16:06	
22 05:23	06:15	20:03 (2) 07:10	08:05	17:08 (4) 08:04	15:32 (5) 08:42	
21:41	20:42	9 20:12 (2) 19:27	18:15	37 17:45 (4) 16:19	12 15:44 (5) 16:06	
23 05:24	06:17	20:05 (2) 07:12	08:07	17:08 (4) 08:06	15:33 (5) 08:42	
21:39	20:39	5 20:10 (2) 19:24	18:13	35 17:43 (4) 16:18	10 15:43 (5) 16:07	
24 05:26	06:19	07:13	18:28 (3) 08:09	17:08 (4) 08:08	15:33 (5) 08:43	
21:38	20:37	19:22	10 18:38 (3) 18:11	33 17:41 (4) 16:17	9 15:42 (5) 16:08	
25 05:27	06:20	07:15	18:24 (3) 07:11	16:09 (4) 08:09	15:34 (5) 08:43	
21:36	20:35	19:19	15 18:39 (3) 17:09	29 16:38 (4) 16:16	7 15:41 (5) 16:08	
26 05:29	06:22	07:17	18:23 (3) 07:13	16:09 (4) 08:11	15:35 (5) 08:43	
21:35	20:32	19:17	18 18:41 (3) 17:06	27 16:36 (4) 16:14	5 15:40 (5) 16:09	
27 05:30	06:24	07:19	18:21 (3) 07:15	16:10 (4) 08:13	15:36 (5) 08:44	
21:33	20:30	19:14	21 18:42 (3) 17:04	24 16:34 (4) 16:13	2 15:38 (5) 16:10	
28 05:32	20:13 (2) 06:26	07:21	18:20 (3) 07:16	16:10 (4) 08:14	08:44	
21:32	7 20:20 (2) 20:28	19:12	22 18:42 (3) 17:02	21 16:31 (4) 16:12	16:11	
29 05:34	20:09 (2) 06:27	07:22	18:19 (3) 07:18	16:11 (4) 08:16	08:44	
21:30	14 20:23 (2) 20:25	19:09	22 18:41 (3) 17:00	18 16:29 (4) 16:12	16:11	
30 05:35	20:08 (2) 06:29	07:24	18:18 (3) 07:20	16:12 (4) 08:18	08:44	
21:28	17 20:25 (2) 20:23	19:07	20 18:38 (3) 16:58	15 16:27 (4) 16:11	16:12	
31 05:37	20:07 (2) 06:31		07:22	16:13 (4)	08:44	
21:26	20 20:27 (2) 20:21		16:56	12 16:25 (4)	16:13	
Potential sun hours	512	460	382	328	259	233
Total, worst case	58	588	128	776	305	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.65	0.65	0.67	0.67	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.18	
Total, real	12	130	28	151	54	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DK - H115

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44 16:15 14	15:23 (5) 15:37 (5) 17:06	08:14 17:06 38	15:57 (4) 16:35 (4) 18:02	07:16 18:02 1	17:33 (3) 17:34 (3) 20:00	07:01 20:00 1	05:52 20:55 35	19:51 (2) 20:26 (2) 21:45	05:03 21:45 6	20:08 (2) 20:14 (2)
2	08:44 16:16 16	15:23 (5) 15:39 (5) 17:08	08:12 17:08 41	15:56 (4) 16:37 (4) 18:04	07:14 18:04 6	17:30 (3) 17:36 (3) 20:02	06:59 20:02 6	05:50 20:57 37	19:50 (2) 20:27 (2) 21:46	05:02 21:46 37	
3	08:44 16:17 16	15:23 (5) 15:39 (5) 17:10	08:10 17:10 43	15:56 (4) 16:39 (4) 18:06	07:12 18:06 9	17:29 (3) 17:38 (3) 20:04	06:56 20:04 9	05:48 20:59 39	19:50 (2) 20:29 (2) 21:48	05:01 21:48 39	
4	08:43 16:18 17	15:24 (5) 15:41 (5) 17:12	08:08 17:12 45	15:56 (4) 16:41 (4) 18:07	07:09 18:07 13	17:28 (3) 17:41 (3) 20:06	06:54 20:06 13	05:46 21:01 41	19:49 (2) 20:30 (2) 21:49	05:00 21:49 41	
5	08:43 16:19 18	15:24 (5) 15:42 (5) 17:14	08:07 17:14 47	15:56 (4) 16:43 (4) 18:09	07:07 18:09 15	17:27 (3) 17:42 (3) 20:07	06:51 20:07 15	05:44 21:03 41	19:49 (2) 20:30 (2) 21:50	04:59 21:50 41	
6	08:43 16:21 19	15:25 (5) 15:44 (5) 17:16	08:05 17:16 49	15:55 (4) 16:44 (4) 18:11	07:04 18:11 18	17:27 (3) 17:45 (3) 20:09	06:49 20:09 18	05:42 21:04 42	19:48 (2) 20:30 (2) 21:51	04:59 21:51 42	
7	08:42 16:22 20	15:25 (5) 15:45 (5) 17:18	08:03 17:18 49	15:55 (4) 16:44 (4) 18:13	07:02 18:13 21	17:25 (3) 17:46 (3) 20:11	06:47 20:11 21	05:40 21:06 42	19:49 (2) 20:31 (2) 21:52	04:58 21:52 42	
8	08:42 16:24 21	15:25 (5) 15:46 (5) 17:20	08:01 17:20 50	15:55 (4) 16:45 (4) 18:15	07:00 18:15 23	17:25 (3) 17:48 (3) 20:13	06:44 20:13 23	05:38 21:08 43	19:48 (2) 20:31 (2) 21:53	04:57 21:53 43	
9	08:41 16:25 23	15:26 (5) 15:49 (5) 17:22	07:59 17:22 50	15:55 (4) 16:45 (4) 18:17	06:57 18:17 25	17:25 (3) 17:50 (3) 20:15	06:42 20:15 25	05:36 21:10 42	19:48 (2) 20:30 (2) 21:54	04:57 21:54 42	
10	08:40 16:26 24	15:26 (5) 15:50 (5) 17:24	07:57 17:24 49	15:56 (4) 16:45 (4) 18:19	06:55 18:19 27	17:25 (3) 17:52 (3) 20:17	06:39 20:17 27	05:34 21:11 42	19:48 (2) 20:30 (2) 21:55	04:56 21:55 42	
11	08:40 16:28 26	15:26 (5) 15:52 (5) 17:26	07:55 17:26 49	15:56 (4) 16:45 (4) 18:21	06:53 18:21 26	17:26 (3) 17:52 (3) 20:19	06:37 20:19 26	05:33 21:13 41	19:49 (2) 20:30 (2) 21:55	04:56 21:55 41	
12	08:39 16:30 25	15:27 (5) 15:52 (5) 17:28	07:53 17:28 49	15:56 (4) 16:45 (4) 18:23	06:50 18:23 25	17:26 (3) 17:51 (3) 20:20	06:35 20:20 25	05:31 21:15 42	19:48 (2) 20:30 (2) 21:56	04:55 21:56 42	
13	08:38 16:31 25	15:27 (5) 15:52 (5) 17:30	07:51 17:30 48	15:56 (4) 16:44 (4) 18:25	06:48 18:25 23	17:27 (3) 17:50 (3) 20:22	06:32 20:22 23	05:29 21:17 41	19:48 (2) 20:29 (2) 21:57	04:55 21:57 41	
14	08:37 16:33 25	15:28 (5) 15:53 (5) 17:32	07:49 17:32 48	15:56 (4) 16:44 (4) 18:27	06:45 18:27 21	17:27 (3) 17:48 (3) 20:24	06:30 20:24 21	05:27 21:18 40	19:49 (2) 20:29 (2) 21:58	04:55 21:58 40	
15	08:36 16:34 25	15:28 (5) 15:53 (5) 17:34	07:47 17:34 46	15:57 (4) 16:43 (4) 18:28	06:43 18:28 18	17:29 (3) 17:47 (3) 20:26	06:28 20:26 18	05:26 21:20 40	19:49 (2) 20:29 (2) 21:58	04:55 21:58 40	
16	08:35 16:36 24	15:28 (5) 15:52 (5) 17:36	07:45 17:36 45	15:58 (4) 16:43 (4) 18:30	06:40 18:30 13	17:31 (3) 17:44 (3) 20:28	06:25 20:28 13	05:24 21:22 39	19:50 (2) 20:29 (2) 21:59	04:54 21:59 39	
17	08:34 16:38 24	15:29 (5) 15:53 (5) 17:38	07:43 17:38 43	15:59 (4) 16:42 (4) 18:32	06:38 18:32 3	17:36 (3) 17:39 (3) 20:30	06:23 20:30 3	05:22 21:23 38	19:50 (2) 20:28 (2) 21:59	04:54 21:59 38	
18	08:33 16:40 23	15:30 (5) 15:53 (5) 17:40	07:41 17:40 42	15:59 (4) 16:41 (4) 18:34	06:35 18:34 42	17:39 (3) 20:31 20:31	06:21 20:31 20:31	05:21 21:25 37	19:51 (2) 20:28 (2) 22:00	04:54 22:00 37	
19	08:32 16:41 22	15:31 (5) 15:53 (5) 17:42	07:39 17:42 40	16:00 (4) 16:40 (4) 18:36	06:33 18:36 40	17:40 (3) 20:33 20:33	06:18 20:33 20:33	05:19 21:27 36	19:52 (2) 20:28 (2) 22:00	04:54 22:00 36	
20	08:31 16:43 22	15:32 (5) 16:08 (4) 17:44	07:36 17:44 38	16:01 (4) 16:39 (4) 18:38	06:31 18:38 38	17:41 (3) 20:35 20:35	06:16 20:35 20:35	05:18 21:28 34	19:52 (2) 20:26 (2) 22:00	04:54 22:00 34	
21	08:30 16:45 25	15:33 (5) 16:11 (4) 17:46	07:34 17:46 35	16:03 (4) 16:38 (4) 18:40	06:28 18:40 35	17:42 (3) 20:37 20:37	06:14 20:37 20:37	05:16 21:30 33	19:53 (2) 20:26 (2) 22:01	04:54 22:01 33	
22	08:29 16:47 26	15:34 (5) 16:12 (4) 17:48	07:32 17:48 32	16:04 (4) 16:36 (4) 18:42	06:26 18:42 32	17:43 (3) 20:39 20:39	06:12 20:39 20:39	05:15 21:31 32	19:54 (2) 20:26 (2) 22:01	04:55 22:01 32	
23	08:27 16:49 27	15:36 (5) 16:15 (4) 17:50	07:30 17:50 28	16:06 (4) 16:34 (4) 18:43	06:23 18:43 28	17:44 (3) 20:41 20:41	06:09 20:41 20:41	05:13 21:33 30	19:54 (2) 20:24 (2) 22:01	04:55 22:01 30	
24	08:26 16:50 26	15:38 (5) 16:17 (4) 17:52	07:28 17:52 23	16:09 (4) 16:32 (4) 18:45	06:21 18:45 23	17:45 (3) 20:43 20:43	06:07 20:43 20:43	05:12 21:34 29	19:55 (2) 20:24 (2) 22:01	04:55 22:01 29	
25	08:24 16:52 22	15:42 (5) 16:19 (4) 17:54	07:25 17:54 16	16:12 (4) 16:28 (4) 18:47	06:18 18:47 16	17:46 (3) 20:44 20:44	06:05 20:44 20:44	05:11 21:36 27	19:56 (2) 20:23 (2) 22:01	04:55 22:01 27	
26	08:23 16:54 21	16:00 (4) 16:21 (4) 17:56	07:23 17:56 21	16:16 (4) 16:49 18:49	06:16 18:49 21	17:47 (3) 20:46 20:46	06:03 20:46 20:46	05:09 21:37 25	19:58 (2) 20:23 (2) 22:01	04:56 22:01 25	
27	08:22 16:56 24	15:59 (4) 16:23 (4) 17:58	07:21 17:58 24	16:13 (4) 16:51 18:51	06:13 18:51 24	17:48 (3) 20:48 20:48	06:01 20:48 20:48	05:08 21:39 23	19:59 (2) 20:22 (2) 22:01	04:56 22:01 23	
28	08:20 16:58 27	15:59 (4) 16:26 (4) 18:00	07:18 18:00 27	16:11 (4) 16:53 18:53	06:11 18:53 27	17:49 (3) 20:50 20:50	05:58 20:50 20:50	05:07 21:40 21	19:54 (2) 20:21 (2) 22:01	04:57 22:01 21	
29	08:18 17:00 30	15:58 (4) 16:28 (4) 18:00	07:16 18:00 30	16:10 (4) 16:54 19:54	06:10 19:54 30	17:50 (3) 20:52 20:52	05:56 20:52 20:52	05:06 21:41 19	19:53 (2) 20:20 (2) 22:01	04:57 22:01 19	
30	08:17 17:02 33	15:57 (4) 16:30 (4) 18:00	07:15 18:00 33	16:09 (4) 16:56 19:56	06:09 19:56 33	17:51 (3) 20:54 20:54	05:54 20:54 20:54	05:05 21:43 15	19:52 (2) 20:18 (2) 22:00	04:58 22:00 15	
31	08:15 17:04 36	15:56 (4) 16:32 (4) 18:00	07:14 18:00 36	16:08 (4) 16:58 19:58	06:08 19:58 36	17:52 (3) 20:54 20:54	05:52 20:54 20:54	05:04 21:44 11	19:51 (2) 20:16 (2) 22:00	04:57 22:00 11	
Potential sun hours	250		273		367		420		494		510
Total, worst case	726		1043		287		176		1057		6
Sun reduction	0.24		0.23		0.27		0.35		0.38		0.32
Oper. time red.	1.00		1.00		1.00		1.00		1.00		1.00
Wind dir. red.	0.66		0.66		0.68		0.65		0.65		0.65
Total reduction	0.16		0.15		0.18		0.23		0.25		0.21
Total, real	116		160		53		40		260		1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DK - H115

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July		August		September		October		November		December	
1	04:59		05:39	19:59 (2)	06:33		07:26	18:05 (3)	07:24	15:25 (4)	08:19	15:08 (5)
	22:00		21:25	41 20:40 (2)	20:18		19:05	24 18:29 (3)	16:54	50 16:15 (4)	16:10	26 15:34 (5)
2	04:59		05:40	19:59 (2)	06:35		07:28	18:04 (3)	07:26	15:25 (4)	08:21	15:08 (5)
	22:00		21:23	42 20:41 (2)	20:16		19:02	26 18:30 (3)	16:52	49 16:14 (4)	16:09	25 15:33 (5)
3	05:00		05:42	19:58 (2)	06:36		07:30	18:03 (3)	07:28	15:25 (4)	08:22	15:09 (5)
	21:59		21:21	42 20:40 (2)	20:13		19:00	27 18:30 (3)	16:50	49 16:14 (4)	16:08	23 15:32 (5)
4	05:01		05:44	19:59 (2)	06:38		07:31	18:03 (3)	07:30	15:25 (4)	08:24	15:10 (5)
	21:59		21:19	42 20:41 (2)	20:11		18:57	26 18:29 (3)	16:48	49 16:14 (4)	16:08	22 15:32 (5)
5	05:02		05:45	19:58 (2)	06:40		07:33	18:03 (3)	07:32	15:25 (4)	08:25	15:10 (5)
	21:58		21:17	42 20:40 (2)	20:09		18:55	23 18:26 (3)	16:46	49 16:14 (4)	16:07	20 15:30 (5)
6	05:03		05:47	19:58 (2)	06:42		07:35	18:02 (3)	07:34	15:25 (4)	08:26	15:11 (5)
	21:58		21:15	42 20:40 (2)	20:06		18:52	22 18:24 (3)	16:44	47 16:12 (4)	16:07	19 15:30 (5)
7	05:04		05:49	19:59 (2)	06:43		07:37	18:01 (3)	07:36	15:26 (4)	08:28	15:11 (5)
	21:57		21:13	41 20:40 (2)	20:04		18:50	20 18:21 (3)	16:43	44 16:10 (4)	16:06	18 15:29 (5)
8	05:05		05:51	19:58 (2)	06:45		07:39	18:02 (3)	07:38	15:26 (4)	08:29	15:11 (5)
	21:56		21:12	41 20:39 (2)	20:01		18:48	16 18:18 (3)	16:41	42 16:08 (4)	16:06	17 15:28 (5)
9	05:06		05:52	19:59 (2)	06:47		07:41	18:02 (3)	07:40	15:26 (4)	08:30	15:12 (5)
	21:55		21:10	40 20:39 (2)	19:59		18:45	14 18:16 (3)	16:39	40 16:06 (4)	16:05	16 15:28 (5)
10	05:07		05:54	19:58 (2)	06:49		07:42	18:03 (3)	07:42	15:28 (4)	08:31	15:13 (5)
	21:55		21:08	39 20:37 (2)	19:56		18:43	11 18:14 (3)	16:37	37 16:05 (4)	16:05	15 15:28 (5)
11	05:08		05:56	19:59 (2)	06:50		07:44	18:04 (3)	07:44	15:28 (4)	08:33	15:13 (5)
	21:54		21:05	36 20:35 (2)	19:54		18:40	7 18:11 (3)	16:35	35 16:03 (4)	16:05	14 15:27 (5)
12	05:09	20:14 (2)	05:57	20:00 (2)	06:52		07:46	18:05 (3)	07:45	15:29 (4)	08:34	15:13 (5)
	21:53	10 20:24 (2)	21:03	34 20:34 (2)	19:51		18:38	4 18:09 (3)	16:34	32 16:01 (4)	16:05	14 15:27 (5)
13	05:10	20:12 (2)	05:59	20:00 (2)	06:54		07:48		07:47	15:30 (4)	08:35	15:14 (5)
	21:52	14 20:26 (2)	21:01	31 20:31 (2)	19:49		18:36		16:32	29 15:59 (4)	16:05	13 15:27 (5)
14	05:12	20:11 (2)	06:01	20:01 (2)	06:56		07:50		07:49	15:31 (4)	08:36	15:14 (5)
	21:51	16 20:27 (2)	20:59	28 20:29 (2)	19:47		18:33		16:31	27 15:58 (4)	16:05	12 15:26 (5)
15	05:13	20:09 (2)	06:03	20:02 (2)	06:58		07:52		07:51	15:31 (4)	08:37	15:15 (5)
	21:50	20 20:29 (2)	20:57	26 20:28 (2)	19:44		18:31		16:29	25 15:56 (4)	16:05	11 15:26 (5)
16	05:14	20:08 (2)	06:05	20:02 (2)	06:59		07:54	16:48 (4)	07:53	15:33 (4)	08:38	15:16 (5)
	21:49	22 20:30 (2)	20:55	23 20:25 (2)	19:42		18:29	9 16:57 (4)	16:27	21 15:54 (4)	16:05	11 15:27 (5)
17	05:16	20:08 (2)	06:06	20:03 (2)	07:01		07:55	16:42 (4)	07:55	15:15 (5)	08:38	15:16 (5)
	21:47	24 20:32 (2)	20:53	20 20:23 (2)	19:39		18:26	19 17:01 (4)	16:26	22 15:52 (4)	16:05	11 15:27 (5)
18	05:17	20:06 (2)	06:08	20:05 (2)	07:03		07:57	16:39 (4)	07:57	15:12 (5)	08:39	15:17 (5)
	21:46	26 20:32 (2)	20:51	17 20:22 (2)	19:37		18:24	25 17:04 (4)	16:24	26 15:51 (4)	16:05	10 15:27 (5)
19	05:18	20:05 (2)	06:10	20:06 (2)	07:05		07:59	16:37 (4)	07:59	15:10 (5)	08:40	15:18 (5)
	21:45	28 20:33 (2)	20:48	13 20:19 (2)	19:34		18:22	29 17:06 (4)	16:23	27 15:49 (4)	16:05	10 15:28 (5)
20	05:20	20:05 (2)	06:12	20:09 (2)	07:06		08:01	16:35 (4)	08:00	15:09 (5)	08:41	15:18 (5)
	21:44	30 20:35 (2)	20:46	8 20:17 (2)	19:32		18:20	33 17:08 (4)	16:22	26 15:47 (4)	16:06	9 15:27 (5)
21	05:21	20:04 (2)	06:13	20:14 (2)	07:08		08:03	16:33 (4)	08:02	15:08 (5)	08:41	15:19 (5)
	21:42	31 20:35 (2)	20:44	1 20:15 (2)	19:29		18:17	36 17:09 (4)	16:20	25 15:46 (4)	16:06	9 15:28 (5)
22	05:23	20:03 (2)	06:15		07:10		08:05	16:31 (4)	08:04	15:08 (5)	08:42	15:19 (5)
	21:41	33 20:36 (2)	20:42		19:27		18:15	39 17:10 (4)	16:19	22 15:44 (4)	16:06	9 15:28 (5)
23	05:24	20:03 (2)	06:17		07:12		08:07	16:30 (4)	08:06	15:07 (5)	08:42	15:20 (5)
	21:39	34 20:37 (2)	20:39		19:24		18:13	41 17:11 (4)	16:18	22 15:29 (5)	16:07	9 15:29 (5)
24	05:26	20:02 (2)	06:19		07:13		08:09	16:29 (4)	08:08	15:07 (5)	08:43	15:20 (5)
	21:38	35 20:37 (2)	20:37		19:22		18:11	42 17:11 (4)	16:17	23 15:30 (5)	16:08	10 15:30 (5)
25	05:27	20:02 (2)	06:20		07:15		07:11	15:28 (4)	08:09	15:07 (5)	08:43	15:20 (5)
	21:36	36 20:38 (2)	20:35		19:19		17:09	44 16:12 (4)	16:16	24 15:31 (5)	16:08	10 15:30 (5)
26	05:29	20:01 (2)	06:22		07:17		07:13	15:27 (4)	08:11	15:07 (5)	08:43	15:20 (5)
	21:35	37 20:38 (2)	20:32		19:17		17:06	46 16:13 (4)	16:14	24 15:31 (5)	16:09	11 15:31 (5)
27	05:30	20:01 (2)	06:24		07:19	18:14 (3)	07:15	15:26 (4)	08:13	15:07 (5)	08:44	15:22 (5)
	21:33	38 20:39 (2)	20:30		19:14	10 18:24 (3)	17:04	47 16:13 (4)	16:13	25 15:32 (5)	16:10	10 15:32 (5)
28	05:32	20:00 (2)	06:26		07:21	18:11 (3)	07:16	15:26 (4)	08:14	15:08 (5)	08:44	15:22 (5)
	21:32	39 20:39 (2)	20:28		19:12	16 18:27 (3)	17:02	47 16:13 (4)	16:12	25 15:33 (5)	16:11	11 15:33 (5)
29	05:34	19:59 (2)	06:28		07:22	18:09 (3)	07:18	15:25 (4)	08:16	15:07 (5)	08:44	15:22 (5)
	21:30	40 20:39 (2)	20:25		19:09	20 18:29 (3)	17:00	48 16:13 (4)	16:12	25 15:32 (5)	16:11	12 15:34 (5)
30	05:35	19:59 (2)	06:29		07:24	18:06 (3)	07:20	15:25 (4)	08:18	15:08 (5)	08:44	15:22 (5)
	21:28	41 20:40 (2)	20:23		19:07	23 18:29 (3)	16:58	49 16:14 (4)	16:11	25 15:33 (5)	16:12	12 15:34 (5)
31	05:37	20:00 (2)	06:31				07:22	15:25 (4)			08:44	15:22 (5)
	21:27	41 20:41 (2)	20:21				16:56	49 16:14 (4)			16:13	13 15:35 (5)
Potential sun hours	512		460		382		328		259		233	
Total, worst case	595		649		69		823		966		432	
Sun reduction	0.32		0.34		0.32		0.29		0.27		0.21	
Oper. time red.	1.00		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.	0.65		0.65		0.68		0.66		0.66		0.66	
Total reduction	0.21		0.22		0.22		0.19		0.17		0.14	
Total, real	124		143		15		160		169		59	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyryne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DL - H116

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44		15:02 (4)	08:14		07:16		17:19 (2)	07:01		05:52		05:03					
	16:15	28	15:30 (4)	17:06		18:02	15	17:34 (2)	20:00		20:55		21:45					
2	08:44		15:03 (4)	08:12		16:34 (3)	07:14	17:17 (2)	06:59		05:50		05:02					
	16:16	28	15:31 (4)	17:08	3	16:37 (3)	18:04	19	17:36 (2)	20:02		20:57						
3	08:44		15:03 (4)	08:10		16:33 (3)	07:12	17:16 (2)	06:56		05:48		05:01					
	16:17	28	15:31 (4)	17:10	6	16:39 (3)	18:06	22	17:38 (2)	20:04		20:59						
4	08:43		15:04 (4)	08:08		16:33 (3)	07:09	17:15 (2)	06:54		05:46		05:00					
	16:18	28	15:32 (4)	17:12	8	16:41 (3)	18:07	26	17:41 (2)	20:06		21:01						
5	08:43		15:04 (4)	08:07		16:32 (3)	07:07	17:14 (2)	06:51		05:44		04:59					
	16:19	27	15:31 (4)	17:14	11	16:43 (3)	18:09	28	17:42 (2)	20:07		21:03						
6	08:43		15:05 (4)	08:05		16:32 (3)	07:04	17:13 (2)	06:49		05:42		04:58					
	16:21	27	15:32 (4)	17:16	13	16:45 (3)	18:11	32	17:45 (2)	20:09		21:04						
7	08:42		15:06 (4)	08:03		16:32 (3)	07:02	17:12 (2)	06:47		05:40		04:58					
	16:22	26	15:32 (4)	17:18	15	16:47 (3)	18:13	32	17:44 (2)	20:11		21:06						
8	08:42		15:06 (4)	08:01		16:32 (3)	07:00	17:12 (2)	06:44		05:38		04:57					
	16:24	26	15:32 (4)	17:20	18	16:50 (3)	18:15	33	17:45 (2)	20:13		21:08						
9	08:41		15:08 (4)	07:59		16:33 (3)	06:57	17:12 (2)	06:42		05:36		04:57					
	16:25	25	15:33 (4)	17:22	19	16:52 (3)	18:17	32	17:44 (2)	20:15		21:10						
10	08:40		15:08 (4)	07:57		16:33 (3)	06:55	17:12 (2)	06:39		05:34		04:56					
	16:26	25	15:33 (4)	17:24	20	16:53 (3)	18:19	32	17:44 (2)	20:17		21:11						
11	08:40		15:09 (4)	07:55		16:34 (3)	06:52	17:13 (2)	06:37		05:33		04:56					
	16:28	23	15:32 (4)	17:26	19	16:53 (3)	18:21	31	17:44 (2)	20:19		21:13						
12	08:39		15:10 (4)	07:53		16:35 (3)	06:50	17:12 (2)	06:35		05:31		04:55					
	16:30	22	15:32 (4)	17:28	17	16:52 (3)	18:23	30	17:42 (2)	20:20		21:15						
13	08:38		15:11 (4)	07:51		16:36 (3)	06:48	17:13 (2)	06:32		05:29		04:55					
	16:31	21	15:32 (4)	17:30	14	16:50 (3)	18:25	29	17:42 (2)	20:22		21:17						
14	08:37		15:12 (4)	07:49		16:38 (3)	06:45	17:13 (2)	06:30		05:27		04:55					
	16:33	20	15:32 (4)	17:32	10	16:48 (3)	18:27	27	17:40 (2)	20:24		21:18						
15	08:36		15:14 (4)	07:47		06:43		17:15 (2)	06:28		05:26		04:54					
	16:34	17	15:31 (4)	17:34		18:28	24	17:39 (2)	20:26		21:20		21:58					
16	08:35		15:15 (4)	07:45		06:40		17:16 (2)	06:25		05:24		04:54					
	16:36	15	15:30 (4)	17:36		18:30	21	17:37 (2)	20:28		21:22		21:59					
17	08:34		15:17 (4)	07:43		06:38		17:18 (2)	06:23		05:22		04:54					
	16:38	12	15:29 (4)	17:38		18:32	17	17:35 (2)	20:30		21:23		21:59					
18	08:33		15:20 (4)	07:41		06:35		17:21 (2)	06:21		05:21		04:54					
	16:40	7	15:27 (4)	17:40		18:34	10	17:31 (2)	20:31		21:25		22:00					
19	08:32			07:39		06:33			06:18		05:19		04:54					
	16:41			17:42		18:36			20:33		21:27		22:00					
20	08:31			07:36		06:31			06:16		05:18		04:54					
	16:43			17:44		18:38			20:35		21:28		22:00					
21	08:30			07:34		06:28			06:14		05:16		04:54					
	16:45			17:46		18:40			20:37		21:30		22:01					
22	08:29			07:32		06:26			06:12		05:15		04:55					
	16:47			17:48		18:42			20:39		21:31		22:01					
23	08:27			07:30		06:23			06:09		05:13		04:55					
	16:49			17:50		18:43			20:41		21:33		22:01					
24	08:26			07:28		06:21			06:07		05:12		04:55					
	16:50			17:52		18:45			20:43		21:34		22:01					
25	08:24			07:25		06:18			06:05		05:11		04:55					
	16:52			17:54		18:47			20:44		21:36		22:01					
26	08:23			07:23		06:16			06:03		05:09		04:56					
	16:54			17:56		18:49			20:46		21:37		22:01					
27	08:22			07:21		17:23 (2)	06:13		06:00		05:08		04:56					
	16:56			17:58	8	17:31 (2)	18:51		20:48		21:39		22:01					
28	08:20			07:18		17:20 (2)	06:11		05:58		05:07		04:57					
	16:58			18:00	12	17:32 (2)	18:53		20:50		21:40		22:01					
29	08:19					07:08			05:56		05:06		04:57					
	17:00					19:54			20:52		21:41		22:01					
30	08:17					07:06			05:54		05:05		04:58					
	17:02					19:56			20:54		21:43		22:00					
31	08:15					07:04					05:04							
	17:04					19:58					21:44							
Potential sun hours	250		273		367		420		494		510							
Total, worst case	405		193		460													
Sun reduction	0.24		0.23		0.27													
Oper. time red.	1.00		1.00		1.00													
Wind dir. red.	0.65		0.66		0.68													
Total reduction	0.16		0.15		0.18													
Total, real	64		29		85													

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DL - H116

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:52 (2) 18:21 (2)	07:24 16:54	16:03 (3) 16:23 (3)	08:19 16:10	14:51 (4) 15:14 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:51 (2) 18:21 (2)	07:26 16:52	16:02 (3) 16:21 (3)	08:21 16:09	14:51 (4) 15:15 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:50 (2) 18:22 (2)	07:28 16:50	16:02 (3) 16:19 (3)	08:22 16:08	14:51 (4) 15:16 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:50 (2) 18:22 (2)	07:30 16:48	16:02 (3) 16:17 (3)	08:24 16:08	14:51 (4) 15:17 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:49 (2) 18:22 (2)	07:32 16:46	16:02 (3) 16:15 (3)	08:25 16:07	14:51 (4) 15:17 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:49 (2) 18:21 (2)	07:34 16:44	16:02 (3) 16:12 (3)	08:26 16:07	14:52 (4) 15:18 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:48 (2) 18:20 (2)	07:36 16:43	16:03 (3) 16:10 (3)	08:28 16:06	14:51 (4) 15:18 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:48 (2) 18:18 (2)	07:38 16:41	16:03 (3) 16:08 (3)	08:29 16:06	14:51 (4) 15:19 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:49 (2) 18:16 (2)	07:40 16:39	16:05 (3) 16:07 (3)	08:30 16:05	14:52 (4) 15:20 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:49 (2) 18:14 (2)	07:42 16:37	08:31 16:05	14:52 (4) 15:20 (4)	15:20 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:50 (2) 18:11 (2)	07:44 16:35	08:33 16:05	14:52 (4) 15:20 (4)	15:20 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:51 (2) 18:09 (2)	07:45 16:34	08:34 16:05	14:53 (4) 15:21 (4)	15:21 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:52 (2) 18:07 (2)	07:47 16:32	08:35 16:05	14:53 (4) 15:21 (4)	15:21 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:54 (2) 18:04 (2)	07:49 16:31	08:36 16:04	14:53 (4) 15:22 (4)	15:22 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:57 (2) 18:02 (2)	07:51 16:29	08:37 16:04	14:54 (4) 15:22 (4)	15:22 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:58 (2) 18:03 (2)	07:53 16:27	08:38 16:05	14:54 (4) 15:23 (4)	15:23 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:59 (2) 18:04 (2)	07:55 16:26	08:38 16:05	14:55 (4) 15:24 (4)	15:24 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:59 (2) 18:05 (2)	07:57 16:24	08:39 16:05	14:55 (4) 15:24 (4)	15:24 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:59 (2) 18:06 (2)	07:59 16:23	08:40 16:05	14:56 (4) 15:25 (4)	15:25 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:59 (2) 18:07 (2)	08:00 16:22	08:41 16:06	14:56 (4) 15:25 (4)	15:25 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:59 (2) 18:08 (2)	08:02 16:20	08:41 16:06	14:57 (4) 15:26 (4)	15:26 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:59 (2) 18:09 (2)	08:04 16:19	08:42 16:06	14:57 (4) 15:26 (4)	15:26 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:59 (2) 18:10 (2)	08:06 16:18	08:42 16:07	14:58 (4) 15:27 (4)	15:27 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:59 (2) 18:11 (2)	08:08 16:17	14:57 (4) 15:04 (4)	08:43 16:08	14:58 (4) 15:27 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	18:05 (2) 18:11 (2)	07:11 17:09	08:09 16:16	14:55 (4) 15:07 (4)	08:43 16:08	14:58 (4) 15:27 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	18:01 (2) 18:16 (2)	07:13 17:06	08:11 16:14	14:54 (4) 15:09 (4)	08:43 16:09	14:59 (4) 15:27 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	17:58 (2) 18:18 (2)	07:15 17:04	08:13 16:13	14:53 (4) 15:10 (4)	08:44 16:10	15:00 (4) 15:29 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	17:56 (2) 18:19 (2)	07:16 17:02	08:14 16:12	14:53 (4) 15:12 (4)	08:44 16:10	15:00 (4) 15:29 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	17:55 (2) 18:20 (2)	07:18 17:00	08:16 16:12	14:51 (4) 15:12 (4)	08:44 16:11	15:01 (4) 15:30 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:52 (2) 18:20 (2)	07:20 16:58	08:18 16:11	14:51 (4) 15:13 (4)	08:44 16:12	15:01 (4) 15:29 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	16:03 (3) 16:21 (3)	08:19 16:13	08:44 16:13	15:01 (4) 15:30 (4)	
Potential sun hours	512	460	382	328	259	233			
Total, worst case			117	433	221	864			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.68	0.67	0.65	0.65			
Total reduction			0.22	0.20	0.17	0.13			
Total, real			25	85	38	116			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DM - H117

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		16:30 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		15:46 (2)	08:19		15:31 (3)				
	16:15		17:06	4	16:34 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	33	16:19 (2)	16:10		3	15:34 (3)			
2	08:44		08:12		16:26 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28		07:26		15:47 (2)	08:21						
	16:16		17:08	11	16:37 (2)	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02		16:52	31	16:18 (2)	16:09						
3	08:44		08:10		16:23 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		15:48 (2)	08:22						
	16:17		17:10	16	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00		16:50	30	16:18 (2)	16:08						
4	08:43		08:08		16:22 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31		07:30		15:48 (2)	08:24						
	16:18		17:12	19	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	29	16:17 (2)	16:08						
5	08:43		08:07		16:20 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33		07:32		15:49 (2)	08:25						
	16:19		17:14	23	16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55		16:46		16:14 (2)	16:07						
6	08:43		08:05		16:19 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35		07:34		15:50 (2)	08:26						
	16:21		17:16	26	16:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52		16:44	22	16:12 (2)	16:07						
7	08:42		08:03		16:18 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37		07:36		15:52 (2)	08:28						
	16:22		17:18	29	16:47 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	18	16:10 (2)	16:06						
8	08:42		08:01		16:18 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39		07:38		15:53 (2)	08:29						
	16:24		17:20	30	16:48 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	15	16:08 (2)	16:06						
9	08:41		07:59		16:17 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		15:57 (2)	08:30						
	16:25		17:22	32	16:49 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45		16:39	10	16:07 (2)	16:05						
10	08:40		07:57		16:17 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42		07:42		16:02 (2)	08:31						
	16:26		17:24	32	16:49 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43		16:37	2	16:04 (2)	16:05						
11	08:40				16:17 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44		07:44			08:33						
	16:28	3	15:52 (3)		16:50 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40		16:35			16:05						
12	08:39		07:53		16:16 (2)	07:03	06:50	05:45	04:59	05:02	05:45	06:40	07:33		07:45		15:32 (3)							
	16:30	5	15:54 (3)		16:51 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38		16:34	6	15:38 (3)	16:05						
13	08:38		07:51		16:15 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48		07:47		15:29 (3)	08:35						
	16:31	6	15:55 (3)		16:50 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32	11	15:40 (3)	16:05						
14	08:37		07:49		16:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49		15:28 (3)	08:36						
	16:33	8	15:57 (3)		16:50 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31	14	15:42 (3)	16:04						
15	08:36		07:47		16:16 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52		07:51		15:27 (3)	08:37						
	16:34	10	15:59 (3)		16:50 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	16	15:43 (3)	16:04						
16	08:35		07:45		16:16 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54		07:54		17:00 (2)	07:53						
	16:36	11	16:00 (3)		16:50 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	9	17:09 (2)	16:27	18	15:44 (3)	16:05					
17	08:34		07:43		16:16 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55		07:55		16:56 (2)	07:55						
	16:38	13	16:02 (3)		16:50 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	17	17:13 (2)	16:26	19	15:45 (3)	16:05					
18	08:33		07:41		16:16 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57		16:54 (2)	07:57						
	16:40	16	16:05 (3)		16:49 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	21	17:15 (2)	16:24	20	15:45 (3)	16:05					
19	08:32		07:39		16:17 (2)	06:33	06:13	05:17	04:53	05:16	06:07	07:02	07:56		07:56		16:52 (2)	07:56						
	16:41	17	16:07 (3)		16:42 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	24	17:16 (2)	16:23	21	15:46 (3)	16:05					
20	08:31		07:36		16:18 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		08:01		16:50 (2)	08:00						
	16:43	19	16:08 (3)		16:48 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	27	17:17 (2)	16:22	21	15:46 (3)	16:06					
21	08:30		07:34		16:19 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		08:03		16:49 (2)	08:02						
	16:45	21	16:11 (3)		16:47 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	29	17:18 (2)	16:20	21	15:46 (3)	16:06					
22	08:29		07:32		16:19 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:05		16:48 (2)	08:04						
	16:47	21	16:11 (3)		16:46 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	31	17:19 (2)	16:19	18	15:44 (3)	16:06					
23	08:27		07:30		16:21 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:07		16:47 (2)	08:06						
	16:49	21	16:12 (3)		16:44 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	32	17:19 (2)	16:18	17	15:43 (3)	16:07					
24	08:26		07:28		16:23 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09		08:09		16:46 (2)	08:08						
	16:50	20	16:11 (3)		16:43 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	34	17:20 (2)	16:17	16	15:42 (3)	16:08					
25	08:25		07:25		16:25 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11		08:11		15:46 (2)	08:09						
	16:52	19	16:12 (3)		16:39 (2)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	34	16:20 (2)	16:16	14	15:41 (3)	16:08					
26	08:23		07:23		16:32 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		08:13		15:45 (2)	08:11						
	16:54	18	16:11 (3)		16:33 (2)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	35	16:20 (2)	16:14	11	15:39 (3)	16:09					
27	08:22		07:21			06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15		08:15		15:45 (2)	08:13						
	16:56	16	16:10 (3)			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	35	16:20 (2)	16:13	10	15:38 (3)	16:10					
28	08:20		07:18			06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16		08:16		15:45 (2)	08:14						
	16:58	14	16:10 (3)			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	35	16:20 (2)	16:12	8	15:37 (3)	16:10					
29	08:19		07:18			07:08	05:56	0																

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DN - H118

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	08:42 (2) 18:02	07:16 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05		07:59 (2) 16:10
2	08:44 16:16	08:12 17:08	08:40 (2) 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	20 16:52	08:19 (2) 16:09
3	08:44 16:17	08:10 17:10	08:38 (2) 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	22 16:50	08:20 (2) 16:08
4	08:43 16:18	08:09 17:12	08:36 (2) 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	20 16:48	08:20 (2) 16:08
5	08:43 16:20	08:07 17:14	08:34 (2) 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	18 16:46	08:20 (2) 16:07
6	08:43 16:21	08:05 17:16	08:32 (2) 18:11	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	16 16:44	08:20 (2) 16:07
7	08:42 16:22	08:03 17:18	08:30 (2) 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	14 16:43	08:20 (2) 16:06
8	08:42 16:24	08:01 17:20	08:28 (2) 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	12 16:41	08:20 (2) 16:06
9	08:41 16:25	07:59 17:22	08:28 (2) 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	9 16:39	08:20 (2) 16:05
10	08:41 16:27	07:57 17:24	08:29 (2) 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	7 16:37	08:20 (2) 16:05
11	08:40 16:28	07:55 17:26	08:30 (2) 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	4 16:36	08:15 (2) 16:05
12	08:39 16:30	07:53 17:28	08:32 (2) 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	1 16:34	08:19 (2) 16:05
13	08:38 16:31	07:51 17:30	08:34 (2) 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36		08:18 (2) 16:05
14	08:37 16:33	07:49 17:32	08:36 (2) 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34		08:17 (2) 16:05
15	08:37 16:35	07:47 17:34	08:42 (2) 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31		08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29		08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27		08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24		08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22		08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20		08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18		08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13		08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11		08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09		08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07		08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:04		08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:04 (2) 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	9 16:13	08:44 16:11
30	08:17 17:02	08:45 (2) 18:46 (2)	07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	13 16:12	08:44 16:12
31	08:15 17:04	08:44 (2) 18:48 (2)	07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21	07:22 16:56	07:22 16:56	17 16:11	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	5	218								58	165	
Sun reduction	0.24	0.23								0.29	0.27	
Oper. time red.	1.00	1.00								1.00	1.00	
Wind dir. red.	0.62	0.62								0.62	0.62	
Total reduction	0.15	0.14								0.18	0.16	
Total, real	1	31								10	27	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DO - H119

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:09 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:36 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:37	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:06	08:11 16:14	08:44 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrene@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DP - H120

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:12 (1)	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	3	06:21 (1)	21:45	22:00	21:25	22	06:34 (1)	20:18	19:05
2	08:44	08:12	07:14	06:59	05:50		06:16 (1)	05:02	05:00	05:40	06:12 (1)	06:35	07:28	07:26
	16:16	17:08	18:04	20:02	20:57	6	06:22 (1)	21:47	22:00	21:23	22	06:34 (1)	20:16	19:02
3	08:44	08:10	07:12	06:57	05:48		06:14 (1)	05:01	05:01	05:42	06:12 (1)	06:37	07:30	07:28
	16:17	17:10	18:06	20:04	20:59	9	06:23 (1)	21:48	21:59	21:21	22	06:34 (1)	20:14	19:00
4	08:43	08:09	07:09	06:54	05:46		06:12 (1)	05:00	05:01	05:44	06:14 (1)	06:38	07:32	07:30
	16:18	17:12	18:08	20:06	21:01	12	06:24 (1)	21:49	21:59	21:19	21	06:35 (1)	20:11	18:57
5	08:43	08:07	07:07	06:52	05:44		06:10 (1)	04:59	05:02	05:46	06:16 (1)	06:40	07:33	07:32
	16:20	17:14	18:10	20:08	21:03	14	06:24 (1)	21:50	21:58	21:18	19	06:35 (1)	20:09	18:55
6	08:43	08:05	07:05	06:49	05:42		06:09 (1)	04:59	05:03	05:47	06:17 (1)	06:42	07:35	07:34
	16:21	17:16	18:12	20:09	21:05	16	06:25 (1)	21:51	21:58	21:16	17	06:34 (1)	20:06	18:53
7	08:42	08:03	07:02	06:47	05:40		06:07 (1)	04:58	05:04	05:49	06:19 (1)	06:44	07:37	07:36
	16:22	17:18	18:13	20:11	21:06	18	06:25 (1)	21:52	21:57	21:14	15	06:34 (1)	20:04	18:50
8	08:42	08:01	07:00	06:44	05:38		06:05 (1)	04:57	05:05	05:51	06:20 (1)	06:45	07:39	07:38
	16:24	17:20	18:15	20:13	21:08	19	06:24 (1)	21:53	21:56	21:12	13	06:33 (1)	20:01	18:48
9	08:41	07:59	06:58	06:42	05:36		06:03 (1)	04:57	05:06	05:52	06:22 (1)	06:47	07:41	07:40
	16:25	17:22	18:17	20:15	21:10	21	06:24 (1)	21:54	21:56	21:10	11	06:33 (1)	19:59	18:45
10	08:41	07:57	06:55	06:40	05:35		06:02 (1)	04:56	05:07	05:54	06:24 (1)	06:49	07:43	07:42
	16:27	17:24	18:19	20:17	21:12	23	06:25 (1)	21:55	21:55	21:08	8	06:32 (1)	19:57	18:43
11	08:40	07:55	06:53	06:37	05:33		06:02 (1)	04:56	05:08	05:56	06:25 (1)	06:51	07:44	07:44
	16:28	17:26	18:21	20:19	21:13	22	06:24 (1)	21:56	21:54	21:06	6	06:31 (1)	19:54	18:41
12	08:39	07:53	06:50	06:35	05:31		06:02 (1)	04:56	05:10	05:58	06:27 (1)	06:52	07:46	07:46
	16:30	17:28	18:23	20:21	21:15	21	06:23 (1)	21:56	21:53	21:04	3	06:30 (1)	19:52	18:38
13	08:38	07:51	06:48	06:33	05:29		06:03 (1)	04:55	05:11	05:59		06:54	07:48	07:48
	16:31	17:30	18:25	20:22	21:17	20	06:23 (1)	21:57	21:52	21:01		19:49	18:36	16:32
14	08:37	07:49	06:45	06:30	05:27		06:03 (1)	04:55	05:12	06:01		06:56	07:50	07:49
	16:33	17:32	18:27	20:24	21:19	19	06:22 (1)	21:58	21:51	20:59		19:47	18:34	16:31
15	08:37	07:47	06:43	06:28	05:26		06:04 (1)	04:55	05:13	06:03		06:58	07:52	07:51
	16:35	17:34	18:29	20:26	21:20	18	06:22 (1)	21:58	21:50	20:57		19:44	18:31	16:29
16	08:36	07:45	06:41	06:25	05:24		06:05 (1)	04:55	05:15	06:05		07:00	07:54	07:53
	16:36	17:36	18:31	20:28	21:22	16	06:21 (1)	21:59	21:49	20:55		19:42	18:29	16:28
17	08:35	07:43	06:38	06:23	05:22		06:06 (1)	04:54	05:16	06:06		07:01	07:56	07:55
	16:38	17:38	18:32	20:30	21:24	14	06:20 (1)	21:59	21:48	20:53		19:39	18:27	16:26
18	08:33	07:41	06:36	06:21	05:21		06:07 (1)	04:54	05:17	06:08		07:03	07:58	07:57
	16:40	17:40	18:34	20:32	21:25	11	06:18 (1)	22:00	21:46	20:51		19:37	18:24	16:25
19	08:32	07:39	06:33	06:19	05:19		06:10 (1)	04:54	05:19	06:10		07:05	07:59	07:59
	16:42	17:42	18:36	20:33	21:27	6	06:16 (1)	22:00	21:45	20:48		19:34	18:22	16:23
20	08:31	07:37	06:31	06:16	05:18			04:55	05:20	06:12		07:07	08:01	08:01
	16:43	17:44	18:38	20:35	21:28			22:00	21:44	20:46		19:32	18:20	16:22
21	08:30	07:34	06:28	06:14	05:16			04:55	05:22	06:14		07:08	08:03	08:02
	16:45	17:46	18:40	20:37	21:30			22:01	21:42	20:44		19:29	18:18	16:21
22	08:29	07:32	06:26	06:12	05:15			04:55	05:23	06:15		07:10	08:05	08:04
	16:47	17:48	18:42	20:39	21:31			22:01	21:41	20:42		19:27	18:15	16:19
23	08:27	07:30	06:23	06:10	05:13			04:55	05:24	06:17		07:12	08:07	08:06
	16:49	17:50	18:44	20:41	21:33			22:01	21:40	20:39		19:24	18:13	16:18
24	08:26	07:28	06:21	06:07	05:12			04:55	05:26	06:19		07:14	08:09	08:08
	16:51	17:52	18:45	20:43	21:35			22:01	21:38	20:37		19:22	18:11	16:17
25	08:25	07:26	06:19	06:05	05:11			04:56	05:28		06:19 (1)	06:21	07:15	07:11
	16:53	17:54	18:47	20:45	21:36			22:01	21:37	8	06:27 (1)	20:35	19:20	17:09
26	08:23	07:23	06:16	06:03	05:10			04:56	05:29		06:17 (1)	06:22	07:17	07:13
	16:55	17:56	18:49	20:46	21:37			22:01	21:35	12	06:29 (1)	20:33	19:17	17:07
27	08:22	07:21	06:14	06:01	05:08			04:57	05:31		06:16 (1)	06:24	07:19	07:15
	16:56	17:58	18:51	20:48	21:39			22:01	21:33	15	06:31 (1)	20:30	19:15	17:05
28	08:20	07:19	06:11	05:59	05:07			04:57	05:32		06:15 (1)	06:26	07:21	07:17
	16:58	18:00	18:53	20:50	21:40			22:01	21:32	16	06:31 (1)	20:28	19:12	17:02
29	08:19		07:09	05:56	05:06			04:58	05:34		06:14 (1)	06:28	07:23	07:19
	17:00		19:55	20:52	21:42			22:01	21:30	19	06:33 (1)	20:26	19:10	17:00
30	08:17		07:06	05:54	05:05			04:58	05:36		06:13 (1)	06:29	07:24	07:21
	17:02		19:57	20:54	21:43			22:00	21:28	20	06:33 (1)	20:23	19:07	16:58
31	08:15		07:04		05:04				05:37		06:13 (1)	06:31		07:22
	17:04		19:58		21:44				21:27	21	06:34 (1)	20:21		16:56
Potential sun hours	250	273	367	420	494		510	512		460		382	328	259
Total, worst case					288			111		179				
Sun reduction					0.38			0.32		0.34				
Oper. time red.					1.00			1.00		1.00				
Wind dir. red.					0.67			0.67		0.67				
Total reduction					0.26			0.22		0.23				
Total, real					74			24		41				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DQ - H121

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	05:03	05:34 (1)	04:59	05:32 (1)	05:39	06:33	07:26	07:24	08:19		
2	16:15	17:06	18:02	20:00	20:56	21:45	05:44 (1)	22:00	17	05:49 (1)	21:25	20:18	19:05	16:54	16:10	
	08:44	08:12	07:14	06:59	05:50	05:02	05:33 (1)	05:00		05:33 (1)	05:41	06:35	07:28	07:26	08:21	
3	16:16	17:08	18:04	20:02	20:57	21:47	05:44 (1)	22:00	17	05:50 (1)	21:23	20:16	19:02	16:52	16:09	
	08:44	08:10	07:12	06:57	05:48	05:01	05:32 (1)	05:01		05:34 (1)	05:42	06:37	07:30	07:28	08:22	
4	16:17	17:10	18:06	20:04	20:59	21:48	05:44 (1)	21:59	17	05:51 (1)	21:21	20:14	19:00	16:50	16:09	
	08:43	08:09	07:09	06:54	05:46	05:00	05:31 (1)	05:01		05:34 (1)	05:44	06:38	07:32	07:30	08:24	
5	16:18	17:12	18:08	20:06	21:01	21:49	05:44 (1)	21:59	16	05:50 (1)	21:19	20:11	18:57	16:48	16:08	
	08:43	08:07	07:07	06:52	05:44	04:59	05:31 (1)	05:02		05:35 (1)	05:46	06:40	07:33	07:32	08:25	
6	16:20	17:14	18:10	20:08	21:03	21:50	05:45 (1)	21:58	16	05:51 (1)	21:18	20:09	18:55	16:47	16:07	
	08:43	08:05	07:05	06:49	05:42	04:59	05:30 (1)	05:03		05:36 (1)	05:47	06:42	07:35	07:34	08:27	
7	16:21	17:16	18:12	20:09	21:05	21:51	05:45 (1)	21:58	15	05:51 (1)	21:16	20:06	18:53	16:45	16:07	
	08:42	08:03	07:02	06:47	05:40	04:58	05:30 (1)	05:04		05:37 (1)	05:49	06:44	07:37	07:36	08:28	
8	16:22	17:18	18:13	20:11	21:06	21:52	05:45 (1)	21:57	14	05:51 (1)	21:14	20:04	18:50	16:43	16:06	
	08:42	08:01	07:00	06:44	05:38	04:57	05:29 (1)	05:05		05:38 (1)	05:51	06:45	07:39	07:38	08:29	
9	16:24	17:20	18:15	20:13	21:08	21:53	05:45 (1)	21:56	13	05:51 (1)	21:12	20:01	18:48	16:41	16:06	
	08:41	07:59	06:58	06:42	05:36	04:57	05:29 (1)	05:06		05:39 (1)	05:52	06:47	07:41	07:40	08:30	
10	16:25	17:22	18:17	20:15	21:10	21:54	05:45 (1)	21:56	13	05:52 (1)	21:10	19:59	18:45	16:39	16:06	
	08:41	07:57	06:55	06:40	05:35	04:56	05:28 (1)	05:07		05:40 (1)	05:54	06:49	07:43	07:42	08:32	
11	16:27	17:24	18:19	20:17	21:12	21:55	05:45 (1)	21:55	12	05:52 (1)	21:08	19:57	18:43	16:37	16:05	
	08:40	07:55	06:53	06:37	05:33	04:56	05:28 (1)	05:08		05:41 (1)	05:56	06:51	07:44	07:44	08:33	
12	16:28	17:26	18:21	20:19	21:13	21:56	05:45 (1)	21:54	11	05:52 (1)	21:06	19:54	18:41	16:36	16:05	
	08:39	07:53	06:50	06:35	05:31	04:56	05:28 (1)	05:10		05:42 (1)	05:58	06:52	07:46	07:46	08:34	
13	16:30	17:28	18:23	20:21	21:15	21:56	05:46 (1)	21:53	10	05:52 (1)	21:04	19:52	18:38	16:34	16:05	
	08:38	07:51	06:48	06:33	05:29	04:55	05:27 (1)	05:11		05:43 (1)	05:59	06:54	07:48	07:48	08:35	
14	16:31	17:30	18:25	20:22	21:17	21:57	05:45 (1)	21:52	9	05:52 (1)	21:01	19:49	18:36	16:32	16:05	
	08:37	07:49	06:45	06:30	05:27	04:55	05:27 (1)	05:12		05:44 (1)	06:01	06:56	07:50	07:49	08:36	
15	16:33	17:32	18:27	20:24	21:19	21:58	05:45 (1)	21:51	7	05:51 (1)	20:59	19:47	18:34	16:31	16:06	
	08:36	07:47	06:43	06:28	05:26	04:55	05:27 (1)	05:13		05:45 (1)	06:03	06:58	07:52	07:51	08:37	
16	16:35	17:34	18:29	20:26	21:20	21:58	05:46 (1)	21:50	6	05:51 (1)	20:57	19:44	18:31	16:29	16:05	
	08:36	07:45	06:41	06:25	05:24	04:55	05:27 (1)	05:15		05:47 (1)	06:05	07:00	07:54	07:53	08:38	
17	16:36	17:36	18:31	20:28	21:22	21:59	05:46 (1)	21:49	5	05:52 (1)	20:55	19:42	18:29	16:28	16:05	
	08:35	07:43	06:38	06:23	05:22	04:54	05:27 (1)	05:16		05:48 (1)	06:06	07:01	07:56	07:55	08:39	
18	16:38	17:38	18:32	20:30	21:24	21:59	05:46 (1)	21:48	3	05:51 (1)	20:53	19:39	18:27	16:26	16:05	
	08:33	07:41	06:36	06:21	05:21	04:54	05:27 (1)	05:17		05:49 (1)	06:08	07:03	07:58	07:57	08:39	
19	16:40	17:40	18:34	20:32	21:25	22:00	05:46 (1)	21:46	2	05:51 (1)	20:51	19:37	18:24	16:25	16:05	
	08:32	07:39	06:33	06:19	05:19	04:54	05:27 (1)	05:19			06:10	07:05	07:59	07:59	08:40	
20	16:42	17:42	18:36	20:33	21:27	22:00	05:46 (1)	21:45			20:48	19:34	18:22	16:23	16:05	
	08:31	07:37	06:31	06:16	05:18	04:55	05:27 (1)	05:20		06:12	07:07	08:01	08:01	08:41		
21	16:43	17:44	18:38	20:35	21:28	22:00	05:46 (1)	21:44			20:46	19:32	18:20	16:22	16:06	
	08:30	07:34	06:28	06:14	05:16	04:55	05:28 (1)	05:22		06:14	07:08	08:03	08:02	08:41		
22	16:45	17:46	18:40	20:37	21:30	22:01	05:47 (1)	21:42			20:44	19:29	18:18	16:21	16:06	
	08:29	07:32	06:26	06:12	05:15	04:55	05:28 (1)	05:23		06:15	07:10	08:05	08:04	08:42		
23	16:47	17:48	18:42	20:39	21:31	22:01	05:47 (1)	21:41			20:42	19:27	18:15	16:19	16:07	
	08:27	07:30	06:23	06:10	05:13	04:55	05:28 (1)	05:24		06:17	07:12	08:07	08:06	08:42		
24	16:49	17:50	18:44	20:41	21:33	22:01	05:47 (1)	21:40			20:39	19:24	18:13	16:18	16:07	
	08:26	07:28	06:21	06:07	05:12	04:55	05:28 (1)	05:26		06:19	07:14	08:09	08:08	08:43		
25	16:51	17:52	18:45	20:43	21:34	22:01	05:47 (1)	21:38			20:37	19:22	18:11	16:17	16:08	
	08:25	07:26	06:19	06:05	05:11	04:56	05:29 (1)	05:28		06:21	07:15	08:11	08:09	08:43		
26	16:53	17:54	18:47	20:45	21:36	1	05:41 (1)	22:01	19	05:48 (1)	21:37	20:35	17:09	16:16	16:08	
	08:23	07:23	06:16	06:03	05:10	05:39 (1)	04:56			05:29 (1)	05:29	06:22	07:17	07:13	08:11	08:44
27	16:55	17:56	18:49	20:46	21:37	2	05:41 (1)	22:01	19	05:48 (1)	21:35	20:33	19:17	17:07	16:15	16:09
	08:22	07:21	06:14	06:01	05:08	05:38 (1)	04:57			05:30 (1)	05:31	06:24	07:19	07:15	08:13	08:44
28	16:56	17:58	18:51	20:48	21:39	4	05:42 (1)	22:01	19	05:49 (1)	21:33	20:30	19:15	17:05	16:14	16:10
	08:20	07:19	06:11	05:59	05:07	05:37 (1)	04:57			05:30 (1)	05:32	06:26	07:21	07:17	08:14	08:44
29	16:58	18:00		20:50	21:40	5	05:42 (1)	22:01	18	05:48 (1)	21:32	20:28	19:12	17:02	16:13	16:11
	08:19		07:09	05:56	05:06	05:36 (1)	04:58			05:31 (1)	05:34	06:28	07:23	07:19	08:16	08:44
30	17:00		07:55	20:52	21:42	7	05:43 (1)	22:01	18	05:49 (1)	21:30	20:26	19:10	17:00	16:12	16:12
	08:17		07:06	05:54	05:05	05:35 (1)	04:58			05:31 (1)	05:36	06:29	07:24	07:21	08:18	08:44
31	17:02		19:57	20:54	21:43	8	05:43 (1)	22:00	18	05:49 (1)	21:28	20:23	19:07	16:58	16:11	16:13
	08:15		07:04		05:04	05:34 (1)					05:37	06:31		07:22		08:44
	17:04		19:58		21:44	9	05:43 (1)				21:27	20:21		16:56		16:14
Potential sun hours	250	273	367	420	494		510		512		460		382	328	259	233
Total, worst case					36		511				203					
Sun reduction					0.38		0.32				0.32					
Oper. time red.					1.00		1.00				1.00					
Wind dir. red.					0.66		0.66				0.66					
Total reduction					0.25		0.21				0.21					
Total, real					9		107				43					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DR - H122

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DS - H123

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 21:03	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:11 (5) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:09 (5) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:11 (5) 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:11 (5) 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:14 (5) 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	05:52 20:54	05:04 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			5	156	28	453
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.66	0.66
Total reduction			0.18	0.24	0.25	0.21
Total, real			1	37	7	95

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DS - H123

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 16	05:32 (3) 05:48 (3) 21:25	05:39 20:18	06:33 8	07:13 (5) 07:21 (5)	07:26 19:05 16:54 16:10
2	05:00 22:00 15	05:33 (3) 05:48 (3) 21:23	05:40 20:16	06:35 14	07:10 (5) 07:24 (5)	07:28 19:02 16:52 16:09
3	05:00 21:59 15	05:33 (3) 05:48 (3) 21:21	05:42 20:14	06:37 17	07:09 (5) 07:26 (5)	07:30 19:00 16:50 16:09
4	05:01 21:59 14	05:34 (3) 05:48 (3) 21:19	05:44 20:11	06:38 20	07:06 (5) 07:26 (5)	07:32 18:57 16:48 16:08
5	05:02 21:58 14	05:35 (3) 05:49 (3) 21:17	05:46 20:09	06:40 20	07:07 (5) 07:27 (5)	07:33 18:55 16:46 16:07
6	05:03 21:58 13	05:36 (3) 05:49 (3) 21:16	05:47 20:06	06:42 18	07:09 (5) 07:27 (5)	07:35 18:53 16:45 16:07
7	05:04 21:57 12	05:37 (3) 05:49 (3) 21:14	05:49 20:04	06:44 17	07:10 (5) 07:27 (5)	07:37 18:50 16:43 16:06
8	05:05 21:56 12	05:38 (3) 05:50 (3) 21:12	05:51 20:01	06:45 15	07:12 (5) 07:27 (5)	07:39 18:48 16:41 16:06
9	05:06 21:55 11	05:39 (3) 05:50 (3) 21:10	05:52 19:59	06:47 13	07:14 (5) 07:27 (5)	07:41 18:45 16:39 16:06
10	05:07 21:55 10	05:40 (3) 05:50 (3) 21:08	05:54 19:57	06:49 10	07:16 (5) 07:26 (5)	07:43 18:43 16:37 16:05
11	05:08 21:54 9	05:41 (3) 05:50 (3) 21:06	05:56 19:54	06:51 8	07:17 (5) 07:25 (5)	07:44 18:41 16:36 16:05
12	05:10 21:53 8	05:42 (3) 05:50 (3) 21:04	05:58 19:52	06:52 5	07:19 (5) 07:24 (5)	07:46 18:38 16:34 16:05
13	05:11 21:52 7	05:43 (3) 05:50 (3) 21:01	05:59 19:49	06:54 2	07:21 (5) 07:23 (5)	07:48 18:36 16:32 16:05
14	05:12 21:51 6	05:44 (3) 05:50 (3) 20:59	06:01 19:47	06:56 18:34	07:50 16:31	07:49 16:05
15	05:13 21:50 5	05:45 (3) 05:50 (3) 20:57	06:03 19:44	06:58 18:31	07:52 16:29	07:51 16:05
16	05:15 21:49 3	05:47 (3) 05:50 (3) 20:55	06:05 19:42	06:59 18:29	07:54 16:28	07:53 16:05
17	05:16 21:47 2	05:48 (3) 05:50 (3) 20:53	06:06 19:39	07:01 18:27	07:56 16:26	07:55 16:05
18	05:17 21:46 1	05:49 (3) 05:50 (3) 20:51	06:08 19:37	07:03 18:24	07:57 16:25	07:57 16:05
19	05:19 21:45 0	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44 0	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42 0	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41 0	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39 0	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38 0	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:36 0	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35 0	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33 0	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32 0	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30 0	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:35 21:28 0	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27 0	06:31 20:21	07:25 19:05	07:22 16:56	08:19 16:10	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	173		167			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	37		36			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DT - H124

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DU - H125

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
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10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:40 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DV - H126

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:44	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:58	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	09:09 (2) 17:32	07:49 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:37 16:34	09:08 (2) 17:34	07:47 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	09:07 (2) 17:36	07:45 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	09:05 (2) 17:38	07:43 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	09:04 (2) 17:40	07:41 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	09:03 (2) 17:42	07:39 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	09:01 (2) 17:44	07:37 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	09:00 (2) 17:46	07:34 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:20	08:41 16:06
22	08:29 16:47	08:59 (2) 17:48	07:32 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	08:57 (2) 17:50	07:30 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	08:55 (2) 17:52	07:28 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	08:55 (2) 17:54	07:25 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	08:55 (2) 17:56	07:23 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	08:57 (2) 17:58	07:21 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	08:57 (2) 18:00	07:19 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:34	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00	08:58 (2) 19:15	07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02	08:59 (2) 19:13	07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04	09:02 (2) 19:12	07:04 19:58	05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	06:31 16:56	07:22 16:56	07:22 16:56	08:18 16:11	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	237										239	
Sun reduction	0.24										0.27	
Oper. time red.	1.00										1.00	
Wind dir. red.	0.61										0.61	
Total reduction	0.15										0.16	
Total, real	35										39	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DW - H127

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:23 (5)	08:14	15:50 (4)	07:16	17:09 (3)	07:01	19:17 (2)	05:52	05:03	
	16:15	14	15:37 (5)	17:06	36	16:26 (4)	18:02	23	17:32 (3)	20:00	16
2	08:44	15:23 (5)	08:12	15:50 (4)	07:14	17:09 (3)	06:59	19:14 (2)	05:50	05:02	
	16:16	16	15:39 (5)	17:08	36	16:26 (4)	18:04	21	17:30 (3)	20:02	21
3	08:44	15:23 (5)	08:10	15:50 (4)	07:12	17:10 (3)	06:56	19:13 (2)	05:48	05:01	
	16:17	16	15:39 (5)	17:10	36	16:26 (4)	18:06	19	17:29 (3)	20:04	24
4	08:43	15:24 (5)	08:08	15:51 (4)	07:09	17:12 (3)	06:54	19:12 (2)	05:46	05:00	
	16:18	17	15:41 (5)	17:12	35	16:26 (4)	18:07	16	17:28 (3)	20:06	27
5	08:43	15:24 (5)	08:07	15:51 (4)	07:07	17:13 (3)	06:51	19:10 (2)	05:44	04:59	
	16:19	18	15:42 (5)	17:14	34	16:25 (4)	18:09	13	17:26 (3)	20:07	30
6	08:43	15:25 (5)	08:05	15:52 (4)	07:04	17:17 (3)	06:49	19:09 (2)	05:42	04:59	
	16:21	19	15:44 (5)	17:16	33	16:25 (4)	18:11	5	17:22 (3)	20:09	33
7	08:42	15:25 (5)	08:03	15:53 (4)	07:02		06:47		19:08 (2)	05:40	
	16:22	20	15:45 (5)	17:18	31	16:24 (4)	18:13		20:11	19:42 (2)	34
8	08:42	15:25 (5)	08:01	15:54 (4)	07:00		06:44		19:08 (2)	05:38	
	16:24	21	15:46 (5)	17:20	29	16:23 (4)	18:15		20:13	19:42 (2)	34
9	08:41	15:26 (5)	07:59	15:55 (4)	06:57		06:42		19:08 (2)	05:36	
	16:25	22	15:48 (5)	17:22	28	16:23 (4)	18:17		20:15	19:43 (2)	35
10	08:40	15:27 (5)	07:57	15:56 (4)	06:55		06:39		19:07 (2)	05:34	
	16:26	21	15:48 (5)	17:24	26	16:22 (4)	18:19		20:17	19:42 (2)	35
11	08:40	15:27 (5)	07:55	15:58 (4)	06:52		06:37		19:07 (2)	05:33	
	16:28	21	15:48 (5)	17:26	22	16:20 (4)	18:21		20:19	19:42 (2)	35
12	08:39	15:27 (5)	07:53	15:59 (4)	06:50		06:35		19:07 (2)	05:31	
	16:30	21	15:48 (5)	17:28	18	16:17 (4)	18:23		20:20	19:42 (2)	35
13	08:38	15:28 (5)	07:51	16:03 (4)	06:48		06:32		19:06 (2)	05:29	
	16:31	20	15:48 (5)	17:30	11	16:14 (4)	18:25		20:22	19:41 (2)	35
14	08:37	15:29 (5)	07:49		06:45		06:30		19:07 (2)	05:27	
	16:33	23	15:57 (4)	17:32		18:27		20:24	19:40 (2)	21:18	
15	08:36	15:30 (5)	07:47		06:43		06:28		19:07 (2)	05:26	
	16:34	24	15:59 (4)	17:34		18:28		20:26	19:40 (2)	21:20	
16	08:35	15:30 (5)	07:45		06:40		06:25		19:08 (2)	05:24	
	16:36	26	16:00 (4)	17:36		18:30		20:28	19:39 (2)	21:22	
17	08:34	15:31 (5)	07:43		06:38		06:23		19:08 (2)	05:22	
	16:38	27	16:02 (4)	17:38		18:32		20:30	19:37 (2)	21:23	
18	08:33	15:32 (5)	07:41		06:35		06:21		19:09 (2)	05:21	
	16:40	30	16:05 (4)	17:40		18:34		20:31	19:36 (2)	21:25	
19	08:32	15:34 (5)	07:39		06:33		06:18		19:10 (2)	05:19	
	16:41	29	16:07 (4)	17:42		18:36		20:33	19:35 (2)	21:27	
20	08:31	15:35 (5)	07:36	17:15 (3)	06:31		06:16		19:12 (2)	05:18	
	16:43	28	16:08 (4)	17:44	1	17:16 (3)	18:38		20:35	19:33 (2)	21:28
21	08:30	15:38 (5)	07:34	17:13 (3)	06:28		06:14		19:13 (2)	05:16	
	16:45	27	16:11 (4)	17:46	5	17:18 (3)	18:40		20:37	19:30 (2)	21:30
22	08:29	15:49 (4)	07:32	17:11 (3)	06:26		06:12		19:16 (2)	05:15	
	16:47	23	16:12 (4)	17:48	8	17:19 (3)	18:42		20:39	19:27 (2)	21:31
23	08:27	15:49 (4)	07:30	17:10 (3)	06:23		06:09			05:13	
	16:49	26	16:15 (4)	17:50	12	17:22 (3)	18:43		20:41	21:33	
24	08:26	15:49 (4)	07:28	17:10 (3)	06:21		06:07			05:12	
	16:50	28	16:17 (4)	17:52	14	17:24 (3)	18:45		20:43	21:34	
25	08:24	15:49 (4)	07:25	17:09 (3)	06:18		06:05			05:11	
	16:52	30	16:19 (4)	17:54	17	17:26 (3)	18:47		20:44	21:36	
26	08:23	15:49 (4)	07:23	17:09 (3)	06:16		06:03			05:09	
	16:54	32	16:21 (4)	17:56	19	17:28 (3)	18:49		20:46	21:37	
27	08:22	15:48 (4)	07:21	17:09 (3)	06:13		06:01			05:08	
	16:56	35	16:23 (4)	17:58	22	17:31 (3)	18:51		20:48	21:39	
28	08:20	15:49 (4)	07:18	17:09 (3)	06:11		05:58			05:07	
	16:58	36	16:25 (4)	18:00	23	17:32 (3)	18:53		20:50	21:40	
29	08:18	15:49 (4)			07:08		05:56			05:06	
	17:00	36	16:25 (4)		19:54		20:52			21:41	
30	08:17	15:49 (4)			07:06		19:24 (2)		05:54	05:05	
	17:02	36	16:25 (4)		19:56		19:30 (2)		20:54	21:43	
31	08:15	15:49 (4)			07:04		19:19 (2)			05:04	
	17:04	36	16:25 (4)		19:58		19:31 (2)			21:44	
Potential sun hours	250		273		367		420		494	510	
Total, worst case	778		496		115		621				
Sun reduction	0.24		0.23		0.27		0.35				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.66		0.67		0.67		0.67				
Total reduction	0.16		0.15		0.18		0.24				
Total, real	125		77		21		147				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DW - H127

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:06 (2) 19:41 (2)	07:26 16:54	15:26 (4) 15:51 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	19:06 (2) 19:41 (2)	07:28 16:52	15:24 (4) 15:52 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	19:05 (2) 19:40 (2)	07:30 16:50	15:23 (4) 15:53 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	19:05 (2) 19:39 (2)	07:31 18:57	15:22 (4) 15:54 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	19:05 (2) 19:39 (2)	07:33 18:55	15:22 (4) 15:55 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	19:06 (2) 19:38 (2)	07:35 18:52	15:21 (4) 15:55 (4)
7	05:04 21:57	05:49 21:13	06:43 20:04	19:05 (2) 19:35 (2)	07:37 18:50	15:20 (4) 15:55 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	19:06 (2) 19:33 (2)	07:39 18:48	15:20 (4) 15:56 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	19:07 (2) 19:31 (2)	07:41 18:45	15:20 (4) 15:56 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	19:07 (2) 19:28 (2)	07:42 18:43	15:21 (4) 15:57 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	19:09 (2) 19:26 (2)	07:44 18:40	15:21 (4) 15:57 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	19:11 (2) 19:24 (2)	07:46 18:38	15:21 (4) 15:57 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	19:15 (2) 19:22 (2)	07:48 18:36	15:21 (4) 15:57 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:42 (3) 18:04 (3)	15:21 (4) 15:57 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:41 (3) 18:02 (3)	15:21 (4) 15:56 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:41 (3) 17:59 (3)	15:22 (4) 15:54 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:41 (3) 17:57 (3)	15:22 (4) 15:52 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:41 (3) 17:55 (3)	15:23 (4) 15:51 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:42 (3) 17:52 (3)	15:23 (4) 15:49 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:43 (3) 17:50 (3)	15:24 (4) 15:47 (4)
21	05:21 21:42	06:13 20:44	19:21 (2) 19:33 (2)	07:08 18:17	17:44 (3) 17:48 (3)	15:13 (5) 15:46 (4)
22	05:23 21:41	06:15 20:42	19:18 (2) 19:35 (2)	07:10 18:15	17:48 (3) 16:20	15:11 (5) 15:44 (4)
23	05:24 21:39	06:17 20:39	19:16 (2) 19:37 (2)	07:12 18:13	16:06 16:18	15:10 (5) 15:43 (4)
24	05:26 21:38	06:19 20:37	19:14 (2) 19:39 (2)	07:13 18:11	16:08 16:17	15:09 (5) 15:42 (4)
25	05:27 21:36	06:20 20:35	19:12 (2) 19:39 (2)	07:15 17:09	16:09 16:16	15:09 (5) 15:41 (4)
26	05:29 21:35	06:22 20:32	19:11 (2) 19:40 (2)	07:17 17:06	16:11 16:14	15:09 (5) 15:39 (4)
27	05:30 21:33	06:24 20:30	19:10 (2) 19:41 (2)	07:19 17:04	16:13 16:13	15:09 (5) 15:38 (4)
28	05:32 21:32	06:26 20:28	19:08 (2) 19:41 (2)	07:21 17:02	16:14 16:12	15:09 (5) 15:37 (4)
29	05:34 21:30	06:27 20:25	19:07 (2) 19:41 (2)	07:22 17:00	16:15 15:31 (4)	15:08 (5) 15:45 (4)
30	05:35 21:28	06:29 20:23	19:07 (2) 19:41 (2)	07:24 16:58	16:12 15:29 (4)	15:09 (5) 15:47 (4)
31	05:37 21:27	06:31 20:21	19:06 (2) 19:41 (2)	07:25 16:56	15:26 (4) 15:49 (4)	15:09 (5) 16:11
Potential sun hours	512	460	382	328	259	233
Total, worst case		298	344	273	898	422
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.66
Total reduction		0.23	0.21	0.20	0.18	0.14
Total, real		68	74	54	158	57

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DX - H128

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December				
1	08:44		15:02 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24				06:33	07:26	07:24				08:19	14:51 (2)			
	16:15	23	15:25 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54				06:35	07:28	07:26				16:10	18	15:09 (2)		
2	08:44		15:03 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26				06:36	07:30	07:28				08:21		14:50 (2)		
	16:16	23	15:26 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				06:36	07:30	07:28				16:09	19	15:09 (2)		
3	08:44		15:02 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28				06:38	07:31	07:30				08:22		14:50 (2)		
	16:17	23	15:25 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50				06:38	07:31	07:30				16:08	20	15:10 (2)		
4	08:43		15:03 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30				06:40	07:33	07:32				08:24		14:51 (2)		
	16:18	23	15:26 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48				06:40	07:33	07:32				16:08	21	15:12 (2)		
5	08:43		15:04 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32				06:42	07:35	07:34				08:25		14:50 (2)		
	16:19	22	15:26 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46				06:42	07:35	07:34				16:07	22	15:12 (2)		
6	08:43		15:05 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34				06:43	07:37	07:36				08:26		14:51 (2)		
	16:21	22	15:27 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44				06:43	07:37	07:36				16:07	22	15:13 (2)		
7	08:42		15:05 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				06:45	07:39	07:38				08:28		14:51 (2)		
	16:22	22	15:27 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				06:45	07:39	07:38				16:06	22	15:13 (2)		
8	08:42		15:05 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38				06:47	07:41	07:40				08:29		14:51 (2)		
	16:23	21	15:26 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41				06:47	07:41	07:40				16:06	22	15:13 (2)		
9	08:41		15:07 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				06:49	07:42	07:42				08:30		14:52 (2)		
	16:25	20	15:27 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39				06:49	07:42	07:42				16:05	22	15:14 (2)		
10	08:40		15:08 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42				06:49	07:42	07:42				08:32		14:52 (2)		
	16:26	19	15:27 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37				06:49	07:42	07:42				16:05	23	15:15 (2)		
11	08:40		15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44				06:50	07:44	07:44				08:33		14:52 (2)		
	16:28	19	15:27 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35				06:50	07:44	07:44				16:05	23	15:15 (2)		
12	08:39		15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46				06:50	07:44	07:46				08:34		14:52 (2)		
	16:29	18	15:27 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34				06:52	07:46	07:46				16:05	23	15:15 (2)		
13	08:38		15:10 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47				06:52	07:46	07:47				08:35		14:52 (2)		
	16:31	17	15:27 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32				06:54	07:48	07:47				16:04	24	15:16 (2)		
14	08:37		15:12 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				06:54	07:48	07:49				08:36		14:54 (2)		
	16:33	14	15:26 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30				06:56	07:50	07:49				16:04	23	15:17 (2)		
15	08:36		15:13 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51				06:56	07:52	07:51				08:37		14:53 (2)		
	16:34	13	15:26 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				06:58	07:52	07:51				16:04	24	15:17 (2)		
16	08:35		15:15 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53				06:58	07:54	07:53				08:38		14:54 (2)		
	16:36	8	15:23 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27				06:59	07:54	07:53				16:05	23	15:17 (2)		
17	08:34		15:19 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55				06:59	07:55	07:55				08:39		14:54 (2)		
	16:38	2	15:21 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26				07:01	07:55	07:55				16:05	24	15:18 (2)		
18	08:33			07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				07:03	07:57	07:57				08:39		14:55 (2)		
	16:39			17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24				07:03	07:57	07:57				16:05	24	15:19 (2)		
19	08:32			07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				07:05	07:59	07:59				08:40		14:56 (2)		
	16:41			17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23				07:05	07:59	07:59				16:05	23	15:19 (2)		
20	08:31			07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00				07:06	08:01	08:00				08:41		14:56 (2)		
	16:43			17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22				07:06	08:01	08:00				16:05	23	15:19 (2)		
21	08:30			07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				07:08	08:03	08:02				08:41		14:57 (2)		
	16:45			17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20				07:08	08:03	08:02				16:06	23	15:20 (2)		
22	08:29			07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04				07:10	08:05	08:04				08:42		14:57 (2)		
	16:47			17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19				07:10	08:05	08:04				16:06	23	15:20 (2)		
23	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				07:12	08:07	08:06				08:42		14:58 (2)		
	16:49			17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18				07:12	08:07	08:06				16:07	23	15:21 (2)		
24	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08				07:13	08:09	08:08				08:43		14:58 (2)		
	16:50			17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17				07:13	08:09	08:08				16:07	23	15:21 (2)		
25	08:25			07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	08:11	08:09				07:15	08:11	08:09				14:57 (2)	08:43		14:58 (2)	
	16:52			17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:15				07:15	08:11	08:09				1	14:58 (2)	16:08	23	15:21 (2)
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11				07:17	08:13	08:11				14:54 (2)	08:43		14:58 (2)	
	16:54			17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14				07:17	08:13	08:11				8	15:02 (2)	16:09	24	15:22 (2)
27	08:22			07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13				07:19	08:15	08:13				14:53 (2)	08:44		15:00 (2)	
	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13				07:19	08:15	08:13				12	15:05 (2)	16:10	23	15:23 (2)
28	08:20			07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14				07:19	08:15	08:13				14:52 (2)	08:44		15:00 (2)	
	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12				07:21	08:16	08:14				14	15:06 (2)	16:10	23	15:23 (2)
29	08:19			07:17	06:10	05:57	05:06	04:57	05:34	06:27	07:22	08:18	08:16														

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DY - H129

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DZ - H130

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EA - H131

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EB - H132

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EC - H133

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: ED - H134

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EE - H135

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EF - H136

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EG - H137

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: EH - H138

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	06:27 (5) 06:56 (5)	05:03 21:45	05:34 (4) 22:00	04:59 21:25		06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	06:28 (5) 06:54 (5)	05:02 21:47	05:33 (4) 22:00	05:00 21:23	05:42 (4)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	06:29 (5) 06:53 (5)	05:01 21:48	05:32 (4) 21:59	05:00 21:21	05:40 (4) 05:46 (4)	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	06:29 (5) 06:52 (5)	05:00 21:49	05:31 (4) 21:59	05:01 21:59	05:39 (4) 05:47 (4)	05:44 21:19	06:38 20:11	07:32 19:57	08:25 16:48
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	06:31 (5) 06:50 (5)	04:59 21:50	05:31 (4) 21:58	05:02 21:58	05:39 (4) 05:48 (4)	05:46 21:17	06:40 20:09	07:32 18:55	08:25 16:46
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:49 21:04	06:33 (5) 06:49 (5)	04:59 21:51	05:32 (4) 21:58	05:03 21:58	05:38 (4) 05:50 (4)	05:47 21:16	06:42 20:06	07:35 18:53	08:26 16:45
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	06:35 (5) 06:46 (5)	04:58 21:52	05:33 (4) 21:57	05:04 21:57	05:38 (4) 05:50 (4)	05:49 21:14	06:44 20:04	07:37 18:50	08:28 16:43
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	06:46 (5) 21:53	04:57 05:42 (4)	05:05 21:56	05:05 21:56	05:38 (4) 05:51 (4)	05:51 21:12	06:45 20:00	07:39 18:41	08:29 16:41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	06:47 (5) 21:54	05:06 21:55	05:06 21:55	05:06 21:55	05:39 (4) 05:52 (4)	05:52 21:10	06:39 (5) 23 07:02 (5)	07:41 19:59	08:30 16:39
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	06:56 (5) 21:55	06:49 21:55	05:36 (4) 05:40 (4)	05:07 21:55	05:40 (4) 05:53 (4)	05:54 21:08	06:38 (5) 25 07:03 (5)	06:49 19:57	08:32 16:37
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	06:56 (5) 21:55	04:56 21:55	05:40 (4) 21:54	05:08 21:54	05:41 (4) 05:53 (4)	05:56 21:06	06:36 (5) 27 07:03 (5)	06:51 19:54	08:33 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	06:56 (5) 21:56	04:59 21:53	05:31 (4) 21:53	05:09 21:53	05:42 (4) 05:54 (4)	05:46 21:03	06:35 (5) 29 07:04 (5)	07:46 19:52	08:34 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	06:55 (5) 21:57	04:55 21:57	05:11 21:52	05:09 21:52	05:43 (4) 05:54 (4)	05:59 21:01	06:35 (5) 30 07:05 (5)	06:54 19:49	08:35 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	06:56 (5) 21:58	04:55 21:58	05:12 21:51	05:09 21:51	05:44 (4) 05:55 (4)	06:01 20:59	06:34 (5) 31 07:05 (5)	06:56 19:47	08:36 16:31
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	06:52 (5) 06:54 (5)	05:26 21:58	05:13 21:50	05:09 21:50	05:45 (4) 05:55 (4)	06:03 20:57	06:33 (5) 32 07:05 (5)	06:58 19:44	08:37 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	06:50 (5) 06:56 (5)	04:55 21:59	05:15 21:49	05:09 21:49	05:47 (4) 05:56 (4)	06:05 20:55	06:33 (5) 32 07:05 (5)	06:59 19:42	08:38 16:28
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	06:47 (5) 06:56 (5)	04:54 21:59	05:16 21:47	05:09 21:47	05:48 (4) 05:56 (4)	06:06 20:53	06:35 (5) 30 07:05 (5)	07:01 19:39	08:38 16:26
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	06:45 (5) 06:57 (5)	04:54 22:00	05:17 21:46	05:09 21:46	05:49 (4) 05:56 (4)	06:08 20:51	06:37 (5) 28 07:05 (5)	07:03 19:37	08:39 16:25
19	08:32 16:42	07:40 17:42	06:34 18:36	06:20 20:33	05:19 21:27	06:53 (5) 06:58 (5)	04:54 22:00	05:19 21:45	05:09 21:45	05:56 (4) 05:56 (4)	06:08 20:48	06:38 (5) 26 07:04 (5)	07:40 19:34	08:40 16:23
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	06:41 (5) 06:59 (5)	04:58 22:00	05:20 21:44	05:09 21:44	05:52 (4) 05:57 (4)	06:12 20:46	06:40 (5) 24 07:04 (5)	07:06 19:32	08:41 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	06:39 (5) 06:59 (5)	04:55 22:01	05:21 21:42	05:09 21:42	05:53 (4) 05:56 (4)	06:13 20:44	06:42 (5) 22 07:04 (5)	07:08 19:29	08:42 16:21
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	06:36 (5) 06:59 (5)	04:55 22:01	05:23 21:41	05:09 21:41	05:55 (4) 05:57 (4)	06:15 20:42	06:43 (5) 20 07:03 (5)	07:10 19:27	08:42 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	06:34 (5) 06:59 (5)	04:55 22:01	05:24 21:39	05:09 21:39	05:56 (4) 05:57 (4)	06:12 20:39	07:05 (5) 17 07:02 (5)	07:12 19:24	08:42 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	06:32 (5) 06:59 (5)	04:55 22:01	05:26 21:38	05:09 21:38	05:41 (4) 05:46 (4)	04:55 22:01	06:13 20:37	07:14 19:22	08:43 16:17
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	06:30 (5) 06:59 (5)	04:56 22:01	05:27 21:36	05:09 21:36	05:40 (4) 05:46 (4)	04:56 22:01	06:14 20:35	07:15 19:19	08:43 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	06:28 (5) 06:59 (5)	04:56 22:01	05:29 21:36	05:09 21:36	05:39 (4) 05:44 (4)	04:56 22:01	06:15 20:32	07:17 19:17	08:43 16:15
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	06:26 (5) 06:58 (5)	04:57 22:01	05:31 21:33	05:09 21:33	05:52 (4) 05:53 (4)	06:12 20:30	06:16 19:15	07:19 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	06:26 (5) 06:58 (5)	04:57 22:01	05:32 21:32	05:09 21:32	05:46 (4) 05:56 (5)	04:57 20:28	06:24 19:12	07:21 17:02	08:44 16:13
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	06:26 (5) 06:57 (5)	04:58 22:01	05:34 21:30	05:09 21:30	05:36 (4) 05:46 (4)	04:58 21:25	06:28 20:21	07:23 19:10	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	06:27 (5) 06:56 (5)	04:58 22:00	05:35 (4) 05:46 (4)	05:09 21:28	05:33 (4) 05:46 (4)	04:58 22:00	06:29 20:23	07:24 19:07	08:44 16:11
31	08:15 17:04		07:04 19:58	05:54 20:54	05:04 21:44	06:27 (5) 21:44	04:58 21:44	05:36 (4) 05:46 (4)	05:09 21:27	05:34 (4) 21:27	04:58 21:27	06:29 20:21	07:24 19:07	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case				341	225	107	186	495						
Sun reduction				0.35	0.38	0.32	0.32	0.34						
Oper. time red.				1.00	1.00	1.00	1.00	1.00						
Wind dir. red.				0.68	0.67	0.66	0.66	0.68						
Total reduction				0.24	0.26	0.21	0.21	0.23						
Total, real				81	57	22	39	114						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EI - H139

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EJ - H140

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EK - H141

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EL - H142

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:25 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:54	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: EM - H143

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01	07:25 (5)	05:52		06:18 (4)	05:03		05:34 (3)	
	16:15	17:06	18:02						20:00	27	07:52 (5)	20:55	8	06:26 (4)	21:45	3	05:37 (3)
2	08:44	08:12	07:14						06:59		07:26 (5)	05:50		06:16 (4)	05:02		05:33 (3)
	16:16	17:08	18:04						20:02	25	07:51 (5)	20:57	9	06:25 (4)	21:47	5	05:38 (3)
3	08:44	08:10	07:12						06:56		07:26 (5)	05:48		06:14 (4)	05:01		05:32 (3)
	16:17	17:10	18:06						20:04	23	07:49 (5)	20:59	10	06:24 (4)	21:48	6	05:38 (3)
4	08:43	08:09	07:09						06:54		07:27 (5)	05:46		06:12 (4)	05:00		05:31 (3)
	16:18	17:12	18:08						20:06	21	07:48 (5)	21:01	11	06:23 (4)	21:49	7	05:38 (3)
5	08:43	08:07	07:07						06:52		07:28 (5)	05:44		06:10 (4)	04:59		05:31 (3)
	16:20	17:14	18:10						20:08	18	07:46 (5)	21:03	11	06:21 (4)	21:50	8	05:39 (3)
6	08:43	08:05	07:05						06:49		07:30 (5)	05:42		06:13 (4)	04:59		05:30 (3)
	16:21	17:16	18:11						20:09	14	07:44 (5)	21:04	7	06:20 (4)	21:51	9	05:39 (3)
7	08:42	08:03	07:02						06:47		07:34 (5)	05:40			04:58		05:30 (3)
	16:22	17:18	18:13						20:11	6	07:40 (5)	21:06			21:52	10	05:40 (3)
8	08:42	08:01	07:00						06:44			05:38			04:57		05:29 (3)
	16:24	17:20	18:15						20:13			21:08			21:53	11	05:40 (3)
9	08:41	07:59	06:57						06:42			05:36			04:57		05:29 (3)
	16:25	17:22	18:17						20:15			21:10			21:54	11	05:40 (3)
10	08:40	07:57	06:55						06:40			05:35			04:56		05:28 (3)
	16:27	17:24	18:19						20:17			21:12			21:55	12	05:40 (3)
11	08:40	07:55	06:53						06:37			05:33			04:56		05:28 (3)
	16:28	17:26	18:21						20:19			21:13			21:55	13	05:41 (3)
12	08:39	07:53	06:50						06:35			05:31			04:56		05:28 (3)
	16:30	17:28	18:23						20:20			21:15			21:56	13	05:41 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:27 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	14	05:41 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:27 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	14	05:41 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:27 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	14	05:41 (3)
16	08:35	07:45	06:41						06:25			05:24			04:55		05:27 (3)
	16:36	17:36	18:30						20:28			21:22			21:59	15	05:42 (3)
17	08:34	07:43	06:38						06:23			05:22			04:54		05:27 (3)
	16:38	17:38	18:32						20:30			21:23			21:59	15	05:42 (3)
18	08:33	07:41	06:36						06:21			05:21			04:54		05:27 (3)
	16:40	17:40	18:34						20:32			21:25			22:00	15	05:42 (3)
19	08:32	07:39	06:33						06:18			05:19			04:54		05:27 (3)
	16:42	17:42	18:36						20:33			21:27			22:00	15	05:42 (3)
20	08:31	07:37	06:31						06:16			05:18			04:54		05:27 (3)
	16:43	17:44	18:38						20:35			21:28			22:00	15	05:42 (3)
21	08:30	07:34	06:28						06:14			05:16			04:55		05:27 (3)
	16:45	17:46	18:40						20:37			21:30			22:01	15	05:42 (3)
22	08:29	07:32	06:26					06:50 (5)	06:12			05:15			04:55		05:28 (3)
	16:47	17:48	18:42	1	06:51 (5)	20:39			20:39			21:31			22:01	15	05:43 (3)
23	08:27	07:30	06:23					06:47 (5)	06:09			05:13			04:55		05:28 (3)
	16:49	17:50	18:44	5	06:52 (5)	20:41			20:41			21:33			22:01	15	05:43 (3)
24	08:26	07:28	06:21					06:45 (5)	06:07			05:12			04:55		05:28 (3)
	16:51	17:52	18:45	8	06:53 (5)	20:43			20:43			21:34			22:01	15	05:43 (3)
25	08:25	07:25	06:18					06:42 (5)	06:05			05:11			04:56		05:29 (3)
	16:53	17:54	18:47	11	06:53 (5)	20:44			20:44			21:36			22:01	15	05:44 (3)
26	08:23	07:23	06:16					06:40 (5)	06:03			05:09			04:56		05:29 (3)
	16:54	17:56	18:49	14	06:54 (5)	20:46			20:46			21:37			22:01	15	05:44 (3)
27	08:22	07:21	06:14					06:37 (5)	06:01		06:26 (4)	05:08			04:57		05:30 (3)
	16:56	17:58	18:51	17	06:54 (5)	20:48	1	06:27 (4)	21:39			05:07			22:01	14	05:44 (3)
28	08:20	07:19	06:11					06:35 (5)	05:59			06:24 (4)			04:57		05:30 (3)
	16:58	18:00	18:53	19	06:54 (5)	20:50	3	06:27 (4)	21:40			05:06			22:01	14	05:44 (3)
29	08:19		07:09					07:32 (5)	05:56			06:22 (4)			04:58		05:31 (3)
	17:00		19:55	21	07:53 (5)	20:52	5	06:27 (4)	21:41						22:01	14	05:45 (3)
30	08:17		07:06					07:30 (5)	05:54			06:20 (4)		05:35 (3)	04:58		05:31 (3)
	17:02		19:56	23	07:53 (5)	20:54	7	06:27 (4)	21:43		1	05:36 (3)			22:00	13	05:44 (3)
31	08:15		07:04					07:27 (5)				05:04			05:34 (3)		
	17:04		19:58	25	07:52 (5)				21:44		2	05:36 (3)					
Potential sun hours	250	273	367						420			494			510		
Total, worst case					144				150				59		370		
Sun reduction					0.27				0.35				0.38		0.32		
Oper. time red.					1.00				1.00				1.00		1.00		
Wind dir. red.					0.67				0.67				0.67		0.66		
Total reduction					0.18				0.24				0.26		0.21		
Total, real					26				36				15		78		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EM - H143

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1 04:59	05:32 (3) 05:39		06:33	07:26	07:24	08:19
22:00	13 05:45 (3) 21:25		20:18	19:05	16:54	16:10
2 05:00	05:33 (3) 05:40		06:35	07:28	07:26	08:21
22:00	12 05:45 (3) 21:23		20:16	19:02	16:52	16:09
3 05:00	05:33 (3) 05:42		06:37	07:30	07:28	08:22
21:59	12 05:45 (3) 21:21		20:14	19:00	16:50	16:09
4 05:01	05:34 (3) 05:44		06:38	07:32	07:30	08:24
21:59	11 05:45 (3) 21:19		20:11	18:57	16:48	16:08
5 05:02	05:35 (3) 05:46		06:40	07:31 (5) 07:33	07:32	08:25
21:58	10 05:45 (3) 21:17		20:09	4 07:35 (5) 18:55	16:46	16:07
6 05:03	05:36 (3) 05:47		06:42	07:26 (5) 07:35	07:34	08:26
21:58	9 05:45 (3) 21:16		20:06	14 07:40 (5) 18:53	16:45	16:07
7 05:04	05:37 (3) 05:49		06:44	07:23 (5) 07:37	07:36	08:28
21:57	8 05:45 (3) 21:14	9 06:21 (4) 20:04	18 07:41 (5) 18:50	16:43	16:06	
8 05:05	05:38 (3) 05:51	06:20 (4) 06:45	07:21 (5) 07:39	07:38	08:29	
21:56	7 05:45 (3) 21:12	11 06:31 (4) 20:01	21 07:42 (5) 18:48	16:41	16:06	
9 05:06	05:39 (3) 05:52	06:22 (4) 06:47	07:20 (5) 07:41	07:40	08:30	
21:55	6 05:45 (3) 21:10	11 06:33 (4) 19:59	23 07:43 (5) 18:45	16:39	16:06	
10 05:07	05:40 (3) 05:54	06:24 (4) 06:49	07:19 (5) 07:43	07:42	08:32	
21:55	5 05:45 (3) 21:08	10 06:34 (4) 19:57	25 07:44 (5) 18:43	16:37	16:05	
11 05:08	05:41 (3) 05:56	06:25 (4) 06:51	07:18 (5) 07:44	07:44	08:33	
21:54	4 05:45 (3) 21:06	9 06:34 (4) 19:54	26 07:44 (5) 18:41	16:36	16:05	
12 05:09	05:42 (3) 05:58	06:27 (4) 06:52	07:19 (5) 07:46	07:46	08:34	
21:53	3 05:45 (3) 21:03	8 06:35 (4) 19:52	25 07:44 (5) 18:38	16:34	16:05	
13 05:11	05:43 (3) 05:59	06:29 (4) 06:54	07:21 (5) 07:48	07:47	08:35	
21:52	1 05:44 (3) 21:01	6 06:35 (4) 19:49	24 07:45 (5) 18:36	16:32	16:05	
14 05:12	06:01	06:30 (4) 06:56	07:22 (5) 07:50	07:49	08:36	
21:51	20:59	5 06:35 (4) 19:47	22 07:44 (5) 18:34	16:31	16:05	
15 05:13	06:03	06:32 (4) 06:58	07:24 (5) 07:52	07:51	08:37	
21:50	20:57	3 06:35 (4) 19:44	19 07:43 (5) 18:31	16:29	16:05	
16 05:14	06:05	06:33 (4) 06:59	07:26 (5) 07:54	07:53	08:38	
21:49	20:55	1 06:34 (4) 19:42	17 07:43 (5) 18:29	16:28	16:05	
17 05:16	06:06	07:01	07:28 (5) 07:56	07:55	08:39	
21:47	20:53	19:39	15 07:43 (5) 18:27	16:26	16:05	
18 05:17	06:08	07:03	07:29 (5) 07:57	07:57	08:39	
21:46	20:51	19:37	12 07:41 (5) 18:24	16:25	16:05	
19 05:19	06:10	07:05	07:31 (5) 07:59	07:59	08:40	
21:45	20:48	19:34	9 07:40 (5) 18:22	16:23	16:05	
20 05:20	06:12	07:07	07:33 (5) 08:01	08:01	08:41	
21:44	20:46	19:32	6 07:39 (5) 18:20	16:22	16:06	
21 05:21	06:13	07:08	07:35 (5) 08:03	08:02	08:41	
21:42	20:44	19:29	2 07:37 (5) 18:18	16:21	16:06	
22 05:23	06:15	07:10	08:05	08:04	08:42	
21:41	20:42	19:27	18:15	16:19	16:07	
23 05:24	06:17	07:12	08:07	08:06	08:42	
21:39	20:39	19:24	18:13	16:18	16:07	
24 05:26	06:19	07:14	08:09	08:08	08:43	
21:38	20:37	19:22	18:11	16:17	16:08	
25 05:27	06:21	07:15	07:11	08:09	08:43	
21:36	20:35	19:19	17:09	16:16	16:08	
26 05:29	06:22	07:17	07:13	08:11	08:43	
21:35	20:32	19:17	17:07	16:15	16:09	
27 05:31	06:24	07:19	07:15	08:13	08:44	
21:33	20:30	19:15	17:05	16:14	16:10	
28 05:32	06:26	07:21	07:17	08:14	08:44	
21:32	20:28	19:12	17:02	16:13	16:11	
29 05:34	06:28	07:23	07:19	08:16	08:44	
21:30	20:25	19:10	17:00	16:12	16:12	
30 05:35	06:29	07:24	07:20	08:18	08:44	
21:28	20:23	19:07	16:58	16:11	16:13	
31 05:37	06:31		07:22		08:44	
21:27	20:21		16:56		16:14	
Potential sun hours	512	460	382	328	259	233
Total, worst case	101	73	282			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.67	0.67			
Total reduction	0.21	0.23	0.22			
Total, real	22	17	61			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EN - H144

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:07 (5)	08:14	15:26 (4)	07:16	17:05 (3)	07:01	05:52	19:18 (2)	05:03	
	16:15	30	15:37 (4)	17:06	40	16:06 (4)	18:02	20:00	20:55	34	19:52 (2)
2	08:44	15:07 (5)	08:12	15:26 (4)	07:14	17:05 (3)	06:59	05:50	19:19 (2)	05:02	
	16:16	32	15:39 (4)	17:08	39	16:05 (4)	18:04	20:02	20:57	32	19:51 (2)
3	08:44	15:07 (5)	08:10	15:27 (4)	07:12	17:06 (3)	06:56	05:48	19:20 (2)	05:01	
	16:17	32	15:39 (4)	17:10	38	16:05 (4)	18:06	20:04	20:59	29	19:49 (2)
4	08:43	15:09 (5)	08:08	15:28 (4)	07:09	17:07 (3)	06:54	05:46	19:21 (2)	05:00	
	16:18	32	15:41 (4)	17:12	36	16:04 (4)	18:07	20:06	21:01	27	19:48 (2)
5	08:43	15:09 (5)	08:07	15:29 (4)	07:07	17:08 (3)	06:51	05:44	19:22 (2)	04:59	
	16:19	33	15:42 (4)	17:14	34	16:03 (4)	18:09	20:07	21:03	24	19:46 (2)
6	08:43	15:10 (5)	08:05	15:31 (4)	07:04	17:10 (3)	06:49	19:39 (2)	05:42	19:24 (2)	04:59
	16:21	34	15:44 (4)	17:16	31	16:02 (4)	18:11	20:09	2	19:41 (2)	21:04
7	08:42	15:10 (5)	08:03	15:32 (4)	07:02	17:14 (3)	06:47	19:31 (2)	05:40	19:28 (2)	04:58
	16:22	35	15:45 (4)	17:18	28	16:00 (4)	18:13	4	17:18 (3)	20:11	12
8	08:42	15:11 (5)	08:01	15:34 (4)	07:00		06:44	19:28 (2)	05:38	19:33 (2)	04:57
	16:24	35	15:46 (4)	17:20	25	15:59 (4)	18:15	20:13	18	19:46 (2)	21:08
9	08:41	15:12 (5)	07:59	15:37 (4)	06:57		06:42	19:26 (2)	05:36		04:57
	16:25	37	15:49 (4)	17:22	20	15:57 (4)	18:17	20:15	22	19:48 (2)	21:10
10	08:40	15:13 (5)	07:57	15:41 (4)	06:55		06:39	19:23 (2)	05:34		04:56
	16:26	37	15:50 (4)	17:24	13	15:54 (4)	18:19	20:17	26	19:49 (2)	21:11
11	08:40	15:14 (5)	07:55		06:53		06:37	19:22 (2)	05:33		04:56
	16:28	38	15:52 (4)	17:26		18:21	20:19	29	19:51 (2)	21:13	21:55
12	08:39	15:15 (5)	07:53		06:50		06:35	19:21 (2)	05:31		04:55
	16:30	39	15:54 (4)	17:28		18:23	20:20	32	19:53 (2)	21:15	21:56
13	08:38	15:17 (5)	07:51		06:48		06:32	19:19 (2)	05:29		04:55
	16:31	38	15:55 (4)	17:30		18:25	20:22	35	19:54 (2)	21:17	21:57
14	08:37	15:18 (5)	07:49		06:45		06:30	19:18 (2)	05:27		04:55
	16:33	39	15:57 (4)	17:32		18:27	20:24	38	19:56 (2)	21:18	21:58
15	08:36	15:20 (4)	07:47		06:43		06:28	19:18 (2)	05:26		04:55
	16:34	39	15:59 (4)	17:34		18:28	20:26	40	19:58 (2)	21:20	21:58
16	08:35	15:19 (4)	07:45		06:40		06:25	19:17 (2)	05:24		04:54
	16:36	41	16:00 (4)	17:36		18:30	20:28	41	19:58 (2)	21:22	21:59
17	08:34	15:20 (4)	07:43		06:38		06:23	19:16 (2)	05:22		04:54
	16:38	42	16:02 (4)	17:38		18:32	20:30	42	19:58 (2)	21:23	21:59
18	08:33	15:20 (4)	07:41		06:35		06:21	19:15 (2)	05:21		04:54
	16:40	44	16:04 (4)	17:40		18:34	20:31	43	19:58 (2)	21:25	22:00
19	08:32	15:20 (4)	07:39	17:10 (3)	06:33		06:18	19:15 (2)	05:19		04:54
	16:41	45	16:05 (4)	17:42	3	17:13 (3)	18:36	20:33	43	19:58 (2)	21:27
20	08:31	15:20 (4)	07:36	17:09 (3)	06:31		06:16	19:15 (2)	05:18		04:54
	16:43	44	16:04 (4)	17:44	7	17:16 (3)	18:38	20:35	43	19:58 (2)	21:28
21	08:30	15:21 (4)	07:34	17:08 (3)	06:28		06:14	19:14 (2)	05:16		04:54
	16:45	44	16:05 (4)	17:46	10	17:18 (3)	18:40	20:37	43	19:57 (2)	21:30
22	08:29	15:20 (4)	07:32	17:06 (3)	06:26		06:12	19:14 (2)	05:15		04:55
	16:47	45	16:05 (4)	17:48	13	17:19 (3)	18:42	20:39	43	19:57 (2)	21:31
23	08:27	15:21 (4)	07:30	17:06 (3)	06:23		06:09	19:14 (2)	05:13		04:55
	16:49	45	16:06 (4)	17:50	16	17:22 (3)	18:43	20:41	43	19:57 (2)	21:33
24	08:26	15:21 (4)	07:28	17:05 (3)	06:21		06:07	19:14 (2)	05:12		04:55
	16:50	45	16:06 (4)	17:52	19	17:24 (3)	18:45	20:43	43	19:57 (2)	21:34
25	08:24	15:22 (4)	07:25	17:04 (3)	06:18		06:05	19:14 (2)	05:11		04:55
	16:52	44	16:06 (4)	17:54	22	17:26 (3)	18:47	20:44	42	19:56 (2)	21:36
26	08:23	15:22 (4)	07:23	17:04 (3)	06:16		06:03	19:15 (2)	05:09		04:56
	16:54	44	16:06 (4)	17:56	24	17:28 (3)	18:49	20:46	41	19:56 (2)	21:37
27	08:22	15:22 (4)	07:21	17:05 (3)	06:13		06:01	19:15 (2)	05:08		04:56
	16:56	44	16:06 (4)	17:58	26	17:31 (3)	18:51	20:48	40	19:55 (2)	21:39
28	08:20	15:23 (4)	07:18	17:04 (3)	06:11		05:58	19:16 (2)	05:07		04:57
	16:58	44	16:07 (4)	18:00	27	17:31 (3)	18:53	20:50	39	19:55 (2)	21:40
29	08:19	15:23 (4)			07:09		05:56	19:16 (2)	05:06		04:57
	17:00	43	16:06 (4)		19:54		20:52	38	19:54 (2)	21:41	22:01
30	08:17	15:24 (4)			07:06		05:54	19:17 (2)	05:05		04:58
	17:02	42	16:06 (4)		19:56		20:54	36	19:53 (2)	21:43	22:00
31	08:15	15:24 (4)			07:04				05:04		
	17:04	41	16:05 (4)		19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case	1227		471		128		874		183		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.66		0.67		0.66		0.66		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	196		73		23		203		46		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: EN - H144

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:21 (2) 19:50 (2)	07:26 16:54	15:09 (4) 15:24 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	19:22 (2) 19:48 (2)	07:28 16:52	15:06 (4) 15:27 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	19:24 (2) 19:46 (2)	07:30 16:50	15:04 (4) 15:29 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	19:25 (2) 19:43 (2)	07:31 16:48	15:02 (4) 15:30 (4)
5	05:02 21:58	05:45 21:17	19:39 (2) 19:48 (2)	06:40 20:09	07:33 16:46	15:00 (4) 15:32 (4)
6	05:03 21:58	05:47 21:15	19:36 (2) 19:52 (2)	06:42 20:06	07:34 16:44	15:34 (4) 15:33 (4)
7	05:04 21:57	05:49 21:14	19:34 (2) 19:55 (2)	06:43 20:04	07:36 16:43	15:31 (4) 16:06
8	05:05 21:56	05:51 21:12	19:31 (2) 19:56 (2)	06:45 20:01	07:38 16:41	14:57 (4) 15:34 (4)
9	05:06 21:55	05:52 21:10	19:30 (2) 19:58 (2)	06:47 19:59	07:40 16:39	14:56 (4) 16:05
10	05:07 21:55	05:54 21:08	19:28 (2) 19:58 (2)	06:49 19:56	07:42 16:37	14:56 (4) 16:05
11	05:08 21:54	05:56 21:05	19:27 (2) 19:59 (2)	06:50 19:54	07:44 16:35	14:56 (4) 16:05
12	05:09 21:53	05:57 21:03	19:26 (2) 20:01 (2)	06:52 19:51	07:45 16:34	14:55 (4) 16:05
13	05:10 21:52	05:59 21:01	19:24 (2) 20:01 (2)	06:54 19:49	07:47 16:32	14:55 (4) 16:05
14	05:12 21:51	06:01 20:59	19:23 (2) 20:02 (2)	06:56 19:47	07:49 16:31	14:55 (4) 16:04
15	05:13 21:50	06:03 20:57	19:23 (2) 20:02 (2)	06:58 19:44	07:51 16:29	14:55 (4) 16:05
16	05:14 21:49	06:04 20:55	19:21 (2) 20:02 (2)	06:59 19:42	07:53 16:27	14:55 (4) 16:05
17	05:16 21:47	06:06 20:53	19:21 (2) 20:03 (2)	07:01 19:39	07:55 16:26	14:55 (4) 16:05
18	05:17 21:46	06:08 20:51	19:21 (2) 20:03 (2)	07:03 19:37	07:57 16:24	14:55 (4) 16:05
19	05:18 21:45	06:10 20:48	19:20 (2) 20:03 (2)	07:05 19:34	07:59 16:23	14:55 (4) 16:05
20	05:20 21:44	06:12 20:46	19:19 (2) 20:03 (2)	07:06 19:32	08:00 16:22	14:55 (4) 16:06
21	05:21 21:42	06:13 20:44	19:19 (2) 20:03 (2)	07:08 19:29	08:02 16:20	14:56 (4) 16:06
22	05:23 21:41	06:15 20:42	19:18 (2) 20:02 (2)	07:10 19:27	08:04 16:19	14:56 (4) 16:06
23	05:24 21:39	06:17 20:39	19:19 (2) 20:02 (2)	07:12 19:24	08:06 16:18	14:56 (4) 16:07
24	05:26 21:38	06:19 20:37	19:19 (2) 20:02 (2)	07:13 19:22	08:08 16:17	14:57 (4) 16:08
25	05:27 21:36	06:20 20:35	19:18 (2) 20:01 (2)	07:15 19:19	08:09 16:16	14:58 (4) 16:08
26	05:29 21:35	06:22 20:32	19:18 (2) 20:01 (2)	07:17 19:17	08:11 16:14	14:58 (4) 16:09
27	05:30 21:33	06:24 20:30	19:19 (2) 20:00 (2)	07:19 19:14	08:13 16:13	14:59 (4) 16:10
28	05:32 21:32	06:26 20:28	19:18 (2) 19:59 (2)	07:21 19:12	08:14 16:12	14:58 (5) 16:11
29	05:34 21:30	06:28 20:25	19:19 (2) 19:57 (2)	07:22 19:09	08:16 16:12	14:57 (5) 16:11
30	05:35 21:28	06:29 20:23	19:20 (2) 19:55 (2)	07:24 19:07	08:18 16:11	14:56 (5) 16:12
31	05:37 21:27	06:31 20:21	19:20 (2) 19:52 (2)	07:22 16:56	08:44 16:13	15:06 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		970	112	299	1163	932
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.66	0.67	0.66	0.65
Total reduction		0.23	0.21	0.20	0.17	0.14
Total, real		218	24	59	203	126

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EO - H145

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	15:16 (3) 08:14	15:32 (2) 07:16	15:41 (2) 07:01	15:52 (2) 06:53	16:03 (2) 06:44	16:14 (2) 06:35	16:25 (2) 06:16	16:36 (2) 06:07	16:47 (2) 05:58	16:58 (2) 05:49	17:09 (2) 05:40	17:20 (2) 05:31
2 08:44	15:16 (3) 08:12	15:32 (2) 07:14	15:41 (2) 06:59	15:52 (2) 06:50	16:03 (2) 06:41	16:14 (2) 06:32	16:25 (2) 06:23	16:36 (2) 06:14	16:47 (2) 06:05	16:58 (2) 05:56	17:09 (2) 05:47	17:20 (2) 05:38
3 08:44	15:16 (3) 08:10	15:32 (2) 07:12	15:41 (2) 06:57	15:52 (2) 06:48	16:03 (2) 06:39	16:14 (2) 06:30	16:25 (2) 06:21	16:36 (2) 06:12	16:47 (2) 06:03	16:58 (2) 05:54	17:09 (2) 05:45	17:20 (2) 05:36
4 08:43	15:17 (3) 08:08	15:33 (2) 07:09	15:42 (2) 06:50	15:53 (2) 06:41	16:04 (2) 06:32	16:15 (2) 06:23	16:26 (2) 06:14	16:37 (2) 06:05	16:48 (2) 05:56	16:59 (2) 05:47	17:10 (2) 05:38	17:21 (2) 05:29
5 08:43	15:17 (3) 08:07	15:34 (2) 07:07	15:43 (2) 06:51	15:54 (2) 06:42	16:05 (2) 06:33	16:16 (2) 06:24	16:27 (2) 06:15	16:38 (2) 06:06	16:49 (2) 05:57	17:00 (2) 05:48	17:11 (2) 05:39	17:22 (2) 05:30
6 08:43	15:18 (3) 08:05	15:35 (2) 07:04	15:44 (2) 06:49	15:55 (2) 06:40	16:06 (2) 06:34	16:17 (2) 06:26	16:28 (2) 06:17	16:39 (2) 06:08	16:50 (2) 05:59	17:01 (2) 05:50	17:12 (2) 05:41	17:23 (2) 05:32
7 08:42	15:18 (3) 08:03	15:36 (2) 07:02	15:45 (2) 06:47	15:56 (2) 06:40	16:07 (2) 06:36	16:18 (2) 06:28	16:29 (2) 06:19	16:40 (2) 06:10	16:51 (2) 06:01	17:02 (2) 05:52	17:13 (2) 05:43	17:24 (2) 05:34
8 08:42	15:19 (3) 08:01	15:37 (2) 07:00	15:46 (2) 06:44	15:57 (2) 06:44	16:08 (2) 06:38	16:19 (2) 06:30	16:30 (2) 06:22	16:41 (2) 06:13	16:52 (2) 06:04	17:03 (2) 05:55	17:14 (2) 05:46	17:25 (2) 05:35
9 08:41	15:20 (3) 07:59	15:39 (2) 06:57	15:48 (2) 06:42	15:59 (2) 06:36	16:10 (2) 06:25	16:21 (2) 06:16	16:32 (2) 06:08	16:43 (2) 06:00	16:54 (2) 05:52	17:05 (2) 05:43	17:16 (2) 05:34	17:27 (2) 05:25
10 08:40	15:21 (3) 07:57	15:40 (2) 06:55	15:49 (2) 06:39	16:00 (2) 06:30	16:11 (2) 06:21	16:22 (2) 06:12	16:33 (2) 06:03	16:44 (2) 05:54	16:55 (2) 05:45	17:06 (2) 05:36	17:17 (2) 05:27	17:28 (2) 05:18
11 08:40	15:21 (3) 07:55	15:44 (2) 06:53	15:53 (2) 06:37	16:04 (2) 06:25	16:15 (2) 06:15	16:26 (2) 06:06	16:37 (2) 05:57	16:48 (2) 05:48	16:59 (2) 05:39	17:10 (2) 05:30	17:21 (2) 05:21	17:32 (2) 05:12
12 08:39	15:22 (3) 07:53	15:48 (2) 06:50	15:57 (2) 06:35	16:08 (2) 06:26	16:19 (2) 06:17	16:30 (2) 06:08	16:41 (2) 05:59	16:52 (2) 05:50	17:03 (2) 05:41	17:14 (2) 05:32	17:25 (2) 05:23	17:36 (2) 05:14
13 08:38	15:23 (3) 07:51	15:51 (2) 06:48	16:00 (2) 06:32	16:11 (2) 06:22	16:22 (2) 06:12	16:33 (2) 06:03	16:44 (2) 05:54	16:55 (2) 05:46	17:06 (2) 05:37	17:17 (2) 05:28	17:28 (2) 05:19	17:39 (2) 05:10
14 08:37	15:24 (3) 07:49	15:52 (2) 06:46	16:01 (2) 06:30	16:12 (2) 06:21	16:23 (2) 06:11	16:34 (2) 06:01	16:45 (2) 05:51	16:56 (2) 05:42	17:07 (2) 05:33	17:18 (2) 05:24	17:29 (2) 05:15	17:40 (2) 05:06
15 08:36	15:25 (3) 07:47	15:53 (2) 06:44	16:02 (2) 06:28	16:13 (2) 06:20	16:24 (2) 06:13	16:35 (2) 06:02	16:46 (2) 05:52	16:57 (2) 05:43	17:08 (2) 05:34	17:19 (2) 05:25	17:30 (2) 05:16	17:41 (2) 05:07
16 08:35	15:26 (3) 07:45	15:54 (2) 06:42	16:03 (2) 06:26	16:14 (2) 06:19	16:25 (2) 06:17	16:36 (2) 06:04	16:47 (2) 05:54	16:58 (2) 05:45	17:09 (2) 05:36	17:20 (2) 05:27	17:31 (2) 05:18	17:42 (2) 05:09
17 08:34	15:27 (3) 07:43	15:55 (2) 06:40	16:04 (2) 06:24	16:15 (2) 06:21	16:26 (2) 06:19	16:37 (2) 06:06	16:48 (2) 05:56	16:59 (2) 05:47	17:10 (2) 05:38	17:21 (2) 05:29	17:32 (2) 05:20	17:43 (2) 05:11
18 08:33	15:28 (3) 07:41	15:56 (2) 06:38	16:05 (2) 06:22	16:16 (2) 06:22	16:27 (2) 06:20	16:38 (2) 06:08	16:49 (2) 05:57	17:00 (2) 05:48	17:11 (2) 05:39	17:22 (2) 05:30	17:33 (2) 05:21	17:44 (2) 05:12
19 08:32	15:29 (3) 07:39	15:57 (2) 06:36	16:06 (2) 06:20	16:17 (2) 06:23	16:28 (2) 06:21	16:39 (2) 06:10	16:50 (2) 05:58	17:01 (2) 05:49	17:12 (2) 05:40	17:23 (2) 05:31	17:34 (2) 05:22	17:45 (2) 05:13
20 08:31	15:30 (3) 07:36	15:58 (2) 06:34	16:07 (2) 06:18	16:18 (2) 06:24	16:29 (2) 06:22	16:40 (2) 06:12	16:51 (2) 06:00	17:02 (2) 05:51	17:13 (2) 05:42	17:24 (2) 05:33	17:35 (2) 05:24	17:46 (2) 05:14
21 08:30	15:31 (3) 07:34	15:59 (2) 06:32	16:08 (2) 06:16	16:19 (2) 06:25	16:30 (2) 06:23	16:41 (2) 06:14	16:52 (2) 06:02	17:03 (2) 05:53	17:14 (2) 05:44	17:25 (2) 05:35	17:36 (2) 05:26	17:47 (2) 05:15
22 08:29	15:32 (3) 07:32	16:00 (2) 06:30	16:09 (2) 06:14	16:20 (2) 06:26	16:31 (2) 06:24	16:42 (2) 06:16	16:53 (2) 06:04	17:04 (2) 05:55	17:15 (2) 05:46	17:26 (2) 05:37	17:37 (2) 05:28	17:48 (2) 05:16
23 08:27	15:33 (3) 07:30	16:01 (2) 06:28	16:10 (2) 06:12	16:21 (2) 06:27	16:32 (2) 06:25	16:43 (2) 06:18	16:54 (2) 06:06	17:05 (2) 05:57	17:16 (2) 05:48	17:27 (2) 05:39	17:38 (2) 05:30	17:49 (2) 05:18
24 08:26	15:34 (3) 07:28	16:02 (2) 06:26	16:11 (2) 06:10	16:22 (2) 06:25	16:33 (2) 06:26	16:44 (2) 06:20	16:55 (2) 06:08	17:06 (2) 05:59	17:17 (2) 05:50	17:28 (2) 05:41	17:39 (2) 05:32	17:50 (2) 05:19
25 08:25	15:35 (3) 07:25	16:03 (2) 06:24	16:12 (2) 06:08	16:23 (2) 06:23	16:34 (2) 06:25	16:45 (2) 06:18	16:56 (2) 06:06	17:07 (2) 05:57	17:18 (2) 05:48	17:29 (2) 05:39	17:40 (2) 05:30	17:51 (2) 05:16
26 08:23	15:36 (3) 07:23	16:04 (2) 06:22	16:13 (2) 06:06	16:24 (2) 06:21	16:35 (2) 06:23	16:46 (2) 06:16	16:57 (2) 06:04	17:08 (2) 05:55	17:19 (2) 05:46	17:30 (2) 05:37	17:41 (2) 05:28	17:52 (2) 05:13
27 08:22	15:37 (3) 07:21	16:05 (2) 06:20	16:14 (2) 06:04	16:25 (2) 06:19	16:36 (2) 06:21	16:47 (2) 06:14	16:58 (2) 06:02	17:09 (2) 05:53	17:20 (2) 05:44	17:31 (2) 05:35	17:42 (2) 05:26	17:53 (2) 05:10
28 08:20	15:38 (3) 07:19	16:06 (2) 06:18	16:15 (2) 06:02	16:26 (2) 06:17	16:37 (2) 06:20	16:48 (2) 06:12	16:59 (2) 06:00	17:10 (2) 05:51	17:21 (2) 05:42	17:32 (2) 05:33	17:43 (2) 05:24	17:54 (2) 05:08
29 08:19	15:39 (3) 07:17	16:07 (2) 06:16	16:16 (2) 06:00	16:27 (2) 06:15	16:38 (2) 06:17	16:49 (2) 06:10	17:00 (2) 05:58	17:11 (2) 05:49	17:22 (2) 05:40	17:33 (2) 05:31	17:44 (2) 05:22	17:55 (2) 05:05
30 08:17	15:40 (3) 07:15	16:08 (2) 06:14	16:17 (2) 05:58	16:28 (2) 06:13	16:39 (2) 06:15	16:50 (2) 06:08	17:01 (2) 05:56	17:12 (2) 05:47	17:23 (2) 05:38	17:34 (2) 05:29	17:45 (2) 05:20	17:56 (2) 04:59
31 08:15	15:41 (3) 07:13	16:09 (2) 06:12	16:18 (2) 05:56	16:29 (2) 06:11	16:40 (2) 06:13	16:51 (2) 06:06	17:02 (2) 05:54	17:13 (2) 05:45	17:24 (2) 05:36	17:35 (2) 05:27	17:46 (2) 05:18	17:57 (2) 04:56
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	897	312										618
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.66	0.66										0.65
Total reduction	0.16	0.15										0.14
Total, real	144	48										84

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EP - H146

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	15:17 (3) 08:14	15:35 (2) 07:16	16:15 (2) 07:01	16:52 05:05	17:01 05:03	17:00 04:59	17:00 05:39	17:00 06:33	17:00 07:26	17:00 07:24	15:07 (2) 08:19	15:04 (3) 08:23
2 08:44	15:18 (3) 08:12	15:35 (2) 07:14	16:15 (2) 07:00	16:59 05:50	17:02 05:02	17:00 04:59	17:00 05:40	17:00 06:35	17:00 07:28	16:54 36 15:43 (2) 16:10	22 15:26 (3) 08:23	
3 08:44	15:19 (3) 08:10	15:36 (2) 07:12	16:16 (2) 07:02	17:00 05:51	17:03 05:04	17:00 05:41	17:00 06:36	17:00 07:30	17:00 07:28	15:06 (2) 08:21	15:03 (3) 08:23	
4 08:43	15:18 (3) 08:08	15:35 (2) 07:09	16:15 (2) 07:00	17:00 05:46	17:00 05:01	17:00 05:41	17:00 06:36	17:00 07:30	17:00 07:28	15:07 (2) 16:09	23 15:26 (3) 08:23	
5 08:43	15:18 (3) 08:07	15:35 (2) 07:07	16:15 (2) 07:00	17:00 05:44	17:00 05:01	17:00 05:41	17:00 06:36	17:00 07:30	17:00 07:28	15:08 (2) 16:08	23 15:27 (3) 08:23	
6 08:43	15:19 (3) 08:05	15:36 (2) 07:04	16:16 (2) 07:01	17:00 05:42	17:00 05:02	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:09 (2) 16:08	23 15:28 (3) 08:23	
7 08:42	15:19 (3) 08:03	15:36 (2) 07:02	16:16 (2) 07:00	17:00 05:40	17:00 05:02	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:10 (2) 16:07	24 15:29 (3) 08:23	
8 08:42	15:20 (3) 08:01	15:36 (2) 07:00	16:16 (2) 07:00	17:00 05:38	17:00 05:05	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:11 (2) 16:06	24 15:29 (3) 08:23	
9 08:41	15:21 (3) 07:59	15:37 (2) 06:57	16:17 (2) 06:57	17:00 05:36	17:00 05:06	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:12 (2) 16:06	24 15:29 (3) 08:23	
10 08:40	15:21 (3) 07:57	15:38 (2) 06:55	16:18 (2) 06:55	17:00 05:34	17:00 05:07	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:13 (2) 16:05	21 15:28 (3) 08:23	
11 08:40	15:22 (3) 07:55	15:38 (2) 06:53	16:18 (2) 06:53	17:00 05:33	17:00 05:08	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:14 (2) 16:05	21 15:28 (3) 08:23	
12 08:39	15:22 (3) 07:53	15:40 (2) 06:50	16:19 (2) 06:50	17:00 05:31	17:00 05:09	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:15 (2) 16:05	20 15:27 (3) 08:23	
13 08:38	15:23 (3) 07:51	15:40 (2) 06:48	16:19 (2) 06:48	17:00 05:29	17:00 05:10	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:16 (2) 16:05	19 15:26 (3) 08:23	
14 08:37	15:24 (3) 07:49	15:41 (2) 06:45	16:20 (2) 06:45	17:00 05:27	17:00 05:12	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:17 (2) 16:04	17 15:26 (3) 08:23	
15 08:36	15:24 (3) 07:47	15:43 (2) 06:43	16:20 (2) 06:43	17:00 05:26	17:00 05:13	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:18 (2) 16:04	17 15:26 (3) 08:23	
16 08:35	15:25 (3) 07:45	15:45 (2) 06:40	16:21 (2) 06:40	17:00 05:24	17:00 05:14	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:19 (2) 16:03	15 15:25 (3) 08:23	
17 08:34	15:26 (3) 07:43	15:49 (2) 06:38	16:22 (2) 06:38	17:00 05:22	17:00 05:16	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:20 (2) 16:03	15 15:25 (3) 08:23	
18 08:33	15:27 (3) 07:41	15:54 (2) 06:36	16:23 (2) 06:36	17:00 05:21	17:00 05:17	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:21 (2) 16:03	15 15:25 (3) 08:23	
19 08:32	15:29 (3) 07:39	15:57 (2) 06:33	16:24 (2) 06:33	17:00 05:19	17:00 05:18	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:22 (2) 16:03	15 15:25 (3) 08:23	
20 08:31	15:30 (3) 07:36	16:01 (2) 06:30	16:25 (2) 06:30	17:00 05:18	17:00 05:20	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:23 (2) 16:03	15 15:25 (3) 08:23	
21 08:30	15:33 (3) 07:34	16:04 (2) 06:28	16:26 (2) 06:28	17:00 05:16	17:00 05:21	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:24 (2) 16:03	15 15:25 (3) 08:23	
22 08:29	15:37 (2) 07:32	16:06 (2) 06:26	16:27 (2) 06:26	17:00 05:15	17:00 05:23	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:25 (2) 16:03	15 15:25 (3) 08:23	
23 08:27	15:37 (2) 07:30	16:07 (2) 06:24	16:28 (2) 06:24	17:00 05:13	17:00 05:24	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:26 (2) 16:03	15 15:25 (3) 08:23	
24 08:26	15:38 (2) 07:28	16:08 (2) 06:23	16:29 (2) 06:23	17:00 05:12	17:00 05:26	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:27 (2) 16:03	15 15:25 (3) 08:23	
25 08:25	15:38 (2) 07:25	16:09 (2) 06:22	16:30 (2) 06:22	17:00 05:11	17:00 05:27	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:28 (2) 16:03	15 15:25 (3) 08:23	
26 08:23	15:39 (2) 07:23	16:10 (2) 06:21	16:31 (2) 06:21	17:00 05:10	17:00 05:29	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:29 (2) 16:03	15 15:25 (3) 08:23	
27 08:22	15:39 (2) 07:21	16:11 (2) 06:20	16:32 (2) 06:20	17:00 05:09	17:00 05:30	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:30 (2) 16:03	15 15:25 (3) 08:23	
28 08:20	15:40 (2) 07:19	16:12 (2) 06:19	16:33 (2) 06:19	17:00 05:08	17:00 05:32	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:31 (2) 16:03	15 15:25 (3) 08:23	
29 08:19	15:41 (2) 07:17	16:13 (2) 06:18	16:34 (2) 06:18	17:00 05:07	17:00 05:34	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:32 (2) 16:03	15 15:25 (3) 08:23	
30 08:17	15:42 (2) 07:15	16:14 (2) 06:17	16:35 (2) 06:17	17:00 05:06	17:00 05:36	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:33 (2) 16:03	15 15:25 (3) 08:23	
31 08:15	15:43 (2) 07:13	16:15 (2) 06:16	16:36 (2) 06:16	17:00 05:05	17:00 05:38	17:00 05:42	17:00 06:37	17:00 07:31	17:00 07:30	15:34 (2) 16:03	15 15:25 (3) 08:23	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	888	581										
Sun reduction	0.24	0.23										
Oper. time red.	1.00	1.00										
Wind dir. red.	0.66	0.66										
Total reduction	0.16	0.15										
Total, real	142	89										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EQ - H147

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: ER - H148

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:09 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:36 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: ES - H149

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: ET - H150

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:27 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:12 (1)										
	16:15	10	15:37 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	21	15:33 (1)								
2	08:44	15:28 (1)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	15:12 (1)										
	16:16	10	15:38 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	21	15:33 (1)								
3	08:44	15:27 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	15:12 (1)										
	16:17	12	15:39 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	20	15:32 (1)								
4	08:43	15:28 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	15:13 (1)										
	16:18	13	15:41 (1)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	19	15:32 (1)								
5	08:43	15:28 (1)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	15:13 (1)										
	16:19	14	15:42 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	17	15:30 (1)								
6	08:43	15:28 (1)	08:05	07:05	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:27	15:15 (1)										
	16:21	16	15:44 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	16:07	15	15:30 (1)								
7	08:42	15:28 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	15:15 (1)										
	16:22	17	15:45 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	14	15:29 (1)								
8	08:42	15:28 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	15:16 (1)										
	16:24	18	15:46 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	13	15:29 (1)								
9	08:41	15:29 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	15:16 (1)										
	16:25	20	15:49 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	12	15:28 (1)								
10	08:40	15:29 (1)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	15:17 (1)										
	16:26	21	15:50 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:03	11	15:28 (1)								
11	08:40	15:30 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	15:17 (1)										
	16:28	20	15:50 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:35	16:05	10	15:27 (1)								
12	08:39	15:30 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	15:18 (1)										
	16:30	21	15:51 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	16:05	9	15:27 (1)								
13	08:38	15:30 (1)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	15:19 (1)										
	16:31	21	15:51 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05	8	15:27 (1)								
14	08:37	15:31 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	15:20 (1)										
	16:33	21	15:52 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:04	7	15:27 (1)								
15	08:36	15:31 (1)	07:47	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	08:37	15:21 (1)										
	16:34	21	15:52 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	6	15:27 (1)								
16	08:35	15:32 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38	15:21 (1)										
	16:36	20	15:52 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	5	15:26 (1)								
17	08:34	15:32 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39	15:21 (1)										
	16:38	20	15:52 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:26	16:26	16:05	6	15:27 (1)								
18	08:33	15:33 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57		15:14 (1)	08:39	15:22 (1)								
	16:40	19	15:52 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:24		15:22 (1)	16:05	5	15:27 (1)						
19	08:32	15:34 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59		15:12 (1)	08:40	15:23 (1)								
	16:41	18	15:52 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23		15:24 (1)	16:05	5	15:28 (1)						
20	08:31	15:34 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01		15:11 (1)	08:41	15:23 (1)								
	16:43	17	15:51 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22		15:25 (1)	16:06	4	15:27 (1)						
21	08:30	15:36 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02		15:11 (1)	08:41	15:24 (1)								
	16:45	15	15:51 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20		15:26 (1)	16:06	4	15:28 (1)						
22	08:29	15:36 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		15:10 (1)	08:42	15:24 (1)								
	16:47	14	15:50 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19		15:27 (1)	16:06	4	15:28 (1)						
23	08:27	15:38 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		15:10 (1)	08:42	15:25 (1)								
	16:49	12	15:50 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18		15:28 (1)	16:07	4	15:29 (1)						
24	08:26	15:40 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08		15:10 (1)	08:43	15:25 (1)								
	16:50	8	15:48 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17		15:29 (1)	16:08	4	15:29 (1)						
25	08:25		07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09		15:10 (1)	08:43	15:25 (1)								
	16:52		17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16		15:30 (1)	16:08	5	15:30 (1)							
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11		15:10 (1)	08:43	15:26 (1)								
	16:54		17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14		15:30 (1)	16:09	5	15:31 (1)							
27	08:22		07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13		15:10 (1)	08:44	15:27 (1)								
	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13		15:31 (1)	16:10	5	15:32 (1)							
28	08:20		07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14		15:11 (1)	08:44	15:27 (1)								
	16:58		18:00	06:53	06:40	05:47	05:40	06:34	07:28	19:12	17:02	16:12		15:32 (1)	16:11	6	15:33 (1)							
29	08:19			07:09	05:56	05:06	04:57	05:34	06:28	07:22	07:18	08:16		15:10 (1)	08:44	15:27 (1)								
	17:00			07:55	05:52	05:42	06:01	06:30	07:24	19:10	17:00	16:12		15:31 (1)	16:11	7	15:34 (1)							
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18		15:11 (1)	08:44	15:27 (1)								
	17:02			07:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11		15:32 (1)	16:12	8	15:35 (1)							
31	08:15			07:04		05:04		05:37	06:31		07:22			08:44		15:27 (1)								
	17:04			19:58		21:44		21:27	20:21		16:56			16:13	8	15:35 (1)								
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	227		233	288								
Total, worst case		398											0.24	</										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EU - H151

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		14:47 (4)	08:14		16:23 (3)	07:16		17:05 (2)	07:01		05:52			05:03		
	16:15	24	15:11 (4)	17:06	11	16:34 (3)	18:02	29	17:34 (2)	20:00		20:55			21:45		
2	08:44		14:48 (4)	08:12		16:22 (3)	07:14		17:03 (2)	06:59		05:50			05:02		
	16:16	23	15:11 (4)	17:08	15	16:37 (3)	18:04	33	17:36 (2)	20:02		20:57			21:46		
3	08:44		14:48 (4)	08:10		16:22 (3)	07:12		17:03 (2)	06:56		05:48			05:01		
	16:17	23	15:11 (4)	17:10	17	16:39 (3)	18:06	34	17:37 (2)	20:04		20:59			21:48		
4	08:43		14:49 (4)	08:08		16:22 (3)	07:09		17:03 (2)	06:54		05:46			05:00		
	16:18	22	15:11 (4)	17:12	19	16:41 (3)	18:07	34	17:37 (2)	20:06		21:01			21:49		
5	08:43		14:50 (4)	08:07		16:22 (3)	07:07		17:02 (2)	06:51		05:44			04:59		
	16:19	21	15:11 (4)	17:14	21	16:43 (3)	18:09	35	17:37 (2)	20:07		21:03			21:50		
6	08:43		14:51 (4)	08:05		16:23 (3)	07:04		17:02 (2)	06:49		05:42			04:58		
	16:21	20	15:11 (4)	17:16	21	16:44 (3)	18:11	35	17:37 (2)	20:09		21:04			21:51		
7	08:42		14:52 (4)	08:03		16:23 (3)	07:02		17:01 (2)	06:47		05:40			04:58		
	16:22	19	15:11 (4)	17:18	21	16:44 (3)	18:13	35	17:36 (2)	20:11		21:06			21:52		
8	08:42		14:53 (4)	08:01		16:24 (3)	07:00		17:01 (2)	06:44		05:38			04:57		
	16:24	17	15:10 (4)	17:20	20	16:44 (3)	18:15	35	17:36 (2)	20:13		21:08			21:53		
9	08:41		14:55 (4)	07:59		16:25 (3)	06:57		17:01 (2)	06:42		05:36			04:57		
	16:25	15	15:10 (4)	17:22	18	16:43 (3)	18:17	34	17:35 (2)	20:15		21:10			21:54		
10	08:40		14:57 (4)	07:57		16:26 (3)	06:55		17:01 (2)	06:39		05:34			04:56		
	16:26	12	15:09 (4)	17:24	16	16:42 (3)	18:19	34	17:35 (2)	20:17		21:11			21:55		
11	08:40		14:59 (4)	07:55		16:28 (3)	06:53		17:02 (2)	06:37		05:33			04:56		
	16:28	9	15:08 (4)	17:26	12	16:40 (3)	18:21	33	17:35 (2)	20:19		21:13			21:55		
12	08:39			07:53		16:32 (3)	06:50		17:02 (2)	06:35		05:31			04:55		
	16:30			17:28	5	16:37 (3)	18:23	31	17:33 (2)	20:20		21:15			21:56		
13	08:38			07:51			06:48		17:04 (2)	06:32		05:29			04:55		
	16:31			17:30			18:25	28	17:32 (2)	20:22		21:17			21:57		
14	08:37			07:49			06:45		17:04 (2)	06:30		05:27			04:55		
	16:33			17:32			18:27	26	17:30 (2)	20:24		21:18			21:58		
15	08:36			07:47			06:43		17:06 (2)	06:28		05:26			04:54		
	16:34			17:34			18:28	23	17:29 (2)	20:26		21:20			21:58		
16	08:35			07:45			06:40		17:08 (2)	06:25		05:24			04:54		
	16:36			17:36			18:30	18	17:26 (2)	20:28		21:22			21:59		
17	08:34			07:43			06:38		17:11 (2)	06:23		05:22			04:54		
	16:38			17:38			18:32	12	17:23 (2)	20:30		21:23			21:59		
18	08:33			07:41			06:35			06:21		05:21			04:54		
	16:40			17:40			18:34			20:31		21:25			22:00		
19	08:32			07:39			06:33			06:18		05:19			04:54		
	16:41			17:42			18:36			20:33		21:27			22:00		
20	08:31			07:36			06:31			06:16		05:18			04:54		
	16:43			17:44			18:38			20:35		21:28			22:00		
21	08:30			07:34			06:28			06:14		05:16			04:54		
	16:45			17:46			18:40			20:37		21:30			22:01		
22	08:29			07:32			06:26			06:12		05:15			04:55		
	16:47			17:48			18:42			20:39		21:31			22:01		
23	08:27			07:30			06:23			06:09		05:13			04:55		
	16:49			17:50	4	17:22 (2)	18:43			20:41		21:33			22:01		
24	08:26			07:28			17:13 (2)	06:21		06:07		05:12			04:55		
	16:50			17:52	11	17:24 (2)	18:45			20:43		21:34			22:01		
25	08:24			07:25			17:10 (2)	06:18		06:05		05:11			04:55		
	16:52			17:54	16	17:26 (2)	18:47			20:44		21:36			22:01		
26	08:23			07:23			17:08 (2)	06:16		06:03		05:09			04:56		
	16:54			17:56	20	17:28 (2)	18:49			20:46		21:37			22:01		
27	08:22			07:21			17:07 (2)	06:13		06:00		05:08			04:56		
	16:56			17:58	24	17:31 (2)	18:51			20:48		21:39			22:01		
28	08:20		16:24 (3)	07:18			17:05 (2)	06:11		05:58		05:07			04:57		
	16:58	2	16:26 (3)	18:00	27	17:32 (2)	18:53			20:50		21:40			22:01		
29	08:19		16:23 (3)				07:08			05:56		05:06			04:57		
	17:00	5	16:28 (3)				19:54			20:52		21:41			22:01		
30	08:17		16:23 (3)				07:06			05:54		05:05			04:58		
	17:02	6	16:29 (3)				19:56			20:54		21:43			22:00		
31	08:15		16:22 (3)				07:04					05:04					
	17:04	9	16:31 (3)				19:58					21:44					
Potential sun hours	250			273			367			420		494			510		
Total, worst case		227			298			509									
Sun reduction		0.24			0.23			0.27									
Oper. time red.		1.00			1.00			1.00									
Wind dir. red.		0.65			0.66			0.68									
Total reduction		0.16			0.15			0.18									
Total, real		36			46			93									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: EU - H151

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:42 (2) 18:11 (2)	07:24 16:54	15:56 (3) 16:12 (3)	08:19 16:10	14:41 (4) 14:50 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:41 (2) 18:12 (2)	07:26 16:52	15:55 (3) 16:13 (3)	08:21 16:09	14:39 (4) 14:51 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:40 (2) 18:13 (2)	07:28 16:50	15:54 (3) 16:13 (3)	08:22 16:08	14:38 (4) 14:53 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:39 (2) 18:13 (2)	07:30 16:48	15:53 (3) 16:14 (3)	08:24 16:08	14:38 (4) 14:55 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:38 (2) 18:13 (2)	07:32 16:46	15:52 (3) 16:14 (3)	08:25 16:07	14:37 (4) 14:56 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:38 (2) 18:13 (2)	07:34 16:44	15:52 (3) 16:12 (3)	08:26 16:07	14:37 (4) 14:57 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:37 (2) 18:12 (2)	07:36 16:43	15:52 (3) 16:10 (3)	08:28 16:06	14:37 (4) 14:58 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:37 (2) 18:12 (2)	07:38 16:41	15:52 (3) 16:08 (3)	08:29 16:06	14:36 (4) 14:58 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:37 (2) 18:12 (2)	07:40 16:39	15:53 (3) 16:07 (3)	08:30 16:05	14:37 (4) 15:00 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:37 (2) 18:11 (2)	07:42 16:37	15:53 (3) 16:05 (3)	08:31 16:05	14:37 (4) 15:00 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:37 (2) 18:10 (2)	07:44 16:35	15:54 (3) 16:03 (3)	08:33 16:05	14:37 (4) 15:01 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:37 (2) 18:09 (2)	07:45 16:34	15:55 (3) 16:01 (3)	08:34 16:05	14:37 (4) 15:01 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:38 (2) 18:07 (2)	07:47 16:32	15:55 (3) 15:59 (3)	08:35 16:05	14:37 (4) 15:02 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:39 (2) 18:04 (2)	07:49 16:31	15:56 (3) 15:57 (3)	08:36 16:04	14:37 (4) 15:02 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:40 (2) 18:02 (2)	07:51 16:29		08:37 16:04	14:37 (4) 15:03 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:41 (2) 17:59 (2)	07:53 16:27		08:38 16:05	14:38 (4) 15:04 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:43 (2) 17:57 (2)	07:55 16:26		08:38 16:05	14:38 (4) 15:05 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:46 (2) 17:55 (2)	07:57 16:24		08:39 16:05	14:39 (4) 15:05 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22		07:59 16:23		08:40 16:05	14:40 (4) 15:06 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20		08:00 16:22		08:41 16:06	14:39 (4) 15:06 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17		08:02 16:20		08:41 16:06	14:40 (4) 15:07 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:04 16:19		08:42 16:06	14:40 (4) 15:07 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13		08:06 16:18		08:42 16:07	14:41 (4) 15:08 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11		08:08 16:17		08:43 16:08	14:42 (4) 15:08 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09		08:09 16:16		08:43 16:08	14:42 (4) 15:08 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	17:55 (2) 18:03 (2)	07:13 17:06	08:11 16:14		08:43 16:09	14:42 (4) 15:08 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	17:50 (2) 18:07 (2)	07:15 17:04	08:13 16:13		08:44 16:10	14:44 (4) 15:10 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	17:48 (2) 18:09 (2)	07:16 17:02	08:14 16:12		08:44 16:10	14:44 (4) 15:10 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	17:46 (2) 18:10 (2)	07:18 17:00	08:16 16:12		08:44 16:11	14:45 (4) 15:10 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:43 (2) 18:11 (2)	07:20 16:58	15:59 (3) 16:07 (3)	08:18 16:11		14:45 (4) 15:10 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	15:57 (3) 16:09 (3)			08:44 16:13	14:45 (4) 15:10 (4)
Potential sun hours	512	460	382	328		259		233	
Total, worst case			98	538		196		723	
Sun reduction			0.32	0.29		0.27		0.21	
Oper. time red.			1.00	1.00		1.00		1.00	
Wind dir. red.			0.68	0.68		0.66		0.65	
Total reduction			0.22	0.20		0.17		0.13	
Total, real			21	106		34		97	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: EV - H152

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:09 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:54 (2)										
	16:15	24	15:33 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	27	15:21 (2)								
2	08:44	15:10 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	14:54 (2)										
	16:16	24	15:34 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	26	15:20 (2)								
3	08:44	15:09 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	14:55 (2)										
	16:17	25	15:34 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	26	15:21 (2)								
4	08:43	15:10 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	14:56 (2)										
	16:18	25	15:35 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	26	15:22 (2)								
5	08:43	15:10 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	14:56 (2)										
	16:19	25	15:35 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	26	15:22 (2)								
6	08:43	15:11 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	14:57 (2)										
	16:21	25	15:36 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:07	25	15:22 (2)								
7	08:42	15:11 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	14:57 (2)										
	16:22	26	15:37 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	25	15:22 (2)								
8	08:42	15:11 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	14:57 (2)										
	16:23	26	15:37 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	25	15:22 (2)								
9	08:41	15:12 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	14:58 (2)										
	16:25	26	15:38 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	25	15:23 (2)								
10	08:40	15:12 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	14:59 (2)										
	16:26	26	15:38 (2)	17:24	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	16:05	24	15:23 (2)								
11	08:40	15:12 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33	14:59 (2)										
	16:28	27	15:39 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05	24	15:23 (2)								
12	08:39	15:12 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	15:00 (2)										
	16:29	27	15:39 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	23	15:23 (2)								
13	08:38	15:13 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	15:00 (2)										
	16:31	26	15:39 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04	23	15:23 (2)								
14	08:37	15:13 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	15:02 (2)										
	16:33	27	15:40 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04	23	15:25 (2)								
15	08:36	15:14 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37	15:01 (2)										
	16:34	26	15:40 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	23	15:24 (2)								
16	08:35	15:14 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	14:59 (2)	08:38	15:02 (2)									
	16:36	26	15:40 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	9	15:08 (2)	16:05	22	15:24 (2)						
17	08:34	15:14 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	14:57 (2)	08:39	15:03 (2)									
	16:38	26	15:40 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	13	15:10 (2)	16:05	22	15:25 (2)						
18	08:33	15:15 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	14:55 (2)	08:39	15:04 (2)									
	16:40	25	15:40 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	17	15:12 (2)	16:05	22	15:26 (2)						
19	08:32	15:16 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	14:54 (2)	08:40	15:04 (2)									
	16:41	25	15:41 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	19	15:13 (2)	16:05	22	15:26 (2)						
20	08:31	15:17 (2)	07:36	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	14:53 (2)	08:41	15:04 (2)									
	16:43	23	15:40 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	21	15:14 (2)	16:06	22	15:26 (2)						
21	08:30	15:18 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	14:53 (2)	08:41	15:05 (2)									
	16:45	22	15:40 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	22	15:15 (2)	16:06	22	15:27 (2)						
22	08:29	15:18 (2)	07:32	06:26	06:11	05:15	04:55	05:23	06:15	07:10	08:05	08:04	14:53 (2)	08:42	15:05 (2)									
	16:47	21	15:39 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	23	15:16 (2)	16:06	22	15:27 (2)						
23	08:27	15:20 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	14:52 (2)	08:42	15:06 (2)									
	16:49	19	15:39 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	25	15:17 (2)	16:07	22	15:28 (2)						
24	08:26	15:21 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	14:52 (2)	08:43	15:06 (2)									
	16:50	17	15:38 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	25	15:17 (2)	16:08	22	15:28 (2)						
25	08:25	15:24 (2)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09	14:53 (2)	08:43	15:06 (2)									
	16:52	13	15:37 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	25	15:18 (2)	16:08	22	15:28 (2)						
26	08:23	15:26 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	14:53 (2)	08:43	15:07 (2)									
	16:54	9	15:35 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	26	15:19 (2)	16:09	22	15:29 (2)						
27	08:22	15:27 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13	14:53 (2)	08:44	15:08 (2)									
	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	26	15:19 (2)	16:10	22	15:30 (2)							
28	08:20	15:28 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	14:53 (2)	08:44	15:08 (2)									
	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	27	15:20 (2)	16:10	23	15:31 (2)							
29	08:19	15:29 (2)	07:18	06:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16	14:53 (2)	08:44	15:09 (2)									
	17:00			19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	27	15:20 (2)	16:11	22	15:31 (2)							
30	08:17	15:30 (2)	07:17	06:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	14:54 (2)	08:44	15:09 (2)									
	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	26	15:20 (2)	16:12	23	15:32 (2)							
31	08:15	15:31 (2)	07:15	07:04		05:04	05:04	05:37	06:31	07:22	08:18	08:16	14:54 (2)	08:44	15:08 (2)									
	17:04			19:58		21:44		21:27	20:21		16:56				16:13	24	15:32 (2)</							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EW - H153

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EX - H154

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EY - H155

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EZ - H156

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	08:42 (2) 18:02	07:16 20:00	07:01 20:55	05:52 21:45	05:03 22:00	04:59 21:25	05:39 20:18	06:33 19:05	07:26 19:05	07:24 16:54	08:02 (2) 26 08:28 (2)	08:19 16:10
2	08:44 16:16	08:12 17:08	08:40 (2) 18:04	07:14 20:02	06:59 20:57	05:50 21:47	05:02 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:02 (2) 26 08:28 (2)	08:21 16:09	
3	08:44 16:17	08:10 17:10	08:38 (2) 18:06	07:12 20:04	06:56 20:59	05:48 21:48	05:01 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:01 (2) 27 08:28 (2)	08:22 16:08	
4	08:43 16:18	08:09 17:12	08:36 (2) 18:08	07:09 20:06	06:54 21:01	05:46 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:01 (2) 27 08:28 (2)	08:24 16:08	
5	08:43 16:20	08:07 17:14	08:34 (2) 18:09	07:07 20:08	06:52 21:03	05:44 21:50	05:02 21:58	05:45 21:19	06:40 20:09	07:33 18:55	07:32 16:46	08:02 (2) 26 08:28 (2)	08:25 16:07	
6	08:43 16:21	08:05 17:16	08:32 (2) 18:11	07:05 20:09	06:49 21:05	05:42 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:44	08:04 (2) 24 08:28 (2)	08:27 16:07	
7	08:42 16:22	08:03 17:18	08:31 (2) 18:13	07:02 20:11	06:47 21:06	05:40 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:06 (2) 22 08:28 (2)	08:28 16:06	
8	08:42 16:24	08:01 17:20	08:32 (2) 18:15	07:00 20:13	06:44 21:08	05:38 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:09 (2) 19 08:28 (2)	08:29 16:06	
9	08:41 16:25	07:59 17:22	08:32 (2) 18:17	06:57 20:15	06:42 21:10	05:36 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:11 (2) 17 08:28 (2)	08:30 16:05	
10	08:41 16:27	07:57 17:24	08:32 (2) 18:19	06:55 20:17	06:40 21:12	05:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:13 (2) 14 08:27 (2)	08:32 16:05	
11	08:40 16:28	07:55 17:26	08:58 (2) 18:21	06:53 20:19	06:37 21:13	05:33 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:15 (2) 11 08:26 (2)	08:33 16:05	
12	08:39 16:30	07:53 17:28	08:58 (2) 18:23	06:50 20:21	06:35 21:15	05:31 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:17 (2) 8 08:25 (2)	08:34 16:05	
13	08:38 16:31	07:51 17:30	08:35 (2) 18:25	06:48 20:22	06:32 21:17	05:29 21:57	04:55 21:52	05:11 21:01	05:59 19:49	06:54 18:36	06:54 16:32	08:19 (2) 5 08:24 (2)	08:35 16:05	
14	08:37 16:33	07:49 17:32	08:36 (2) 18:27	06:45 20:24	06:30 21:19	05:27 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:21 (2) 2 08:23 (2)	08:36 16:05	
15	08:36 16:34	07:47 17:34	08:37 (2) 18:29	06:43 20:26	06:28 21:20	05:26 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29		16:05	
16	08:36 16:36	07:45 17:36	08:40 (2) 18:30	06:40 20:28	06:25 21:22	05:24 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28		16:05	
17	08:35 16:38	07:43 17:38	08:50 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		16:05	
18	08:33 16:40	07:41 17:40		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		16:05	
19	08:32 16:41	07:39 17:42		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57		16:05	
20	08:31 16:43	07:37 17:44		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		16:05	
21	08:30 16:45	07:34 17:46		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		16:06	
22	08:29 16:47	07:32 17:48		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		16:06	
23	08:27 16:49	07:30 17:50		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		16:07	
24	08:26 16:51	07:28 17:52		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		16:07	
25	08:25 16:52	07:25 17:54		06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11		16:08	
26	08:24 16:54	07:23 17:56		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		16:08	
27	08:22 16:56	07:21 17:58		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15		16:09	
28	08:20 16:58	07:19 18:00	08:49 (2) 08:51 (2)	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:05 (2) 19 08:24 (2)	08:14 16:13	
29	08:19 17:00	08:47 (2) 08:52 (2)		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:03 (2) 22 08:25 (2)	08:16 16:12	
30	08:17 17:02	08:45 (2) 08:54 (2)		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:03 (2) 24 08:27 (2)	08:18 16:11	
31	08:15 17:04	08:44 (2) 08:55 (2)		07:04 19:58	05:04 21:44	04:57 21:27	05:37 20:21	06:31 20:21	07:22 16:56	07:22 25 08:28 (2)	08:03 (2) 16:56		08:44 16:13	
Potential sun hours	250		273		367		420		494		510		512	
Total, worst case	27		345											
Sun reduction	0.24		0.23											
Oper. time red.	1.00		1.00											
Wind dir. red.	0.61		0.61											
Total reduction	0.15		0.14											
Total, real	4		49											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FA - H157

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	08:42 (2) 17:16	07:16 18:02	07:01 18:00	05:52 18:00	05:03 18:00	04:59 18:00	05:39 18:00	06:33 18:00	07:26 18:00	08:19 18:00
2	08:44 16:16	08:12 17:08	08:40 (2) 17:14	07:14 18:04	06:59 18:02	05:50 18:02	05:02 18:02	05:00 18:02	05:40 18:02	06:35 18:02	07:28 18:02	08:21 18:02
3	08:44 16:17	08:10 17:10	08:38 (2) 17:12	07:12 18:06	06:56 18:04	05:48 18:04	05:01 18:04	05:00 18:04	05:42 18:04	06:36 18:04	07:30 18:04	08:22 18:04
4	08:43 16:18	08:09 17:12	08:36 (2) 17:12	07:09 18:08	06:54 18:06	05:46 18:06	05:00 18:06	05:01 18:06	05:44 18:06	06:38 18:06	07:32 18:06	08:24 18:06
5	08:43 16:20	08:07 17:14	08:34 (2) 17:14	07:07 18:09	06:52 18:08	05:44 18:08	05:04 18:08	05:02 18:08	05:45 18:08	06:40 18:08	07:33 18:08	08:25 18:08
6	08:43 16:21	08:05 17:16	08:35 (2) 17:16	07:05 18:11	06:49 18:09	05:42 18:09	05:03 18:09	05:03 18:09	05:47 18:09	06:42 18:09	07:35 18:09	08:27 18:09
7	08:42 16:22	08:03 17:18	08:35 (2) 17:18	07:02 18:13	06:47 18:11	05:40 18:11	05:04 18:11	05:04 18:11	05:49 18:11	06:44 18:11	07:37 18:11	08:28 18:11
8	08:42 16:24	08:01 17:20	08:35 (2) 17:20	07:00 18:15	06:44 18:13	05:38 18:13	05:05 18:13	05:05 18:13	05:51 18:13	06:45 18:13	07:39 18:13	08:29 18:13
9	08:41 16:25	07:59 17:22	08:36 (2) 17:22	06:57 18:17	06:42 18:15	05:36 18:15	05:06 18:15	05:06 18:15	05:52 18:15	06:47 18:15	07:41 18:15	08:30 18:15
10	08:41 16:27	07:57 17:24	08:37 (2) 17:24	06:55 18:19	06:40 18:17	05:34 18:17	05:07 18:17	05:07 18:17	05:54 18:17	06:49 18:17	07:43 18:17	08:32 18:17
11	08:40 16:28	07:55 17:26	08:38 (2) 17:26	06:53 18:21	06:37 18:19	05:33 18:19	05:08 18:19	05:08 18:19	05:56 18:19	06:51 18:19	07:44 18:19	08:33 18:19
12	08:39 16:30	07:53 17:28	08:39 (2) 17:28	06:50 18:23	06:35 18:21	05:31 18:21	05:09 18:21	05:09 18:21	05:58 18:21	06:52 18:21	07:46 18:21	08:34 18:21
13	08:38 16:31	07:51 17:30	08:41 (2) 17:30	06:48 18:25	06:32 18:23	05:29 18:23	05:11 18:23	05:11 18:23	05:59 18:23	06:54 18:23	07:48 18:23	08:35 18:23
14	08:37 16:33	07:49 17:32	08:43 (2) 17:32	06:45 18:27	06:30 18:24	05:27 18:24	05:12 18:24	05:12 18:24	06:01 18:24	06:56 18:24	07:50 18:24	08:36 18:24
15	08:36 16:34	07:47 17:34	08:53 (2) 17:34	06:43 18:27	06:28 18:25	05:26 18:25	05:13 18:25	05:13 18:25	06:03 18:25	06:58 18:25	07:52 18:25	08:37 18:25
16	08:36 16:36	07:45 17:36	08:53 (2) 17:36	06:40 18:28	06:25 18:26	05:24 18:26	05:14 18:26	05:14 18:26	06:05 18:26	06:59 18:26	07:54 18:26	08:38 18:26
17	08:35 16:38	07:43 17:38	08:53 (2) 17:38	06:38 18:30	06:23 18:28	05:22 18:28	05:16 18:28	05:16 18:28	06:06 18:28	07:01 18:28	07:56 18:28	08:39 18:28
18	08:33 16:40	07:41 17:40	08:53 (2) 17:40	06:36 18:32	06:21 18:30	05:21 18:30	05:17 18:30	05:17 18:30	06:08 18:30	07:03 18:30	07:57 18:30	08:39 18:30
19	08:32 16:41	07:39 17:42	08:53 (2) 17:42	06:33 18:36	06:18 18:33	05:19 18:33	05:18 18:33	05:18 18:33	06:10 18:33	07:05 18:33	07:59 18:33	08:40 18:33
20	08:31 16:43	07:37 17:44	08:53 (2) 17:44	06:31 18:38	06:16 18:35	05:18 18:35	05:20 18:35	05:20 18:35	06:12 18:35	07:06 18:35	08:01 18:35	08:41 18:35
21	08:30 16:45	07:34 17:46	08:53 (2) 17:46	06:28 18:40	06:14 18:37	05:16 18:37	05:21 18:37	05:21 18:37	06:13 18:37	07:08 18:37	08:03 18:37	08:41 18:37
22	08:29 16:47	07:32 17:48	08:53 (2) 17:48	06:26 18:42	06:12 18:39	05:15 18:39	05:23 18:39	05:23 18:39	06:15 18:39	07:10 18:39	08:05 18:39	08:42 18:39
23	08:27 16:49	07:30 17:50	08:53 (2) 17:50	06:23 18:43	06:09 18:41	05:13 18:41	05:24 18:41	05:24 18:41	06:17 18:41	07:12 18:41	08:07 18:41	08:42 18:41
24	08:26 16:51	07:28 17:52	08:53 (2) 17:52	06:21 18:45	06:07 18:43	05:12 18:43	05:26 18:43	05:26 18:43	06:19 18:43	07:14 18:43	08:09 18:43	08:43 18:43
25	08:25 16:52	07:25 17:54	08:53 (2) 17:54	06:18 18:47	06:05 18:44	05:11 18:44	05:27 18:44	05:27 18:44	06:21 18:44	07:15 18:44	08:11 18:44	08:43 18:44
26	08:23 16:54	08:52 (2) 17:56	07:23 17:56	06:16 18:49	06:03 18:46	05:09 18:46	04:56 18:46	04:56 18:46	06:22 18:46	07:17 18:46	08:11 18:46	08:44 18:46
27	08:22 16:56	08:51 (2) 17:58	07:21 17:58	06:14 18:51	06:01 18:48	05:08 18:48	04:56 18:48	04:56 18:48	06:24 18:48	07:19 18:48	08:13 18:48	08:44 18:48
28	08:20 16:58	08:49 (2) 18:00	07:19 18:00	06:11 18:53	05:58 18:50	05:07 18:50	04:57 18:50	04:57 18:50	06:26 18:50	07:21 18:50	08:14 18:50	08:44 18:50
29	08:19 17:00	08:47 (2) 18:02	07:17 18:02	07:09 18:55	05:56 18:52	05:06 18:52	04:58 18:52	04:58 18:52	06:28 18:52	07:23 18:52	08:16 18:52	08:44 18:52
30	08:17 17:02	08:45 (2) 18:04	07:15 18:04	07:06 18:56	05:54 18:54	05:05 18:54	04:58 18:54	04:58 18:54	06:29 18:54	07:24 18:54	08:18 18:54	08:44 18:54
31	08:15 17:04	08:44 (2) 18:06	07:13 18:06	07:04 18:58	05:54 18:56	05:04 18:56	04:58 18:56	04:58 18:56	06:31 18:56	07:22 18:56	08:16 18:56	08:44 18:56
Potential sun hours	250	273	309	367	420	494	510	512	460	382	259	233
Total, worst case	55	309	309									
Sun reduction	0.24	0.23	0.23									
Oper. time red.	1.00	1.00	1.00									
Wind dir. red.	0.61	0.61	0.61									
Total reduction	0.15	0.14	0.14									
Total, real	8	44	44									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FB - H158

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	09:47 (3)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	11:16 (1)										
	16:15	53	12:04 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:10	29	11:45 (1)									
2	08:44	09:48 (3)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	11:16 (1)										
	16:16	52	12:05 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09	30	11:46 (1)									
3	08:44	09:49 (3)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	11:14 (1)										
	16:17	48	12:04 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	33	11:47 (1)									
4	08:43	09:51 (3)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	11:14 (1)										
	16:18	46	12:05 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	35	11:49 (1)									
5	08:43	11:26 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	11:14 (1)										
	16:20	38	12:04 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	35	11:49 (1)									
6	08:43	11:28 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	11:14 (1)										
	16:21	37	12:05 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	37	11:51 (1)									
7	08:42	11:29 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28	11:13 (1)										
	16:22	35	12:04 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	38	11:51 (1)									
8	08:42	11:29 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	11:13 (1)										
	16:24	34	12:03 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	46	11:53 (1)									
9	08:41	11:31 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	11:53 (1)										
	16:25	33	12:04 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	48	11:53 (1)									
10	08:41	11:32 (1)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32	11:53 (1)										
	16:27	31	12:03 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	51	11:54 (1)									
11	08:40	11:34 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	11:54 (1)										
	16:28	29	12:03 (1)	17:26	08:22 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	16:36	53	11:54 (1)									
12	08:39	11:35 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:35	11:55 (1)										
	16:30	27	12:02 (1)	17:28	08:20 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	16:34	55	11:56 (1)									
13	08:38	11:37 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:35	11:56 (1)										
	16:31	24	12:01 (1)	17:30	08:19 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	16:32	56	11:57 (1)									
14	08:37	11:39 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	11:57 (1)										
	16:33	20	11:59 (1)	17:32	08:29 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	16:31	58	11:57 (1)									
15	08:36	11:42 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37	11:58 (1)										
	16:35	16	11:58 (1)	17:34	08:13 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	16:29	59	11:58 (1)									
16	08:36	11:46 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38	11:58 (1)										
	16:36	8	11:54 (1)	17:36	08:11 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	16:28	59	11:57 (1)									
17	08:35	07:43	07:38	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:41	11:57 (1)											
	16:38	22	08:31 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16	16:05	60	11:58 (1)									
18	08:33	07:41	07:36	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39	11:57 (1)											
	16:40	24	08:31 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	19	16:05	60	11:59 (1)									
19	08:32	07:39	07:34	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:38	11:59 (1)											
	16:41	25	08:30 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	21	16:05	61	12:00 (1)									
20	08:31	07:37	07:32	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:37	12:00 (1)											
	16:43	25	08:30 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	23	16:06	62	12:00 (1)									
21	08:30	07:34	07:29	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:36	12:00 (1)											
	16:45	24	08:30 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	24	16:06	62	12:01 (1)									
22	08:29	07:32	07:27	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:35	12:01 (1)											
	16:47	22	08:28 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	25	16:07	62	12:01 (1)									
23	08:27	07:30	07:25	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:35	12:01 (1)											
	16:49	20	08:27 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	25	16:07	62	12:02 (1)									
24	08:26	07:28	07:23	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:37	12:01 (1)											
	16:51	18	08:26 (2)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	23	16:08	62	12:02 (1)									
25	08:25	07:25	07:20	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:39	12:01 (1)											
	16:52	15	08:24 (2)	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	21	16:08	60	11:52 (1)									
26	08:23	07:23	07:18	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:12	08:41	12:01 (1)											
	16:54	9	08:21 (2)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	19	16:09	60	12:03 (1)									
27	08:22	07:21	07:16	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:14	08:43	12:01 (1)											
	16:56	17:58	18:00	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	16	16:10	60	12:03 (1)									
28	08:20	07:19	07:14	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:44	12:01 (1)											
	16:58	18:00	18:01	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	13	16:11	60	12:04 (1)									
29	08:19	07:17	07:12	06:09	05:56	05:06	04:58	05:34	06:28	07:23	08:18	08:46	12:01 (1)											
	17:00	19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	10	07:57 (2)	16:12	24	16:11	58	12:04 (1)								
30	08:17	07:15	07:10	06:07	05:54	05:05	04:58	05:35	06:29	07:24	08:19	08:48	12:01 (1)											
	17:02	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	7	07:57 (2)	16:11	27	11:43 (1)	57	12:04 (1)								
31	08:15	07:14	07:09	06:04	05:04	04:57	05:37	06:31	07:25	08:20	09:15	09:50	12:01 (1)											
	17:04	19:58	21:44	21:44	21:44	21:27	20:21	19:15	16:56	4	07:56 (2)	16:13	56	12:04 (1)										
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	1624											
Total, worst case	531	277								277	95		1624											
Sun reduction	0.24	0.23								0.29	0.27		0.21											
Oper. time red.	1.00	1.00								1.00	1.00		1.00											
Wind dir. red.	0.60	0.64								0.64	0.60		0.60											
Total reduction	0.15	0.15								0.19	0.16		0.12											
Total, real	77	41								52	15		201											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FC - H159

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FD - H160

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FE - H161

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FF - H162

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FG - H163

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	11:48 (1) 08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (2) 08:19
2 16:15	12:12 (1) 17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	17 16:54	08:11 (2) 16:10
3 08:44	11:49 (1) 08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	07:56 (2) 08:21
4 16:16	12:12 (1) 17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	14 16:52	08:10 (2) 16:09
5 08:44	11:50 (1) 08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	07:58 (2) 08:22
6 16:17	12:11 (1) 17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	12 16:50	08:10 (2) 16:08
7 08:43	11:52 (1) 08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:00 (2) 08:24
8 16:18	12:10 (1) 17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	9 16:48	08:09 (2) 16:08
9 08:43	11:53 (1) 08:07	08:34 (2) 07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:02 (2) 08:25	11:44 (1)
10 16:20	12:09 (1) 17:14	2 08:36 (2) 18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	5 08:07 (2) 16:07	6 11:50 (1)
11 08:43	11:56 (1) 08:05	08:32 (2) 07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:04 (2) 08:27	11:42 (1)
12 16:21	12:08 (1) 17:16	6 08:38 (2) 18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	2 08:06 (2) 16:07	12 11:54 (1)
13 08:42	11:59 (1) 08:03	08:30 (2) 07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:02 (2) 08:28	11:40 (1)
14 16:22	12:05 (1) 17:18	9 08:39 (2) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	08:06 (2) 08:31	16 11:56 (1)
15 08:42	11:59 (1) 08:03	08:28 (2) 07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:02 (2) 08:28	11:40 (1)
16 16:24	12:05 (1) 17:18	12 08:40 (2) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	08:02 (2) 08:28	16 11:56 (1)
17 08:41	11:59 (1) 08:03	08:26 (2) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:02 (2) 08:28	11:40 (1)
18 16:25	12:05 (1) 17:18	15 08:41 (2) 18:17	20:15	21:10	21:54	21:56	21:10	20:01	18:48	16:41	08:02 (2) 08:28	11:40 (1)
19 08:41	11:59 (1) 08:03	08:24 (2) 06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:02 (2) 08:28	11:40 (1)
20 16:27	12:05 (1) 17:18	17 08:41 (2) 18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	08:02 (2) 08:28	11:40 (1)
21 08:40	11:59 (1) 08:03	08:22 (2) 06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:02 (2) 08:28	11:40 (1)
22 16:28	12:05 (1) 17:18	20 08:42 (2) 18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	08:02 (2) 08:28	11:40 (1)
23 08:39	11:59 (1) 08:03	08:20 (2) 06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:02 (2) 08:28	11:40 (1)
24 16:30	12:05 (1) 17:18	22 08:42 (2) 18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	08:02 (2) 08:28	11:40 (1)
25 08:38	11:59 (1) 08:03	08:18 (2) 06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:02 (2) 08:28	11:40 (1)
26 16:31	12:05 (1) 17:18	24 08:42 (2) 18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	08:02 (2) 08:28	11:40 (1)
27 08:37	11:59 (1) 08:03	08:16 (2) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:02 (2) 08:28	11:40 (1)
28 16:33	12:05 (1) 17:18	26 08:42 (2) 18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	08:02 (2) 08:28	11:40 (1)
29 08:36	11:59 (1) 08:03	08:16 (2) 06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:02 (2) 08:28	11:40 (1)
30 16:35	12:05 (1) 17:18	25 08:41 (2) 18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	08:02 (2) 08:28	11:40 (1)
31 08:36	11:59 (1) 08:03	08:17 (2) 06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:02 (2) 08:28	11:40 (1)
32 16:36	12:05 (1) 17:18	24 08:41 (2) 18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	08:02 (2) 08:28	11:40 (1)
33 08:35	11:59 (1) 08:03	08:18 (2) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:02 (2) 08:28	11:40 (1)
34 16:38	12:05 (1) 17:18	23 08:41 (2) 18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	08:02 (2) 08:28	11:40 (1)
35 08:33	11:59 (1) 08:03	08:19 (2) 06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:02 (2) 08:28	11:40 (1)
36 16:40	12:05 (1) 17:18	21 08:40 (2) 18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	08:02 (2) 08:28	11:40 (1)
37 08:32	11:59 (1) 08:03	08:19 (2) 06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:02 (2) 08:28	11:40 (1)
38 16:41	12:05 (1) 17:18	19 08:38 (2) 18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	08:02 (2) 08:28	11:40 (1)
39 08:31	11:59 (1) 08:03	08:21 (2) 06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:02 (2) 08:28	11:40 (1)
40 16:43	12:05 (1) 17:18	16 08:37 (2) 18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	08:02 (2) 08:28	11:40 (1)
41 08:30	11:59 (1) 08:03	08:24 (2) 06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:03	08:02 (2) 08:28	11:40 (1)
42 16:45	12:05 (1) 17:18	10 08:34 (2) 18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:20	08:02 (2) 08:28	11:40 (1)
43 08:29	11:59 (1) 08:03	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:05	08:02 (2) 08:28	11:40 (1)
44 16:47	12:05 (1) 17:18	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	08:02 (2) 08:28	11:40 (1)
45 08:27	11:59 (1) 08:03	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:07	08:02 (2) 08:28	11:40 (1)
46 16:49	12:05 (1) 17:18	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	08:02 (2) 08:28	11:40 (1)
47 08:26	11:59 (1) 08:03	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:09	08:02 (2) 08:28	11:40 (1)
48 16:51	12:05 (1) 17:18	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	08:02 (2) 08:28	11:40 (1)
49 08:25	11:59 (1) 08:03	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:11	08:02 (2) 08:28	11:40 (1)
50 16:52	12:05 (1) 17:18	18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:09	16:16	08:02 (2) 08:28	11:40 (1)
51 08:23	11:59 (1) 08:03	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:13	08:02 (2) 08:28	11:40 (1)
52 16:54	12:05 (1) 17:18	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:15	08:02 (2) 08:28	11:40 (1)
53 08:22	11:59 (1) 08:03	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:15	08:02 (2) 08:28	11:40 (1)
54 16:56	12:05 (1) 17:18	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:05	16:14	08:02 (2) 08:28	11:40 (1)
55 08:20	11:59 (1) 08:03	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:17	08:02 (2) 08:28	11:40 (1)
56 16:58	12:05 (1) 17:18	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:13	08:02 (2) 08:28	11:40 (1)
57 08:19	11:59 (1) 08:03	07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:19	08:02 (2) 08:28	11:40 (1)
58 17:00	12:05 (1) 17:18	19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:12	08:02 (2) 08:28	11:40 (1)
59 08:17	11:59 (1) 08:03	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:20	08:02 (2) 08:28	11:40 (1)
60 17:02	12:05 (1) 17:18	19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	08:02 (2) 08:28	11:40 (1)
61 08:15	11:59 (1) 08:03	07:04	05:54	05:04	04:57	05:37	06:31	07:22	08:18	08:18	08:02 (2) 08:28	11:40 (1)
62 17:04	12:05 (1) 17:18	19:58	20:56	21:44	22:01	21:27	20:21	19:05	18:00	16:13	08:02 (2) 08:28	11:40 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	120	291									59	688
Sun reduction	0.24	0.23									0.27	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.61	0.63									0.63	0.61
Total reduction	0.15	0.15									0.17	0.13
Total, real	18	42									10	87

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FH - H164

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
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30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FI - H165

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FJ - H166

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44		15:20 (5)	08:14		15:46 (4)	07:16		17:10 (3)	07:01			05:52		05:03			
	16:15	17	15:37 (5)	17:06	39	16:25 (4)	18:02	24	17:34 (3)	20:00			20:55		21:45			
2	08:44		15:20 (5)	08:12		15:46 (4)	07:14		17:10 (3)	06:59			05:50		05:02			
	16:16	19	15:39 (5)	17:08	39	16:25 (4)	18:04	24	17:34 (3)	20:02			20:57		21:46			
3	08:44		15:20 (5)	08:10		15:46 (4)	07:12		17:10 (3)	06:56		19:32 (2)	05:48		05:01			
	16:17	19	15:39 (5)	17:10	39	16:25 (4)	18:06	23	17:33 (3)	20:04	5		20:59		21:48			
4	08:43		15:21 (5)	08:08		15:47 (4)	07:09		17:11 (3)	06:54		19:27 (2)	05:46		05:00			
	16:18	20	15:41 (5)	17:12	38	16:25 (4)	18:07	22	17:33 (3)	20:06	12		21:01		21:49			
5	08:43		15:21 (5)	08:07		15:47 (4)	07:07		17:12 (3)	06:51		19:24 (2)	05:44		04:59			
	16:19	21	15:42 (5)	17:14	37	16:24 (4)	18:09	19	17:31 (3)	20:07	16		21:03		21:50			
6	08:43		15:22 (5)	08:05		15:48 (4)	07:04		17:14 (3)	06:49		19:22 (2)	05:42		04:59			
	16:21	22	15:44 (5)	17:16	36	16:24 (4)	18:11	15	17:29 (3)	20:09	20		21:04		21:51			
7	08:42		15:22 (5)	08:03		15:49 (4)	07:02		17:15 (3)	06:47		19:19 (2)	05:40		04:58			
	16:22	22	15:44 (5)	17:18	34	16:23 (4)	18:13	11	17:26 (3)	20:11	24		21:06		21:52			
8	08:42		15:22 (5)	08:01		15:49 (4)	07:00			06:44		19:18 (2)	05:38		04:57			
	16:24	22	15:44 (5)	17:20	34	16:23 (4)	18:15			20:13	28		21:08		21:53			
9	08:41		15:23 (5)	07:59		15:50 (4)	06:57			06:42		19:17 (2)	05:36		04:57			
	16:25	23	15:46 (5)	17:22	32	16:22 (4)	18:17			20:15	31		21:10		21:54			
10	08:40		15:24 (5)	07:57		15:52 (4)	06:55			06:39		19:15 (2)	05:34		04:56			
	16:26	22	15:46 (5)	17:24	29	16:21 (4)	18:19			20:17	34		21:11		21:55			
11	08:40		15:24 (5)	07:55		15:53 (4)	06:52			06:37		19:15 (2)	05:33		04:56			
	16:28	22	15:46 (5)	17:26	27	16:20 (4)	18:21			20:19	35		21:13		21:55			
12	08:39		15:25 (5)	07:53		15:55 (4)	06:50			06:35		19:14 (2)	05:31		04:55			
	16:30	24	15:54 (4)	17:28	24	16:19 (4)	18:23			20:20	37		21:15		21:56			
13	08:38		15:25 (5)	07:51		15:56 (4)	06:48			06:32		19:13 (2)	05:29		04:55			
	16:31	26	15:55 (4)	17:30	20	16:16 (4)	18:25			20:22	37		21:17		21:57			
14	08:37		15:26 (5)	07:49		16:00 (4)	06:45			06:30		19:13 (2)	05:27		04:55			
	16:33	27	15:57 (4)	17:32	13	16:13 (4)	18:27			20:24	37		21:18		21:58			
15	08:36		15:27 (5)	07:47			06:43			06:28		19:13 (2)	05:26		04:54			
	16:34	29	15:59 (4)	17:34			18:28			20:26	37		21:20		21:58			
16	08:35		15:27 (5)	07:45			06:40			06:25		19:13 (2)	05:24		04:54			
	16:36	30	16:00 (4)	17:36			18:30			20:28	37		21:22		21:59			
17	08:34		15:28 (5)	07:43			06:38			06:23		19:12 (2)	05:22		04:54			
	16:38	32	16:02 (4)	17:38			18:32			20:30	37		21:23		21:59			
18	08:33		15:30 (5)	07:41			06:35			06:21		19:12 (2)	05:21		04:54			
	16:40	33	16:05 (4)	17:40			18:34			20:31	37		21:25		22:00			
19	08:32		15:32 (5)	07:39			06:33			06:18		19:13 (2)	05:19		04:54			
	16:41	33	16:07 (4)	17:42			18:36			20:33	36		21:27		22:00			
20	08:31		15:33 (5)	07:36			06:31			06:16		19:13 (2)	05:18		04:54			
	16:43	32	16:08 (4)	17:44			18:38			20:35	35		21:28		22:00			
21	08:30		15:37 (5)	07:34		17:17 (3)	06:28			06:14		19:13 (2)	05:16		04:54			
	16:45	28	16:11 (4)	17:46	1	17:18 (3)	18:40			20:37	34		21:30		22:01			
22	08:29		15:45 (4)	07:32		17:14 (3)	06:26			06:12		19:13 (2)	05:15		04:55			
	16:47	27	16:12 (4)	17:48	5	17:19 (3)	18:42			20:39	33		21:31		22:01			
23	08:27		15:46 (4)	07:30		17:13 (3)	06:23			06:09		19:14 (2)	05:13		04:55			
	16:49	29	16:15 (4)	17:50	9	17:22 (3)	18:43			20:41	31		21:33		22:01			
24	08:26		15:45 (4)	07:28		17:12 (3)	06:21			06:07		19:15 (2)	05:12		04:55			
	16:50	32	16:17 (4)	17:52	12	17:24 (3)	18:45			20:43	29		21:34		22:01			
25	08:24		15:45 (4)	07:25		17:11 (3)	06:18			06:05		19:16 (2)	05:11		04:55			
	16:52	34	16:19 (4)	17:54	15	17:26 (3)	18:47			20:44	27		21:36		22:01			
26	08:23		15:45 (4)	07:23		17:11 (3)	06:16			06:03		19:18 (2)	05:09		04:56			
	16:54	36	16:21 (4)	17:56	17	17:28 (3)	18:49			20:46	23		21:37		22:01			
27	08:22		15:45 (4)	07:21		17:11 (3)	06:13			06:01		19:20 (2)	05:08		04:56			
	16:56	38	16:23 (4)	17:58	20	17:31 (3)	18:51			20:48	19		21:39		22:01			
28	08:20		15:45 (4)	07:18		17:10 (3)	06:11			05:58		19:22 (2)	05:07		04:57			
	16:58	39	16:24 (4)	18:00	22	17:32 (3)	18:53			20:50	14		21:40		22:01			
29	08:18		15:45 (4)				07:08			05:56		19:27 (2)	05:06		04:57			
	17:00	39	16:24 (4)				19:54			20:52	5		21:41		22:01			
30	08:17		15:45 (4)				07:06			05:54			05:05		04:58			
	17:02	39	16:24 (4)				19:56			20:54			21:43		22:00			
31	08:15		15:45 (4)				07:04						05:04					
	17:04	39	16:24 (4)				19:58						21:44					
Potential sun hours	250			273			367			420			494			510		
Total, worst case	875			542			138			750								
Sun reduction	0.24			0.23			0.27			0.35								
Oper. time red.	1.00			1.00			1.00			1.00								
Wind dir. red.	0.66			0.66			0.68			0.67								
Total reduction	0.16			0.15			0.18			0.23								
Total, real	140			84			25			176								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FJ - H166

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:14 (2) 19:05	07:26 16:54	15:21 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	19:14 (2) 19:02	07:28 16:52	15:20 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	19:14 (2) 19:00	07:28 16:50	15:19 (4) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	19:15 (2) 18:57	07:30 16:48	15:18 (4) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	19:16 (2) 18:55	07:32 16:46	15:17 (4) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	19:18 (2) 18:52	07:34 16:44	15:17 (4) 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	19:19 (2) 18:50	07:36 16:43	15:16 (4) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	19:21 (2) 18:48	07:38 16:41	15:16 (4) 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	19:22 (2) 18:45	07:40 16:39	15:16 (4) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	19:31 (2) 18:43	07:42 16:37	15:17 (4) 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:40 17:44	07:44 16:35	15:17 (4) 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:38 17:43	07:45 16:34	15:17 (4) 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:36 17:43	07:47 16:32	15:17 (4) 16:05
14	05:12 21:51	06:01 20:59	19:33 (2) 19:41 (2)	06:56 19:47	07:50 18:04	15:17 (4) 16:04
15	05:13 21:50	06:03 20:57	19:29 (2) 19:45 (2)	06:58 19:44	07:52 18:02	15:17 (4) 16:05
16	05:14 21:49	06:04 20:55	19:26 (2) 19:46 (2)	06:59 19:42	07:54 17:59	15:18 (4) 16:05
17	05:16 21:47	06:06 20:53	19:24 (2) 19:48 (2)	07:01 19:39	07:55 17:57	15:18 (4) 16:05
18	05:17 21:46	06:08 20:51	19:23 (2) 19:49 (2)	07:03 19:37	07:57 18:24	15:19 (4) 16:05
19	05:18 21:45	06:10 20:48	19:21 (2) 19:50 (2)	07:05 19:34	07:59 18:22	15:20 (4) 16:05
20	05:20 21:44	06:12 20:46	19:20 (2) 19:51 (2)	07:06 19:32	08:01 18:20	15:20 (4) 16:06
21	05:21 21:42	06:13 20:44	19:19 (2) 19:52 (2)	07:08 19:29	08:03 18:17	15:12 (5) 16:06
22	05:23 21:41	06:15 20:42	19:17 (2) 19:51 (2)	07:10 19:27	08:05 18:15	15:09 (5) 16:06
23	05:24 21:39	06:17 20:39	19:17 (2) 19:52 (2)	07:12 19:24	08:07 18:13	15:08 (5) 16:07
24	05:26 21:38	06:19 20:37	19:16 (2) 19:53 (2)	07:13 19:22	08:09 18:11	15:07 (5) 16:07
25	05:27 21:36	06:20 20:35	19:15 (2) 19:52 (2)	07:15 19:19	08:09 17:09	15:07 (5) 16:08
26	05:29 21:35	06:22 20:32	19:15 (2) 19:52 (2)	07:17 19:17	08:11 17:06	15:06 (5) 16:09
27	05:30 21:33	06:24 20:30	19:15 (2) 19:52 (2)	07:19 19:14	08:13 17:04	15:06 (5) 16:10
28	05:32 21:32	06:26 20:28	19:14 (2) 19:51 (2)	07:21 19:12	08:14 17:02	15:06 (5) 16:11
29	05:34 21:30	06:27 20:25	19:14 (2) 19:51 (2)	07:22 19:09	08:16 17:00	15:06 (5) 16:12
30	05:35 21:28	06:29 20:23	19:14 (2) 19:51 (2)	07:24 19:07	08:18 16:58	15:06 (5) 16:12
31	05:37 21:27	06:31 20:21	19:13 (2) 19:50 (2)	07:22 16:56	15:22 (4) 15:49 (4)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		552	207	335	1007	516
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.66
Total reduction		0.23	0.21	0.20	0.18	0.14
Total, real		125	44	66	177	70

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FK - H167

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		14:39 (4)	08:14		16:16 (3)	07:16		16:56 (2)	07:01		05:52			05:03		
	16:15	20	14:59 (4)	17:06	18	16:34 (3)	18:02	35	17:31 (2)	20:00		20:55			21:45		
2	08:44		14:41 (4)	08:12		16:16 (3)	07:14		16:54 (2)	06:59		05:50			05:02		
	16:16	18	14:59 (4)	17:08	21	16:37 (3)	18:04	36	17:30 (2)	20:02		20:57			21:46		
3	08:44		14:41 (4)	08:10		16:16 (3)	07:12		16:54 (2)	06:56		05:48			05:01		
	16:17	17	14:58 (4)	17:10	23	16:39 (3)	18:06	37	17:31 (2)	20:04		20:59			21:48		
4	08:43		14:43 (4)	08:08		16:17 (3)	07:09		16:54 (2)	06:54		05:46			05:00		
	16:18	16	14:59 (4)	17:12	22	16:39 (3)	18:07	37	17:31 (2)	20:06		21:01			21:49		
5	08:43		14:44 (4)	08:07		16:17 (3)	07:07		16:54 (2)	06:51		05:44			04:59		
	16:19	14	14:58 (4)	17:14	22	16:39 (3)	18:09	37	17:31 (2)	20:07		21:03			21:50		
6	08:43		14:46 (4)	08:05		16:18 (3)	07:04		16:54 (2)	06:49		05:42			04:58		
	16:21	12	14:58 (4)	17:16	20	16:38 (3)	18:11	37	17:31 (2)	20:09		21:04			21:51		
7	08:42		14:47 (4)	08:03		16:19 (3)	07:02		16:53 (2)	06:47		05:40			04:58		
	16:22	9	14:56 (4)	17:18	19	16:38 (3)	18:13	37	17:30 (2)	20:11		21:06			21:52		
8	08:42		14:51 (4)	08:01		16:20 (3)	07:00		16:54 (2)	06:44		05:38			04:57		
	16:24	2	14:53 (4)	17:20	17	16:37 (3)	18:15	36	17:30 (2)	20:13		21:08			21:53		
9	08:41			07:59		16:22 (3)	06:57		16:54 (2)	06:42		05:36			04:57		
	16:25			17:22	13	16:35 (3)	18:17	34	17:28 (2)	20:15		21:10			21:54		
10	08:40			07:57		16:24 (3)	06:55		16:55 (2)	06:39		05:34			04:56		
	16:26			17:24	9	16:33 (3)	18:19	33	17:28 (2)	20:17		21:11			21:55		
11	08:40			07:55			06:53		16:56 (2)	06:37		05:33			04:56		
	16:28			17:26			18:21	31	17:27 (2)	20:19		21:13			21:55		
12	08:39			07:53			06:50		16:56 (2)	06:35		05:31			04:55		
	16:30			17:28			18:23	29	17:25 (2)	20:20		21:15			21:56		
13	08:38			07:51			06:48		16:58 (2)	06:32		05:29			04:55		
	16:31			17:30			18:25	26	17:24 (2)	20:22		21:17			21:57		
14	08:37			07:49			06:45		16:59 (2)	06:30		05:27			04:55		
	16:33			17:32			18:27	23	17:22 (2)	20:24		21:18			21:58		
15	08:36			07:47			06:43		17:01 (2)	06:28		05:26			04:54		
	16:34			17:34			18:28	19	17:20 (2)	20:26		21:20			21:58		
16	08:35			07:45			06:40		17:04 (2)	06:25		05:24			04:54		
	16:36			17:36			18:30	11	17:15 (2)	20:28		21:22			21:59		
17	08:34			07:43			06:38			06:23		05:22			04:54		
	16:38			17:38			18:32			20:30		21:23			21:59		
18	08:33			07:41			06:35			06:21		05:21			04:54		
	16:40			17:40			18:34			20:31		21:25			22:00		
19	08:32			07:39			06:33			06:18		05:19			04:54		
	16:41			17:42			18:36			20:33		21:27			22:00		
20	08:31			07:36			06:31			06:16		05:18			04:54		
	16:43			17:44			18:38			20:35		21:28			22:00		
21	08:30			07:34		17:10 (2)	06:28			06:14		05:16			04:54		
	16:45			17:46	8	17:18 (2)	18:40			20:37		21:30			22:01		
22	08:29			07:32		17:05 (2)	06:26			06:12		05:15			04:55		
	16:47			17:48	14	17:19 (2)	18:42			20:39		21:31			22:01		
23	08:27			07:30		17:03 (2)	06:23			06:09		05:13			04:55		
	16:49			17:50	19	17:22 (2)	18:43			20:41		21:33			22:01		
24	08:26			07:28		17:02 (2)	06:21			06:07		05:12			04:55		
	16:50			17:52	22	17:24 (2)	18:45			20:43		21:34			22:01		
25	08:24			07:25		16:59 (2)	06:18			06:05		05:11			04:55		
	16:52			17:54	27	17:26 (2)	18:47			20:44		21:36			22:01		
26	08:23		16:18 (3)	07:23		16:58 (2)	06:16			06:03		05:09			04:56		
	16:54	3	16:21 (3)	17:56	30	17:28 (2)	18:49			20:46		21:37			22:01		
27	08:22		16:17 (3)	07:21		16:58 (2)	06:13			06:01		05:08			04:56		
	16:56	6	16:23 (3)	17:58	32	17:30 (2)	18:51			20:48		21:39			22:01		
28	08:20		16:17 (3)	07:18		16:56 (2)	06:11			05:58		05:07			04:57		
	16:58	9	16:26 (3)	18:00	34	17:30 (2)	18:53			20:50		21:40			22:01		
29	08:19		16:16 (3)				07:08			05:56		05:06			04:57		
	17:00	12	16:28 (3)				19:54			20:52		21:41			22:01		
30	08:17		16:16 (3)				07:06			05:54		05:05			04:58		
	17:02	13	16:29 (3)				19:56			20:54		21:43			22:00		
31	08:15		16:15 (3)				07:04					05:04					
	17:04	16	16:31 (3)				19:58					21:44					
Potential sun hours	250			273			367			420		494			510		
Total, worst case	167			370			498										
Sun reduction	0.24			0.23			0.27										
Oper. time red.	1.00			1.00			1.00										
Wind dir. red.	0.65			0.67			0.68										
Total reduction	0.16			0.16			0.18										
Total, real	26			57			91										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FK - H167

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:36 (2) 18:04 (2)	07:24 16:54	15:53 (3) 16:03 (3)	08:19 16:10	
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:34 (2) 18:05 (2)	07:26 16:52	15:51 (3) 16:05 (3)	08:21 16:09	
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:33 (2) 18:05 (2)	07:28 16:50	15:49 (3) 16:07 (3)	08:22 16:08	
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:32 (2) 18:06 (2)	07:30 16:48	15:48 (3) 16:07 (3)	08:24 16:08	14:36 (4) 14:38 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:31 (2) 18:06 (2)	07:32 16:46	15:47 (3) 16:08 (3)	08:25 16:07	14:33 (4) 14:41 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:31 (2) 18:07 (2)	07:34 16:44	15:47 (3) 16:09 (3)	08:26 16:07	14:32 (4) 14:44 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:29 (2) 18:06 (2)	07:36 16:43	15:46 (3) 16:09 (3)	08:28 16:06	14:31 (4) 14:45 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:29 (2) 18:06 (2)	07:38 16:41	15:46 (3) 16:08 (3)	08:29 16:06	14:30 (4) 14:46 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:29 (2) 18:06 (2)	07:40 16:39	15:47 (3) 16:07 (3)	08:30 16:05	14:30 (4) 14:47 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:28 (2) 18:05 (2)	07:42 16:37	15:47 (3) 16:05 (3)	08:31 16:05	14:30 (4) 14:48 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:29 (2) 18:05 (2)	07:44 16:35	15:47 (3) 16:03 (3)	08:33 16:05	14:30 (4) 14:49 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:29 (2) 18:04 (2)	07:45 16:34	15:48 (3) 16:01 (3)	08:34 16:05	14:29 (4) 14:50 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:29 (2) 18:04 (2)	07:47 16:32	15:48 (3) 15:59 (3)	08:35 16:05	14:29 (4) 14:50 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:29 (2) 18:03 (2)	07:49 16:31	15:49 (3) 15:57 (3)	08:36 16:04	14:29 (4) 14:51 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:30 (2) 18:02 (2)	07:51 16:29	15:50 (3) 15:56 (3)	08:37 16:04	14:30 (4) 14:52 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:31 (2) 17:59 (2)	07:53 16:27	15:50 (3) 15:54 (3)	08:38 16:05	14:30 (4) 14:52 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:32 (2) 17:57 (2)	07:55 16:26	15:54 (3) 16:05	08:38 16:05	14:31 (4) 14:53 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:33 (2) 17:55 (2)	07:57 16:24	16:05 16:05	08:39 16:05	14:31 (4) 14:54 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:35 (2) 17:52 (2)	07:59 16:23	16:05 16:05	08:40 16:05	14:32 (4) 14:55 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:38 (2) 17:50 (2)	08:00 16:22	16:05 16:06	08:41 16:06	14:32 (4) 14:55 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:43 (2) 17:47 (2)	08:02 16:20	16:05 16:06	08:41 16:06	14:32 (4) 14:56 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:47 (2) 17:47 (2)	08:04 16:19	16:06 16:06	08:42 16:06	14:32 (4) 14:56 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:47 (2) 17:47 (2)	08:06 16:18	16:06 16:07	08:42 16:07	14:33 (4) 14:57 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:47 (2) 17:47 (2)	08:08 16:17	16:07 16:08	08:43 16:08	14:34 (4) 14:57 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	17:47 (2) 17:47 (2)	08:09 16:16	16:08 16:08	08:43 16:08	14:34 (4) 14:57 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	17:47 (2) 17:47 (2)	08:11 16:14	16:08 16:09	08:43 16:09	14:34 (4) 14:57 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	17:48 (2) 17:55 (2)	07:15 17:04	08:13 16:13	16:09 16:10	08:44 16:10	14:36 (4) 14:58 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	17:43 (2) 17:59 (2)	07:16 17:02	08:14 16:12	16:10 16:11	08:44 16:11	14:36 (4) 14:59 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	17:40 (2) 18:02 (2)	07:18 17:00	08:16 16:12	16:11 16:11	08:44 16:11	14:37 (4) 14:59 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:37 (2) 18:02 (2)	07:20 16:58	08:18 16:11	16:11 16:12	08:44 16:12	14:37 (4) 14:58 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56			16:12 16:13	08:44 16:13	14:38 (4) 14:58 (4)
Potential sun hours	512	460	382	328	259		233		
Total, worst case			70	624	245		554		
Sun reduction			0.32	0.29	0.27		0.21		
Oper. time red.			1.00	1.00	1.00		1.00		
Wind dir. red.			0.68	0.68	0.66		0.65		
Total reduction			0.22	0.20	0.18		0.13		
Total, real			15	123	43		75		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FL - H168

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	15:43 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:25 (2)
	16:15	17:06	24 16:07 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	9 15:34 (2)
2	08:44	08:12	15:44 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	15:26 (2)
	16:16	17:08	22 16:06 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	6 15:32 (2)
3	08:44	08:10	15:45 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	15:29 (2)
	16:17	17:10	20 16:05 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	3 15:32 (2)
4	08:43	08:08	15:46 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	
	16:18	17:12	18 16:04 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	15:48 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	
	16:19	17:14	14 16:02 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	9 15:30 (2)	16:07
6	08:43	08:05	15:51 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	
	16:21	17:16	9 16:00 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	14 15:32 (2)	16:07
7	08:42	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	
	16:22	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	18 15:34 (2)	16:06
8	08:42	08:01		07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	
	16:23	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	20 15:35 (2)	16:06
9	08:41	15:47 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	
	16:25	2 15:49 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	22 15:37 (2)	16:05
10	08:40	15:44 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	
	16:26	6 15:50 (2)	17:24	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	24 15:38 (2)	16:05
11	08:40	15:43 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33	
	16:28	9 15:52 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	26 15:39 (2)	16:05
12	08:39	15:42 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	
	16:29	12 15:54 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	26 15:39 (2)	16:05
13	08:38	15:41 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	
	16:31	14 15:55 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	28 15:40 (2)	16:04
14	08:37	15:41 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	
	16:33	16 15:57 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	28 15:40 (2)	16:04
15	08:36	15:40 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37	
	16:34	19 15:59 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	28 15:40 (2)	16:04
16	08:35	15:39 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	
	16:36	21 16:00 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	28 15:40 (2)	16:05
17	08:34	15:39 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:38	
	16:38	23 16:02 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	28 15:40 (2)	16:05
18	08:33	15:39 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	
	16:40	24 16:03 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	29 15:41 (2)	16:05
19	08:32	15:39 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	
	16:41	25 16:04 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	28 15:41 (2)	16:05
20	08:31	15:38 (2)	07:36	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	08:41	
	16:43	26 16:04 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	28 15:41 (2)	16:06
21	08:30	15:39 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	
	16:45	26 16:05 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	27 15:41 (2)	16:06
22	08:29	15:38 (2)	07:32	06:26	06:11	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42	
	16:47	28 16:06 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	25 15:40 (2)	16:06
23	08:27	15:39 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	
	16:49	28 16:07 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	25 15:41 (2)	16:07
24	08:26	15:39 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43	
	16:50	28 16:07 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	24 15:40 (2)	16:08
25	08:25	15:39 (2)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09	08:43	
	16:52	28 16:07 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	23 15:40 (2)	16:08
26	08:23	15:39 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43	
	16:54	28 16:07 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	21 15:39 (2)	16:09
27	08:22	15:39 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:44	
	16:56	28 16:07 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	19 15:38 (2)	16:10
28	08:20	15:40 (2)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	08:44	
	16:58	28 16:08 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16 15:37 (2)	16:10
29	08:19	15:40 (2)		07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	08:44	
	17:00	28 16:08 (2)		19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	14 15:35 (2)	16:11
30	08:17	15:41 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44	
	17:02	26 16:07 (2)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	12 15:35 (2)	16:12
31	08:15	15:41 (2)		07:04		05:04		05:37	06:31		07:22		08:44	
	17:04	26 16:07 (2)		19:58		21:44		21:27	20:21		16:56		16:13	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	590	233	18
Total, worst case	499	107										590		0.21
Sun reduction	0.24	0.23										0.27		0.21
Oper. time red.	1.00	1.00										1.00		1.00
Wind dir. red.	0.66	0.66										0.66		0.66
Total reduction	0.16	0.15										0.18		0.14
Total, real	80	16										103		2

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FM - H169

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March	April	May	June	July	August	September	October	November	December				
1	08:44	10:03 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	09:52 (2)				
2	16:15	72	15:20 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	67	15:06 (1)		
	08:44		10:04 (2)	08:12	07:14	06:59	05:50	05:02	05:40	06:35	07:28	07:26	08:21	09:52 (2)				
3	16:16	72	15:21 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	69	15:07 (1)		
	08:44		10:04 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	09:52 (2)			
4	16:17	72	15:21 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08	69	15:07 (1)		
	08:43		10:05 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	09:52 (2)			
5	16:18	70	15:21 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	70	15:08 (1)		
	08:43		10:05 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	09:52 (2)			
6	16:20	70	15:21 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	70	15:08 (1)		
	08:43		10:06 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	09:52 (2)			
7	16:21	70	15:22 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	16:07	71	15:09 (1)		
	08:42		10:07 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	09:52 (2)			
8	16:22	70	15:23 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	71	15:09 (1)		
	08:42		10:07 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	09:53 (2)			
9	16:24	70	15:23 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	72	15:10 (1)		
	08:41		10:08 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	09:53 (2)			
10	16:25	70	15:24 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	72	15:10 (1)		
	08:40		10:09 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32	09:53 (2)			
11	16:27	69	15:24 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	72	15:10 (1)		
	08:40		10:10 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	09:53 (2)			
12	16:28	67	15:24 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05	72	15:10 (1)		
	08:39		10:10 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	09:53 (2)			
13	16:30	66	15:24 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	16:05	72	15:10 (1)		
	08:38		10:11 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47	08:35	09:55 (2)			
14	16:31	65	15:25 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05	71	15:11 (1)		
	08:37		10:12 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	09:55 (2)			
15	16:33	64	15:25 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:05	72	15:12 (1)		
	08:36		10:13 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37	09:55 (2)			
16	16:34	62	15:25 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05	72	15:12 (1)		
	08:35		10:15 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	14:42 (1)	08:38	09:55 (2)		
17	16:36	59	15:25 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	7	14:49 (1)	16:05	72	15:12 (1)
	08:34		10:15 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	14:39 (1)	08:39	09:56 (2)		
18	16:38	56	15:24 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	14	14:53 (1)	16:05	72	15:12 (1)
	08:33		10:17 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	14:37 (1)	08:39	09:56 (2)		
19	16:40	54	15:25 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	18	14:55 (1)	16:05	72	15:13 (1)
	08:32		10:19 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	14:36 (1)	08:40	09:57 (2)		
20	16:41	50	15:25 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	20	14:56 (1)	16:05	72	15:14 (1)
	08:31		10:20 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	10:00 (2)	08:41	09:57 (2)		
21	16:43	45	15:24 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	33	14:58 (1)	16:06	72	15:14 (1)
	08:30		10:22 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	09:57 (2)	08:41	09:58 (2)		
22	16:45	41	15:24 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	41	14:59 (1)	16:06	71	15:14 (1)
	08:29		10:25 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	09:56 (2)	08:42	09:58 (2)		
23	16:47	33	15:23 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	45	15:00 (1)	16:06	71	15:14 (1)
	08:27		15:02 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	09:55 (2)	08:42	09:59 (2)		
24	16:49	20	15:22 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	50	15:01 (1)	16:07	72	15:16 (1)
	08:26		15:03 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	09:54 (2)	08:43	09:59 (2)		
25	16:51	18	15:21 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	54	15:02 (1)	16:08	72	15:16 (1)
	08:25		15:06 (1)	07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11	08:09	09:53 (2)	08:43	09:59 (2)		
26	16:52	14	15:20 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	56	15:02 (1)	16:08	72	15:16 (1)
	08:23		15:10 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	09:53 (2)	08:43	09:59 (2)		
27	16:54	6	15:16 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15	59	15:03 (1)	16:09	72	15:17 (1)
	08:22		07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13	08:11	09:53 (2)	08:44	09:59 (2)		
28	16:56		07:58	18:51	19:54	21:39	22:01	21:33	20:30	19:14	17:04	16:13	61	15:04 (1)	16:10	72	15:18 (1)	
	08:20		07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14	08:12	09:52 (2)	08:44	09:59 (2)		
29	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	63	15:05 (1)	16:11	72	15:18 (1)	
	08:19			07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16	08:14	09:51 (2)	08:44	09:59 (2)		
30	17:00			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	65	15:05 (1)	16:11	73	15:19 (1)	
	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:19	08:18	08:16	09:52 (2)	08:44	09:59 (2)		
31	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	65	15:05 (1)	16:12	72	15:19 (1)	
	08:15			07:04		05:04		05:37	06:31		07:22			08:44	09:59 (2)			
Potential sun hours	17:04	250	273	367	420	494	510	512	460	382	328	259	651	233	2214			
Total, worst case		1425											651		2214			
Sun reduction		0.24											0.27		0.21			
Oper. time red.		1.00											1.00		1.00			
Wind dir. red.		0.62											0.62		0.61			
Total reduction		0.15											0.16		0.13			
Total, real		213											107		281			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FN - H170

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:24 (2)	08:14	15:28 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24			08:19							15:03 (2)	
	16:15	15:36 (2)	17:06	15:54 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54			16:10							15:30 (2)	
2	08:44	15:23 (2)	08:12	15:29 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26			08:21							15:04 (2)	
	16:16	15:38 (2)	17:08	15:53 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52			16:09							15:29 (2)	
3	08:44	15:23 (2)	08:10	15:30 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			08:22							15:05 (2)	
	16:17	15:39 (2)	17:10	15:52 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50			16:08							15:29 (2)	
4	08:43	15:23 (2)	08:08	15:32 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30			08:24							15:06 (2)	
	16:18	15:40 (2)	17:12	15:51 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48			16:08							15:29 (2)	
5	08:43	15:22 (2)	08:07	15:34 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32			15:07 (2)							15:07 (2)	
	16:19	15:41 (2)	17:14	15:49 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	9		15:16 (2)							15:29 (2)	
6	08:43	15:22 (2)	08:05	15:38 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34			15:03 (2)							15:08 (2)	
	16:21	15:43 (2)	17:16	15:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16		15:19 (2)							15:29 (2)	
7	08:42	15:22 (2)	08:03	15:32 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36			15:01 (2)							15:09 (2)	
	16:22	15:43 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:57	21:14	20:04	18:50	16:43	20		15:21 (2)							15:28 (2)	
8	08:42	15:21 (2)	08:01	18:15	20:13	21:08	21:53	21:56	21:56	21:12	20:01	18:48	16:41	22		15:22 (2)							15:10 (2)	
	16:24	15:44 (2)	17:20	18:17	20:15	21:10	21:54	21:55	21:55	21:10	19:59	18:45	16:39	25		15:24 (2)							15:28 (2)	
9	08:41	15:22 (2)	07:59	18:19	20:17	21:11	21:55	21:55	21:55	21:08	19:56	18:43	16:37	27		14:59 (2)							15:12 (2)	
	16:25	15:46 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:55	21:10	19:59	18:45	16:39	25		15:24 (2)							15:28 (2)	
10	08:40	15:22 (2)	07:57	18:19	20:17	21:11	21:55	21:55	21:55	21:08	19:56	18:43	16:37	27		14:58 (2)							15:12 (2)	
	16:26	15:47 (2)	17:24	18:19	20:17	21:11	21:55	21:55	21:55	21:08	19:56	18:43	16:37	27		15:25 (2)							15:27 (2)	
11	08:40	15:21 (2)	07:55	18:19	20:17	21:11	21:55	21:55	21:55	21:08	19:56	18:43	16:37	27		14:58 (2)							15:14 (2)	
	16:28	15:48 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:54	21:05	19:54	18:40	16:35	28		15:26 (2)							15:27 (2)	
12	08:39	15:21 (2)	07:53	18:23	20:20	21:15	21:56	21:53	21:53	21:03	19:51	18:36	16:34	29		14:57 (2)							15:15 (2)	
	16:30	15:48 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:53	21:03	19:51	18:36	16:34	29		15:26 (2)							15:26 (2)	
13	08:38	15:21 (2)	07:51	18:23	20:20	21:15	21:56	21:53	21:53	21:03	19:51	18:36	16:34	29		14:56 (2)							15:16 (2)	
	16:31	15:49 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:52	21:01	19:49	18:36	16:32	31		15:27 (2)							15:25 (2)	
14	08:37	15:21 (2)	07:49	18:25	20:22	21:17	21:57	21:52	21:52	21:01	19:49	18:36	16:32	31		14:56 (2)							15:18 (2)	
	16:33	15:50 (2)	17:32	18:27	20:24	21:18	21:58	21:51	21:51	21:05	19:47	18:33	16:31	32		15:28 (2)							15:26 (2)	
15	08:36	15:21 (2)	07:47	18:27	20:24	21:18	21:58	21:51	21:51	21:05	19:47	18:33	16:31	32		14:56 (2)							15:19 (2)	
	16:34	15:51 (2)	17:34	18:28	20:26	21:20	21:58	21:50	21:50	21:07	19:44	18:31	16:29	32		15:28 (2)							15:24 (2)	
16	08:35	15:20 (2)	07:45	18:30	20:28	21:22	21:59	21:49	21:49	21:05	19:42	18:29	16:27	32		14:56 (2)							15:05 (2)	
	16:36	15:51 (2)	17:36	18:30	20:28	21:22	21:59	21:49	21:49	21:05	19:42	18:29	16:27	32		15:28 (2)							15:05 (2)	
17	08:34	15:21 (2)	07:43	18:30	20:28	21:22	21:59	21:49	21:49	21:05	19:42	18:29	16:27	32		14:56 (2)							15:08 (2)	
	16:38	15:52 (2)	17:38	18:32	20:30	21:23	21:59	21:47	21:47	21:03	19:39	18:26	16:26	33		15:29 (2)							15:05 (2)	
18	08:33	15:21 (2)	07:41	18:35	20:21	21:15	21:54	21:47	21:47	21:03	19:39	18:26	16:26	33		14:56 (2)							15:08 (2)	
	16:40	15:53 (2)	17:40	18:34	20:31	21:25	22:00	21:46	21:46	21:01	19:37	18:24	16:24	33		15:29 (2)							15:05 (2)	
19	08:32	15:21 (2)	07:39	18:33	20:18	21:12	21:51	21:44	21:44	21:00	19:36	18:23	16:23	33		14:56 (2)							15:08 (2)	
	16:41	15:54 (2)	17:42	18:36	20:33	21:27	22:00	21:45	21:45	21:00	19:34	18:21	16:23	33		15:29 (2)							15:05 (2)	
20	08:31	15:21 (2)	07:36	18:31	20:16	21:10	21:49	21:42	21:42	21:00	19:36	18:23	16:23	33		14:56 (2)							15:08 (2)	
	16:43	15:54 (2)	17:44	18:38	20:35	21:28	22:00	21:44	21:44	21:00	19:32	18:20	16:22	33		15:29 (2)							15:06 (2)	
21	08:30	15:21 (2)	07:34	18:38	20:14	21:08	21:47	21:40	21:40	21:00	19:32	18:20	16:22	33		14:56 (2)							15:08 (2)	
	16:45	15:54 (2)	17:46	18:40	20:37	21:30	22:01	21:42	21:42	21:00	19:32	18:20	16:22	33		15:29 (2)							15:06 (2)	
22	08:29	15:21 (2)	07:32	18:40	20:37	21:30	22:01	21:42	21:42	21:00	19:32	18:20	16:22	33		14:57 (2)							15:28 (2)	
	16:47	15:54 (2)	17:48	18:42	20:39	21:31	22:01	21:41	21:41	21:00	19:32	18:20	16:22	33		15:30 (2)							15:06 (2)	
23	08:27	15:22 (2)	07:30	18:42	20:39	21:31	22:01	21:41	21:41	21:00	19:32	18:20	16:22	33		14:57 (2)							15:28 (2)	
	16:49	15:55 (2)	17:50	18:43	20:41	21:33	22:01	21:39	21:39	21:00	19:32	18:20	16:22	33		15:30 (2)							15:07 (2)	
24	08:26	15:22 (2)	07:28	18:43	20:41	21:33	22:01	21:39	21:39	21:00	19:32	18:20	16:22	33		14:58 (2)							15:28 (2)	
	16:50	15:55 (2)	17:52	18:45	20:43	21:34	22:01	21:38	21:38	21:00	19:32	18:20	16:22	32		15:30 (2)							15:08 (2)	
25	08:25	15:23 (2)	07:25	18:45	20:43	21:34	22:01	21:38	21:38	21:00	19:32	18:20	16:22	31		14:59 (2)							15:28 (2)	
	16:52	15:56 (2)	17:54	18:47	20:44	21:36	22:01	21:36	21:36	21:00	19:32	18:20	16:22	31		15:30 (2)							15:08 (2)	
26	08:23	15:23 (2)	07:23	18:46	20:43	21:35	22:01	21:37	21:37	21:00	19:32	18:20	16:22	31		14:59 (2)							15:28 (2)	
	16:54	15:55 (2)	17:56	18:49	20:46	21:37	22:01	21:35	21:35	21:00	19:32	18:20	16:22	31		15:30 (2)							15:09 (2)	
27	08:22	15:23 (2)	07:21	18:49	20:46	21:37	22:01	21:35	21:35	21:00	19:32	18:20	16:22	31		15:00 (2)							15:28 (2)	
	16:56	15:55 (2)	17:58	18:51	20:48	21:39	22:01	21:33	21:33	21:00	19:32	18:20	16:22	30		15:30 (2)							15:10 (2)	
28	08:20	15:24 (2)	07:19	18:51	20:48	21:39	22:01	21:33	21:33	21:00	19:32	18:20	16:22	30		15:01 (2)							15:28 (2)	
	16:58	15:56 (2)	18:00	18:53	20:50	21:40	22:01	21:32	21:32	21:00	19:32	18:20	16:22	29		15:30 (2)							15:10 (2)	
29	08:19	15:25 (2)		18:53	20:50	21:40	22:01	21:32	21:32	21:00	19:32	18:20	16:22	29		15:01 (2)							15:28 (2)	
	17:00	15:55 (2)		18:55	20:52	21:41	22:01	21:30	21:30	21:00	19:32	18:20	16:22	28		15:29 (2)								

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FO - H171

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:11 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FP - H172

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FQ - H173

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FR - H174

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FS - H175

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	17:02 (4) 17:20 (4)	07:01 20:00	05:52 20:55
2	08:44 16:16	08:12 17:08	07:14 18:04	17:03 (4) 17:18 (4)	06:59 20:02	20:55 20:57
3	08:43 16:17	08:10 17:10	07:11 18:05	17:06 (4) 17:15 (4)	06:56 20:04	19:34 (2) 19:37 (2)
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	19:32 (2) 19:39 (2)	05:48 21:01
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	19:30 (2) 19:40 (2)	05:44 21:03
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	19:29 (2) 19:42 (2)	05:42 21:04
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	19:27 (2) 19:43 (2)	05:40 21:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	19:27 (2) 19:46 (2)	05:38 21:08
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	19:27 (2) 19:48 (2)	05:36 21:10
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	19:26 (2) 19:49 (2)	05:34 21:11
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	19:26 (2) 19:49 (2)	05:32 21:13
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	19:26 (2) 19:48 (2)	05:31 21:15
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:26 (2) 19:47 (2)	05:29 21:17
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:27 (2) 19:46 (2)	05:27 21:18
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:28 (2) 19:45 (2)	05:25 21:20
16	08:35 16:36	07:45 17:36	17:05 (4) 18:30	06:25 20:28	19:29 (2) 19:42 (2)	05:24 21:22
17	08:34 16:38	07:43 17:38	17:04 (4) 18:32	06:23 20:30	19:31 (2) 19:40 (2)	05:22 21:23
18	08:33 16:40	07:41 17:40	17:02 (4) 18:34	06:21 20:31	19:40 (2) 21:25	05:21 22:00
19	08:32 16:41	07:39 17:42	17:01 (4) 18:36	06:18 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	17:00 (4) 18:38	06:16 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	17:00 (4) 18:40	06:14 20:37	05:16 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	16:59 (4) 18:41	06:11 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	16:59 (4) 18:43	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	16:59 (4) 18:45	06:07 20:42	05:12 21:34	04:56 22:01
25	08:24 16:52	07:25 17:54	16:59 (4) 18:47	06:05 20:44	05:11 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	16:59 (4) 18:49	06:03 20:46	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	17:00 (4) 18:51	06:00 20:48	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	17:01 (4) 18:53	05:58 20:50	05:07 21:40	04:57 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:01
31	08:15 17:04		07:04 19:58		05:04 21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case		223	42	236		
Sun reduction		0.23	0.27	0.35		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.67	0.67	0.67		
Total reduction		0.16	0.18	0.23		
Total, real		35	8	55		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FS - H175

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:25 (2) 19:48 (2)	07:26 19:05	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	19:25 (2) 19:48 (2)	07:28 19:02	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	19:24 (2) 19:45 (2)	07:30 19:00	07:28 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	19:24 (2) 19:43 (2)	07:31 18:57	07:30 16:48
5	05:02 21:58	05:45 21:17	06:40 20:09	19:24 (2) 19:41 (2)	07:33 18:55	07:32 16:46
6	05:03 21:58	05:47 21:15	06:42 20:06	19:25 (2) 19:39 (2)	07:35 18:52	07:34 16:44
7	05:04 21:57	05:49 21:13	06:43 20:04	19:25 (2) 19:35 (2)	07:37 18:50	07:36 16:43
8	05:05 21:56	05:50 21:11	06:45 20:01	19:26 (2) 19:33 (2)	07:39 18:48	07:38 16:41
9	05:06 21:55	05:52 21:09	06:47 19:59	19:28 (2) 19:31 (2)	07:41 18:45	07:40 16:39
10	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	16:39 16:37	16:05 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:39 (4) 17:51 (4)	07:44 16:35
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:36 (4) 17:53 (4)	07:45 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:35 (4) 17:54 (4)	07:47 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:33 (4) 17:55 (4)	07:49 16:31
15	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	17:32 (4) 17:56 (4)	07:51 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:31 (4) 17:56 (4)	07:53 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:31 (4) 17:56 (4)	07:55 16:26
18	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	17:31 (4) 17:55 (4)	07:57 16:24
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:30 (4) 17:52 (4)	07:59 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:30 (4) 17:50 (4)	08:00 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:30 (4) 17:48 (4)	08:02 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:31 (4) 17:45 (4)	08:04 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:31 (4) 17:43 (4)	08:06 16:18
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:32 (4) 17:41 (4)	08:08 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	16:33 (4) 16:38 (4)	08:09 16:16
26	05:29 21:35	06:22 20:32	19:34 (2) 19:43 (2)	07:17 17:13	16:35 (4) 16:36 (4)	08:11 16:14
27	05:30 21:33	06:24 20:30	19:31 (2) 19:45 (2)	07:14 17:04	08:13 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	19:29 (2) 19:46 (2)	07:21 17:02	08:14 16:12	08:44 16:10
29	05:34 21:30	06:27 20:25	19:28 (2) 19:47 (2)	07:22 17:00	08:16 16:11	08:44 16:11
30	05:35 21:28	06:29 20:23	19:27 (2) 19:48 (2)	07:24 16:58	08:18 16:11	08:44 16:12
31	05:37 21:26	06:31 20:21	19:25 (2) 19:47 (2)	07:22 16:56	08:44 16:13	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		102	137	269		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.67	0.67	0.67		
Total reduction		0.23	0.21	0.20		
Total, real		23	29	53		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FT - H176

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44		15:15 (5)	08:14		15:40 (4)	07:16		17:05 (3)	07:01		19:04 (2)	05:52		05:03			
	16:15	22	15:37 (5)	17:06	33	16:13 (4)	18:02	17	17:22 (3)	20:00	29	19:33 (2)	20:55		21:45			
2	08:44		15:16 (5)	08:12		15:40 (4)	07:14		17:06 (3)	06:59		19:02 (2)	05:50		05:02			
	16:16	22	15:38 (5)	17:08	32	16:12 (4)	18:04	14	17:20 (3)	20:02	33	19:35 (2)	20:57		21:46			
3	08:44		15:16 (5)	08:10		15:41 (4)	07:12		17:09 (3)	06:56		19:02 (2)	05:48		05:01			
	16:17	22	15:39 (4)	17:10	31	16:12 (4)	18:06	8	17:17 (3)	20:04	34	19:36 (2)	20:59		21:48			
4	08:43		15:17 (5)	08:08		15:42 (4)	07:09			06:54		19:01 (2)	05:46		05:00			
	16:18	24	15:41 (4)	17:12	29	16:11 (4)	18:07			20:06	36	19:37 (2)	21:01		21:49			
5	08:43		15:17 (5)	08:07		15:44 (4)	07:07			06:51		19:00 (2)	05:44		04:59			
	16:19	25	15:42 (4)	17:14	26	16:10 (4)	18:09			20:07	36	19:36 (2)	21:03		21:50			
6	08:43		15:18 (5)	08:05		15:45 (4)	07:04			06:49		19:00 (2)	05:42		04:59			
	16:21	26	15:44 (4)	17:16	23	16:08 (4)	18:11			20:09	37	19:37 (2)	21:04		21:51			
7	08:42		15:18 (5)	08:03		15:47 (4)	07:02			06:47		18:59 (2)	05:40		04:58			
	16:22	27	15:45 (4)	17:18	20	16:07 (4)	18:13			20:11	37	19:36 (2)	21:06		21:52			
8	08:42		15:19 (5)	08:01		15:50 (4)	07:00			06:44		18:59 (2)	05:38		04:57			
	16:24	27	15:46 (4)	17:20	15	16:05 (4)	18:15			20:13	37	19:36 (2)	21:08		21:53			
9	08:41		15:20 (5)	07:59		15:54 (4)	06:57			06:42		18:59 (2)	05:36		04:57			
	16:25	29	15:49 (4)	17:22	6	16:00 (4)	18:17			20:15	37	19:36 (2)	21:10		21:54			
10	08:40		15:21 (5)	07:57			06:55			06:39		18:59 (2)	05:34		04:56			
	16:26	29	15:50 (4)	17:24			18:19			20:17	35	19:34 (2)	21:11		21:55			
11	08:40		15:21 (5)	07:55			06:52			06:37		18:59 (2)	05:33		04:56			
	16:28	31	15:52 (4)	17:26			18:21			20:19	35	19:34 (2)	21:13		21:55			
12	08:39		15:22 (5)	07:53			06:50			06:35		19:00 (2)	05:31		04:55			
	16:30	32	15:54 (4)	17:28			18:23			20:20	34	19:34 (2)	21:15		21:56			
13	08:38		15:23 (5)	07:51			06:48			06:32		19:00 (2)	05:29		04:55			
	16:31	32	15:55 (4)	17:30			18:25			20:22	32	19:32 (2)	21:17		21:57			
14	08:37		15:24 (5)	07:49			06:45			06:30		19:01 (2)	05:27		04:55			
	16:33	33	15:57 (4)	17:32			18:27			20:24	30	19:31 (2)	21:18		21:58			
15	08:36		15:26 (5)	07:47			06:43			06:28		19:02 (2)	05:26		04:54			
	16:34	33	15:59 (4)	17:34			18:28			20:26	28	19:30 (2)	21:20		21:58			
16	08:35		15:27 (5)	07:45			06:40			06:25		19:03 (2)	05:24		04:54			
	16:36	33	16:00 (4)	17:36			18:30			20:28	26	19:29 (2)	21:22		21:59			
17	08:34		15:29 (5)	07:43		17:08 (3)	06:38			06:23		19:04 (2)	05:22		04:54			
	16:38	33	16:02 (4)	17:38	1	17:09 (3)	18:32			20:30	22	19:26 (2)	21:23		21:59			
18	08:33		15:35 (4)	07:41		17:05 (3)	06:35			06:21		19:06 (2)	05:21		04:54			
	16:40	30	16:05 (4)	17:40	6	17:11 (3)	18:34			20:31	18	19:24 (2)	21:25		22:00			
19	08:32		15:36 (4)	07:39		17:05 (3)	06:33			06:18		19:09 (2)	05:19		04:54			
	16:41	31	16:07 (4)	17:42	8	17:13 (3)	18:36			20:33	12	19:21 (2)	21:27		22:00			
20	08:31		15:35 (4)	07:36		17:04 (3)	06:31			06:16			05:18		04:54			
	16:43	33	16:08 (4)	17:44	12	17:16 (3)	18:38			20:35			21:28		22:00			
21	08:30		15:35 (4)	07:34		17:04 (3)	06:28			06:14			05:16		04:54			
	16:45	36	16:11 (4)	17:46	14	17:18 (3)	18:40			20:37			21:30		22:01			
22	08:29		15:35 (4)	07:32		17:02 (3)	06:26			06:12			05:15		04:55			
	16:47	36	16:11 (4)	17:48	17	17:19 (3)	18:42			20:39			21:31		22:01			
23	08:27		15:36 (4)	07:30		17:02 (3)	06:23			06:09			05:13		04:55			
	16:49	36	16:12 (4)	17:50	20	17:22 (3)	18:43			20:41			21:33		22:01			
24	08:26		15:35 (4)	07:28		17:03 (3)	06:21			06:07			05:12		04:55			
	16:50	37	16:12 (4)	17:52	21	17:24 (3)	18:45			20:43			21:34		22:01			
25	08:24		15:36 (4)	07:25		17:02 (3)	06:18			06:05			05:11		04:55			
	16:52	37	16:13 (4)	17:54	24	17:26 (3)	18:47			20:44			21:36		22:01			
26	08:23		15:36 (4)	07:23		17:03 (3)	06:16			06:03			05:09		04:56			
	16:54	37	16:13 (4)	17:56	22	17:25 (3)	18:49			20:46			21:37		22:01			
27	08:22		15:36 (4)	07:21		17:03 (3)	06:13		18:15 (2)	06:01			05:08		04:56			
	16:56	37	16:13 (4)	17:58	22	17:25 (3)	18:51	9	18:24 (2)	20:48			21:39		22:01			
28	08:20		15:37 (4)	07:18		17:03 (3)	06:11		18:12 (2)	05:58			05:07		04:57			
	16:58	36	16:13 (4)	18:00	20	17:23 (3)	18:53	14	18:26 (2)	20:50			21:40		22:01			
29	08:18		15:37 (4)				07:08		19:09 (2)	05:56			05:06		04:57			
	17:00	36	16:13 (4)				19:54	19	19:28 (2)	20:52			21:41		22:01			
30	08:17		15:38 (4)				07:06		19:07 (2)	05:54			05:05		04:58			
	17:02	35	16:13 (4)				19:56	23	19:30 (2)	20:54			21:43		22:00			
31	08:15		15:38 (4)				07:04		19:05 (2)				05:04					
	17:04	34	16:12 (4)				19:58	26	19:31 (2)				21:44					
Potential sun hours	250		273		367		420		494		510							
Total, worst case	971		402		130		588											
Sun reduction	0.24		0.23		0.27		0.35											
Oper. time red.	1.00		1.00		1.00		1.00											
Wind dir. red.	0.66		0.67		0.67		0.67											
Total reduction	0.16		0.16		0.18		0.24											
Total, real	156		62		24		140											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FT - H176

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:58 (2) 19:33 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:58 (2) 19:33 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:56 (2) 19:33 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:56 (2) 19:33 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:56 (2) 19:33 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:56 (2) 19:33 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:55 (2) 19:31 (2)	07:37 16:43	08:28 16:06
8	05:05 21:56	05:50 21:12	06:45 20:01	18:55 (2) 19:31 (2)	07:39 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	18:56 (2) 19:30 (2)	07:41 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:55 (2) 19:28 (2)	07:42 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:56 (2) 19:26 (2)	07:44 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:57 (2) 19:24 (2)	07:45 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:58 (2) 19:22 (2)	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:59 (2) 19:18 (2)	07:49 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	19:01 (2) 19:16 (2)	07:51 16:29	08:37 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	19:04 (2) 19:14 (2)	07:53 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	18:26 18:26	07:55 16:26	08:38 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	18:26 18:24	07:57 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	18:22 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	18:20 18:20	08:00 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	18:03 18:17	08:02 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	18:05 18:15	08:04 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	07:12 19:24	18:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	19:12 (2) 19:25 (2)	07:13 19:22	08:08 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	19:08 (2) 19:27 (2)	07:15 19:19	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	19:06 (2) 19:29 (2)	07:17 19:17	08:11 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	19:05 (2) 19:31 (2)	07:19 19:14	08:13 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	19:02 (2) 19:31 (2)	07:21 19:12	08:14 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	19:01 (2) 19:32 (2)	07:22 19:09	08:16 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	19:00 (2) 19:33 (2)	07:24 19:07	08:18 16:11	08:44 16:12
31	05:37 21:27	06:31 20:21	18:59 (2) 19:32 (2)	07:22 16:56	08:19 16:13	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		207	482	228	907	664
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.66
Total reduction		0.23	0.22	0.20	0.18	0.14
Total, real		48	104	45	159	90

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FU - H177

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		15:10 (5)	08:14		15:33 (4)	07:16		17:04 (3)	07:01		18:59 (2)	05:52		05:03		
	16:15	27	15:37 (4)	17:06	28	16:01 (4)	18:02	11	17:15 (3)	20:00	34	19:33 (2)	20:55		21:45		
2	08:44		15:11 (5)	08:12		15:34 (4)	07:14			06:59		18:58 (2)	05:50		05:02		
	16:16	28	15:39 (4)	17:08	26	16:00 (4)	18:04			20:02	36	19:34 (2)	20:57		21:46		
3	08:44		15:11 (5)	08:10		15:36 (4)	07:12			06:56		18:57 (2)	05:48		05:01		
	16:17	28	15:39 (4)	17:10	22	15:58 (4)	18:06			20:04	37	19:34 (2)	20:59		21:48		
4	08:43		15:12 (5)	08:08		15:38 (4)	07:09			06:54		18:57 (2)	05:46		05:00		
	16:18	29	15:41 (4)	17:12	19	15:57 (4)	18:07			20:06	38	19:35 (2)	21:01		21:49		
5	08:43		15:12 (5)	08:07		15:40 (4)	07:07			06:51		18:56 (2)	05:44		04:59		
	16:19	30	15:42 (4)	17:14	14	15:54 (4)	18:09			20:07	38	19:34 (2)	21:03		21:50		
6	08:43		15:13 (5)	08:05		15:47 (4)	07:04			06:49		18:56 (2)	05:42		04:59		
	16:21	31	15:44 (4)	17:16	1	15:48 (4)	18:11			20:09	38	19:34 (2)	21:04		21:51		
7	08:42		15:14 (5)	08:03			07:02			06:47		18:55 (2)	05:40		04:58		
	16:22	31	15:45 (4)	17:18			18:13			20:11	38	19:33 (2)	21:06		21:52		
8	08:42		15:14 (5)	08:01			07:00			06:44		18:55 (2)	05:38		04:57		
	16:24	32	15:46 (4)	17:20			18:15			20:13	38	19:33 (2)	21:08		21:53		
9	08:41		15:16 (5)	07:59			06:57			06:42		18:55 (2)	05:36		04:57		
	16:25	33	15:49 (4)	17:22			18:17			20:15	38	19:33 (2)	21:10		21:54		
10	08:40		15:17 (5)	07:57			06:55			06:39		18:55 (2)	05:34		04:56		
	16:26	33	15:50 (4)	17:24			18:19			20:17	37	19:32 (2)	21:11		21:55		
11	08:40		15:18 (5)	07:55			06:53			06:37		18:55 (2)	05:33		04:56		
	16:28	34	15:52 (4)	17:26			18:21			20:19	36	19:31 (2)	21:13		21:55		
12	08:39		15:19 (5)	07:53			06:50			06:35		18:56 (2)	05:31		04:55		
	16:30	35	15:54 (4)	17:28			18:23			20:20	35	19:31 (2)	21:15		21:56		
13	08:38		15:21 (5)	07:51			06:48			06:32		18:56 (2)	05:29		04:55		
	16:31	34	15:55 (4)	17:30			18:25			20:22	33	19:29 (2)	21:17		21:57		
14	08:37		15:23 (5)	07:49			06:45			06:30		18:57 (2)	05:27		04:55		
	16:33	34	15:57 (4)	17:32			18:27			20:24	31	19:28 (2)	21:18		21:58		
15	08:36		15:24 (4)	07:47		17:03 (3)	06:43			06:28		18:58 (2)	05:26		04:54		
	16:34	35	15:59 (4)	17:34	2	17:05 (3)	18:28			20:26	29	19:27 (2)	21:20		21:58		
16	08:35		15:23 (4)	07:45		17:01 (3)	06:40			06:25		19:00 (2)	05:24		04:54		
	16:36	37	16:00 (4)	17:36	6	17:07 (3)	18:30			20:28	26	19:26 (2)	21:22		21:59		
17	08:34		15:23 (4)	07:43		17:01 (3)	06:38			06:23		19:01 (2)	05:22		04:54		
	16:38	38	16:01 (4)	17:38	8	17:09 (3)	18:32			20:30	22	19:23 (2)	21:23		21:59		
18	08:33		15:24 (4)	07:41		16:59 (3)	06:35			06:21		19:03 (2)	05:21		04:54		
	16:40	38	16:02 (4)	17:40	12	17:11 (3)	18:34			20:31	18	19:21 (2)	21:25		22:00		
19	08:32		15:25 (4)	07:39		16:58 (3)	06:33			06:18		19:07 (2)	05:19		04:54		
	16:41	37	16:02 (4)	17:42	15	17:13 (3)	18:36			20:33	10	19:17 (2)	21:27		22:00		
20	08:31		15:24 (4)	07:36		16:58 (3)	06:31			06:16			05:18		04:54		
	16:43	38	16:02 (4)	17:44	18	17:16 (3)	18:38			20:35			21:28		22:00		
21	08:30		15:25 (4)	07:34		16:58 (3)	06:28			06:14			05:16		04:54		
	16:45	38	16:03 (4)	17:46	20	17:18 (3)	18:40			20:37			21:30		22:01		
22	08:29		15:25 (4)	07:32		16:57 (3)	06:26			06:12			05:15		04:55		
	16:47	38	16:03 (4)	17:48	22	17:19 (3)	18:42			20:39			21:31		22:01		
23	08:27		15:26 (4)	07:30		16:58 (3)	06:23			06:09			05:13		04:55		
	16:49	37	16:03 (4)	17:50	24	17:22 (3)	18:43			20:41			21:33		22:01		
24	08:26		15:26 (4)	07:28		16:58 (3)	06:21			06:07			05:12		04:55		
	16:50	37	16:03 (4)	17:52	24	17:22 (3)	18:45			20:43			21:34		22:01		
25	08:24		15:27 (4)	07:25		16:58 (3)	06:18		18:17 (2)	06:05			05:11		04:55		
	16:52	36	16:03 (4)	17:54	23	17:21 (3)	18:47	3	18:20 (2)	20:44			21:36		22:01		
26	08:23		15:27 (4)	07:23		16:59 (3)	06:16		18:11 (2)	06:03			05:09		04:56		
	16:54	36	16:03 (4)	17:56	21	17:20 (3)	18:49	12	18:23 (2)	20:46			21:37		22:01		
27	08:22		15:27 (4)	07:21		17:00 (3)	06:13		18:07 (2)	06:01			05:08		04:56		
	16:56	36	16:03 (4)	17:58	19	17:19 (3)	18:51	17	18:24 (2)	20:48			21:39		22:01		
28	08:20		15:29 (4)	07:18		17:01 (3)	06:11		18:05 (2)	05:58			05:07		04:57		
	16:58	34	16:03 (4)	18:00	16	17:17 (3)	18:53	21	18:26 (2)	20:50			21:40		22:01		
29	08:19		15:29 (4)				07:09		19:03 (2)	05:56			05:06		04:57		
	17:00	33	16:02 (4)				19:54	25	19:28 (2)	20:52			21:41		22:01		
30	08:17		15:30 (4)				07:06		19:02 (2)	05:54			05:05		04:58		
	17:02	32	16:02 (4)				19:56	28	19:30 (2)	20:54			21:43		22:00		
31	08:15		15:31 (4)				07:04		19:00 (2)				05:04				
	17:04	30	16:01 (4)				19:58	31	19:31 (2)				21:44				
Potential sun hours	250			273			367			420			494		510		
Total, worst case	1049			340			148			612							
Sun reduction	0.24			0.23			0.27			0.35							
Oper. time red.	1.00			1.00			1.00			1.00							
Wind dir. red.	0.66			0.67			0.67			0.67							
Total reduction	0.16			0.16			0.18			0.24							
Total, real	168			53			27			145							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FU - H177

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:54 (2) 19:30 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:54 (2) 19:31 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:52 (2) 19:30 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:52 (2) 19:30 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:52 (2) 19:30 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:52 (2) 19:30 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:51 (2) 19:29 (2)	07:37 16:43	08:28 16:06
8	05:05 21:56	05:50 21:12	06:45 20:01	18:51 (2) 19:29 (2)	07:39 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	18:51 (2) 19:29 (2)	07:41 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:51 (2) 19:27 (2)	07:42 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:51 (2) 19:26 (2)	07:44 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:52 (2) 19:24 (2)	07:46 17:39 (3)	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:53 (2) 19:22 (2)	07:48 17:49 (3)	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:53 (2) 19:18 (2)	07:50 17:51 (3)	08:36 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	18:54 (2) 19:16 (2)	07:51 17:52 (3)	08:37 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	18:56 (2) 19:14 (2)	07:53 17:53 (3)	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	18:58 (2) 19:11 (2)	07:55 17:53 (3)	08:38 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	19:02 (2) 19:08 (2)	07:57 17:53 (3)	08:39 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	19:07 (2) 18:22 (2)	07:59 17:52 (3)	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	18:20 (2) 18:20 (2)	08:00 17:50 (3)	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	18:03 (2) 18:17 (2)	08:02 17:48 (3)	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	18:05 (2) 18:15 (2)	08:04 17:45 (3)	08:42 16:06
23	05:24 21:39	06:17 20:39	07:12 19:24	18:07 (2) 18:13 (2)	08:06 17:43 (3)	08:42 16:07
24	05:26 21:38	06:19 20:37	19:10 (2) 19:21 (2)	07:13 19:22 (2)	08:08 17:41 (3)	08:43 16:08
25	05:27 21:36	06:20 20:35	19:06 (2) 19:24 (2)	07:15 19:19 (2)	08:09 16:38 (3)	08:43 16:08
26	05:29 21:35	06:22 20:32	19:03 (2) 19:26 (2)	07:17 19:17 (2)	08:11 16:31 (3)	08:43 16:09
27	05:30 21:33	06:24 20:30	19:02 (2) 19:27 (2)	07:19 19:14 (2)	08:13 16:34 (3)	08:44 16:10
28	05:32 21:32	06:26 20:28	18:59 (2) 19:28 (2)	07:21 19:12 (2)	08:14 16:12 (2)	08:44 16:11
29	05:34 21:30	06:27 20:25	18:58 (2) 19:29 (2)	07:22 19:09 (2)	08:16 16:12 (2)	08:44 16:11
30	05:35 21:28	06:29 20:23	18:57 (2) 19:30 (2)	07:24 19:07 (2)	08:18 16:11 (2)	08:44 16:12
31	05:37 21:27	06:31 20:21	18:55 (2) 19:30 (2)	07:22 16:56 (2)	08:19 16:13 (2)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		205	555	245	829	834
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.65
Total reduction		0.23	0.22	0.20	0.17	0.14
Total, real		47	120	48	145	113

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FV - H178

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44		15:07 (5)	08:14		15:30 (4)	07:16			07:01		18:54 (2)	05:52		05:03			
	16:15	30	15:37 (4)	17:06	22	15:52 (4)	18:02			20:00	38	19:32 (2)	20:55		21:45			
2	08:44		15:08 (5)	08:12		15:32 (4)	07:14			06:59		18:53 (2)	05:50		05:02			
	16:16	31	15:39 (4)	17:08	18	15:50 (4)	18:04			20:02	38	19:31 (2)	20:57		21:46			
3	08:44		15:08 (5)	08:10		15:35 (4)	07:12			06:56		18:53 (2)	05:48		05:01			
	16:17	31	15:39 (4)	17:10	13	15:48 (4)	18:06			20:04	39	19:32 (2)	20:59		21:48			
4	08:43		15:09 (5)	08:08			07:09			06:54		18:53 (2)	05:46		05:00			
	16:18	32	15:41 (4)	17:12			18:07			20:06	39	19:32 (2)	21:01		21:49			
5	08:43		15:09 (5)	08:07			07:07			06:51		18:52 (2)	05:44		04:59			
	16:19	33	15:42 (4)	17:14			18:09			20:07	39	19:31 (2)	21:03		21:50			
6	08:43		15:11 (5)	08:05			07:04			06:49		18:52 (2)	05:42		04:59			
	16:21	33	15:44 (4)	17:16			18:11			20:09	39	19:31 (2)	21:04		21:51			
7	08:42		15:11 (5)	08:03			07:02			06:47		18:51 (2)	05:40		04:58			
	16:22	34	15:45 (4)	17:18			18:13			20:11	39	19:30 (2)	21:06		21:52			
8	08:42		15:12 (5)	08:01			07:00			06:44		18:51 (2)	05:38		04:57			
	16:24	34	15:46 (4)	17:20			18:15			20:13	39	19:30 (2)	21:08		21:53			
9	08:41		15:14 (5)	07:59			06:57			06:42		18:52 (2)	05:36		04:57			
	16:25	35	15:49 (4)	17:22			18:17			20:15	38	19:30 (2)	21:10		21:54			
10	08:40		15:15 (5)	07:57			06:55			06:39		18:52 (2)	05:34		04:56			
	16:26	35	15:50 (4)	17:24			18:19			20:17	36	19:28 (2)	21:11		21:55			
11	08:40		15:16 (4)	07:55			06:53			06:37		18:52 (2)	05:33		04:56			
	16:28	36	15:52 (4)	17:26			18:21			20:19	36	19:28 (2)	21:13		21:55			
12	08:39		15:16 (4)	07:53			06:50			06:35		18:53 (2)	05:31		04:55			
	16:30	38	15:54 (4)	17:28			18:23			20:20	34	19:27 (2)	21:15		21:56			
13	08:38		15:16 (4)	07:51			06:48			06:32		18:53 (2)	05:29		04:55			
	16:31	38	15:54 (4)	17:30			18:25			20:22	32	19:25 (2)	21:17		21:57			
14	08:37		15:17 (4)	07:49		16:58 (3)	06:45			06:30		18:55 (2)	05:27		04:55			
	16:33	38	15:55 (4)	17:32	4	17:02 (3)	18:27			20:24	29	19:24 (2)	21:18		21:58			
15	08:36		15:17 (4)	07:47		16:57 (3)	06:43			06:28		18:56 (2)	05:26		04:54			
	16:34	38	15:55 (4)	17:34	8	17:05 (3)	18:28			20:26	26	19:22 (2)	21:20		21:58			
16	08:35		15:17 (4)	07:45		16:57 (3)	06:40			06:25		18:58 (2)	05:24		04:54			
	16:36	38	15:55 (4)	17:36	10	17:07 (3)	18:30			20:28	23	19:21 (2)	21:22		21:59			
17	08:34		15:17 (4)	07:43		16:56 (3)	06:38			06:23		18:59 (2)	05:22		04:54			
	16:38	38	15:55 (4)	17:38	13	17:09 (3)	18:32			20:30	18	19:17 (2)	21:23		21:59			
18	08:33		15:18 (4)	07:41		16:55 (3)	06:35			06:21		19:03 (2)	05:21		04:54			
	16:40	38	15:56 (4)	17:40	16	17:11 (3)	18:34			20:31	11	19:14 (2)	21:25		22:00			
19	08:32		15:18 (4)	07:39		16:55 (3)	06:33			06:18			05:19		04:54			
	16:41	39	15:57 (4)	17:42	18	17:13 (3)	18:36			20:33			21:27		22:00			
20	08:31		15:18 (4)	07:36		16:55 (3)	06:31			06:16			05:18		04:54			
	16:43	38	15:56 (4)	17:44	21	17:16 (3)	18:38			20:35			21:28		22:00			
21	08:30		15:19 (4)	07:34		16:55 (3)	06:28			06:14			05:16		04:54			
	16:45	38	15:57 (4)	17:46	23	17:18 (3)	18:40			20:37			21:30		22:01			
22	08:29		15:19 (4)	07:32		16:54 (3)	06:26			06:12			05:15		04:55			
	16:47	37	15:56 (4)	17:48	25	17:19 (3)	18:42			20:39			21:31		22:01			
23	08:27		15:20 (4)	07:30		16:55 (3)	06:23			06:09			05:13		04:55			
	16:49	37	15:57 (4)	17:50	24	17:19 (3)	18:43			20:41			21:33		22:01			
24	08:26		15:20 (4)	07:28		16:56 (3)	06:21		18:10 (2)	06:07			05:12		04:55			
	16:50	36	15:56 (4)	17:52	22	17:18 (3)	18:45	8	18:18 (2)	20:43			21:34		22:01			
25	08:24		15:22 (4)	07:25		16:56 (3)	06:18		18:06 (2)	06:05			05:11		04:55			
	16:52	35	15:57 (4)	17:54	21	17:17 (3)	18:47	15	18:21 (2)	20:44			21:36		22:01			
26	08:23		15:22 (4)	07:23		16:57 (3)	06:16		18:04 (2)	06:03			05:09		04:56			
	16:54	34	15:56 (4)	17:56	19	17:16 (3)	18:49	19	18:23 (2)	20:46			21:37		22:01			
27	08:22		15:23 (4)	07:21		16:59 (3)	06:13		18:01 (2)	06:01			05:08		04:56			
	16:56	32	15:55 (4)	17:58	15	17:14 (3)	18:51	23	18:24 (2)	20:48			21:39		22:01			
28	08:20		15:24 (4)	07:18		17:01 (3)	06:11		18:00 (2)	05:58			05:07		04:57			
	16:58	32	15:56 (4)	18:00	10	17:11 (3)	18:53	26	18:26 (2)	20:50			21:40		22:01			
29	08:19		15:25 (4)				07:09		18:57 (2)	05:56			05:06		04:57			
	17:00	30	15:55 (4)				19:54	31	19:28 (2)	20:52			21:41		22:01			
30	08:17		15:26 (4)				07:06		18:57 (2)	05:54			05:05		04:58			
	17:02	28	15:54 (4)				19:56	33	19:30 (2)	20:54			21:43		22:00			
31	08:15		15:27 (4)				07:04		18:55 (2)				05:04					
	17:04	25	15:52 (4)				19:58	36	19:31 (2)				21:44					
Potential sun hours	250			273			367			420			494			510		
Total, worst case	1071			302			191			593								
Sun reduction	0.24			0.23			0.27			0.35								
Oper. time red.	1.00			1.00			1.00			1.00								
Wind dir. red.	0.66			0.67			0.67			0.67								
Total reduction	0.16			0.16			0.18			0.24								
Total, real	171			47			35			141								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FV - H178

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:51 (2) 19:27 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:51 (2) 19:27 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:49 (2) 19:27 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:49 (2) 19:27 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:48 (2) 19:27 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:48 (2) 19:27 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:47 (2) 19:26 (2)	07:37 16:43	08:28 16:06
8	05:05 21:56	05:50 21:12	06:45 20:01	18:47 (2) 19:26 (2)	07:39 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	18:47 (2) 19:26 (2)	07:41 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:46 (2) 19:25 (2)	07:42 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:47 (2) 19:24 (2)	07:44 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:47 (2) 19:23 (2)	07:46 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:48 (2) 19:22 (2)	07:48 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:48 (2) 19:18 (2)	07:50 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	18:49 (2) 19:16 (2)	07:51 16:29	08:37 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	18:50 (2) 19:14 (2)	07:53 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	18:51 (2) 19:11 (2)	07:55 16:26	08:38 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	18:53 (2) 19:08 (2)	07:57 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	18:56 (2) 19:06 (2)	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	19:05 (2) 19:17 (2)	07:15 17:13	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	19:02 (2) 19:21 (2)	07:17 17:06	08:11 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	19:00 (2) 19:23 (2)	07:19 17:04	08:13 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	18:57 (2) 19:23 (2)	07:21 17:02	08:14 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	18:55 (2) 19:25 (2)	07:22 17:00	08:16 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	18:54 (2) 19:26 (2)	07:24 16:58	08:18 16:11	08:44 16:12
31	05:37 21:27	06:31 20:21	18:52 (2) 19:26 (2)	07:22 16:56		08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		176	615	255	763	926
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.65
Total reduction		0.23	0.22	0.20	0.17	0.14
Total, real		41	133	50	133	125

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FW - H179

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15 39	14:41 (4) 15:20 (4) 17:06	07:16 18:02	07:01 20:00 43	18:32 (2) 19:15 (2) 20:55	05:03 21:45
2	08:44 16:16 38	14:42 (4) 15:20 (4) 17:08	07:14 18:04	06:59 20:02 43	18:31 (2) 19:14 (2) 20:57	05:02 21:46
3	08:44 16:17 38	14:42 (4) 15:20 (4) 17:10	07:12 18:06	06:56 20:04 42	18:32 (2) 19:14 (2) 20:59	05:01 21:48
4	08:43 16:18 38	14:43 (4) 15:21 (4) 17:12	07:09 18:07	06:54 20:06 40	18:33 (2) 19:13 (2) 21:01	05:00 21:49
5	08:43 16:19 38	14:43 (4) 15:21 (4) 17:14	07:07 18:09	06:51 20:07 38	18:33 (2) 19:11 (2) 21:03	04:59 21:50
6	08:43 16:21 38	14:44 (4) 15:22 (4) 17:16	07:04 18:11	06:49 20:09 37	18:34 (2) 19:11 (2) 21:04	04:59 21:51
7	08:42 16:22 37	14:44 (4) 15:21 (4) 17:18	07:02 18:13	06:47 20:11 35	18:34 (2) 19:09 (2) 21:06	04:58 21:52
8	08:42 16:24 36	14:45 (4) 15:21 (4) 17:20	07:00 18:15	06:44 20:13 32	18:35 (2) 19:07 (2) 21:08	04:57 21:53
9	08:41 16:25 36	14:46 (4) 15:22 (4) 17:22	06:57 18:17	06:42 20:15 29	18:37 (2) 19:06 (2) 21:10	04:57 21:54
10	08:40 16:26 35	14:47 (4) 15:22 (4) 17:24	06:55 18:19	06:39 20:17 25	18:38 (2) 19:03 (2) 21:11	04:56 21:55
11	08:40 16:28 35	14:47 (4) 15:22 (4) 17:26	06:53 18:21	06:37 20:19 20	18:41 (2) 19:01 (2) 21:13	04:56 21:55
12	08:39 16:30 34	14:48 (4) 15:22 (4) 17:28	06:50 18:23	06:35 20:20 13	18:44 (2) 18:57 (2) 21:15	04:55 21:56
13	08:38 16:31 33	14:49 (4) 15:22 (4) 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33 32	14:50 (4) 15:22 (4) 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58
15	08:36 16:34 31	14:51 (4) 15:22 (4) 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58
16	08:35 16:36 30	14:51 (4) 15:21 (4) 17:36	06:40 18:30	06:25 17:51 (2) 20:28	05:24 18:04 (2) 21:22	04:54 21:59
17	08:34 16:38 28	14:53 (4) 15:21 (4) 17:38	06:38 18:32	06:23 17:47 (2) 20:30	05:22 18:06 (2) 21:23	04:54 21:59
18	08:33 16:40 27	14:54 (4) 15:21 (4) 17:40	06:35 18:34	06:21 17:44 (2) 20:31	05:21 18:07 (2) 21:25	04:54 22:00
19	08:32 16:41 24	14:56 (4) 15:20 (4) 17:42	06:33 18:36	06:18 17:42 (2) 20:33	05:19 18:10 (2) 21:27	04:54 22:00
20	08:31 16:43 22	14:57 (4) 15:19 (4) 17:44	06:31 18:38	06:16 17:40 (2) 20:35	05:18 18:11 (2) 21:28	04:54 22:00
21	08:30 16:45 19	14:59 (4) 15:18 (4) 17:46	06:28 18:40	06:14 17:39 (2) 20:37	05:16 18:13 (2) 21:30	04:54 22:01
22	08:29 16:47 15	15:01 (4) 15:16 (4) 17:48	06:26 18:42	06:12 17:37 (2) 20:39	05:15 18:15 (2) 21:31	04:55 22:01
23	08:27 16:49 8	15:05 (4) 15:13 (4) 17:50	06:23 18:43	06:09 17:36 (2) 20:41	05:13 18:16 (2) 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 17:35 (2) 20:43	05:12 18:16 (2) 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 17:34 (2) 20:44	05:11 18:17 (2) 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 17:34 (2) 20:46	05:09 18:17 (2) 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 17:33 (2) 20:48	05:08 18:17 (2) 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 17:33 (2) 20:50	05:07 18:17 (2) 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	05:56 18:32 (2) 20:52	05:06 19:16 (2) 21:41	04:57 22:01
30	08:17 17:02		07:06 19:56	05:54 18:32 (2) 20:54	05:05 19:16 (2) 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	05:54 18:31 (2) 20:54	05:04 18:31 (2) 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case	711	296	573	397		
Sun reduction	0.24	0.23	0.27	0.35		
Oper. time red.	1.00	1.00	1.00	1.00		
Wind dir. red.	0.65	0.66	0.68	0.68		
Total reduction	0.16	0.15	0.18	0.24		
Total, real	112	45	105	95		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FW - H179

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:40 (2) 19:00 (2)	07:26 16:54	16:08 (3) 16:23 (3)
2	04:59 22:00	05:40 21:23	06:35 20:16	18:37 (2) 19:02 (2)	07:28 16:52	16:10 16:21 (3)
3	05:00 21:59	05:42 21:21	06:36 20:13	18:35 (2) 19:04 (2)	07:30 16:50	16:09 (3) 16:19 (3)
4	05:01 21:59	05:44 21:19	06:38 20:11	18:33 (2) 19:04 (2)	07:31 16:48	16:10 (3) 16:17 (3)
5	05:02 21:58	05:45 21:17	06:40 20:09	18:31 (2) 19:06 (2)	07:33 16:46	16:11 (3) 16:15 (3)
6	05:03 21:58	05:47 21:15	06:42 20:06	18:30 (2) 19:07 (2)	07:35 16:44	16:07 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:28 (2) 19:06 (2)	07:37 16:43	16:06 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	18:27 (2) 19:07 (2)	07:39 16:41	16:05 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	18:26 (2) 19:08 (2)	07:41 16:39	16:04 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:25 (2) 19:07 (2)	07:42 16:37	16:03 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:24 (2) 19:07 (2)	07:44 16:35	16:03 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:24 (2) 19:08 (2)	07:46 16:34	16:03 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:23 (2) 19:08 (2)	07:48 16:32	16:03 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:22 (2) 19:07 (2)	07:50 16:31	16:03 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	18:22 (2) 19:06 (2)	07:52 16:29	16:03 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	18:22 (2) 19:06 (2)	07:54 16:27	16:03 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	18:21 (2) 19:05 (2)	07:55 16:26	16:03 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	18:22 (2) 19:04 (2)	07:57 16:24	16:03 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	18:22 (2) 19:04 (2)	07:59 16:23	16:03 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	18:23 (2) 19:03 (2)	08:00 17:27 (3)	16:03 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	18:22 (2) 19:01 (2)	08:02 17:14 (3)	16:03 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	18:23 (2) 18:58 (2)	08:04 17:30 (3)	16:03 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	18:24 (2) 18:56 (2)	08:06 17:10 (3)	16:03 16:18
24	05:26 21:38	06:19 20:37	07:13 19:22	18:26 (2) 18:54 (2)	08:08 17:32 (3)	16:03 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	18:26 (2) 18:51 (2)	08:09 17:31 (3)	16:03 16:16
26	05:29 21:35	06:22 20:32	07:17 19:17	18:28 (2) 18:48 (2)	08:11 17:32 (3)	16:03 16:14
27	05:30 21:33	06:24 20:30	07:19 19:14	18:31 (2) 18:46 (2)	08:13 17:33 (3)	16:03 16:13
28	05:32 21:32	06:26 20:28	07:21 19:12	18:36 (2) 18:43 (2)	08:14 17:31 (3)	16:03 16:12
29	05:34 21:30	06:28 20:25	07:22 19:09	18:43 (2) 18:43 (2)	08:16 17:00	16:03 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	18:43 (2) 18:43 (2)	08:18 16:58	16:03 16:11
31	05:37 21:27	06:31 20:21	18:43 (2) 18:56 (2)	18:43 (2) 18:56 (2)	16:58 16:56	16:11 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		13	973	248	351	1184
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.68	0.68	0.66	0.65	0.65
Total reduction		0.23	0.22	0.19	0.17	0.13
Total, real		3	210	48	60	159

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FX - H180

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April		May		June		
1	08:44		14:41 (4)	08:14		16:13 (3)	07:16		16:48 (2)	07:01		05:52		05:03		
	16:15	11	14:52 (4)	17:06	21	16:34 (3)	18:02	37	17:25 (2)	20:00		20:55		21:45		
2	08:44		14:43 (4)	08:12		16:13 (3)	07:14		16:48 (2)	06:59		05:50		05:02		
	16:16	9	14:52 (4)	17:08	22	16:35 (3)	18:04	36	17:24 (2)	20:02		20:57		21:46		
3	08:44		14:44 (4)	08:10		16:14 (3)	07:12		16:48 (2)	06:56		05:48		05:01		
	16:17	6	14:50 (4)	17:10	21	16:35 (3)	18:06	36	17:24 (2)	20:04		20:59		21:48		
4	08:43			08:08		16:14 (3)	07:09		16:49 (2)	06:54		05:46		05:00		
	16:18			17:12	20	16:34 (3)	18:07	35	17:24 (2)	20:06		21:01		21:49		
5	08:43			08:07		16:15 (3)	07:07		16:48 (2)	06:51		05:44		04:59		
	16:19			17:14	19	16:34 (3)	18:09	35	17:23 (2)	20:07		21:03		21:50		
6	08:43			08:05		16:16 (3)	07:04		16:49 (2)	06:49		05:42		04:58		
	16:21			17:16	17	16:33 (3)	18:11	33	17:22 (2)	20:09		21:04		21:51		
7	08:42			08:03		16:18 (3)	07:02		16:49 (2)	06:47		05:40		04:58		
	16:22			17:18	13	16:31 (3)	18:13	32	17:21 (2)	20:11		21:06		21:52		
8	08:42			08:01		16:20 (3)	07:00		16:50 (2)	06:44		05:38		04:57		
	16:24			17:20	9	16:29 (3)	18:15	30	17:20 (2)	20:13		21:08		21:53		
9	08:41			07:59			06:57		16:51 (2)	06:42		05:36		04:57		
	16:25			17:22			18:17	27	17:18 (2)	20:15		21:10		21:54		
10	08:40			07:57			06:55		16:53 (2)	06:39		05:34		04:56		
	16:26			17:24			18:19	24	17:17 (2)	20:17		21:11		21:55		
11	08:40			07:55			06:53		16:55 (2)	06:37		05:33		04:56		
	16:28			17:26			18:21	20	17:15 (2)	20:19		21:13		21:55		
12	08:39			07:53			06:50		16:57 (2)	06:35		05:31		04:55		
	16:30			17:28			18:23	14	17:11 (2)	20:20		21:15		21:56		
13	08:38			07:51			06:48			06:32		05:29		04:55		
	16:31			17:30			18:25			20:22		21:17		21:57		
14	08:37			07:49			06:45			06:30		05:27		04:55		
	16:33			17:32			18:27			20:24		21:18		21:58		
15	08:36			07:47			06:43			06:28		05:26		04:54		
	16:34			17:34			18:28			20:26		21:20		21:58		
16	08:35			07:45			06:40			06:25		05:24		04:54		
	16:36			17:36			18:30			20:28		21:22		21:59		
17	08:34			07:43			06:38			06:23		05:22		04:54		
	16:38			17:38			18:32			20:30		21:23		21:59		
18	08:33			07:41		17:00 (2)	06:35			06:21		05:21		04:54		
	16:40			17:40	11	17:11 (2)	18:34			20:31		21:25		22:00		
19	08:32			07:39		16:58 (2)	06:33			06:18		05:19		04:54		
	16:41			17:42	15	17:13 (2)	18:36			20:33		21:27		22:00		
20	08:31			07:36		16:56 (2)	06:31			06:16		05:18		04:54		
	16:43			17:44	20	17:16 (2)	18:38			20:35		21:28		22:00		
21	08:30			07:34		16:55 (2)	06:28			06:14		05:16		04:54		
	16:45			17:46	23	17:18 (2)	18:40			20:37		21:30		22:01		
22	08:29			07:32		16:53 (2)	06:26			06:12		05:15		04:55		
	16:47			17:48	26	17:19 (2)	18:42			20:39		21:31		22:01		
23	08:27		16:14 (3)	07:30		16:52 (2)	06:23			06:09		05:13		04:55		
	16:49	1	16:15 (3)	17:50	30	17:22 (2)	18:43			20:41		21:33		22:01		
24	08:26		16:13 (3)	07:28		16:51 (2)	06:21			06:07		05:12		04:55		
	16:50	4	16:17 (3)	17:52	33	17:24 (2)	18:45			20:43		21:34		22:01		
25	08:24		16:13 (3)	07:25		16:50 (2)	06:18			06:05		05:11		04:55		
	16:52	6	16:19 (3)	17:54	34	17:24 (2)	18:47			20:44		21:36		22:01		
26	08:23		16:12 (3)	07:23		16:49 (2)	06:16			06:03		05:09		04:56		
	16:54	9	16:21 (3)	17:56	35	17:24 (2)	18:49			20:46		21:37		22:01		
27	08:22		16:12 (3)	07:21		16:49 (2)	06:13			06:00		05:08		04:56		
	16:56	11	16:23 (3)	17:58	36	17:25 (2)	18:51			20:48		21:39		22:01		
28	08:20		16:12 (3)	07:18		16:48 (2)	06:11			05:58		05:07		04:57		
	16:58	14	16:26 (3)	18:00	36	17:24 (2)	18:53			20:50		21:40		22:01		
29	08:19		16:12 (3)				07:08			05:56		05:06		04:57		
	17:00	16	16:28 (3)				19:54			20:52		21:41		22:01		
30	08:17		16:12 (3)				07:06			05:54		05:05		04:58		
	17:02	17	16:29 (3)				19:56			20:54		21:43		22:00		
31	08:15		16:12 (3)				07:04					05:04				
	17:04	19	16:31 (3)				19:58					21:44				
Potential sun hours	250		273		367		420		494		510					
Total, worst case	123		441		359											
Sun reduction	0.24		0.23		0.27											
Oper. time red.	1.00		1.00		1.00											
Wind dir. red.	0.66		0.67		0.67											
Total reduction	0.16		0.16		0.18											
Total, real	20		69		66											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FX - H180
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:38 (2) 17:48 (2)	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:34 (2) 17:52 (2)	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:32 (2) 17:54 (2)	07:28 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:30 (2) 17:55 (2)	07:30 16:48
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:28 (2) 17:56 (2)	07:32 16:46
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:27 (2) 17:57 (2)	07:34 16:44
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:25 (2) 17:57 (2)	07:36 16:43
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:24 (2) 17:58 (2)	07:38 16:41
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:23 (2) 17:58 (2)	07:40 16:39
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:22 (2) 17:58 (2)	07:42 16:37
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:22 (2) 17:58 (2)	07:44 16:35
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:22 (2) 17:58 (2)	07:45 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:21 (2) 17:58 (2)	07:47 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:21 (2) 17:57 (2)	07:49 16:31
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:21 (2) 17:57 (2)	07:51 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:22 (2) 17:56 (2)	07:53 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:22 (2) 17:56 (2)	07:55 16:26
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:23 (2) 17:55 (2)	07:57 16:24
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:23 (2) 17:52 (2)	07:59 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:24 (2) 17:50 (2)	08:00 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:25 (2) 17:48 (2)	08:02 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:27 (2) 17:45 (2)	08:04 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:29 (2) 17:43 (2)	08:06 16:18
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:32 (2) 17:41 (2)	08:08 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:09 16:16
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:11 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:13 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:14 16:10
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:16 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:18 16:12
31	05:37 21:27	06:31 20:21	07:22 16:56	07:22 16:56	07:22 16:13	07:22 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case				670	237	354
Sun reduction				0.29	0.27	0.21
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.66	0.65
Total reduction				0.20	0.18	0.13
Total, real				132	42	48

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
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Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FY - H181

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1 08:44		08:14	16:04 (3) 07:16	16:33 (2) 07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:59 (2) 08:19		
16:15		17:06	16:14 (3) 18:02	16:50 (2) 20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	24 16:23 (2) 16:10		
2 08:44		08:12	07:14	16:36 (2) 06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	16:00 (2) 08:21		
16:16		17:08	18:04	9 16:45 (2) 20:02	20:57	21:46	22:00	21:23	20:16	19:02	16:52	21 16:21 (2) 16:09		
3 08:44		08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	16:02 (2) 08:22		
16:17		17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	17 16:19 (2) 16:08		
4 08:43		08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	16:04 (2) 08:24		
16:18		17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	13 16:17 (2) 16:08		
5 08:43		08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	16:07 (2) 08:25		
16:19		17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	8 16:15 (2) 16:07		
6 08:43		08:05	16:37 (2) 07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	16:08 (2) 08:26		
16:21		17:16	8 16:45 (2) 18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:07 (2) 08:27		
7 08:42		08:03	16:34 (2) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	16:06 (2) 08:28		
16:22		17:18	13 16:47 (2) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06 (2) 08:29		
8 08:42		08:01	16:32 (2) 07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	16:06 (2) 08:30		
16:24		17:20	18 16:50 (2) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06 (2) 08:31		
9 08:41		07:59	16:30 (2) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	16:06 (2) 08:32		
16:25		17:22	22 16:52 (2) 18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05 (2) 08:33		
10 08:40		07:57	16:29 (2) 06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	15:35 (3) 08:34		
16:26		17:24	25 16:54 (2) 18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	10 15:45 (3) 08:35		
11 08:40		07:55	16:28 (2) 06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44	15:33 (3) 08:36		
16:28		17:26	28 16:56 (2) 18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	14 15:47 (3) 08:37		
12 08:39		07:53	16:27 (2) 06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:45	15:32 (3) 08:38		
16:30		17:28	31 16:58 (2) 18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	13 17:21 (2) 16:34	16 15:48 (3) 08:39		
13 08:38		07:51	16:26 (2) 06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	15:31 (3) 08:40		
16:31		17:30	32 16:58 (2) 18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	19 17:24 (2) 16:32	18 15:49 (3) 08:41		
14 08:37		15:56 (3) 07:49	16:25 (2) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	15:30 (3) 08:42		
16:33	1	15:57 (3) 17:32	34 16:59 (2) 18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	23 17:26 (2) 16:31	20 15:50 (3) 08:43		
15 08:36		15:56 (3) 07:47	16:25 (2) 06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	15:30 (3) 08:44		
16:34	3	15:59 (3) 17:34	34 16:59 (2) 18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	26 17:27 (2) 16:29	20 15:50 (3) 08:45		
16 08:35		15:55 (3) 07:45	16:25 (2) 06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	15:30 (3) 08:46		
16:36	5	16:00 (3) 17:36	35 17:00 (2) 18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	29 17:28 (2) 16:27	21 15:51 (3) 08:47		
17 08:34		15:55 (3) 07:43	16:25 (2) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	15:30 (3) 08:48		
16:38	7	16:02 (3) 17:38	35 17:00 (2) 18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	31 17:29 (2) 16:26	21 15:51 (3) 08:49		
18 08:33		15:55 (3) 07:41	16:24 (2) 06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	15:30 (3) 08:50		
16:40	10	16:05 (3) 17:40	36 17:00 (2) 18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	32 17:29 (2) 16:24	20 15:50 (3) 08:51		
19 08:32		15:55 (3) 07:39	16:24 (2) 06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	15:30 (3) 08:52		
16:41	12	16:07 (3) 17:42	36 17:00 (2) 18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	34 17:30 (2) 16:23	19 15:49 (3) 08:53		
20 08:31		15:55 (3) 07:36	16:24 (2) 06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	15:30 (3) 08:54		
16:43	13	16:08 (3) 17:44	36 17:00 (2) 18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	34 17:30 (2) 16:22	17 15:47 (3) 08:55		
21 08:30		15:55 (3) 07:34	16:25 (2) 06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:03	15:30 (3) 08:56		
16:45	16	16:11 (3) 17:46	35 17:00 (2) 18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	35 17:30 (2) 16:20	16 15:46 (3) 08:57		
22 08:29		15:55 (3) 07:32	16:25 (2) 06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:05	15:31 (3) 08:58		
16:47	17	16:12 (3) 17:48	34 16:59 (2) 18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	35 17:30 (2) 16:19	13 15:44 (3) 08:59		
23 08:27		15:56 (3) 07:30	16:25 (2) 06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:07	15:31 (3) 08:60		
16:49	19	16:15 (3) 17:50	33 16:58 (2) 18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	36 17:30 (2) 16:18	12 15:43 (3) 08:61		
24 08:26		15:56 (3) 07:28	16:26 (2) 06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:09	15:32 (3) 08:62		
16:50	21	16:17 (3) 17:52	32 16:58 (2) 18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	36 17:30 (2) 16:17	10 15:42 (3) 08:63		
25 08:25		15:57 (3) 07:25	16:26 (2) 06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:10	08:10	15:33 (3) 08:64		
16:52	21	16:18 (3) 17:54	30 16:56 (2) 18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	36 16:30 (2) 16:16	8 15:41 (3) 08:65		
26 08:23		15:57 (3) 07:23	16:28 (2) 06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:12	08:12	15:34 (3) 08:66		
16:54	21	16:18 (3) 17:56	27 16:55 (2) 18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	35 16:29 (2) 16:14	5 15:39 (3) 08:67		
27 08:22		15:57 (3) 07:21	16:29 (2) 06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:14	08:14	15:35 (3) 08:68		
16:56	20	16:17 (3) 17:58	25 16:54 (2) 18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	34 16:29 (2) 16:13	3 15:38 (3) 08:69		
28 08:20		15:58 (3) 07:18	16:30 (2) 06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:16	15:36 (3) 08:70		
16:58	20	16:18 (3) 18:00	22 16:52 (2) 18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	33 16:28 (2) 16:12	1 15:37 (3) 08:71		
29 08:19		15:59 (3) 07:17	07:09	05:56	05:06	04:57	05:34	06:27	07:22	08:17	08:17	15:37 (3) 08:72		
17:00	18	16:17 (3) 18:01	19:54	20:52	21:41	22:01	21:30	20:25	19:09	18:00	31 16:27 (2) 16:12	16:11		
30 08:17		16:00 (3) 18:00	19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	30 16:26 (2) 16:11	16:12		
17:02	16	16:16 (3) 18:01	19:58	20:56	21:45	22:01	21:29	20:24	19:08	18:01	30 16:26 (2) 16:11	16:13		
31 08:15		16:01 (3) 18:02	19:59	20:57	21:46	22:02	21:30	20:25	19:09	18:02	31 16:27 (2) 16:12	16:14		
17:04	14	16:15 (3) 18:03	19:59	20:57	21:46	22:02	21:30	20:25	19:09	18:02	31 16:27 (2) 16:12	16:15		
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	347	233
Total, worst case	254		671	26							610		347	
Sun reduction	0.24		0.23	0.27							0.29		0.27	
Oper. time red.	1.00		1.00	1.00							1.00		1.00	
Wind dir. red.	0.66		0.66	0.66							0.66		0.66	
Total reduction	0.16		0.15	0.18							0.19		0.18	
Total, real	41		103	5							117		61	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FZ - H182
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:10 (3)	08:14		15:24 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24					07:24		08:19		14:59 (3)
	16:15	23	15:33 (2)	17:06	33	15:57 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54							16:10	30	15:29 (2)
2	08:44		15:11 (3)	08:12		15:25 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26			15:08 (2)	08:21					14:59 (3)
	16:16	24	15:35 (2)	17:08	31	15:56 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	7					15:15 (2)	16:09	29	15:28 (2)
3	08:44		15:11 (3)	08:10		15:26 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28						15:04 (2)	08:22		14:59 (3)
	16:17	26	15:37 (2)	17:10	30	15:56 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	15					15:19 (2)	16:08	29	15:28 (2)
4	08:43		15:12 (3)	08:08		15:27 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30						15:01 (2)	08:24		14:59 (3)
	16:18	27	15:39 (2)	17:12	28	15:55 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	20					15:21 (2)	16:08	30	15:29 (2)
5	08:43		15:12 (3)	08:07		15:28 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32						14:59 (2)	08:25		14:59 (3)
	16:19	27	15:39 (2)	17:14	26	15:54 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	23					15:22 (2)	16:07	29	15:28 (2)
6	08:43		15:13 (3)	08:05		15:30 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34						14:58 (2)	08:26		15:00 (3)
	16:21	28	15:41 (2)	17:16	23	15:53 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	26					15:24 (2)	16:07	28	15:28 (2)
7	08:42		15:14 (3)	08:03		15:32 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36						14:57 (2)	08:28		14:59 (3)
	16:22	28	15:42 (2)	17:18	19	15:51 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	28					15:25 (2)	16:06	28	15:27 (2)
8	08:42		15:14 (3)	08:01		15:35 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38						14:56 (2)	08:29		14:59 (3)
	16:24	29	15:43 (2)	17:20	14	15:49 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	29					15:25 (2)	16:06	27	15:26 (2)
9	08:41		15:16 (3)	07:59		15:40 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40						14:56 (2)	08:30		15:00 (3)
	16:25	29	15:45 (2)	17:22	4	15:44 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	31					15:27 (2)	16:05	26	15:26 (2)
10	08:40		15:16 (3)	07:57		15:40 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42						14:55 (2)	08:32		15:00 (3)
	16:26	30	15:46 (2)	17:24		18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	33						15:28 (2)	16:05	25	15:25 (2)
11	08:40		15:17 (3)	07:55		18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	33						14:55 (2)	08:33		15:00 (3)
	16:28	30	15:47 (2)	17:26		18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	33						15:28 (2)	16:05	23	15:23 (2)
12	08:39		15:18 (3)	07:53		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	35						14:54 (2)	08:34		15:01 (3)
	16:30	30	15:48 (2)	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	35						15:29 (2)	16:05	21	15:22 (3)
13	08:38		15:19 (3)	07:51		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	35						14:54 (2)	08:35		15:01 (3)
	16:31	30	15:49 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	35						15:29 (2)	16:05	22	15:23 (3)
14	08:37		15:21 (2)	07:49		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	35						14:54 (2)	08:36		15:02 (3)
	16:33	29	15:50 (2)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	35						15:29 (2)	16:04	22	15:24 (3)
15	08:36		15:21 (2)	07:47		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	36						14:54 (2)	08:37		15:02 (3)
	16:34	30	15:51 (2)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	36						15:30 (2)	16:04	22	15:24 (3)
16	08:35		15:20 (2)	07:45		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	36						14:54 (2)	08:38		15:02 (3)
	16:36	31	15:51 (2)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	36						15:30 (2)	16:05	22	15:24 (3)
17	08:34		15:20 (2)	07:43		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	36						14:54 (2)	08:39		15:03 (3)
	16:38	32	15:52 (2)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	36						15:30 (2)	16:05	22	15:25 (3)
18	08:33		15:20 (2)	07:41		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	36						14:54 (2)	08:39		15:04 (3)
	16:40	33	15:53 (2)	17:40		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	36						15:30 (2)	16:05	21	15:25 (3)
19	08:32		15:21 (2)	07:39		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	35						14:55 (2)	08:40		15:04 (3)
	16:41	33	15:54 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	35						15:30 (2)	16:05	22	15:26 (3)
20	08:31		15:20 (2)	07:36		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	35						14:55 (2)	08:41		15:04 (3)
	16:43	34	15:54 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	35						15:30 (2)	16:06	22	15:26 (3)
21	08:30		15:20 (2)	07:34		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	35						14:55 (2)	08:41		15:05 (3)
	16:45	35	15:55 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	35						15:30 (2)	16:06	22	15:27 (3)
22	08:29		15:20 (2)	07:32		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	34						14:56 (2)	08:42		15:05 (3)
	16:47	35	15:55 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	34						15:30 (2)	16:06	22	15:27 (3)
23	08:27		15:21 (2)	07:30		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	33						14:57 (2)	08:42		15:06 (3)
	16:49	35	15:56 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	33						15:30 (2)	16:07	22	15:28 (3)
24	08:26		15:20 (2)	07:28		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	33						14:57 (2)	08:43		15:06 (3)
	16:50	36	15:56 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	33						15:30 (2)	16:08		15:28 (3)
25	08:25		15:21 (2)	07:25		18:47	20:44	21:36	22:01	21:36	20:35	19:15	17:09	16:16	32						14:58 (2)	08:43		15:07 (3)
	16:52	36	15:57 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:15	17:09	16:16	32						15:30 (2)	16:08	21	15:28 (3)
26	08:23		15:21 (2)	07:23		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	31						14:59 (2)	08:43		15:07 (3)
	16:54	36	15:57 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	31						15:30 (2)	16:09	22	15:29 (3)
27	08:22		15:21 (2)	07:21		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	30						15:00 (2)	08:44		15:08 (3)
	16:56	36																						

Table layout: For each day

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GA - H183

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	15:07 (3) 08:14	15:20 (2) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:57 (2)
2	16:15	15:34 (2) 17:06	15:52 (2) 18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	15:26 (2)
3	08:44	15:08 (3) 08:12	15:21 (2) 07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	14:56 (3)
4	16:16	15:35 (2) 17:08	15:51 (2) 18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	15:26 (2)
5	08:44	15:08 (3) 08:10	15:22 (2) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	14:56 (3)
6	16:17	15:36 (2) 17:10	15:51 (2) 18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:10	15:26 (2)
7	08:43	15:09 (3) 08:08	15:23 (2) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	14:57 (3)
8	16:18	15:37 (2) 17:12	15:50 (2) 18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	15:26 (2)
9	08:43	15:09 (3) 08:07	15:24 (2) 07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	14:56 (3)
10	16:19	15:38 (2) 17:14	15:48 (2) 18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	15:25 (2)
11	08:43	15:11 (3) 08:05	15:26 (2) 07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	14:57 (3)
12	16:21	15:40 (2) 17:16	15:47 (2) 18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:07	15:26 (2)
13	08:42	15:11 (3) 08:03	15:29 (2) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	14:57 (3)
14	16:22	15:40 (2) 17:18	15:45 (2) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	15:25 (2)
15	08:42	15:12 (3) 08:01	15:32 (2) 07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	14:56 (3)
16	16:24	15:41 (2) 17:20	15:41 (2) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	15:24 (2)
17	08:41	15:13 (3) 07:59	15:31 (2) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	14:57 (3)
18	16:25	15:43 (2) 17:22	15:48 (2) 18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	15:25 (2)
19	08:40	15:14 (3) 07:57	15:30 (2) 06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	14:57 (3)
20	16:26	15:44 (2) 17:24	15:49 (2) 18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	16:05	15:24 (2)
21	08:40	15:15 (2) 07:55	15:33 (2) 06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44	08:33	14:57 (3)
22	16:28	15:44 (2) 17:26	15:50 (2) 18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	16:03	15:24 (2)
23	08:39	15:15 (2) 07:53	15:31 (2) 06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	14:58 (3)
24	16:30	15:45 (2) 17:28	15:51 (2) 18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	15:24 (2)
25	08:38	15:15 (2) 07:51	15:32 (2) 06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	14:58 (3)
26	16:31	15:46 (2) 17:30	15:52 (2) 18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05	15:23 (2)
27	08:37	15:15 (2) 07:49	15:30 (2) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	14:59 (3)
28	16:33	15:47 (2) 17:32	15:53 (2) 18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:04	15:24 (2)
29	08:36	15:15 (2) 07:47	15:31 (2) 06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	08:37	14:59 (3)
30	16:34	15:48 (2) 17:34	15:54 (2) 18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	15:23 (2)
31	08:35	15:14 (2) 07:45	15:30 (2) 06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	14:59 (3)
32	16:36	15:48 (2) 17:36	15:55 (2) 18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	15:23 (2)
33	08:34	15:14 (2) 07:43	15:30 (2) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39	15:00 (3)
34	16:38	15:49 (2) 17:38	15:56 (2) 18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05	15:23 (2)
35	08:33	15:14 (2) 07:41	15:30 (2) 06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	15:00 (3)
36	16:40	15:50 (2) 17:40	15:57 (2) 18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05	15:23 (2)
37	08:32	15:15 (2) 07:39	15:31 (2) 06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	15:01 (3)
38	16:41	15:50 (2) 17:42	15:57 (2) 18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	15:23 (2)
39	08:31	15:14 (2) 07:36	15:30 (2) 06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	08:41	15:01 (3)
40	16:43	15:50 (2) 17:44	15:57 (2) 18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:06	15:23 (2)
41	08:30	15:15 (2) 07:34	15:31 (2) 06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	15:02 (3)
42	16:45	15:51 (2) 17:46	15:58 (2) 18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	15:24 (2)
43	08:29	15:14 (2) 07:32	15:30 (2) 06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42	15:02 (3)
44	16:47	15:51 (2) 17:48	15:58 (2) 18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06	15:24 (2)
45	08:27	15:15 (2) 07:30	15:31 (2) 06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	15:03 (3)
46	16:49	15:52 (2) 17:50	15:59 (2) 18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07	15:25 (2)
47	08:26	15:15 (2) 07:28	15:31 (2) 06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43	15:03 (3)
48	16:50	15:52 (2) 17:52	15:59 (2) 18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:08	15:25 (2)
49	08:25	15:16 (2) 07:25	15:32 (2) 06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09	08:43	15:03 (3)
50	16:52	15:53 (2) 17:54	15:60 (2) 18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	16:08	15:26 (2)
51	08:23	15:16 (2) 07:23	15:32 (2) 06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43	15:04 (3)
52	16:54	15:56 (2) 17:56	15:61 (2) 18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	16:09	15:27 (2)
53	08:22	15:16 (2) 07:21	15:33 (2) 06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:44	15:05 (3)
54	16:56	15:52 (2) 17:58	15:62 (2) 18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:10	15:28 (2)
55	08:20	15:17 (2) 07:19	15:34 (2) 06:11	06:05	05:07	04:57	05:32	06:26	07:21	07:16	08:14	08:44	15:05 (3)
56	16:58	15:53 (2) 18:00	15:63 (2) 18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16:10	15:29 (2)
57	08:19	15:17 (2) 07:12	15:35 (2) 06:09	06:03	05:06	04:57	05:34	06:27	07:22	07:18	08:16	08:44	15:06 (3)
58	17:00	15:53 (2) 18:00	15:63 (2) 18:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:12	16:11	15:31 (2)
59	08:17	15:18 (2) 07:14	15:35 (2) 06:06	06:04	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44	15:07 (3)
60	17:02	15:52 (2) 18:00	15:64 (2) 18:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:12	15:32 (2)
61	08:15	15:18 (2) 07:10	15:36 (2) 06:04	06:08	05:04	04:57	05:37	06:31	07:22	07:18	08:16	08:44	15:06 (3)
62	17:04	15:52 (2) 18:00	15:64 (2) 18:58	20:58	21:44	22:01	21:27	20:21	19:05	16:56	16:13	16:13	15:32 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case	1013	188									889		785
Sun reduction	0.24	0.23									0.27		0.21
Oper. time red.	1.00	1.00									1.00		1.00
Wind dir. red.	0.66	0.66									0.66		0.65
Total reduction	0.16	0.15									0.17		0.14
Total, real	161	29									155		106

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GB - H184

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

			January			February			March			April			May			June			July			August			September			October			November			December									
1	08:44					15:06 (3)	08:14				15:18 (2)	07:16			07:01			05:52			05:03			04:59			05:39			06:33			07:26			07:24			08:19			14:54 (2)			
	16:15	27				15:33 (2)	17:06	32			15:50 (2)	18:02			20:55			21:45			22:00			22:00			21:25			20:18			19:05			16:54			16:10	31		15:25 (2)			
2	08:44					15:07 (3)	08:12				15:19 (2)	07:14			06:59			05:50			05:02			04:59			05:40			06:35			07:28			07:26			08:21			14:54 (2)			
	16:16	28				15:35 (2)	17:08	30			15:49 (2)	18:04			20:02			20:57			21:47			22:00			21:23			20:16			19:02			16:52			15:24 (2)			15:24 (2)			
3	08:44					15:07 (3)	08:10				15:20 (2)	07:12			06:56			05:48			05:01			05:00			05:42			06:36			07:30			07:28			15:01 (2)			08:22			14:55 (3)
	16:17	28				15:35 (2)	17:10	28			15:48 (2)	18:06			20:04			20:59			21:48			21:59			21:21			20:13			19:00			16:50			15:08 (2)			16:08	30		15:25 (2)
4	08:43					15:08 (3)	08:08				15:21 (2)	07:09			06:54			05:46			05:00			05:01			05:44			06:38			07:31			07:30			14:57 (2)			08:24			14:56 (3)
	16:18	28				15:36 (2)	17:12	26			15:47 (2)	18:07			20:06			21:01			21:49			21:59			21:19			20:11			18:57			16:38			15:12 (2)			16:08	29		15:25 (2)
5	08:43					15:08 (3)	08:07				15:23 (2)	07:07			06:51			05:44			04:59			05:02			05:45			06:40			07:33			07:32			14:54 (2)			08:25			14:55 (3)
	16:19	29				15:37 (2)	17:14	23			15:46 (2)	18:09			20:07			21:03			21:50			21:58			21:17			20:09			18:55			16:46			15:14 (2)			16:07	29		15:24 (2)
6	08:43					15:10 (3)	08:05				15:25 (2)	07:04			06:49			05:42			04:58			05:03			05:47			06:42			07:35			07:34			14:52 (2)			08:26			14:56 (3)
	16:21	29				15:39 (2)	17:16	19			15:44 (2)	18:11			20:09			21:04			21:51			21:58			21:15			20:06			18:52			16:44			15:16 (2)			16:07	29		15:25 (2)
7	08:42					15:10 (3)	08:03				15:28 (2)	07:02			06:47			05:40			04:58			05:04			05:49			06:43			07:37			07:36			14:51 (2)			08:28			14:55 (3)
	16:22	29				15:39 (2)	17:18	14			15:42 (2)	18:13			20:11			21:06			21:52			21:57			21:14			20:04			18:50			16:43			15:17 (2)			16:06	29		15:24 (2)
8	08:42					15:11 (3)	08:01				15:33 (2)	07:00			06:44			05:38			04:57			05:05			05:50			06:45			07:39			07:38			14:50 (2)			08:29			14:55 (3)
	16:24	29				15:40 (2)	17:20	4			15:37 (2)	18:15			20:13			21:08			21:53			21:56			21:12			20:01			18:49			16:41			15:18 (2)			16:06	29		15:24 (2)
9	08:41					15:12 (3)	07:59				06:57	06:42			05:36			04:57			05:06			05:52			05:52			06:47			07:41			07:40			14:50 (2)			08:30			14:56 (3)
	16:25	30				15:42 (2)	17:22				18:17	20:15			21:10			21:54			21:55			21:10			19:59			18:45			16:39			15:20 (2)			16:05	28		15:24 (2)			
10	08:40					15:12 (2)	07:57				06:55	06:39			05:34			04:56			05:07			05:54			06:49			07:42			07:42			14:49 (2)			08:32			14:56 (3)			
	16:26	30				15:42 (2)	17:24				18:19	20:17			21:12			21:55			21:55			21:08			19:56			18:43			16:37			15:21 (2)			16:05	28		15:24 (2)			
11	08:40					15:12 (2)	07:55				06:53	06:37			05:33			04:56			05:08			05:56			06:50			07:44			07:44			14:48 (2)			08:33			14:56 (3)			
	16:28	31				15:43 (2)	17:26				18:21	20:19			21:13			21:55			21:54			21:06			19:54			18:40			16:35			15:21 (2)			16:05	27		15:23 (2)			
12	08:39					15:12 (2)	07:53				06:50	06:35			05:31			04:55			05:09			05:57			06:52			07:46			07:46			14:48 (2)			08:34			14:56 (3)			
	16:30	32				15:44 (2)	17:28				18:23	20:20			21:15			21:56			21:53			21:03			19:51			18:38			16:34			15:22 (2)			16:05	27		15:23 (2)			
13	08:38					15:12 (2)	07:51				06:48	06:32			05:29			04:55			05:10			05:59			06:54			07:48			07:47			14:47 (2)			08:35			14:57 (3)			
	16:31	33				15:45 (2)	17:30				18:25	20:22			21:17			21:57			21:52			21:01			19:49			18:36			16:32			15:23 (2)			16:05	26		15:23 (2)			
14	08:37					15:12 (2)	07:49				06:45	06:30			05:27			04:55			05:12			06:01			06:56			07:50			07:49			14:47 (2)			08:36			14:58 (3)			
	16:33	33				15:45 (2)	17:32				18:27	20:24			21:18			21:58			21:51			20:59			19:47			18:33			16:31			15:23 (2)			16:04	26		15:24 (2)			
15	08:36					15:12 (2)	07:47				06:43	06:28			05:26			04:54			05:13			06:03			06:58			07:52			07:51			14:47 (2)			08:37			14:57 (3)			
	16:34	34				15:46 (2)	17:34				18:28	20:26			21:20			21:58			21:50			20:57			19:44			18:31			16:29			15:23 (2)			16:04	26		15:23 (2)			
16	08:35					15:12 (2)	07:45				06:40	06:25			05:24			04:54			05:14			06:04			06:59			07:54			07:53			14:47 (2)			08:38			14:58 (3)			
	16:36	34				15:46 (2)	17:36				18:30	20:28			21:22			21:59			21:49			20:55			19:42			18:29			16:27			15:24 (2)			16:05	25		15:23 (2)			
17	08:34					15:12 (2)	07:43				06:38	06:23			05:22			04:54			05:16			06:06			07:01			07:55			07:55			14:47 (2)			08:39			14:59 (3)			
	16:38	35				15:47 (2)	17:38				18:32	20:30			21:23			21:59			21:47			20:53			19:39			18:26			16:26			15:24 (2)			16:05	24		15:23 (2)			
18	08:33					15:12 (2)	07:41				06:36	06:21			05:21			04:54			05:17			06:08			07:03			07:57			07:57			14:47 (2)			08:39			14:59 (3)			
	16:40	36				15:48 (2)	17:40				18:34	20:31			21:25			22:00			21:46			20:51			19:37			18:24			16:24			15:24 (2)			16:05	24		15:23 (2)			
19	08:32					15:13 (2)	07:39				06:33	06:18			05:19			04:54			05:18			06:10			07:05			07:59			07:59			14:47 (2)			08:40			15:00 (3)			
	16:41	36				15:49 (2)	17:42				18:36	20:33			21:27			22:00			21:45			20:48			19:34			18:22			16:23			15:24 (2)			16:05	24		15:24 (2)			
20	08:31					15:12 (2)	07:36				06:31	06:16			05:18			04:54			05:20			06:12			07:06			08:01			08:00			14:47 (2)			08:41			15:00 (3)			
	16:43	37				15:49 (2)	17:44				18:38	20:35			21:28			22:00			21:44			20:46			19:32			18:20			16:22			15:24 (2)			16:06	24		15:24 (2)			
21	08:30					15:13 (2)	07:34				06:28	06:14			05:16			04:54			05:21			06:13			07:08			08:03			08:02			14:48 (2)			08:41			15:01 (3)			
	16:45	37				15:50 (2)	17:46				18:40	20:37			21:30			22:01			21:42			20:44			19:29			18:17			16:20			15:25 (2)			16:06	23		15:24 (2)			
22	08:29					15:12 (2)	07:32				06:26	06:12			05:15			04:55			05:23			06:15			07:10			08:05			08:04			14:48 (2)			08:42			15:01 (3)			
	16:47	37				15																																							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GC - H185

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:09	08:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GD - H186

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		11:00 (2)	08:14		15:41 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24							08:19		10:51 (2)	
	16:15	41	11:41 (2)	17:06	26	16:07 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54							16:10	42	15:34 (1)	
2	08:44		11:01 (2)	08:12		15:42 (1)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26							08:21		10:51 (2)	
	16:16	41	11:42 (2)	17:08	25	16:07 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52							16:09	39	15:33 (1)	
3	08:44		11:02 (2)	08:10		15:43 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28							08:22		10:51 (2)	
	16:17	39	11:41 (2)	17:10	23	16:06 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50							16:08	34	11:25 (2)	
4	08:43		11:03 (2)	08:09		15:44 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30							15:20 (1)	08:24	10:51 (2)	
	16:18	39	11:42 (2)	17:12	21	16:05 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	9						15:29 (1)	16:08	35	11:26 (2)
5	08:43		11:03 (2)	08:07		15:46 (1)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32							15:17 (1)	08:25	10:50 (2)	
	16:20	38	11:41 (2)	17:14	18	16:04 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	15						15:32 (1)	16:07	37	11:27 (2)
6	08:43		11:04 (2)	08:05		15:48 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34							15:15 (1)	08:26	10:51 (2)	
	16:21	38	11:42 (2)	17:16	14	16:02 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	18						15:33 (1)	16:07	37	11:28 (2)
7	08:42		11:05 (2)	08:03		15:51 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36							15:14 (1)	08:28	10:50 (2)	
	16:22	36	11:41 (2)	17:18	8	15:59 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21						15:35 (1)	16:06	38	11:28 (2)
8	08:42		11:06 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38							15:13 (1)	08:29	10:51 (2)	
	16:24	35	11:41 (2)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	23						15:36 (1)	16:06	39	11:30 (2)
9	08:41		11:07 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40							15:13 (1)	08:30	10:51 (2)	
	16:25	35	11:42 (2)	17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	25						15:38 (1)	16:05	39	11:30 (2)
10	08:40		11:08 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42							15:12 (1)	08:32	10:51 (2)	
	16:26	39	15:50 (1)	17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	26						15:38 (1)	16:05	40	11:31 (2)
11	08:40		11:09 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44							15:12 (1)	08:33	10:51 (2)	
	16:28	42	15:52 (1)	17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36	27						15:39 (1)	16:05	40	11:31 (2)
12	08:39		11:11 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46							15:11 (1)	08:34	10:51 (2)	
	16:30	42	15:54 (1)	17:28			18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	28						15:39 (1)	16:05	41	11:32 (2)
13	08:38		11:12 (2)	07:51			06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47							15:11 (1)	08:35	10:52 (2)	
	16:31	43	15:55 (1)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	28						15:39 (1)	16:05	41	11:33 (2)
14	08:37		11:14 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49							15:11 (1)	08:36	10:52 (2)	
	16:33	42	15:57 (1)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	29						15:40 (1)	16:05	42	11:34 (2)
15	08:36		11:15 (2)	07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51							15:11 (1)	08:37	10:52 (2)	
	16:34	43	15:59 (1)	17:34			18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	29						15:40 (1)	16:05	42	11:34 (2)
16	08:35		11:18 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53							15:11 (1)	08:38	10:52 (2)	
	16:36	40	16:01 (1)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	29						15:40 (1)	16:05	42	11:34 (2)
17	08:34		11:20 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55							15:11 (1)	08:39	10:52 (2)	
	16:38	36	16:01 (1)	17:38			18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	29						15:40 (1)	16:05	43	11:35 (2)
18	08:33		11:25 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57							15:11 (1)	08:39	10:53 (2)	
	16:40	29	16:03 (1)	17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	29						15:40 (1)	16:05	43	11:36 (2)
19	08:32		15:38 (1)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59							15:12 (1)	08:40	10:54 (2)	
	16:41	26	16:04 (1)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	28						15:40 (1)	16:05	42	11:36 (2)
20	08:31		15:38 (1)	07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01							15:12 (1)	08:41	10:54 (2)	
	16:43	26	16:04 (1)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	28						15:40 (1)	16:06	42	11:36 (2)
21	08:30		15:38 (1)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02							15:13 (1)	08:41	10:54 (2)	
	16:45	27	16:05 (1)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	27						15:40 (1)	16:06	43	11:37 (2)
22	08:29		15:37 (1)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04							15:14 (1)	08:42	10:54 (2)	
	16:47	28	16:05 (1)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	26						15:40 (1)	16:06	43	11:37 (2)
23	08:27		15:38 (1)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06							15:14 (1)	08:42	10:55 (2)	
	16:49	28	16:06 (1)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	26						15:40 (1)	16:07	43	11:38 (2)
24	08:26		15:37 (1)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08							11:02 (2)	08:43	10:56 (2)	
	16:51	29	16:06 (1)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	29						15:40 (1)	16:08	42	11:38 (2)
25	08:25		15:38 (1)	07:25			16:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09							10:58 (2)	08:43	10:56 (2)	
	16:52	29	16:07 (1)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	36						15:39 (1)	16:08	42	11:38 (2)
26	08:23		15:38 (1)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11							10:56 (2)	08:43	10:57 (2)	
	16:54	29	16:07 (1)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15	40						15:39 (1)	16:09	43	11:40 (2)
27	08:22		15:38 (1)	07:21			06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13							10:55 (2)	08:44	10:58 (2)	
	16:56	29	16:07 (1)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	41						15:38 (1)	16:10	42	11:40 (2)
28	08:20		15:39 (1)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14							10:54 (2)	08:44	10:58 (2)	
	16:58	29	16:08 (1)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	42						15:37 (1)	16:11	42	11:40 (2)
29	08:19		15:39 (1)				07:09	05:56	05:06	04:57	05:34														

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GE - H187

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		09:26 (2)	08:14		09:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24							08:19		09:11 (2)	
	16:15	74	15:16 (1)	17:06	26	10:08 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54							16:10	78	15:03 (1)	
2	08:44		09:26 (2)	08:12		09:44 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26							08:21		09:12 (2)	
	16:16	76	15:17 (1)	17:08	22	10:06 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52							16:09	77	15:03 (1)	
3	08:44		09:26 (2)	08:10		09:46 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28							08:22		09:11 (2)	
	16:17	76	15:17 (1)	17:10	17	10:03 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50							16:08	78	15:03 (1)	
4	08:43		09:27 (2)	08:09		09:49 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30							08:24		09:12 (2)	
	16:18	76	15:18 (1)	17:12	11	10:00 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48							16:08	78	15:04 (1)	
5	08:43		09:27 (2)	08:07			07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32							08:25		09:12 (2)	
	16:20	76	15:18 (1)	17:14			18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46							16:07	78	15:04 (1)	
6	08:43		09:27 (2)	08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34							08:27		09:14 (2)	
	16:21	77	15:19 (1)	17:16			18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44							16:07	76	15:05 (1)	
7	08:42		09:27 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				09:19 (2)			08:28		09:14 (2)	
	16:22	77	15:19 (1)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				11			09:30 (2)	16:06	76	15:05 (1)
8	08:42		09:27 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38							09:16 (2)	08:29		09:15 (2)
	16:24	78	15:19 (1)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41				17			09:33 (2)	16:06	76	15:06 (1)
9	08:41		09:28 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40							09:14 (2)	08:30		09:15 (2)
	16:25	78	15:20 (1)	17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39				23			09:37 (2)	16:05	76	15:06 (1)
10	08:40		09:28 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42							09:13 (2)	08:32		09:16 (2)
	16:27	79	15:20 (1)	17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37				25			09:38 (2)	16:05	75	15:06 (1)
11	08:40		09:29 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44							09:12 (2)	08:33		09:16 (2)
	16:28	78	15:21 (1)	17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36				28			09:40 (2)	16:05	74	15:06 (1)
12	08:39		09:29 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46							09:10 (2)	08:34		09:16 (2)
	16:30	78	15:21 (1)	17:28			18:23	20:20	21:15	21:56	21:53	21:04	19:52	18:38	16:34				31			09:41 (2)	16:05	74	15:06 (1)
13	08:38		09:29 (2)	07:51			06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47							09:10 (2)	08:35		09:18 (2)
	16:31	78	15:21 (1)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32				41			14:44 (1)	16:05	74	15:08 (1)
14	08:37		09:29 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49							09:09 (2)	08:36		09:19 (2)
	16:33	79	15:21 (1)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31				49			14:47 (1)	16:05	72	15:08 (1)
15	08:36		09:30 (2)	07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51							09:08 (2)	08:37		09:19 (2)
	16:34	78	15:22 (1)	17:34			18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				55			14:49 (1)	16:05	73	15:08 (1)
16	08:35		09:30 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53							09:08 (2)	08:38		09:19 (2)
	16:36	78	15:22 (1)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27				60			14:51 (1)	16:05	72	15:08 (1)
17	08:34		09:30 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55							09:08 (2)	08:39		09:20 (2)
	16:38	76	15:21 (1)	17:38			18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26				62			14:52 (1)	16:05	71	15:08 (1)
18	08:33		09:31 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57							09:07 (2)	08:39		09:20 (2)
	16:40	76	15:22 (1)	17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25				66			14:53 (1)	16:05	72	15:09 (1)
19	08:32		09:31 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59							09:07 (2)	08:40		09:21 (2)
	16:41	75	15:22 (1)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23				68			14:54 (1)	16:05	72	15:10 (1)
20	08:31		09:31 (2)	07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01							09:07 (2)	08:41		09:21 (2)
	16:43	74	15:21 (1)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22				70			14:55 (1)	16:06	72	15:10 (1)
21	08:30		09:32 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02							09:07 (2)	08:41		09:22 (2)
	16:45	72	15:21 (1)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20				72			14:56 (1)	16:06	72	15:11 (1)
22	08:29		09:32 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04							09:07 (2)	08:42		09:22 (2)
	16:47	70	15:20 (1)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19				74			14:57 (1)	16:06	72	15:11 (1)
23	08:27		09:33 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06							09:07 (2)	08:42		09:23 (2)
	16:49	68	15:20 (1)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18				75			14:58 (1)	16:07	72	15:12 (1)
24	08:26		09:33 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08							09:08 (2)	08:43		09:23 (2)
	16:51	66	15:19 (1)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17				76			14:59 (1)	16:08	72	15:12 (1)
25	08:25		09:35 (2)	07:25			06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09							09:08 (2)	08:43		09:23 (2)
	16:52	62	15:19 (1)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16				76			14:59 (1)	16:08	72	15:12 (1)
26	08:23		09:35 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11							09:08 (2)	08:43		09:24 (2)
	16:54	60	15:18 (1)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15				78			15:00 (1)	16:09	72	15:13 (1)
27	08:22		09:36 (2)	07:21			06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13							09:09 (2)	08:44		09:25 (2)
	16:56	55	15:17 (1)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13				78			15:01 (1)	16:10	72	15:14 (1)
28	08:20		09:37 (2)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14							09:10 (2)	08:44		09:25 (2)
	16:58	49	15:15 (1)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13				79			15:02 (1)	16:11	73	15:14 (1)
29	08:19		09:38 (2)				07:09	05:56	05:06	04:57	05:34	06:28	07:23	07:18	08:16							09:09 (2)	08:44		09:25 (2)
	17:00	40	15:11 (1)				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12				78			15:01 (1)	16:11	73	15:15 (1)
30	08:17		09:39 (2)				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18							09:10 (2)	08:44		09:26 (2)</

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GF - H188

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		11:00 (2)	08:14		15:37 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24							08:19		10:57 (2)
	16:15	46	15:37 (1)	17:06	9	15:46 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54							16:10	36	15:30 (1)
2	08:44		11:01 (2)	08:12			07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26							08:21		10:55 (2)
	16:16	46	15:38 (1)	17:08			18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52							16:09	41	15:31 (1)
3	08:44		11:02 (2)	08:10			07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28							08:22		10:53 (2)
	16:17	45	15:39 (1)	17:10			18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50							16:08	43	15:30 (1)
4	08:43		11:03 (2)	08:09			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30							08:24		10:53 (2)
	16:18	47	15:41 (1)	17:12			18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48							16:08	43	15:30 (1)
5	08:43		11:04 (2)	08:07			07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32							08:25		10:52 (2)
	16:20	46	15:42 (1)	17:14			18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46							16:07	45	15:30 (1)
6	08:43		11:05 (2)	08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34							08:27		10:52 (2)
	16:21	47	15:44 (1)	17:16			18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44							16:07	46	15:30 (1)
7	08:42		11:06 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36							08:28		10:51 (2)
	16:22	46	15:45 (1)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43							16:06	46	15:29 (1)
8	08:42		11:08 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38							08:29		10:51 (2)
	16:24	43	15:45 (1)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41							16:06	47	15:29 (1)
9	08:41		11:10 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40							08:30		10:51 (2)
	16:25	43	15:47 (1)	17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39							16:05	45	15:28 (1)
10	08:40		11:12 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42							15:08 (1)		10:52 (2)
	16:26	41	15:48 (1)	17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37							15:08 (1)	46	15:28 (1)
11	08:40		11:14 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44							15:05 (1)		10:50 (2)
	16:28	37	15:48 (1)	17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36							15:20 (1)	46	15:27 (1)
12	08:39		15:22 (1)	07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46							15:04 (1)		10:50 (2)
	16:30	27	15:49 (1)	17:28			18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34							15:21 (1)	45	15:27 (1)
13	08:38		15:22 (1)	07:51			06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47							15:02 (1)		10:51 (2)
	16:31	28	15:50 (1)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32							15:23 (1)	44	15:27 (1)
14	08:37		15:23 (1)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49							15:01 (1)		10:51 (2)
	16:33	27	15:50 (1)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31							15:24 (1)	45	15:27 (1)
15	08:36		15:23 (1)	07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51							15:01 (1)		10:52 (2)
	16:34	28	15:51 (1)	17:34			18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29							15:25 (1)	44	15:27 (1)
16	08:35		15:23 (1)	07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53							15:00 (1)		10:51 (2)
	16:36	29	15:52 (1)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27							15:25 (1)	43	15:26 (1)
17	08:34		15:23 (1)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55							15:00 (1)		10:52 (2)
	16:38	28	15:51 (1)	17:38			18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:26	16:26							15:26 (1)	43	15:27 (1)
18	08:33		15:23 (1)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57							14:59 (1)		10:52 (2)
	16:40	29	15:52 (1)	17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25							15:27 (1)	43	15:27 (1)
19	08:32		15:24 (1)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59							14:59 (1)		10:53 (2)
	16:41	29	15:53 (1)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23							15:27 (1)	43	15:28 (1)
20	08:31		15:24 (1)	07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01							14:59 (1)		10:53 (2)
	16:43	28	15:52 (1)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22							15:28 (1)	42	15:27 (1)
21	08:30		15:24 (1)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02							14:59 (1)		10:54 (2)
	16:45	29	15:53 (1)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20							15:28 (1)	41	15:28 (1)
22	08:29		15:24 (1)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04							15:00 (1)		10:53 (2)
	16:47	29	15:53 (1)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19							15:28 (1)	42	15:28 (1)
23	08:27		15:25 (1)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06							15:00 (1)		10:54 (2)
	16:49	28	15:53 (1)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18							15:29 (1)	42	15:29 (1)
24	08:26		15:25 (1)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08							15:00 (1)		10:53 (2)
	16:51	28	15:53 (1)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17							15:29 (1)	42	15:29 (1)
25	08:25		15:27 (1)	07:25			06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09							15:01 (1)		10:53 (2)
	16:52	26	15:53 (1)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16							15:29 (1)	43	15:30 (1)
26	08:23		15:27 (1)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11							15:01 (1)		10:56 (2)
	16:54	25	15:52 (1)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15							15:30 (1)	43	15:31 (1)
27	08:22		15:28 (1)	07:21			06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13							15:02 (1)		10:57 (2)
	16:56	24	15:52 (1)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13							15:30 (1)	43	15:32 (1)
28	08:20		15:29 (1)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14							15:03 (1)		10:57 (2)
	16:58	23	15:52 (1)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12							15:30 (1)	44	15:33 (1)
29	08:19		15:30 (1)				07:09	05:56	05:06	04:57	05:34	06:28	07:22	07:18	08:16							15:02 (1)		10:58 (2)
	17:00	21	15:51 (1)				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12							15:30 (1)	45	15:34 (1)
30	08:17		15:32 (1)				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18							15:03 (1)		10:59 (2)
	17:02	17	15:49 (1)				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11							15:30 (1)	45	15:35 (1)
31	08:15		15:34 (1																					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GG - H189

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	11:36 (2)	08:14	15:48 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
2	16:15	12:05 (2)	17:06	16:13 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10
3	08:44	11:37 (2)	08:12	15:49 (1)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21
4	16:16	12:06 (2)	17:08	16:12 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
5	08:44	11:38 (2)	08:10	15:50 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
6	16:17	12:05 (2)	17:10	16:11 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08
7	08:43	11:39 (2)	08:09	15:51 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24
8	16:18	12:05 (2)	17:12	16:10 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
9	08:43	11:40 (2)	08:07	15:52 (1)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25
10	16:19	12:04 (2)	17:14	16:09 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07
11	08:43	11:42 (2)	08:05	15:55 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:26
12	16:21	12:04 (2)	17:16	16:07 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	16:07
13	08:42	11:43 (2)	08:03	15:58 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28
14	16:22	12:03 (2)	17:18	16:04 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06
15	08:42	11:45 (2)	08:01	15:59 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29
16	16:24	12:02 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:41	16:06
17	08:41	11:48 (2)	07:59	16:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	16:39	16:03
18	16:25	12:01 (2)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:39	16:05
19	08:40	11:51 (2)	07:57	16:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	16:39	16:05
20	16:26	11:59 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:37	16:05
21	08:40	11:59 (2)	07:55	16:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	16:39	16:05
22	16:28	11:57 (2)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36	16:36	16:05
23	08:39	11:58 (2)	07:53	16:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	16:39	16:05
24	16:30	11:57 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	16:34	16:05
25	08:38	11:58 (1)	07:51	16:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	16:39	16:05
26	16:31	11:55 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:32	16:05
27	08:37	11:59 (1)	07:49	16:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	16:39	16:05
28	16:33	11:57 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:31	16:05
29	08:36	11:58 (1)	07:47	16:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	16:39	16:05
30	16:34	11:59 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:29	16:05
31	08:35	11:58 (1)	07:45	16:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	16:39	16:05
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33	08:34	11:56 (1)	07:43	16:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	16:39	16:05
34	16:38	11:56 (1)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:26	16:05
35	08:33	11:56 (1)	07:41	16:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	16:39	16:05
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37	08:32	11:56 (1)	07:39	16:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	16:39	16:05
38	16:41	11:57 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:23	16:05
39	08:31	11:55 (1)	07:37	16:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	16:39	16:05
40	16:43	11:56 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:22	16:05
41	08:30	11:55 (1)	07:34	16:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	16:39	16:05
42	16:45	11:54 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:20	16:05
43	08:29	11:55 (1)	07:32	16:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	16:39	16:05
44	16:47	11:54 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:19	16:05
45	08:27	11:54 (1)	07:30	16:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	16:39	16:05
46	16:49	11:51 (1)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:18	16:05
47	08:26	11:54 (1)	07:28	16:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	16:39	16:05
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52	16:54	11:47 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:14	16:14	16:05
53	08:22	11:54 (1)	07:21	16:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13	16:39	16:05
54	16:56	11:46 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:13	16:05
55	08:20	11:54 (1)	07:19	16:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14	16:39	16:05
56	16:58	11:43 (1)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16:12	16:05
57	08:19	11:56 (1)	07:18	16:09	05:56	05:06	04:57	05:34	06:28	07:22	07:18	08:16	16:39	16:05
58	17:00	11:41 (1)	17:59	18:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	16:12	16:05
59	08:17	11:56 (1)	07:17	16:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	16:39	16:05
60	17:02	11:40 (1)	17:57	18:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:11	16:05
61	08:15	11:57 (1)	07:16	16:04	05:54	05:04	04:57	05:37	06:31	07:22	07:18	08:16	16:39	16:05
62	17:04	11:42 (1)	17:59	18:58	20:56	21:44	22:01	21:27	20:21	19:05	16:56	16:11	16:11	16:05
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	233	233
Total, worst case	619	123									533			869
Sun reduction	0.24	0.23									0.27			0.21
Oper. time red.	1.00	1.00									1.00			1.00
Wind dir. red.	0.64	0.66									0.66			0.60
Total reduction	0.16	0.15									0.18			0.12
Total, real	96	19									94			108

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GH - H190

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:04
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:11 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:41	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GI - H191

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

		January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	15:00 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	15:22 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	15:01 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21
	16:16	15:23 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	15:01 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	15:23 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08
4	08:43	15:02 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24
	16:18	15:23 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	15:02 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25
	16:19	15:23 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07
6	08:43	15:04 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26
	16:21	15:24 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:07
7	08:42	15:04 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28
	16:22	15:24 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06
8	08:42	15:05 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29
	16:23	15:24 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06
9	08:41	15:06 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
	16:25	15:24 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05
10	08:40	15:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32
	16:26	15:24 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05
11	08:40	15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33
	16:28	15:24 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05
12	08:39	15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34
	16:29	15:23 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05
13	08:38	15:11 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35
	16:31	15:23 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04
14	08:37	15:13 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36
	16:33	15:22 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04
15	08:36	15:16 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37
	16:34	15:19 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04
16	08:35	15:17 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38
	16:36	15:18 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05
17	08:34	15:19 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39
	16:38	15:20 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05
18	08:33	15:21 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39
	16:39	15:22 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05
19	08:32	15:23 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40
	16:41	15:24 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05
20	08:31	15:25 (2)	07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00	08:41
	16:43	15:26 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05
21	08:30	15:27 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41
	16:45	15:28 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06
22	08:29	15:29 (2)	07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42
	16:47	15:30 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06
23	08:27	15:31 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42
	16:49	15:32 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07
24	08:26	15:33 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43
	16:50	15:34 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07
25	08:25	15:35 (2)	07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	08:11	08:09	08:43
	16:52	15:36 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:15	16:08
26	08:23	15:37 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:43
	16:54	15:38 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14	16:09
27	08:22	15:39 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13	14:55 (2)
	16:56	15:40 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	14:58 (2)
28	08:20	15:41 (2)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	14:53 (2)
	16:58	15:42 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	14:51 (2)
29	08:19	15:43 (2)	07:16	06:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16	14:51 (2)
	17:00	15:44 (2)	18:01	18:54	20:52	21:41	22:01	21:30	20:25	19:09	18:00	16:11	15:02 (2)
30	08:17	15:45 (2)	07:14	06:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	14:50 (2)
	17:02	15:46 (2)	18:03	18:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	15:03 (2)
31	08:15	15:47 (2)	07:12	06:04	05:52	05:04	04:57	05:37	06:31	07:26	08:22	08:20	14:50 (2)
	17:04	15:48 (2)	18:05	18:58	20:56	21:45	22:01	21:27	20:21	19:05	18:00	16:12	15:04 (2)
Potential sun hours	250	256	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		256										38	671
Sun reduction		0.24										0.27	0.21
Oper. time red.		1.00										1.00	1.00
Wind dir. red.		0.65										0.65	0.65
Total reduction		0.16										0.17	0.13
Total, real		40										7	90

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GJ - H192

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:00 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24				06:33	07:26	07:24				08:19	14:50 (2)
	16:15	21	15:21 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54				06:35	07:28	07:26			14	15:04 (2)	
2	08:44		15:01 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26				06:35	07:28	07:26				08:21	14:49 (2)
	16:16	21	15:22 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				06:36	07:30	07:28			15	15:04 (2)	
3	08:44		15:01 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28				06:36	07:30	07:28				08:22	14:49 (2)
	16:17	20	15:21 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50				06:38	07:31	07:30			17	15:06 (2)	
4	08:43		15:02 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30				06:38	07:31	07:30				08:24	14:49 (2)
	16:18	20	15:22 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48				06:40	07:33	07:32			18	15:07 (2)	
5	08:43		15:02 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32				06:40	07:33	07:32				08:25	14:49 (2)
	16:19	20	15:22 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46				06:42	07:35	07:34			18	15:07 (2)	
6	08:43		15:03 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34				06:42	07:35	07:34				08:26	14:49 (2)
	16:21	20	15:23 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44				06:43	07:37	07:36			20	15:09 (2)	
7	08:42		15:04 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				06:43	07:37	07:36				08:28	14:49 (2)
	16:22	18	15:22 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:42				06:45	07:39	07:38			20	15:09 (2)	
8	08:42		15:04 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38				06:45	07:39	07:38				08:29	14:49 (2)
	16:23	18	15:22 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41				06:47	07:41	07:40			20	15:09 (2)	
9	08:41		15:06 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				06:47	07:41	07:40				08:30	14:50 (2)
	16:25	17	15:23 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39				06:49	07:42	07:42			21	15:11 (2)	
10	08:40		15:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42				06:49	07:42	07:42				08:32	14:50 (2)
	16:26	15	15:22 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37				06:49	07:42	07:42			21	15:11 (2)	
11	08:40		15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44				06:49	07:42	07:42				08:33	14:50 (2)
	16:28	14	15:22 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35				06:49	07:42	07:42			21	15:11 (2)	
12	08:39		15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46				06:49	07:42	07:46				08:34	14:50 (2)
	16:29	12	15:21 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34				06:49	07:42	07:46			22	15:12 (2)	
13	08:38		15:11 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47				06:49	07:42	07:46				08:35	14:50 (2)
	16:31	9	15:20 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32				06:49	07:42	07:46			22	15:12 (2)	
14	08:37		15:14 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				06:49	07:42	07:46				08:36	14:52 (2)
	16:33	4	15:18 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30				06:49	07:42	07:46			22	15:14 (2)	
15	08:36			07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51				06:49	07:42	07:46				08:37	14:51 (2)
	16:34			17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				06:49	07:42	07:46			22	15:13 (2)	
16	08:35			07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53				06:49	07:42	07:46				08:38	14:52 (2)
	16:36			17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27				06:49	07:42	07:46			22	15:14 (2)	
17	08:34			07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55				06:49	07:42	07:46				08:39	14:52 (2)
	16:38			17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26				06:49	07:42	07:46			22	15:14 (2)	
18	08:33			07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				06:49	07:42	07:46				08:39	14:53 (2)
	16:39			17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24				06:49	07:42	07:46			22	15:15 (2)	
19	08:32			07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				06:49	07:42	07:46				08:40	14:54 (2)
	16:41			17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23				06:49	07:42	07:46			22	15:16 (2)	
20	08:31			07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00				06:49	07:42	07:46				08:41	14:53 (2)
	16:43			17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22				06:49	07:42	07:46			23	15:16 (2)	
21	08:30			07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				06:49	07:42	07:46				08:41	14:54 (2)
	16:45			17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20				06:49	07:42	07:46			23	15:17 (2)	
22	08:29			07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04				06:49	07:42	07:46				08:42	14:54 (2)
	16:47			17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19				06:49	07:42	07:46			23	15:17 (2)	
23	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				06:49	07:42	07:46				08:42	14:55 (2)
	16:49			17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18				06:49	07:42	07:46			23	15:18 (2)	
24	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08				06:49	07:42	07:46				08:43	14:55 (2)
	16:50			17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17				06:49	07:42	07:46			23	15:18 (2)	
25	08:25			07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	08:11	08:09				06:49	07:42	07:46				08:43	14:56 (2)
	16:52			17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:15				06:49	07:42	07:46			22	15:18 (2)	
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11				06:49	07:42	07:46				08:43	14:56 (2)
	16:54			17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14				06:49	07:42	07:46			22	15:18 (2)	
27	08:22			07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13				06:49	07:42	07:46				08:44	14:57 (2)
	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13				06:49	07:42	07:46			23	15:20 (2)	
28	08:20			07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14			14:54 (2)	06:49	07:42	07:46				08:44	14:58 (2)
	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	4			06:49	07:42	07:46			22	15:20 (2)	
29	08:19				07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16			14:51 (2)	06:49	07:42	07:46				08:44	14:58 (2)
	17:00				19:54	20:52	21:41	22:01	21:30	20:25	19:09	18:00	16:11	9		15:00 (2)	06:49	07:42	07:46			22	15:20 (2)	
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18			14:51 (2)	06:49	07:42	07:46				08:44	14:59 (2)
	17:02				19:56	20:54	21:43	22:00	21															

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GK - H193

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GL - H194

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
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30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GM - H195

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GN - H196

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March		April	May	June	July	August	September	October		November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	3	07:41 (1) 07:44 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18		08:11 (1) 08:20 (1)	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	7	07:39 (1) 07:46 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	9	08:07 (1) 08:21 (1)	07:26 16:52
3	08:44 16:17	08:10 17:10	07:12 18:06	10	07:36 (1) 07:46 (1)	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	14	08:06 (1) 08:22 (1)	07:28 16:50
4	08:43 16:18	08:09 17:12	07:09 18:08	13	07:34 (1) 07:47 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	16	08:05 (1) 08:23 (1)	07:30 16:48
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12	08:39 16:30	07:53 17:28	06:50 18:23	11	07:30 (1) 07:41 (1)	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	5	08:13 (1) 08:18 (1)	07:46 16:34
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19	08:32 16:42	07:39 17:42	06:33 18:36			06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34		07:59 18:22	08:40 16:23
20	08:31 16:43	07:37 17:44	06:31 18:38			06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32		08:01 18:20	08:41 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40			06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29		08:03 18:18	08:42 16:21
22	08:29 16:47	07:32 17:48	06:26 18:42			06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27		08:05 18:15	08:43 16:19
23	08:27 16:49	07:30 17:50	06:23 18:44			06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24		08:07 18:13	08:44 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45			06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22		08:09 18:11	08:45 16:17
25	08:25 16:53	07:26 17:54	06:19 18:47			06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20		08:10 17:09	08:46 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49			06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17		08:11 17:07	08:47 16:15
27	08:22 16:56	07:21 17:58	06:14 18:51			06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15		08:12 17:15	08:48 16:14
28	08:20 16:58	07:19 18:00	06:11 18:53			05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12		08:15 17:02	08:49 16:13
29	08:19 17:00		07:09 19:55			05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10		08:16 17:00	08:50 16:12
30	08:17 17:02		07:06 19:57			05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07		08:18 16:58	08:51 16:13
31	08:16 17:04		07:04 19:58			05:04 21:44	05:04 21:44	05:37 21:27	05:37 21:27	06:31 20:21	07:23 16:56		08:19 16:56	08:52 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328		259	233
Total, worst case				173							175			
Sun reduction				0.27							0.29			
Oper. time red.				1.00							1.00			
Wind dir. red.				0.65							0.65			
Total reduction				0.18							0.19			
Total, real				30							33			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GO - H197

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 18:00 (1)	05:52 20:00	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 18:00 (1)	05:50 20:02	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 18:00 (1)	05:48 20:04	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 17:58 (1)	05:46 20:06	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 17:41 (1)	05:44 20:08	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 17:42 (1)	05:42 20:10	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:24 (1) 16:45	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 17:45 (1)	05:40 20:11	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:26 (1) 16:43	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 17:40	05:38 20:13	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	08:30 (1) 16:41	07:38 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 17:35	05:36 20:15	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:32 (1) 16:39	07:40 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 17:37	05:35 20:17	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:34 (1) 16:37	07:42 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 17:34	05:33 20:19	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	08:35 (1) 16:36	07:44 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 17:31	05:31 20:21	04:56 21:55	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:36 (1) 16:34	07:46 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 17:28	05:29 20:22	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:37 (1) 16:32	07:48 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 17:24	05:27 20:24	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:38 (1) 16:31	07:50 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 17:26	05:26 20:26	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:39 (1) 16:29	07:51 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 17:23	05:24 20:28	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	08:40 (1) 16:28	07:53 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 17:20	05:22 20:30	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	08:41 (1) 16:26	07:55 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 17:18	05:21 20:32	04:54 21:56	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:42 (1) 16:25	07:57 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 17:15	05:19 20:34	04:54 21:57	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	08:43 (1) 16:23	07:59 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 17:12	05:18 20:35	04:54 21:58	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:44 (1) 16:22	08:01 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 17:08	05:16 20:37	04:55 21:30	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:45 (1) 16:21	08:02 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 17:04	05:15 20:39	04:55 21:32	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:46 (1) 16:19	08:04 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 17:00	05:13 20:41	04:55 21:33	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:47 (1) 16:18	08:06 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 16:55 (1)	05:12 20:43	04:55 21:35	05:26 22:01	06:19 21:38	07:14 20:37	08:09 19:22	08:48 (1) 16:17	08:08 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 16:52 (1)	05:11 20:45	04:56 22:01	05:27 21:38	06:21 20:37	07:15 19:22	07:11 18:11	08:49 (1) 16:16	08:09 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 16:50 (1)	05:09 20:46	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 18:17	08:50 (1) 16:15	08:11 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 16:47 (1)	05:08 20:48	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 18:05	08:51 (1) 16:14	08:13 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 16:44 (1)	05:07 20:50	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 18:02	08:52 (1) 16:13	08:15 16:11
29	08:19 17:00		07:09 19:55	05:56 16:41 (1)	05:06 20:52	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 18:00	08:53 (1) 16:12	08:16 16:12
30	08:17 17:02		07:06 19:57	05:54 16:39 (1)	05:05 20:54	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 18:05	08:54 (1) 16:11	08:18 16:13
31	08:16 17:04		07:04 19:58	05:53 16:37 (1)	05:04 21:44	04:57 22:27	05:37 21:27	06:31 20:21	07:25 18:06	07:23 17:05	08:55 (1) 16:10	08:19 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case			53	112						166		
Sun reduction			0.23	0.27						0.29		
Oper. time red.			1.00	1.00						1.00		
Wind dir. red.			0.65	0.65						0.65		
Total reduction			0.15	0.18						0.19		
Total, real			8	20						31		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GP - H198

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GQ - H199

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:40 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:23	07:23	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GR - H200

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February		March	April	May	June	July	August	September	October		November		December		
1	08:44	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24	07:54 (1)	08:19		
	16:15	17:06		18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05		16:54	22	08:16 (1)	16:10	
2	08:44	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		07:56 (1)	08:21	
	16:16	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	20	08:16 (1)	16:09	
3	08:44	08:10		08:38 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30		07:28		07:58 (1)	08:22
	16:17	17:10	3	08:41 (1)	18:06	20:04	20:59	21:48	21:59	20:14	19:00		16:50	18	08:16 (1)	16:09	
4	08:43	08:09		08:36 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		08:00 (1)	08:24
	16:18	17:12	7	08:43 (1)	18:08	20:06	21:01	21:49	21:59	20:11	18:57		16:48	15	08:15 (1)	16:08	
5	08:43	08:07		08:34 (1)	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33		07:32		08:02 (1)	08:25
	16:20	17:14	10	08:44 (1)	18:10	20:08	21:03	21:50	21:58	20:09	18:55		16:46	12	08:14 (1)	16:07	
6	08:43	08:05		08:32 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34		08:04 (1)	08:27
	16:21	17:16	13	08:45 (1)	18:12	20:10	21:05	21:51	21:58	20:16	18:53		16:45	9	08:13 (1)	16:07	
7	08:42	08:03		08:30 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36		08:06 (1)	08:28
	16:22	17:18	15	08:45 (1)	18:13	20:11	21:06	21:52	21:57	20:14	18:50		16:43	6	08:12 (1)	16:06	
8	08:42	08:01		08:28 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38		08:09 (1)	08:29
	16:24	17:20	18	08:46 (1)	18:15	20:13	21:08	21:53	21:56	20:12	18:48		16:41	3	08:12 (1)	16:06	
9	08:41	07:59		08:26 (1)	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		08:12 (1)	08:31
	16:25	17:22	20	08:46 (1)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39			16:05
10	08:41	07:57		08:24 (1)	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43		07:42			08:32
	16:27	17:24	23	08:47 (1)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37			16:05
11	08:40	07:55		08:24 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44			08:33
	16:28	17:26	23	08:47 (1)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36			16:05
12	08:39	07:53		08:24 (1)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46			08:34
	16:30	17:28	23	08:47 (1)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34			16:05
13	08:38	07:51		08:25 (1)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48			08:35
	16:31	17:30	21	08:46 (1)	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36		16:32			16:05
14	08:37	07:49		08:25 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:50			08:36
	16:33	17:32	20	08:45 (1)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34		16:31			16:05
15	08:37	07:47		08:26 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51			08:37
	16:35	17:34	18	08:44 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29			16:05
16	08:36	07:45		08:27 (1)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54		07:53			08:38
	16:36	17:36	16	08:43 (1)	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28			16:05
17	08:35	07:43		08:29 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55			08:39
	16:38	17:38	12	08:41 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26			16:05
18	08:34	07:41		08:32 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58		07:57			08:39
	16:40	17:40	7	08:39 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25			16:05
19	08:32	07:39		06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59		07:59			08:40
	16:41	17:42		18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22		16:23				16:05
20	08:31	07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01		08:01				08:41
	16:43	17:44		18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20		16:22				16:06
21	08:30	07:34		06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03		08:02				08:41
	16:45	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18		16:21				16:06
22	08:29	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:04				08:42
	16:47	17:48		18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15		16:19				16:07
23	08:27	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:06				08:43
	16:49	17:50		18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13		16:18				16:07
24	08:26	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:08				08:43
	16:51	17:52		18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	9	09:00 (1)				16:08
25	08:25	07:26		06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:10		07:58 (1)				08:43
	16:53	17:54		18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	13	08:11 (1)				16:08
26	08:23	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		07:56 (1)				08:44
	16:54	17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	17	08:13 (1)				16:09
27	08:22	07:21		06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15		07:55 (1)				08:44
	16:56	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	19	08:14 (1)				16:10
28	08:20	07:19		06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17		07:54 (1)				08:44
	16:58	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	21	08:15 (1)				16:11
29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19		07:53 (1)				08:44
	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	22	08:15 (1)				16:12
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21		07:54 (1)				08:44
	17:02			19:57	20:54	21:43	22:01	21:28	20:23	19:07	18:08	22	08:16 (1)				16:13
31	08:16			07:04		05:04		05:37	06:31		07:22		07:53 (1)				08:44
	17:04			19:58		21:44		21:27	20:21		18:56	23	08:16 (1)				16:14
Potential sun hours	250	273		367	420	494	510	512	460	382	328		259				233
Total, worst case			249								146		105				
Sun reduction			0.23								0.29		0.27				
Oper. time red.			1.00								1.00		1.00				
Wind dir. red.			0.62								0.62		0.62				
Total reduction			0.14								0.18		0.16				
Total, real			36								27		17				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GS - H201

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GT - H202

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GU - H203

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GV - H204

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GW - H205

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GX - H206

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GY - H207

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GZ - H208

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
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Total, worst case												
Sun reduction												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HA - H209

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HB - H210

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HC - H211

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HD - H212

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	05:03 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HE - H213

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HF - H214

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HG - H215

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HH - H216

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HI - H217

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HJ - H218

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HK - H219

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:22 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HL - H220

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:22 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HM - H221

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HN - H222

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HO - H223

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HP - H224

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:54	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HQ - H225

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: HR - H226

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December						
1	08:44	08:14	07:16	07:01	05:52	05:03	05:33 (5)	04:59	05:32 (5)	05:39	06:33	07:26	07:24	08:19				
2	16:15	17:06	18:02	20:00	20:55	21:45	24	05:57 (5)	22:00	33	06:05 (5)	21:25	20:18	19:05	16:54	16:10		
	08:44	08:12	07:14	06:59	05:50	05:02		05:33 (5)	05:00		05:33 (5)	05:40	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	21:46	25	05:58 (5)	22:00	33	06:06 (5)	21:23	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	06:56	05:48	05:01		05:32 (5)	05:00		05:33 (5)	05:42	06:36	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	21:48	26	05:58 (5)	21:59	32	06:05 (5)	21:21	20:14	19:00	16:50	16:09		
	08:43	08:08	07:09	06:54	05:46	05:00		05:31 (5)	05:01		05:34 (5)	05:44	06:38	07:32	07:30	08:24		
4	16:18	17:12	18:08	20:06	21:01	21:49	27	05:58 (5)	21:59	31	06:05 (5)	21:19	20:11	18:57	16:48	16:08		
	08:43	08:07	07:07	06:52	05:44	04:59		05:31 (5)	05:02		05:35 (5)	05:46	06:40	07:33	07:32	08:25		
	16:20	17:14	18:10	20:08	21:03	21:50	28	05:59 (5)	21:58	31	06:06 (5)	21:17	20:09	18:55	16:46	16:07		
6	08:43	08:05	07:05	06:49	05:42	04:59		05:30 (5)	05:03		05:36 (5)	05:47	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	21:51	29	05:59 (5)	21:58	30	06:06 (5)	21:15	20:06	18:53	16:45	16:07		
	08:42	08:03	07:02	06:47	05:40	04:58		05:30 (5)	05:04		05:37 (5)	05:49	06:44	07:37	07:36	08:28		
8	16:22	17:18	18:13	20:11	21:06	21:52	30	06:00 (5)	21:57	29	06:06 (5)	21:14	20:04	18:50	16:43	16:06		
	08:42	08:01	07:00	06:44	05:38	04:57		05:29 (5)	05:05		05:38 (5)	05:51	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	21:53	31	06:00 (5)	21:56	28	06:06 (5)	21:12	20:01	18:48	16:41	16:06		
9	08:41	07:59	06:57	06:42	05:36	04:57		05:29 (5)	05:06		05:39 (5)	05:52	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	21:54	32	06:01 (5)	21:55	27	06:06 (5)	21:10	19:59	18:45	16:39	16:06		
	08:40	07:57	06:55	06:40	05:35	04:56		05:28 (5)	05:07		05:40 (5)	05:54	06:49	07:43	07:42	08:31		
10	16:27	17:24	18:19	20:17	21:11	21:55	33	06:01 (5)	21:55	26	06:06 (5)	21:08	19:56	18:43	16:37	16:05		
	08:40	07:55	06:53	06:37	05:33	04:56		05:28 (5)	05:08		05:41 (5)	05:56	06:51	07:44	07:44	08:33		
	16:28	17:26	18:21	20:19	21:13	21:55	33	06:01 (5)	21:54	24	06:05 (5)	21:06	19:54	18:41	16:36	16:05		
12	08:39	07:53	06:50	06:35	05:31	04:56		05:28 (5)	05:09		05:42 (5)	05:58	06:52	07:46	07:46	08:34		
	16:30	17:28	18:23	20:20	21:15	21:56	34	06:02 (5)	21:53	23	06:05 (5)	21:03	19:52	18:38	16:34	16:05		
	08:38	07:51	06:48	06:32	05:29	04:55		05:27 (5)	05:11		05:43 (5)	05:59	06:54	07:48	07:47	08:35		
13	16:31	17:30	18:25	20:22	21:17	21:57	34	06:01 (5)	21:52	22	06:05 (5)	21:01	19:49	18:36	16:32	16:05		
	08:37	07:49	06:45	06:30	05:27	04:55		05:27 (5)	05:12		05:44 (5)	06:01	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:18	21:58	35	06:02 (5)	21:51	20	06:04 (5)	20:59	19:47	18:34	16:31	16:06		
15	08:36	07:47	06:43	06:28	05:26	04:55		05:27 (5)	05:13		05:45 (5)	06:03	06:58	07:52	07:51	08:37		
	16:35	17:34	18:29	20:26	21:20	21:58	35	06:02 (5)	21:50	19	06:04 (5)	20:57	19:44	18:31	16:29	16:05		
	08:35	07:45	06:40	06:25	05:24	04:55		05:27 (5)	05:14		05:47 (5)	06:05	06:59	07:54	07:53	08:38		
16	16:36	17:36	18:30	20:28	21:22	21:59	35	06:02 (5)	21:49	17	06:04 (5)	20:55	19:42	18:29	16:28	16:05		
	08:34	07:43	06:38	06:23	05:22	04:54		05:27 (5)	05:16		05:48 (5)	06:06	07:01	07:56	07:55	08:38		
	16:38	17:38	18:32	20:30	21:23	21:59	36	06:03 (5)	21:47	15	06:03 (5)	20:53	19:39	18:27	16:26	16:05		
18	08:33	07:41	06:36	06:21	05:21	04:54		05:27 (5)	05:17		05:49 (5)	06:08	07:03	07:57	07:57	08:39		
	16:40	17:40	18:34	20:32	21:25	22:00	36	06:03 (5)	21:46	14	06:03 (5)	20:51	19:37	18:24	16:25	16:05		
	08:32	07:39	06:33	06:18	05:19	04:54		05:27 (5)	05:19		05:50 (5)	06:10	07:05	07:59	07:59	08:40		
20	16:41	17:42	18:36	20:33	21:27	22:00	36	06:03 (5)	21:45	12	06:02 (5)	20:48	19:34	18:22	16:23	16:05		
	08:31	07:37	06:31	06:16	05:18	04:54		05:27 (5)	05:20		05:52 (5)	06:12	07:06	08:01	08:00	08:41		
	16:43	17:44	18:38	20:35	21:28	22:00	36	06:03 (5)	21:44	9	06:01 (5)	20:46	19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16	04:55		05:27 (5)	05:21		05:53 (5)	06:13	07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	21:30	3	05:48 (5)	22:01	36	06:03 (5)	21:42	7	06:00 (5)	20:44	19:29	18:18	16:21	16:06
	08:29	07:32	06:26	06:12	05:15	04:55		05:28 (5)	05:23		05:55 (5)	06:15	07:10	08:05	08:04	08:42		
22	16:47	17:48	18:42	20:39	21:31	6	05:50 (5)	22:01	36	06:04 (5)	21:41	5	06:00 (5)	20:42	19:27	18:15	16:19	16:07
	08:27	07:30	06:23	06:09	05:13	04:53 (5)	04:55		05:28 (5)	05:24		05:56 (5)	06:17	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	21:33	8	05:51 (5)	22:01	36	06:04 (5)	21:39	2	05:58 (5)	20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	04:51 (5)	04:55		05:28 (5)	05:26			06:19	07:14	08:09	08:08	08:43	
	16:51	17:52	18:45	20:43	21:34	10	05:51 (5)	22:01	36	06:04 (5)	21:38		20:37	19:22	18:11	16:17	16:08	
	08:25	07:25	06:18	06:05	05:11	04:50 (5)	04:56		05:29 (5)	05:27			06:21	07:15	08:11	08:09	08:43	
25	16:53	17:54	18:47	20:44	21:36	13	05:53 (5)	22:01	36	06:05 (5)	21:36		20:35	19:19	17:09	16:16	16:08	
	08:23	07:23	06:16	06:03	05:09	04:53 (5)	04:56		05:29 (5)	05:29			06:22	07:17	08:13	08:11	08:43	
	16:54	17:56	18:49	20:46	21:37	14	05:53 (5)	22:01	36	06:05 (5)	21:35		20:32	19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08	04:53 (5)	04:57		05:30 (5)	05:31			06:24	07:19	08:15	08:13	08:44	
	16:56	17:58	18:51	20:48	21:39	16	05:54 (5)	22:01	35	06:05 (5)	21:33		20:30	19:14	17:04	16:14	16:10	
	08:20	07:19	06:11	05:59	05:07	04:53 (5)	04:57		05:30 (5)	05:32			06:26	07:21	08:17	08:14	08:44	
28	16:58	18:00	18:53	20:50	21:40	18	05:55 (5)	22:01	35	06:05 (5)	21:32		20:28	19:12	17:02	16:13	16:11	
	08:19		07:09	05:56	05:06	04:53 (5)	04:58		05:31 (5)	05:34			06:28	07:23	08:18	08:16	08:44	
	17:00		19:55	20:52	21:41	20	05:56 (5)	22:01	34	06:05 (5)	21:30		20:25	19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05	04:53 (5)	04:58		05:31 (5)	05:35			06:29	07:24	08:20	08:18	08:44	
	17:02		19:56	20:54	21:43	21	05:56 (5)	22:00	34	06:05 (5)	21:28		20:23	19:07	16:58	16:11	16:13	
	08:15		07:04		05:04	04:53 (5)					05:37		06:31		07:22		08:44	
	17:04		19:58		21:44	22	05:56 (5)				21:27		20:21		16:56		16:14	
Potential sun hours	250	273	367	420	494	510		512		460		382		328		259		233
Total, worst case					151		989			489								
Sun reduction					0.38		0.32											
Oper. time red.					1.00		1.00			1.00								
Wind dir. red.					0.66		0.66			0.66								
Total reduction					0.25		0.21			0.21								
Total, real					38		208			104								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: HS - H227

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	06:18 (4) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	06:16 (4) 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	06:14 (4) 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	06:12 (4) 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	06:13 (4) 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	06:15 (4) 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	07:14 (5) 20:20	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	07:12 (5) 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	07:09 (5) 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	07:07 (5) 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	07:04 (5) 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	07:02 (5) 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:59 (5) 20:32	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:57 (5) 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:54 (5) 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:52 (5) 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:50 (5) 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:47 (5) 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:47 (5) 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:46 (5) 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:47 (5) 20:46	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:47 (5) 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	06:49 (5) 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	07:49 (5) 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	07:51 (5) 20:54	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	07:53 (5) 20:56	05:04 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			429		44	179
Sun reduction			0.27		0.35	0.32
Oper. time red.			1.00		1.00	1.00
Wind dir. red.			0.67		0.68	0.66
Total reduction			0.18		0.26	0.21
Total, real			78		10	38

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HS - H227

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 6	05:32 (3) 05:38 (3) 21:25	05:39 21:25 20:18	06:33 20:18 06:35	07:26 19:05 3	07:52 (5) 07:55 (5) 16:54 16:10
2	05:00 22:00 5	05:33 (3) 05:38 (3) 21:23	05:40 21:23 20:16	06:35 20:16 19:02	07:26 19:02 16:52 16:09	08:21 16:09 08:22 16:09
3	05:00 21:59 5	05:33 (3) 05:38 (3) 21:21	05:42 21:21 20:14	06:36 20:14 06:38	07:30 19:00 07:32	08:22 16:50 07:30 16:08
4	05:01 21:59 4	05:34 (3) 05:38 (3) 21:19	05:44 21:19 20:11	06:38 20:11 06:40	07:32 18:57 07:33	08:24 16:48 07:32 16:07
5	05:02 21:58 3	05:35 (3) 05:38 (3) 21:17	05:46 21:17 20:09	06:40 20:09 06:42	07:33 18:55 07:35	08:25 16:46 07:34 16:07
6	05:03 21:58 2	05:36 (3) 05:38 (3) 21:16	05:47 21:16 4	06:27 (4) 06:31 (4) 20:06	06:42 20:06 18:53	08:26 16:07 16:45 16:07
7	05:04 21:57 1	05:37 (3) 05:38 (3) 21:14	05:49 21:14 11	06:24 (4) 06:35 (4) 20:04	06:44 20:04 18:50	08:28 16:06 16:43 16:06
8	05:05 21:56 1	05:51 21:12 14	06:22 (4) 20:01 18:48	06:45 20:01 07:41	07:39 18:48 07:41	08:29 16:06 07:40 16:06
9	05:06 21:55 10	05:52 21:10 16	06:22 (4) 19:59 18:45	06:47 19:59 07:43	07:41 18:45 07:43	08:30 16:06 07:42 16:05
10	05:07 21:55 11	05:54 21:08 15	06:24 (4) 19:57 06:25 (4) 19:54	06:49 19:57 06:51 19:54	07:43 18:43 07:44 18:41	08:32 16:05 07:44 16:05
11	05:08 21:54 12	05:56 21:06 14	06:25 (4) 19:54 06:27 (4) 19:52	06:51 19:54 07:46 (5) 18:38	07:44 18:41 07:46 18:38	08:33 16:05 07:46 16:05
12	05:09 21:53 13	05:58 21:03 13	06:27 (4) 19:52 06:28 (4) 19:54	06:52 19:52 07:43 (5) 18:36	07:46 18:38 07:48 18:36	08:34 16:05 07:47 16:05
13	05:11 21:52 14	05:59 21:01 11	06:28 (4) 19:49 06:30 (4) 19:47	06:54 19:49 06:56 19:47	07:48 18:36 07:50 18:34	08:35 16:05 07:49 16:05
14	05:12 21:51 15	06:01 20:59 10	06:30 (4) 19:47 06:32 (4) 19:44	06:56 19:47 06:58 19:44	07:50 18:34 07:52 18:31	08:36 16:05 07:51 16:05
15	05:13 21:50 16	06:03 20:57 8	06:33 (4) 19:42 06:34 (4) 19:42	06:59 19:42 07:38 (5) 18:29	07:54 18:29 07:52 18:29	08:38 16:05 07:52 16:05
16	05:14 21:49 17	06:05 20:55 6	06:35 (4) 19:42 06:36 (4) 19:42	07:01 19:42 07:36 (5) 18:27	07:56 18:29 07:56 18:27	08:39 16:05 07:55 16:05
17	05:16 21:47 18	06:06 20:53 4	06:37 (4) 19:39 06:38 (4) 19:39	07:03 19:39 07:34 (5) 18:27	07:57 18:27 07:57 18:27	08:40 16:05 07:57 16:05
18	05:17 21:46 19	06:08 20:51 2	06:39 (4) 19:37 07:05 19:34	07:03 19:37 07:33 (5) 18:22	07:57 18:24 07:59 18:22	08:41 16:05 07:59 16:05
19	05:19 21:45 20	06:10 20:48 06:12	07:05 19:34 07:06 19:32	07:33 (5) 18:22 08:01 18:20	07:59 18:22 08:01 18:20	08:42 16:06 08:01 16:06
20	05:20 21:44 21	06:12 20:46 06:13	07:06 19:32 07:08 19:29	08:01 18:20 07:35 (5) 18:18	08:02 16:06 08:03 18:18	08:43 16:07 08:02 16:06
21	05:21 21:42 22	06:13 20:44 06:15	07:08 19:29 07:10 19:27	08:03 18:18 08:05 18:15	08:04 16:06 08:05 18:15	08:44 16:08 08:04 16:07
22	05:22 21:41 23	06:15 20:42 06:17	07:10 19:27 07:12 19:24	08:05 (5) 18:15 07:38 (5) 18:13	08:06 16:07 08:07 18:13	08:45 16:08 08:06 16:07
23	05:23 21:39 24	06:17 20:39 06:19	07:12 19:24 07:14 19:22	08:07 (5) 18:13 08:09 18:11	08:08 16:07 08:09 18:11	08:46 16:08 08:10 16:08
24	05:24 21:38 25	06:19 20:37 06:21	07:14 19:22 07:15 19:19	08:09 (5) 18:11 07:42 (5) 17:09	08:11 16:08 07:11 17:09	08:47 16:09 08:11 16:08
25	05:25 21:36 26	06:21 20:35 06:22	07:15 19:19 07:17 19:17	08:11 (5) 17:09 08:04 (5) 17:13	08:12 16:08 08:11 17:13	08:48 16:09 08:12 16:09
26	05:26 21:35 27	06:23 20:32 06:24	07:17 19:17 07:19 19:15	08:13 (5) 17:07 07:45 (5) 17:05	08:14 16:09 07:15 17:05	08:49 16:10 08:13 16:10
27	05:27 21:33 28	06:25 20:30 06:26	07:19 19:15 07:21 19:12	08:15 (5) 17:05 07:47 (5) 17:02	08:16 16:10 07:17 17:02	08:50 16:11 08:14 16:11
28	05:28 21:32 29	06:27 20:28 06:28	07:21 19:12 07:23 19:10	08:17 (5) 17:02 07:49 (5) 17:00	08:18 16:12 08:16 17:00	08:51 16:12 08:16 16:12
29	05:29 21:30 30	06:29 20:25 06:29	07:23 19:10 07:24 19:07	08:19 (5) 17:00 07:51 (5) 16:58	08:19 16:12 08:18 16:11	08:52 16:13 08:19 16:13
30	05:30 21:28 31	06:31 20:23 06:31	07:25 19:07 07:22 16:56	08:21 (5) 16:58 07:22 16:56	08:21 16:14 07:22 16:56	08:53 16:14 08:21 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	26	128	434	3		
Sun reduction	0.32	0.34	0.32	0.29		
Oper. time red.	1.00	1.00	1.00	1.00		
Wind dir. red.	0.66	0.68	0.67	0.67		
Total reduction	0.21	0.23	0.21	0.20		
Total, real	6	30	93	1		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HT - H228

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	07:25 (5)	05:52
	16:15	17:06	18:02	20:00	4	07:29 (5)
2	08:44	08:12	07:14	06:59	07:23 (5)	05:50
	16:16	17:08	18:04	20:02	7	07:30 (5)
3	08:44	08:10	07:12	06:56	07:20 (5)	05:48
	16:17	17:10	18:06	20:04	9	07:29 (5)
4	08:43	08:09	07:09	06:54	07:18 (5)	05:46
	16:18	17:12	18:08	20:06	12	07:30 (5)
5	08:43	08:07	07:07	06:52	07:15 (5)	05:44
	16:20	17:14	18:10	20:08	14	07:29 (5)
6	08:43	08:05	07:05	06:49	07:13 (5)	05:42
	16:21	17:16	18:11	20:09	16	07:29 (5)
7	08:42	08:03	07:02	06:47	07:11 (5)	05:40
	16:22	17:18	18:13	20:11	18	07:29 (5)
8	08:42	08:01	07:00	06:44	07:08 (5)	05:38
	16:24	17:20	18:15	20:13	19	07:27 (5)
9	08:41	07:59	06:57	06:42	07:07 (5)	05:36
	16:25	17:22	18:17	20:15	19	07:26 (5)
10	08:40	07:57	06:55	06:40	07:07 (5)	05:35
	16:27	17:24	18:19	20:17	17	07:24 (5)
11	08:40	07:55	06:53	06:37	07:08 (5)	05:33
	16:28	17:26	18:21	20:19	15	07:23 (5)
12	08:39	07:53	06:50	06:35	07:10 (5)	05:31
	16:30	17:28	18:23	20:21	11	07:21 (5)
13	08:38	07:51	06:48	06:32		05:29
	16:31	17:30	18:25	20:22		21:17
14	08:37	07:49	06:45	06:30		05:27
	16:33	17:32	18:27	20:24		21:18
15	08:36	07:47	06:43	06:28		05:26
	16:35	17:34	18:29	20:26		21:20
16	08:35	07:45	06:41	06:25		05:24
	16:36	17:36	18:30	20:28		21:22
17	08:34	07:43	06:38	06:23		05:22
	16:38	17:38	18:32	20:30		21:23
18	08:33	07:41	06:36	06:21		05:21
	16:40	17:40	18:34	20:32		21:25
19	08:32	07:39	06:33	06:19		05:19
	16:42	17:42	18:36	20:33		21:27
20	08:31	07:37	06:31	06:16		05:18
	16:43	17:44	18:38	20:35		21:28
21	08:30	07:34	06:28	06:14		05:16
	16:45	17:46	18:40	20:37		21:30
22	08:29	07:32	06:26	06:12		05:15
	16:47	17:48	18:42	20:39		21:31
23	08:27	07:30	06:23	06:09		05:13
	16:49	17:50	18:44	20:41		21:33
24	08:26	07:28	06:21	06:07		05:12
	16:51	17:52	18:45	20:43		21:34
25	08:25	07:25	06:18	06:05		05:11
	16:53	17:54	18:47	20:44		21:36
26	08:23	07:23	06:16	06:03		05:10
	16:54	17:56	18:49	20:46		21:37
27	08:22	07:21	06:14	06:01		05:08
	16:56	17:58	18:51	20:48		21:39
28	08:20	07:19	06:11	05:59		05:07
	16:58	18:00	18:53	20:50		21:40
29	08:19		07:09	05:56		05:06
	17:00		19:55	20:52		21:41
30	08:17		07:06	05:54		05:05
	17:02		19:56	20:54		21:43
31	08:15		07:04			05:04
	17:04		19:58			21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case				161	12	390
Sun reduction				0.35	0.38	0.32
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.66	0.66
Total reduction				0.24	0.25	0.21
Total, real				38	3	82

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: HT - H228

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 13	05:32 (3) 05:45 (3) 21:25	05:39 21:25	06:33 20:18 15	07:07 (5) 07:22 (5) 19:05	07:24 16:54 16:10
2	05:00 22:00 13	05:33 (3) 05:46 (3) 21:23	05:40 21:23	06:35 20:16 17	07:06 (5) 07:23 (5) 19:02	07:26 16:52 16:09
3	05:00 21:59 12	05:33 (3) 05:45 (3) 21:21	05:42 21:21	06:37 20:14 19	07:05 (5) 07:24 (5) 19:00	07:28 16:50 16:09
4	05:01 21:59 12	05:34 (3) 05:46 (3) 21:19	05:44 21:19	06:38 20:11 19	07:05 (5) 07:24 (5) 18:57	07:30 16:48 16:08
5	05:02 21:58 11	05:35 (3) 05:46 (3) 21:17	05:46 21:17	06:40 20:09 18	07:07 (5) 07:25 (5) 18:55	07:32 16:46 16:07
6	05:03 21:58 11	05:36 (3) 05:47 (3) 21:16	05:47 21:16	06:42 20:06 16	07:09 (5) 07:25 (5) 18:53	07:34 16:45 16:07
7	05:04 21:57 10	05:37 (3) 05:47 (3) 21:14	05:49 21:14	06:44 20:04 14	07:10 (5) 07:24 (5) 18:50	07:36 16:43 16:06
8	05:05 21:56 9	05:38 (3) 05:47 (3) 21:12	05:51 21:12	06:45 20:01 12	07:12 (5) 07:24 (5) 18:48	07:38 16:41 16:06
9	05:06 21:55 8	05:39 (3) 05:47 (3) 21:10	05:52 21:10	06:47 19:59 9	07:14 (5) 07:23 (5) 18:45	07:40 16:39 16:06
10	05:07 21:55 7	05:40 (3) 05:47 (3) 21:08	05:54 21:08	06:49 19:57 7	07:16 (5) 07:23 (5) 18:43	07:42 16:37 16:05
11	05:08 21:54 6	05:41 (3) 05:47 (3) 21:06	05:56 21:06	06:51 19:54 4	07:17 (5) 07:21 (5) 18:41	07:44 16:36 16:05
12	05:10 21:53 5	05:42 (3) 05:47 (3) 21:03	05:58 21:03	06:52 19:52 1	07:19 (5) 07:20 (5) 18:38	07:46 16:34 16:05
13	05:11 21:52 4	05:43 (3) 05:47 (3) 21:01	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32 16:05
14	05:12 21:51 3	05:44 (3) 05:47 (3) 20:59	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31 16:05
15	05:13 21:50 2	05:45 (3) 05:47 (3) 20:57	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29 16:05
16	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21	07:10 (5) 07:21 (5)	07:22 16:56	08:44 16:14	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	126	11	151			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.67	0.67			
Total reduction	0.21	0.23	0.22			
Total, real	27	3	33			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: HU - H229

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:27 (1)	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:56	17	06:35 (1)	21:45	22:00	21:25	11	06:38 (1)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:40	06:26 (1)	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	19	06:35 (1)	21:47	22:00	21:23	14	06:40 (1)	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:57	05:48	06:14 (1)	05:01	05:00	05:42	06:24 (1)	06:37	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	21	06:35 (1)	21:48	21:59	21:21	17	06:41 (1)	20:14	19:00	16:50	16:09
4	08:43	08:09	07:09	06:54	05:46	06:12 (1)	05:00	05:01	05:44	06:23 (1)	06:38	07:32	07:30	08:24		
	16:18	17:12	18:08	20:06	21:01	22	06:34 (1)	21:49	21:59	21:19	19	06:42 (1)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	06:11 (1)	04:59	05:02	05:46	06:23 (1)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:10	20:08	21:03	23	06:34 (1)	21:50	21:58	21:18	20	06:43 (1)	20:09	18:55	16:46	16:07
6	08:43	08:05	07:05	06:49	05:42	06:12 (1)	04:59	05:03	05:47	06:22 (1)	06:42	07:35	07:34	08:27		
	16:21	17:16	18:12	20:09	21:05	22	06:34 (1)	21:51	21:58	21:16	21	06:43 (1)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	06:13 (1)	04:58	05:04	05:49	06:22 (1)	06:44	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	21	06:34 (1)	21:52	21:57	21:14	22	06:44 (1)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	06:13 (1)	04:57	05:05	05:51	06:21 (1)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	20	06:33 (1)	21:53	21:56	21:12	22	06:43 (1)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36	06:13 (1)	04:57	05:06	05:52	06:22 (1)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	18	06:31 (1)	21:54	21:56	21:10	22	06:44 (1)	19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35	06:15 (1)	04:56	05:07	05:54	06:24 (1)	06:49	07:43	07:42	08:32		
	16:27	17:24	18:19	20:17	21:12	16	06:31 (1)	21:55	21:55	21:08	20	06:44 (1)	19:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33	06:16 (1)	04:56	05:08	05:56	06:25 (1)	06:51	07:44	07:44	08:33		
	16:28	17:26	18:21	20:19	21:13	13	06:29 (1)	21:56	21:54	21:06	18	06:43 (1)	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	06:17 (1)	04:56	05:10	05:58	06:27 (1)	06:52	07:46	07:46	08:34		
	16:30	17:28	18:23	20:21	21:15	10	06:27 (1)	21:56	21:53	21:04	16	06:43 (1)	19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29	06:21 (1)	04:55	05:11	05:59	06:29 (1)	06:54	07:48	07:48	08:35		
	16:31	17:30	18:25	20:22	21:17	3	06:24 (1)	21:57	21:52	21:01	14	06:43 (1)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:30 (1)	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	12	06:42 (1)	19:47	18:34	16:31	16:05	
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:32 (1)	06:58	07:52	07:51	08:37		
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	9	06:41 (1)	19:44	18:31	16:29	16:05	
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	06:34 (1)	07:00	07:54	07:53	08:38		
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	6	06:40 (1)	19:42	18:29	16:28	16:05	
17	08:35	07:43	06:38	06:23	05:22		04:54	05:16	06:06	06:35 (1)	07:01	07:56	07:55	08:39		
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	3	06:38 (1)	19:39	18:27	16:26	16:05	
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08			07:03	07:58	07:57	08:39	
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51			19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:19	05:19		04:54	05:19	06:10			07:05	07:59	07:59	08:40	
	16:42	17:42	18:36	20:34	21:27		22:00	21:45	20:49			19:34	18:22	16:23	16:05	
20	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12			07:07	08:01	08:01	08:41	
	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46			19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16		04:55	05:21	06:14			07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30		22:01	21:42	20:44			19:29	18:18	16:21	16:06	
22	08:29	07:32	06:26	06:12	05:15		04:55	05:23	06:15			07:10	08:05	08:04	08:42	
	16:47	17:48	18:42	20:39	21:31		22:01	21:41	20:42			19:27	18:15	16:19	16:07	
23	08:27	07:30	06:23	06:10	05:13		04:55	05:24	06:17			07:12	08:07	08:06	08:42	
	16:49	17:50	18:44	20:41	21:33		22:01	21:40	20:39			19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26	06:19			07:14	08:09	08:08	08:43	
	16:51	17:52	18:45	20:43	21:35		22:01	21:38	20:37			19:22	18:11	16:17	16:08	
25	08:25	07:26	06:19	06:05	05:11		04:56	05:28	06:21			07:15	07:11	08:09	08:43	
	16:53	17:54	18:47	20:45	21:36		22:01	21:37	20:35			19:20	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:10	06:28 (1)	04:56	05:29	06:22			07:17	07:13	08:11	08:44	
	16:55	17:56	18:49	20:46	4	06:32 (1)	21:37	22:01	20:33			19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08	06:26 (1)	04:57	05:31	06:24			07:19	07:15	08:13	08:44	
	16:56	17:58	18:51	20:48	7	06:33 (1)	21:39	22:01	20:30			19:15	17:05	16:14	16:10	
28	08:20	07:19	06:11	05:59	05:07	06:24 (1)	04:57	05:32	06:26			07:21	07:17	08:15	08:44	
	16:58	18:00	18:53	20:50	10	06:34 (1)	21:40	22:01	20:28			19:12	17:02	16:13	16:11	
29	08:19		07:09	05:56	05:06	06:22 (1)	04:58	05:34	06:28			07:23	07:19	08:16	08:44	
	17:00		19:55	20:52	12	06:34 (1)	21:42	22:01	20:26			19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05	06:20 (1)	04:58	05:36	06:29			07:24	07:21	08:18	08:44	
	17:02		19:57	20:54	15	06:35 (1)	21:43	22:00	20:23			19:07	16:58	16:11	16:13	
31	08:15		07:04		05:04			05:37	06:31				07:22		08:44	
	17:04		19:58		21:44		21:27	7	06:37 (1)	20:21			16:56		16:14	
Potential sun hours	250	273	367	420	494		510	512	460			382	328	259	233	
Total, worst case					225				266							
Sun reduction				0.35	0.38				0.32							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.68	0.68				0.68							
Total reduction				0.24	0.26				0.22							
Total, real				11	58				2			61				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HV - H230

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March		April	May	June	July	August		September	October	November	December	
1	08:44	08:14	07:16		07:01	07:25 (1)	05:52	05:03	04:59	05:39	06:33	07:09 (1)	07:26	07:24	08:19
	16:15	17:06	18:02		20:00	5 07:30 (1)	20:56	21:45	22:00	21:25	20:18	19 07:28 (1)	19:05	16:54	16:10
2	08:44	08:12	07:14		06:59	07:23 (1)	05:50	05:02	05:00	05:40	06:35	07:08 (1)	07:28	07:26	08:21
	16:16	17:08	18:04		20:02	9 07:32 (1)	20:57	21:47	22:00	21:23	20:16	21 07:29 (1)	19:02	16:52	16:09
3	08:44	08:10	07:12		06:57	07:20 (1)	05:48	05:01	05:00	05:42	06:37	07:08 (1)	07:30	07:28	08:22
	16:17	17:10	18:06		20:04	12 07:32 (1)	20:59	21:48	21:59	21:21	20:14	22 07:30 (1)	19:00	16:50	16:09
4	08:43	08:09	07:09		06:54	07:18 (1)	05:46	05:00	05:01	05:44	06:38	07:06 (1)	07:32	07:30	08:24
	16:18	17:12	18:08		20:06	15 07:33 (1)	21:01	21:49	21:59	21:19	20:11	23 07:29 (1)	18:57	16:48	16:08
5	08:43	08:07	07:07		06:52	07:15 (1)	05:44	04:59	05:02	05:46	06:40	07:07 (1)	07:33	07:32	08:25
	16:20	17:14	18:10		20:08	18 07:33 (1)	21:03	21:50	21:58	21:18	20:09	22 07:29 (1)	18:55	16:46	16:07
6	08:43	08:05	07:05		06:49	07:13 (1)	05:42	04:59	05:03	05:47	06:42	07:09 (1)	07:35	07:34	08:27
	16:21	17:16	18:12		20:10	20 07:33 (1)	21:05	21:51	21:58	21:16	20:06	20 07:29 (1)	18:53	16:45	16:07
7	08:42	08:03	07:02		06:47	07:11 (1)	05:40	04:58	05:04	05:49	06:44	07:10 (1)	07:37	07:36	08:28
	16:22	17:18	18:13		20:11	22 07:33 (1)	21:06	21:52	21:57	21:14	20:04	18 07:28 (1)	18:50	16:43	16:06
8	08:42	08:01	07:00		06:44	07:09 (1)	05:38	04:57	05:05	05:51	06:45	07:12 (1)	07:39	07:38	08:29
	16:24	17:20	18:15		20:13	23 07:32 (1)	21:08	21:53	21:56	21:12	20:02	15 07:27 (1)	18:48	16:41	16:06
9	08:41	07:59	06:58		06:42	07:10 (1)	05:36	04:57	05:06	05:52	06:47	07:14 (1)	07:41	07:40	08:30
	16:25	17:22	18:17		20:15	22 07:32 (1)	21:10	21:54	21:56	21:10	19:59	12 07:26 (1)	18:45	16:39	16:06
10	08:41	07:57	06:55		06:40	07:10 (1)	05:35	04:56	05:07	05:54	06:49	07:16 (1)	07:43	07:42	08:32
	16:27	17:24	18:19		20:17	21 07:31 (1)	21:12	21:55	21:55	21:08	19:57	9 07:25 (1)	18:43	16:37	16:05
11	08:40	07:55	06:53		06:37	07:10 (1)	05:33	04:56	05:08	05:56	06:51	07:17 (1)	07:44	07:44	08:33
	16:28	17:26	18:21		20:19	20 07:30 (1)	21:13	21:56	21:54	21:06	19:54	6 07:23 (1)	18:41	16:36	16:05
12	08:39	07:53	06:50		06:35	07:11 (1)	05:31	04:56	05:09	05:58	06:52	07:19 (1)	07:46	07:46	08:34
	16:30	17:28	18:23		20:21	17 07:28 (1)	21:15	21:56	21:53	21:04	19:52	1 07:20 (1)	18:38	16:34	16:05
13	08:38	07:51	06:48		06:33	07:13 (1)	05:29	04:55	05:11	05:59	06:54		07:48	07:48	08:35
	16:31	17:30	18:25		20:22	14 07:27 (1)	21:17	21:57	21:52	21:02	19:49		18:36	16:32	16:05
14	08:37	07:49	06:45		06:30	07:14 (1)	05:27	04:55	05:12	06:01	06:56		07:50	07:49	08:36
	16:33	17:32	18:27		20:24	9 07:23 (1)	21:19	21:58	21:51	20:59	19:47		18:34	16:31	16:05
15	08:37	07:47	06:43		06:28		05:26	04:55	05:13	06:03	06:58		07:52	07:51	08:37
	16:35	17:34	18:29		20:26		21:20	21:58	21:50	20:57	19:44		18:31	16:29	16:05
16	08:36	07:45	06:41		06:25		05:24	04:55	05:15	06:05	07:00		07:54	07:53	08:38
	16:36	17:36	18:31		20:28		21:22	21:59	21:49	20:55	19:42		18:29	16:28	16:05
17	08:35	07:43	06:38		06:23		05:22	04:54	05:16	06:06	07:01		07:56	07:55	08:39
	16:38	17:38	18:32		20:30		21:24	21:59	21:48	20:53	19:39		18:27	16:26	16:05
18	08:33	07:41	06:36		06:21		05:21	04:54	05:17	06:08	07:03		07:58	07:57	08:39
	16:40	17:40	18:34		20:32		21:25	22:00	21:46	20:51	19:37		18:24	16:25	16:05
19	08:32	07:39	06:33		06:19		05:19	04:54	05:19	06:10	07:05		07:59	07:59	08:40
	16:42	17:42	18:36		20:34		21:27	22:00	21:45	20:49	19:34		18:22	16:23	16:05
20	08:31	07:37	06:31		06:16		05:18	04:54	05:20	06:12	07:07		08:01	08:01	08:41
	16:43	17:44	18:38		20:35		21:28	22:01	21:44	20:46	19:32		18:20	16:22	16:06
21	08:30	07:34	06:28		06:14		05:16	04:55	05:21	06:14	07:08		08:03	08:02	08:41
	16:45	17:46	18:40		20:37		21:30	22:01	21:42	20:44	19:29		18:18	16:21	16:06
22	08:29	07:32	06:26		06:12		05:15	04:55	05:23	06:15	07:10		08:05	08:04	08:42
	16:47	17:48	18:42		20:39		21:32	22:01	21:41	20:42	19:27		18:15	16:19	16:07
23	08:27	07:30	06:23		06:10		05:13	04:55	05:24	06:17	07:12		08:07	08:06	08:42
	16:49	17:50	18:44		20:41		21:33	22:01	21:40	20:40	19:24		18:13	16:18	16:07
24	08:26	07:28	06:21		06:07		05:12	04:55	05:26	06:19	07:14		08:09	08:08	08:43
	16:51	17:52	18:45		20:43		21:35	22:01	21:38	20:37	19:22		18:11	16:17	16:08
25	08:25	07:26	06:19		06:05		05:11	04:56	05:28	06:21	07:15		07:11	08:09	08:43
	16:53	17:54	18:47		20:45		21:36	22:01	21:37	20:35	19:20		17:09	16:16	16:08
26	08:23	07:23	06:16		06:03		05:10	04:56	05:29	06:22	07:17		07:13	08:11	08:44
	16:54	17:56	18:49		20:46		21:37	22:01	21:35	20:33	19:17		17:07	16:15	16:09
27	08:22	07:21	06:14		06:01		05:08	04:57	05:31	06:24	07:19		07:15	08:13	08:44
	16:56	17:58	18:51		20:48		21:39	22:01	21:33	20:30	19:15		17:05	16:14	16:10
28	08:20	07:19	06:11		05:59		05:07	04:57	05:32	06:26	07:21		07:17	08:15	08:44
	16:58	18:00	18:53		20:50		21:40	22:01	21:32	20:28	19:12		17:02	16:13	16:11
29	08:19		07:09		05:56		05:06	04:58	05:34	06:28		07:15 (1)	07:23		
	17:00		19:55		20:52		21:42	22:01	21:30	20:26	9 07:24 (1)	07:24 (1)	19:10		
30	08:17		07:06		05:54		05:05	04:58	05:36	06:29		07:13 (1)	07:24		
	17:02		19:57		20:54		21:43	22:01	21:28	20:23	14 07:27 (1)	07:27 (1)	19:07		
31	08:15		07:04	07:27 (1)		05:04		05:37	06:31			07:11 (1)			
	17:04		19:58	07:28 (1)		21:44		21:27	20:21	17 07:28 (1)					
Potential sun hours	250	273	367	1	420			494	510	512	460	382	328	259	233
Total, worst case				1	227						40		188		
Sun reduction				0.27	0.35						0.34		0.32		
Oper. time red.				1.00	1.00						1.00		1.00		
Wind dir. red.				0.68	0.68						0.68		0.68		
Total reduction				0.18	0.24						0.23		0.22		
Total, real				0	54						9		41		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HW - H231

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 18:02	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 18:00	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 18:00	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 18:00	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 18:00	05:44 21:03	05:02 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 18:00	05:42 21:05	05:03 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 18:00	05:40 21:06	05:04 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 18:00	05:38 21:08	05:05 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 18:00	05:36 21:10	05:06 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 18:00	05:35 21:12	05:07 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 18:00	05:33 21:13	05:08 21:56	05:08 21:56	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 18:00	05:31 21:15	05:09 21:56	05:09 21:56	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 18:00	05:29 21:17	05:11 21:57	05:11 21:57	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 18:00	05:27 21:19	05:12 21:58	05:12 21:58	06:01 21:51	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 18:00	05:26 21:20	05:13 21:58	05:13 21:58	06:03 21:50	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 18:00	05:24 21:22	05:14 21:59	05:14 21:59	06:05 21:49	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 18:00	05:22 21:24	05:16 21:59	05:16 21:59	06:06 21:48	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 18:00	05:21 21:25	05:17 22:00	05:17 22:00	06:08 21:46	07:03 19:37	07:58 18:24	07:57 16:25	08:40 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 18:00	05:19 21:27	05:19 22:00	05:19 22:00	06:10 21:45	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 18:00	05:18 21:28	05:19 22:01	05:19 22:01	06:12 21:44	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 18:00	05:16 21:30	05:21 22:01	05:21 22:01	06:14 21:42	07:08 19:29	08:03 18:18	08:03 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 18:00	05:15 21:32	05:23 22:01	05:23 22:01	06:15 21:41	07:10 19:27	08:05 18:15	08:05 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 18:00	05:13 21:33	05:24 22:01	05:24 22:01	06:17 21:40	07:12 19:24	08:07 18:13	08:07 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 18:00	05:12 21:35	05:26 22:01	05:26 22:01	06:19 21:38	07:14 19:22	08:09 18:11	08:09 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 18:00	05:11 21:36	05:27 22:01	05:27 22:01	06:21 21:37	07:15 19:20	07:11 18:09	07:11 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 18:00	05:09 21:37	05:29 22:01	05:29 22:01	06:22 21:35	07:17 19:17	07:13 18:07	07:13 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 18:00	05:08 21:39	05:31 22:01	05:31 22:01	06:24 21:33	07:19 19:15	07:15 18:05	07:15 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 18:00	05:07 21:40	05:32 22:01	05:32 22:01	06:26 21:32	07:21 19:12	07:17 18:02	07:17 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 18:00	05:06 21:42	05:34 22:01	05:34 22:01	06:28 21:30	07:23 19:10	07:19 18:00	07:19 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 18:00	05:05 21:43	05:35 22:01	05:35 22:01	06:29 21:28	07:24 19:07	07:21 18:00	07:21 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:54 18:00	05:04 21:44	05:37 22:01	05:37 22:01	06:31 21:27	07:22 18:00	07:22 18:00	07:22 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		35	212							256		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		5	37							49		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: HX - H232

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	08:01 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04	08:02 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	07:12	07:38 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06	08:02 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
4	08:43	08:09	07:09	07:38 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08	08:02 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	08:07	07:07	07:37 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
	16:20	17:14	18:10	08:02 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05	07:05	07:37 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12	08:02 (1)	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03	07:02	07:37 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13	08:02 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01	07:00	07:37 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15	08:01 (1)	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
9	08:41	07:59	06:58	07:38 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
	16:25	17:22	18:17	08:00 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06
10	08:41	07:57	06:55	07:38 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24	18:19	07:59 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55	06:53	07:39 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
	16:28	17:26	18:21	07:57 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
12	08:39	07:53	06:50	07:40 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:34
	16:30	17:28	18:23	07:55 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
13	08:38	07:51	06:48	07:44 (1)	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
	16:31	17:30	18:25	07:52 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:05
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	06:59	07:54	08:38
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:07
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:08
25	08:25	07:26	06:19		06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:43
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:08
26	08:23	07:23	06:16	07:48 (1)	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:44
	16:54	17:56	18:49	07:56 (1)	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:09
27	08:22	07:21	06:14	07:46 (1)	06:01	05:08	04:57	05:31	06:24	07:19	07:15	08:44
	16:56	17:58	18:51	07:59 (1)	20:48	21:39	22:01	21:33	20:30	19:15	17:05	16:10
28	08:20	07:19	06:11	07:43 (1)	05:59	05:07	04:57	05:32	06:26	07:21	07:17	08:44
	16:58	18:00	18:53	07:59 (1)	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:11
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	07:21	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	3 08:29 (1)	16:11
31	08:15		07:04			05:04		05:37	06:31		07:22	08:44
	17:04		19:58			21:44		21:27	20:21		16:56	16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		259
Total, worst case			274							3	313	233
Sun reduction		0.23	0.27							0.32	0.29	
Oper. time red.		1.00	1.00							1.00	1.00	
Wind dir. red.		0.65	0.65							0.65	0.65	
Total reduction		0.15	0.18							0.21	0.19	
Total, real		6	48							1	59	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
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abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HY - H233

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	08:42 (3)	07:16	08:37 (1)	07:01
	16:15	17:06	18 09:00 (1)	18:02	09:08 (1)	20:00
2	08:44	08:12	08:40 (3)	07:14	08:39 (1)	06:59
	16:16	17:08	23 09:03 (1)	18:04	09:06 (1)	20:02
3	08:44	08:10	08:38 (3)	07:12	08:41 (1)	06:56
	16:17	17:10	27 09:05 (1)	18:06	09:03 (1)	20:04
4	08:43	08:09	08:36 (3)	07:09	08:45 (1)	06:54
	16:18	17:12	31 09:07 (1)	18:08	08:59 (1)	20:06
5	08:43	08:07	08:34 (3)	07:07		06:52
	16:20	17:14	35 09:09 (1)	18:10		20:08
6	08:43	08:05	08:33 (3)	07:05		06:49
	16:21	17:16	37 09:10 (1)	18:11		20:09
7	08:42	08:03	08:34 (3)	07:02		06:47
	16:22	17:18	38 09:12 (1)	18:13		20:11
8	08:42	08:01	08:35 (3)	07:00	07:24 (2)	06:44
	16:24	17:20	38 09:13 (1)	18:15	07:27 (2)	20:13
9	08:41	07:59	08:35 (1)	06:57	07:22 (2)	06:42
	16:25	17:22	39 09:14 (1)	18:17	07:29 (2)	20:15
10	08:41	07:57	08:34 (1)	06:55	07:19 (2)	06:40
	16:27	17:24	41 09:15 (1)	18:19	07:29 (2)	20:17
11	08:40	07:55	08:34 (1)	06:53	07:17 (2)	06:37
	16:28	17:26	42 09:16 (1)	18:21	07:29 (2)	20:19
12	08:39	07:53	08:33 (1)	06:50	07:14 (2)	06:35
	16:30	17:28	43 09:16 (1)	18:23	07:28 (2)	20:21
13	08:38	07:51	08:33 (1)	06:48	07:12 (2)	06:32
	16:31	17:30	44 09:17 (1)	18:25	07:28 (2)	20:22
14	08:37	07:49	08:32 (1)	06:45	07:09 (2)	06:30
	16:33	17:32	44 09:16 (1)	18:27	07:27 (2)	20:24
15	08:37	07:47	08:32 (1)	06:43	07:10 (2)	06:28
	16:35	17:34	45 09:17 (1)	18:29	07:27 (2)	20:26
16	08:36	07:45	08:32 (1)	06:41	07:10 (2)	06:25
	16:36	17:36	45 09:17 (1)	18:30	07:25 (2)	20:28
17	08:35	07:43	08:32 (1)	06:38	07:12 (2)	06:23
	16:38	17:38	46 09:18 (1)	18:32	07:23 (2)	20:30
18	08:33	07:41	08:32 (1)	06:36	07:15 (2)	06:21
	16:40	17:40	46 09:18 (1)	18:34	07:19 (2)	20:32
19	08:32	07:39	08:31 (1)	06:33		06:18
	16:41	17:42	46 09:17 (1)	18:36		20:33
20	08:31	07:37	08:31 (1)	06:31		06:16
	16:43	17:44	46 09:17 (1)	18:38		20:35
21	08:30	07:34	08:32 (1)	06:28		06:14
	16:45	17:46	45 09:17 (1)	18:40		20:37
22	08:29	07:32	08:32 (1)	06:26		06:12
	16:47	17:48	44 09:16 (1)	18:42		20:39
23	08:27	07:30	08:32 (1)	06:23		06:09
	16:49	17:50	43 09:15 (1)	18:44		20:41
24	08:26	07:28	08:33 (1)	06:21		06:07
	16:51	17:52	42 09:15 (1)	18:45		20:43
25	08:25	07:26	08:33 (1)	06:18		06:05
	16:53	17:54	40 09:13 (1)	18:47		20:45
26	08:23	07:23	08:34 (1)	06:16		06:03
	16:54	17:56	38 09:12 (1)	18:49		20:46
27	08:22	07:21	08:35 (1)	06:14		06:01
	16:56	17:58	37 09:12 (1)	18:51		20:48
28	08:20	08:49 (3)	07:19	08:36 (1)		05:59
	16:58	18:00	33 09:09 (1)	18:53		20:50
29	08:19	08:47 (3)		07:09		05:56
	17:00	5 08:52 (3)		19:55		20:52
30	08:17	08:45 (3)		07:06		05:54
	17:02	7 08:52 (3)		19:57		20:54
31	08:15	08:44 (3)		07:04		05:04
	17:04	10 08:54 (3)		19:58		21:44
Potential sun hours	250	273		367	420	510
Total, worst case	24	1096		221		
Sun reduction	0.24	0.23		0.27		
Oper. time red.	1.00	1.00		1.00		
Wind dir. red.	0.61	0.61		0.64		
Total reduction	0.15	0.14		0.17		
Total, real	4	156		38		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
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abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: HY - H233

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (2) 16:54	08:04 (1) 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (2) 16:52	08:05 (1) 16:09
3	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:56 (2) 16:50	08:04 (3) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:58 (2) 16:48	08:04 (3) 16:08
5	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	08:00 (2) 16:46	08:03 (3) 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:02 (2) 16:45	08:04 (3) 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:06 (3) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:09 (3) 16:06
9	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	09:22 (1) 16:39	08:11 (3) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	09:17 (1) 16:37	08:13 (3) 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	09:35 (1) 16:37	08:30 (1) 16:05
12	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	09:14 (1) 16:36	08:15 (3) 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	09:38 (1) 16:32	08:25 (3) 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	09:12 (1) 16:32	08:17 (3) 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	09:40 (1) 16:34	08:24 (3) 16:05
16	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	09:07 (1) 16:31	08:23 (3) 16:05
17	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	09:44 (1) 16:29	08:37 (1) 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	09:06 (1) 16:28	08:39 (1) 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	09:05 (1) 16:26	08:39 (1) 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	09:04 (1) 16:25	08:39 (1) 16:05
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	09:03 (1) 16:22	08:40 (1) 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	09:47 (1) 16:21	08:41 (1) 16:06
23	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	09:02 (1) 16:21	08:42 (1) 16:06
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	09:01 (1) 16:19	08:43 (1) 16:07
25	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	09:01 (1) 16:18	08:43 (1) 16:07
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:47 (1) 16:16	08:44 (1) 16:08
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:04	08:01 (1) 16:15	08:44 (1) 16:09
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:47 (1) 16:14	08:44 (1) 16:10
29	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:01 (1) 16:13	08:44 (1) 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:02 (1) 16:12	08:44 (1) 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56	08:03 (1) 16:11	08:44 (1) 16:12
Potential sun hours	512	460	382	328	259	233
Total, worst case			75	939	347	
Sun reduction			0.32	0.29	0.27	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.66	0.61	0.61	
Total reduction			0.21	0.18	0.16	
Total, real			16	169	56	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
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Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HZ - H234

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	12:17 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	32	12:49 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05
2	08:44	12:19 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	31	12:50 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
3	08:44	12:19 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
	16:17	30	12:49 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
4	08:43	12:21 (1)	08:09	06:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32
	16:18	28	12:49 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
5	08:43	12:21 (1)	08:07	06:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33
	16:20	28	12:49 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55
6	08:43	12:23 (1)	08:05	06:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35
	16:21	26	12:49 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53
7	08:42	12:24 (1)	08:03	06:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37
	16:22	24	12:48 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
8	08:42	12:26 (1)	08:01	06:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
	16:24	21	12:47 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48
9	08:41	12:28 (1)	07:59	06:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
	16:25	18	12:46 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45
10	08:40	12:31 (1)	07:57	06:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43
	16:27	14	12:45 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43
11	08:40	12:34 (1)	07:55	06:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
	16:28	8	12:42 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41
12	08:39	07:53	06:22 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:40
	16:30	17:28	18:20 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	17:24
13	08:38	07:51	06:22 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:42
	16:31	17:30	18:20 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	17:20
14	08:37	07:49	06:22 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:44
	16:33	17:32	18:22 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	17:16
15	08:36	07:47	06:22 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:46
	16:34	17:34	18:23 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	17:14
16	08:36	07:45	06:23 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:48
	16:36	17:36	18:24 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	17:12
17	08:35	07:43	06:24 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:50
	16:38	17:38	18:24 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	17:10
18	08:33	07:41	06:24 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:51
	16:40	17:40	18:26 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	17:07
19	08:32	07:39	06:26 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:53
	16:41	17:42	18:27 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	17:05
20	08:31	07:37	06:28 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:55
	16:43	17:44	18:29 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	17:03
21	08:30	07:34	06:31 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:57
	16:45	17:46	18:30 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	17:02
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:57 (2)	09:52
	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	17	08:14 (2)
23	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:56 (2)	09:51
	16:49	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	20	09:16 (2)
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:54 (2)	09:48
	16:51	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	23	09:17 (2)
25	08:25	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	07:53 (2)	08:47
	16:52	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	24	08:17 (2)
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	07:52 (2)	08:44
	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	26	08:18 (2)
27	08:22	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	07:52 (2)	08:43
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	26	08:18 (2)
28	08:20	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	07:51 (2)	08:44
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	27	08:18 (2)
29	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	07:51 (2)	08:46
	17:00		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	28	08:19 (2)
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	07:52 (2)	08:48
	17:02		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	27	08:19 (2)
31	08:15		07:04		05:04		05:37	06:31		07:22	07:52 (2)	08:50
	17:04		19:58		21:44		21:27	20:21		16:56	27	08:19 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	260	378										964
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.62	0.62										0.62
Total reduction	0.15	0.14										0.13
Total, real	39	55										125

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park IE-F91 RHH9 Sligo +353719161416 abyrrne / abyrrne@jodireland.com Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Assumptions for shadow calculations

Shadow receptor: IA - H235

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44 16:15	30	13:11 (1) 13:41 (1)	08:14 17:06	29	08:42 (2) 09:11 (2)	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05			07:24 16:54	27	08:13 (2) 08:40 (2)	08:19 16:10	3	13:11 (1) 13:14 (1)		
2	08:44 16:16	29	13:12 (1) 13:41 (1)	08:12 17:08	31	08:41 (2) 09:12 (2)	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02			07:26 16:52	29	08:12 (2) 08:41 (2)	08:21 16:09	12	13:07 (1) 13:19 (1)		
3	08:44 16:17	29	13:12 (1) 13:41 (1)	08:10 17:10	31	08:41 (2) 09:12 (2)	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00			07:28 16:50	29	08:12 (2) 08:41 (2)	08:22 16:08	16	13:05 (1) 13:21 (1)		
4	08:43 16:18	27	13:14 (1) 13:41 (1)	08:09 17:12	31	08:41 (2) 09:12 (2)	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57			07:30 16:48	30	08:11 (2) 08:41 (2)	08:24 16:08	19	13:04 (1) 13:23 (1)		
5	08:43 16:20	26	13:14 (1) 13:40 (1)	08:07 17:14	31	08:41 (2) 09:12 (2)	07:07 18:09	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55			07:32 16:46	31	08:11 (2) 08:42 (2)	08:25 16:07	21	13:03 (1) 13:24 (1)		
6	08:43 16:21	24	13:16 (1) 13:40 (1)	08:05 17:16	31	08:41 (2) 09:12 (2)	07:05 18:11	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53			07:34 16:44	31	08:11 (2) 08:42 (2)	08:27 16:07	23	13:03 (1) 13:26 (1)		
7	08:42 16:22	23	13:17 (1) 13:39 (1)	08:03 17:18	30	08:42 (2) 09:12 (2)	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50			07:36 16:43	31	08:11 (2) 08:42 (2)	08:28 16:06	25	13:02 (1) 13:27 (1)		
8	08:42 16:24	19	13:19 (1) 13:38 (1)	08:01 17:20	29	08:42 (2) 09:11 (2)	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48			07:38 16:41	31	08:12 (2) 08:43 (2)	08:29 16:06	27	13:02 (1) 13:29 (1)		
9	08:41 16:25	16	13:22 (1) 13:38 (1)	07:59 17:22	28	08:43 (2) 09:11 (2)	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45			07:40 16:39	30	08:12 (2) 08:43 (2)	08:30 16:05	29	13:01 (1) 13:30 (1)		
10	08:40 16:27	12	13:24 (1) 13:36 (1)	07:57 17:24	26	08:44 (2) 09:10 (2)	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:58	05:54 21:08	06:49 19:57	07:43 18:43			07:42 16:37	29	08:13 (2) 08:45 (2)	07:43 16:05	29	13:01 (1) 13:31 (1)		
11	08:40 16:28	5	13:28 (1) 13:33 (1)	07:55 17:26	25	08:45 (2) 09:13 (1)	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41			07:44 16:36	27	08:15 (2) 08:42 (2)	07:44 16:05	30	13:01 (1) 13:31 (1)		
12	08:39 16:30		07:53 17:28	07:53 17:30	23	08:46 (2) 09:09 (2)	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38			07:46 16:34	24	08:17 (2) 08:41 (2)	07:46 16:05	31	13:01 (1) 13:32 (1)		
13	08:38 16:31		07:51 17:30	07:51 17:30	19	08:47 (2) 09:08 (2)	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36			07:48 16:32	22	08:19 (2) 08:41 (2)	07:48 16:05	31	13:02 (1) 13:33 (1)		
14	08:37 16:33		07:49 17:32	07:49 17:32	15	08:49 (2) 09:04 (2)	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33			07:49 16:31	19	08:21 (2) 08:40 (2)	07:50 16:06	32	13:02 (1) 13:34 (1)		
15	08:36 16:34		07:47 17:34	07:47 17:34	9	08:52 (2) 09:01 (2)	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31			07:51 16:29	17	08:23 (2) 08:40 (2)	07:52 16:05	33	13:02 (1) 13:35 (1)		
16	08:36 16:36		07:45 17:36	07:45 17:36		06:40 18:30	06:25 20:28	06:25 21:22	05:24 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 18:29			07:53 16:28	14	08:25 (2) 08:39 (2)	07:54 16:05	34	13:01 (1) 13:35 (1)		
17	08:34 16:38		07:43 17:38	07:43 17:38		06:38 18:32	06:23 20:30	06:23 21:23	05:22 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 18:27			07:55 16:26	11	08:27 (2) 08:38 (2)	07:56 16:05	33	13:02 (1) 13:35 (1)		
18	08:33 16:40		07:41 17:40	07:41 17:40		06:36 18:34	06:21 20:32	06:21 21:25	05:21 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 18:24			07:57 16:25	8	08:29 (2) 08:37 (2)	07:57 16:05	34	13:02 (1) 13:36 (1)		
19	08:32 16:41		07:39 17:42	07:39 17:42		06:33 18:36	06:18 20:33	06:18 21:27	05:19 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 18:22			07:59 16:23	5	08:31 (2) 08:36 (2)	07:59 16:05	34	13:03 (1) 13:37 (1)		
20	08:31 16:43		07:37 17:44	07:37 17:44		06:31 18:38	06:16 20:35	06:16 21:28	05:16 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 18:20			08:01 16:22	1	08:33 (2) 08:34 (2)	08:01 16:06	34	13:03 (1) 13:37 (1)		
21	08:30 16:45		07:34 17:46	07:34 17:46		06:28 18:40	06:14 20:37	06:14 21:30	05:16 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:03 18:17			08:03 16:20		08:34 (2) 08:35 (2)	08:03 16:06	34	13:04 (1) 13:38 (1)		
22	08:29 16:47	1	08:58 (2) 08:59 (2)	07:32 17:48		06:26 18:42	06:12 20:39	06:12 21:31	05:15 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 18:15			08:05 16:19		08:35 (2) 08:36 (2)	08:05 16:07	34	13:04 (1) 13:38 (1)		
23	08:27 16:49	5	09:02 (2) 09:02 (2)	07:30 17:50		06:23 18:43	06:09 20:41	06:09 21:33	05:13 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:07 18:13			08:07 16:18		08:37 (2) 08:38 (2)	08:07 16:07	34	13:05 (1) 13:39 (1)		
24	08:26 16:51	8	09:05 (2) 09:03 (2)	07:28 17:52		06:21 18:45	06:07 20:43	06:07 21:34	05:12 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:09 18:11			08:09 16:17		08:38 (2) 08:39 (2)	08:09 16:08	34	13:05 (1) 13:39 (1)		
25	08:25 16:52	11	08:54 (2) 09:05 (2)	07:25 17:54		06:18 18:47	06:05 20:44	06:05 21:36	05:11 22:01	05:27 21:37	06:20 20:35	07:15 19:19	07:11 17:09	07:11 17:09			07:11 16:16		08:39 (2) 08:40 (2)	07:11 16:08	34	13:05 (1) 13:39 (1)		
26	08:23 16:54	14	08:52 (2) 09:06 (2)	07:23 17:56		06:16 18:49	06:03 20:46	06:03 21:37	05:09 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 18:07	07:13 18:07			07:13 16:15		08:40 (2) 08:41 (2)	07:13 16:09	33	13:07 (1) 13:40 (1)		
27	08:22 16:56	17	08:51 (2) 09:08 (2)	07:21 17:58		06:14 18:51	06:01 20:48	06:01 21:39	05:08 22:01	05:34 21:33	06:24 20:30	07:19 19:14	08:04 18:04	08:04 18:04			08:04 16:10	12	08:42 (2) 08:43 (2)	07:19 16:10	34	13:08 (1) 13:41 (1)		
28	08:20 16:58	20	08:49 (2) 09:09 (2)	07:19 18:00		06:11 18:53	05:58 20:50	05:58 21:40	05:07 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:03 18:03	08:03 18:03			08:03 16:11	16	08:44 (2) 08:45 (2)	07:17 16:12	33	13:08 (1) 13:41 (1)		
29	08:19 17:00	22	08:47 (2) 09:07 (2)			06:09 18:55	05:56 20:52	05:56 21:42	05:06 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:07 18:07	08:07 18:07			08:07 16:12		08:46 (2) 08:47 (2)	07:19 16:11	33	13:08 (1) 13:41 (1)		
30	08:17 17:02	25	08:45 (2) 09:10 (2)			06:06 18:56	05:54 20:54	05:54 21:43	05:05 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:10 18:08	08:10 18:08			08:10 16:12	23	08:47 (2) 08:48 (2)	07:19 16:11	33	13:09 (1) 13:41 (1)		
31	08:15 17:04	27	08:44 (2) 09:11 (2)			06:04 18:58	05:54 20:58	05:54 21:44	05:04 22:01	05:37 21:27	06:31 20:21	07:22 19:07	08:11 18:09	08:11 18:09			08:11 16:13	25	08:49 (2) 08:50 (2)	07:22 16:13	32	13:09 (1) 13:41 (1)		
Potential sun hours	250		273			367		420		494		510		512		460		382		328		259		233
Total, worst case	389		388			388		388		388		388		388		388		388		388		388		388
Sun reduction	0.24		0.23			0.23		0.23		0.23		0.23		0.23		0.23		0.23		0.23		0.23		0.21
Oper. time red.	1.00		1.00			1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00
Wind dir. red.	0.62		0.61			0.61		0.61		0.61		0.61		0.61		0.61		0.61		0.61		0.61		0.63
Total reduction	0.15		0.14			0.14		0.14		0.14		0.14		0.14		0.14		0.14		0.14		0.14		0.13
Total, real	59		55			55		55		55		55		55		55		55		55		55		117

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IB - H236

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44 16:15	30	13:13 (1) 13:43 (1)	08:14 17:06	31	08:42 (2) 09:13 (2)	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	26	08:15 (2) 08:41 (2)	08:19 16:10	08:19 13:12 (1)	6	13:12 (1) 13:18 (1)			
2	08:44 16:16	30	13:14 (1) 13:44 (1)	08:12 17:08	31	08:42 (2) 09:13 (2)	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	28	08:14 (2) 08:42 (2)	08:21 16:09	13	13:09 (1) 13:22 (1)				
3	08:44 16:17	29	13:14 (1) 13:43 (1)	08:10 17:10	31	08:42 (2) 09:13 (2)	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	29	08:13 (2) 08:42 (2)	08:22 16:08	17	13:07 (1) 13:24 (1)				
4	08:43 16:18	27	13:16 (1) 13:43 (1)	08:09 17:12	31	08:42 (2) 09:13 (2)	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	30	08:13 (2) 08:43 (2)	08:24 16:08	20	13:06 (1) 13:26 (1)				
5	08:43 16:20	23	13:17 (1) 13:43 (1)	08:07 17:14	31	08:42 (2) 09:13 (2)	07:07 18:09	06:52 20:08	05:44 21:03	05:02 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	31	08:12 (2) 08:43 (2)	08:25 16:07	22	13:05 (1) 13:27 (1)				
6	08:43 16:21	23	13:18 (1) 13:43 (1)	08:05 17:16	30	08:43 (2) 09:13 (2)	07:05 18:11	06:49 20:09	05:42 21:05	05:03 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:44	31	08:12 (2) 08:43 (2)	08:27 16:07	24	13:05 (1) 13:29 (1)				
7	08:42 16:22	25	13:20 (1) 13:42 (1)	08:03 17:18	30	08:43 (2) 09:13 (2)	07:02 18:13	06:47 20:11	05:40 21:06	05:04 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	31	08:12 (2) 08:43 (2)	08:28 16:06	26	13:04 (1) 13:30 (1)				
8	08:42 16:24	22	13:21 (1) 13:41 (1)	08:01 17:20	30	08:44 (2) 09:13 (2)	07:00 18:15	06:44 20:13	05:38 21:08	05:05 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	31	08:13 (2) 08:44 (2)	07:39 16:06	27	13:04 (1) 13:31 (1)				
9	08:41 16:25	20	13:24 (1) 13:41 (1)	07:59 17:22	29	08:44 (2) 09:13 (2)	06:57 18:17	06:42 20:15	05:36 21:10	05:06 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	31	08:13 (2) 08:44 (2)	07:41 16:05	28	13:04 (1) 13:32 (1)				
10	08:40 16:27	17	13:26 (1) 13:39 (1)	07:57 17:24	28	08:45 (2) 09:11 (2)	06:55 18:19	06:40 20:17	05:34 21:12	05:07 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	31	08:13 (2) 08:44 (2)	07:43 16:05	30	13:02 (1) 13:33 (1)				
11	08:40 16:28	13	13:29 (1) 13:36 (1)	07:55 17:26	26	08:46 (2) 09:11 (2)	06:53 18:21	06:37 20:19	05:33 21:13	05:08 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	31	08:15 (2) 08:43 (2)	07:44 16:05	30	13:03 (1) 13:33 (1)				
12	08:39 16:30	7	13:36 (1) 17:28	07:53 17:28	25	08:48 (2) 09:09 (2)	06:50 18:23	06:35 20:21	05:31 21:15	05:09 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	28	08:17 (2) 08:48 (2)	07:46 16:05	30	13:03 (1) 13:34 (1)				
13	08:38 16:31			07:51 17:30	21	08:49 (2) 09:07 (2)	06:48 18:27	06:32 20:22	05:29 21:17	05:11 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	26	08:19 (2) 08:51 (2)	07:48 16:05	31	13:34 (1) 13:36 (1)				
14	08:37 16:33			07:49 17:32	19	08:51 (2) 09:05 (2)	06:45 18:27	06:30 20:24	05:27 21:18	05:12 21:58	06:01 21:51	06:56 20:59	07:50 19:47	07:50 18:33	07:49 16:31	24	08:21 (2) 08:42 (2)	07:49 16:05	32	13:04 (1) 13:37 (1)				
15	08:36 16:34			07:47 17:34	14	08:52 (2) 09:01 (2)	06:43 18:29	06:28 20:26	05:26 21:20	05:13 21:58	06:03 21:50	06:58 20:57	07:52 19:44	07:52 18:31	07:51 16:29	21	08:23 (2) 08:44 (2)	07:51 16:05	33	13:04 (1) 13:37 (1)				
16	08:36 16:36			07:45 17:36	6	08:55 (2) 09:02 (2)	06:40 18:30	06:25 20:28	05:24 21:22	05:14 21:59	06:05 21:49	06:59 20:55	07:54 19:42	07:54 18:29	07:53 16:28	19	08:25 (2) 08:46 (2)	07:53 16:05	33	13:04 (1) 13:37 (1)				
17	08:34 16:38			07:43 17:38			06:38 18:32	06:23 20:30	05:22 21:23	05:16 21:59	06:06 21:48	07:01 20:53	07:56 19:39	07:56 18:27	07:55 16:26	16	08:27 (2) 08:48 (2)	07:55 16:05	33	13:04 (1) 13:38 (1)				
18	08:33 16:40			07:41 17:40			06:36 18:34	06:21 20:32	05:21 21:25	05:17 22:00	06:08 21:46	07:03 20:51	07:57 19:37	07:57 18:24	07:57 16:25	13	08:29 (2) 08:50 (2)	07:57 16:05	34	13:05 (1) 13:39 (1)				
19	08:32 16:41			07:39 17:42			06:36 18:36	06:21 20:33	05:21 21:27	05:18 22:00	06:10 21:45	07:05 20:48	07:59 19:34	07:59 18:22	07:59 16:25	10	08:31 (2) 08:52 (2)	07:59 16:05	34	13:05 (1) 13:40 (1)				
20	08:31 16:43			07:37 17:44			06:33 18:38	06:16 20:35	05:18 21:28	05:20 22:00	06:12 21:44	07:06 20:46	08:01 19:32	08:01 18:20	08:01 16:22	7	08:33 (2) 08:54 (2)	08:01 16:06	35	13:05 (1) 13:41 (1)				
21	08:30 16:45			07:34 17:46			06:28 18:40	06:14 20:37	05:16 21:30	05:21 22:01	06:13 21:42	07:08 20:44	08:03 19:29	08:03 18:17	08:02 16:20	4	08:37 (2) 08:58 (2)	08:02 16:06	34	13:06 (1) 13:40 (1)				
22	08:29 16:47			07:32 17:48			06:26 18:42	06:12 20:39	05:15 21:31	05:23 22:01	06:15 21:41	07:10 20:42	08:05 19:27	08:05 18:15	08:04 16:19		08:38 (2) 09:00 (2)	08:04 16:05		13:06 (1) 13:40 (1)				
23	08:27 16:49	4	08:58 (2) 09:02 (2)	07:32 17:48			06:23 18:43	06:09 20:41	05:13 21:33	05:24 22:01	06:17 21:40	07:12 20:39	08:07 19:24	08:07 18:13	08:06 16:18		08:39 (2) 09:01 (2)	08:06 16:06		13:07 (1) 13:41 (1)				
24	08:26 16:51	7	08:55 (2) 09:05 (2)	07:28 17:52			06:21 18:45	06:07 20:43	05:12 21:34	05:26 22:01	06:19 21:38	07:14 20:37	08:09 19:22	08:09 18:11	08:08 16:17		08:40 (2) 09:02 (2)	08:08 16:08		13:07 (1) 13:41 (1)				
25	08:25 16:52	10	08:56 (2) 09:06 (2)	07:25 17:54			06:18 18:47	06:05 20:44	05:11 21:36	05:27 22:01	06:20 21:37	07:15 20:35	08:11 19:19	08:11 18:09	08:09 16:16		08:41 (2) 09:03 (2)	08:09 16:09		13:08 (1) 13:42 (1)				
26	08:23 16:54	13	08:57 (2) 09:07 (2)	07:23 17:56			06:16 18:49	06:03 20:46	05:09 21:37	05:29 22:01	06:22 21:35	07:17 20:33	08:12 19:17	08:12 18:07	08:11 16:15		08:42 (2) 09:04 (2)	08:11 16:09		13:09 (1) 13:43 (1)				
27	08:22 16:56	16	08:58 (2) 09:10 (2)	07:21 17:58			06:14 18:51	06:01 20:48	05:08 21:39	05:31 22:01	06:24 21:33	07:19 20:30	08:07 19:14	08:07 18:04	08:06 16:10		08:43 (2) 09:05 (2)	08:06 16:09		13:10 (1) 13:44 (1)				
28	08:20 16:58	19	08:59 (2) 09:11 (2)	07:19 18:00			06:11 18:53	05:58 20:50	05:07 21:40	05:32 22:01	06:26 21:32	07:21 20:28	08:08 19:12	08:08 18:05	08:07 16:11		08:44 (2) 09:06 (2)	08:07 16:09		13:11 (1) 13:45 (1)				
29	08:19 17:00	21	08:47 (2) 09:11 (2)				06:10 18:55	05:56 20:52	05:06 21:42	05:34 22:01	06:28 21:30	07:23 20:25	08:15 19:10	08:15 18:06	08:14 16:12		08:45 (2) 09:07 (2)	08:14 16:09		13:12 (1) 13:46 (1)				
30	08:17 17:02	24	08:48 (2) 09:15 (2)				06:09 18:56	05:55 20:54	05:06 21:43	05:35 22:00	06:29 21:28	07:24 20:23	08:16 19:07	08:16 18:08	08:15 16:12		08:46 (2) 09:08 (2)	08:15 16:09		13:13 (1) 13:47 (1)				
31	08:15 17:04	26	08:49 (2) 09:13 (2)				06:08 18:58	05:54 20:56	05:05 21:44	05:36 22:01	06:30 21:27	07:25 20:21	08:17 19:08	08:17 18:09	08:16 16:13		08:47 (2) 09:09 (2)	08:16 16:09		13:14 (1) 13:48 (1)				
Potential sun hours	250		273				367		420	494	510	512	460	382	328		259		467		233		911	
Total, worst case	415		383				367		420	494	510	512	460	382	328		259		467		233		911	
Sun reduction	0.24		0.23				0.24		0.23	0.23	0.23	0.23	0.23	0.23	0.23		0.24		0.27		0.23		0.21	
Oper. time red.	1.00		1.00				1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00		1.00		1.00		1.00	
Wind dir. red.	0.62		0.61				0.61		0.61	0.61	0.61	0.61	0.61	0.61	0.61		0.61		0.61		0.61		0.63	
Total reduction	0.15		0.14				0.14		0.14	0.14	0.14	0.14	0.14	0.14	0.14		0.15		0.16		0.13		0.13	
Total, real	63		54				367		420	494	510	512	460	382	328		75		16		119		119	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IC - H237

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: ID - H238

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	20:12 (5) 21:01 (5)	04:59 22:00	20:18 (5) 21:08 (5)	05:39 21:25	20:34 (5) 20:53 (5)	06:33 06:35	07:26 07:28	07:24 07:26	08:19 08:21
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	20:13 (5) 21:02 (5)	05:00 22:00	20:19 (5) 21:09 (5)	05:40 21:23	20:37 (5) 20:52 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	20:13 (5) 21:02 (5)	05:00 21:59	20:18 (5) 21:08 (5)	05:42 21:21	20:40 (5) 20:50 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	20:13 (5) 21:02 (5)	05:01 21:59	20:19 (5) 21:09 (5)	05:44 21:19	20:50 (5) 20:11	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	05:49 21:50	20:13 (5) 21:03 (5)	05:02 21:58	20:19 (5) 21:09 (5)	05:45 21:17	20:50 (5) 20:21 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	05:49 21:51	20:13 (5) 21:03 (5)	05:03 21:57	20:19 (5) 21:09 (5)	05:47 21:15	20:50 (5) 20:06	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	05:48 21:52	20:13 (5) 21:03 (5)	05:04 21:57	20:20 (5) 21:09 (5)	05:49 21:13	20:50 (5) 20:04	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	05:47 21:53	20:13 (5) 21:03 (5)	05:05 21:56	20:20 (5) 21:10 (5)	05:51 21:11	20:50 (5) 20:01	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:34 (5) 20:38 (5)	20:14 (5) 21:04 (5)	05:06 21:55	20:20 (5) 21:10 (5)	05:52 21:10	20:50 (5) 20:10 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:28 (5) 20:40 (5)	20:14 (5) 21:03 (5)	05:07 21:55	20:20 (5) 21:10 (5)	05:54 21:07	20:50 (5) 20:20 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	20:26 (5) 20:42 (5)	20:14 (5) 21:04 (5)	05:08 21:54	20:21 (5) 21:09 (5)	05:56 21:05	20:50 (5) 20:21 (5)	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:23 (5) 20:43 (5)	20:15 (5) 21:04 (5)	05:09 21:53	20:21 (5) 21:09 (5)	05:58 21:03	20:50 (5) 19:51	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:22 (5) 20:45 (5)	20:14 (5) 21:04 (5)	05:11 21:52	20:21 (5) 21:09 (5)	05:59 21:01	20:50 (5) 19:49	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:20 (5) 20:47 (5)	20:14 (5) 21:04 (5)	05:12 21:51	20:21 (5) 21:09 (5)	06:01 20:59	20:50 (5) 19:47	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:19 (5) 20:48 (5)	20:15 (5) 21:05 (5)	05:13 21:50	20:21 (5) 21:09 (5)	06:03 20:57	20:50 (5) 19:44	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:18 (5) 20:50 (5)	20:15 (5) 21:05 (5)	05:14 21:49	20:22 (5) 21:10 (5)	06:05 20:55	20:50 (5) 19:42	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:17 (5) 20:51 (5)	20:15 (5) 21:05 (5)	05:16 21:47	20:22 (5) 21:09 (5)	06:06 20:53	20:50 (5) 19:39	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:16 (5) 20:54 (5)	20:16 (5) 21:05 (5)	05:18 21:45	20:23 (5) 21:08 (5)	06:10 20:48	20:50 (5) 19:34	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:15 (5) 20:55 (5)	20:16 (5) 21:06 (5)	05:20 21:44	20:24 (5) 21:09 (5)	06:12 20:46	20:50 (5) 19:32	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
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25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:13 (5) 20:59 (5)	20:17 (5) 21:07 (5)	05:27 21:36	20:27 (5) 21:04 (5)	06:20 20:35	20:50 (5) 19:19	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:13 (5) 21:00 (5)	20:18 (5) 21:08 (5)	05:31 21:33	20:28 (5) 21:01 (5)	06:24 20:30	20:50 (5) 19:14	07:19 17:04	07:15 16:14	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	20:13 (5) 21:00 (5)	20:18 (5) 21:07 (5)	05:32 21:32	20:29 (5) 20:59 (5)	06:26 20:28	20:50 (5) 19:12	07:21 17:02	07:16 16:13	08:14 16:11	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	20:13 (5) 21:01 (5)	20:18 (5) 21:08 (5)	05:34 21:30	20:30 (5) 20:58 (5)	06:28 20:25	20:50 (5) 19:09	07:22 17:00	07:18 16:12	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	20:13 (5) 21:01 (5)	20:18 (5) 21:08 (5)	05:35 21:28	20:31 (5) 20:56 (5)	06:29 20:23	20:50 (5) 19:07	07:24 16:58	07:20 16:11	08:18 16:12	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44	20:12 (5) 21:01 (5)		05:37 21:26	20:33 (5) 20:55 (5)	06:31 20:21		07:22 16:56			08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233			
Total, worst case					820	1491	1350	44							
Sun reduction					0.38	0.32	0.32	0.34							
Oper. time red.					1.00	1.00	1.00	1.00							
Wind dir. red.					0.63	0.63	0.63	0.63							
Total reduction					0.24	0.20	0.20	0.22							
Total, real					197	301	276	9							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: IE - H239
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December						
1	08:44	08:14	07:16	07:01	05:52	05:03	20:21 (5)	04:59	20:30 (5)	05:39	20:35 (5)	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:55	21:45	31	20:52 (5)	22:00	27	20:57 (5)	21:25	18	20:53 (5)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02	20:22 (5)	05:00	20:30 (5)	05:40	20:36 (5)	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	21:46	31	20:53 (5)	22:00	27	20:57 (5)	21:23	16	20:52 (5)	20:16	19:02	16:52	16:09
3	08:43	08:10	07:12	06:56	05:48	05:01	20:22 (5)	05:00	20:29 (5)	05:42	20:37 (5)	06:36	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	21:48	31	20:53 (5)	21:59	28	20:57 (5)	21:21	13	20:50 (5)	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	05:00	20:22 (5)	05:01	20:29 (5)	05:44	20:40 (5)	06:38	07:31	07:30	08:24			
	16:18	17:12	18:07	20:06	21:01	21:49	31	20:53 (5)	21:59	29	20:58 (5)	21:19	8	20:48 (5)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	04:59	20:23 (5)	05:02	20:29 (5)	05:45	20:40 (5)	06:33	07:32	07:32	08:25			
	16:20	17:14	18:09	20:07	21:03	21:50	30	20:53 (5)	21:58	29	20:58 (5)	21:17	20:09	18:55	16:46	16:07		
6	08:42	08:05	07:04	06:49	05:42	04:59	20:23 (5)	05:03	20:30 (5)	05:47	20:42 (5)	06:35	07:34	07:34	08:26			
	16:21	17:16	18:11	20:09	21:04	21:51	30	20:53 (5)	21:57	29	20:59 (5)	21:15	20:06	18:52	16:44	16:07		
7	08:42	08:03	07:02	06:47	05:40	04:58	20:23 (5)	05:04	20:30 (5)	05:49	20:43 (5)	06:37	07:37	07:36	08:28			
	16:22	17:18	18:13	20:11	21:06	21:52	29	20:52 (5)	21:57	29	20:59 (5)	21:13	20:04	18:50	16:43	16:06		
8	08:41	08:01	07:00	06:44	05:38	04:57	20:24 (5)	05:05	20:30 (5)	05:51	20:45 (5)	06:39	07:39	07:38	08:29			
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9	08:41	07:59	06:57	06:42	05:36	20:29 (5)	04:57	20:25 (5)	05:06	20:29 (5)	05:52	20:47 (5)	07:41	07:40	08:30			
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10	08:40	07:57	06:55	06:39	05:34	20:26 (5)	04:56	20:25 (5)	05:07	20:29 (5)	05:54	20:49 (5)	07:42	07:42	08:31			
	16:27	17:24	18:19	20:17	21:11	14	20:40 (5)	21:55	27	20:52 (5)	21:54	32	21:01 (5)	21:07	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33	20:25 (5)	04:56	20:25 (5)	05:08	20:29 (5)	05:56	20:50 (5)	07:44	07:44	08:33			
	16:28	17:26	18:21	20:19	21:13	17	20:42 (5)	21:55	28	20:53 (5)	21:54	32	21:01 (5)	21:05	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	20:24 (5)	04:55	20:26 (5)	05:09	20:29 (5)	05:58	20:52 (5)	07:46	07:45	08:34			
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16	08:35	07:45	06:40	06:25	05:24	20:21 (5)	04:54	20:27 (5)	05:14	20:29 (5)	06:05	20:59 (5)	07:54	07:53	08:38			
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18	08:33	07:41	06:35	06:21	05:21	20:20 (5)	04:54	20:28 (5)	05:17	20:29 (5)	06:08	20:58 (5)	07:57	07:57	08:39			
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	17:00		19:54	20:52	21:41	33	20:53 (5)	22:00	26	20:56 (5)	21:30	25	20:58 (5)	21:05	19:09	18:00	16:12	16:12
30	08:17		07:06	05:54	05:05	20:20 (5)	04:58	20:29 (5)	05:35	20:33 (5)	06:29	20:58 (5)	07:59	07:59	08:41			
	17:02		19:56	20:53	21:43	33	20:53 (5)	22:00	27	20:56 (5)	21:28	23	20:56 (5)	21:05	19:07	18:00	16:12	16:12
31	08:15		07:04		05:04	20:21 (5)				20:34 (5)	06:31				19:07	18:00	16:11	16:12
	17:04		19:58		21:44	32	20:53 (5)			21:26	21					18:00	16:11	16:13
Potential sun hours	250	273	367	420	494	510		512	460			382	328	259				233
Total, worst case					654	812		932	55									
Sun reduction					0.38	0.32		0.32	0.34									
Oper. time red.					1.00	1.00		1.00	1.00.									

Table layout: For each day in each month the following matrix apply

Day in month	S

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IF - H240

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IG - H241

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: IH - H242
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	16:28 (5) 18:02	07:16 17:34 (4)	07:01 20:00	20:06 (2) 21:45
2	08:44 16:16	08:12 17:08	16:28 (5) 18:04	07:14 17:36 (4)	06:59 20:02	20:05 (2) 21:46
3	08:43 16:17	08:10 17:10	16:28 (5) 18:06	07:11 17:38 (4)	06:56 20:04	20:05 (2) 21:48
4	08:43 16:18	08:08 17:12	16:27 (5) 18:07	07:09 17:41 (4)	06:54 20:06	20:04 (2) 21:49
5	08:43 16:19	08:07 17:14	16:27 (5) 18:09	07:07 17:42 (4)	06:51 20:07	20:04 (2) 21:50
6	08:42 16:21	08:05 17:16	16:27 (5) 18:11	07:04 17:45 (4)	06:49 20:09	20:04 (2) 21:51
7	08:42 16:22	08:03 17:18	16:27 (5) 18:13	07:02 17:46 (4)	06:47 20:11	20:04 (2) 21:52
8	08:42 16:24	08:01 17:20	16:27 (5) 18:15	07:00 17:48 (4)	06:44 20:13	20:04 (2) 21:53
9	08:41 16:25	07:59 17:22	16:27 (5) 18:17	06:57 17:50 (4)	06:42 20:15	20:04 (2) 21:54
10	08:40 16:26	07:57 17:24	16:28 (5) 18:19	06:55 17:50 (4)	06:39 20:17	20:04 (2) 21:55
11	08:40 16:28	07:55 17:26	16:29 (5) 18:21	06:52 17:50 (4)	06:37 20:19	20:05 (2) 21:55
12	08:39 16:30	07:53 17:28	16:29 (5) 18:23	06:50 17:51 (4)	06:35 20:20	20:05 (2) 21:56
13	08:38 16:31	07:51 17:30	16:30 (5) 18:25	06:48 17:49 (4)	06:32 20:22	20:05 (2) 21:57
14	08:37 16:33	07:49 17:32	16:32 (5) 18:27	06:45 17:47 (4)	06:30 20:24	20:07 (2) 21:57
15	08:36 16:34	07:47 17:34	16:43 (5) 18:28	18:27 17:47 (4)	20:28 20:26	20:07 (2) 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 18:04 (3)	06:25 20:28	20:09 (2) 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 18:06 (3)	06:23 20:30	20:10 (2) 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 18:07 (3)	06:21 20:31	20:12 (2) 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 18:10 (3)	06:18 20:33	20:14 (2) 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 18:11 (3)	06:16 20:35	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 18:13 (3)	06:14 20:37	04:54 22:01
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 18:15 (3)	06:12 20:39	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 18:17 (3)	06:09 20:41	04:55 22:01
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 18:16 (3)	06:07 20:42	04:55 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 18:15 (3)	06:05 20:44	04:55 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 18:13 (3)	06:03 20:46	04:56 22:01
27	08:22 16:56	07:21 17:58	17:30 (4) 17:31 (4)	06:13 18:00 (3)	06:01 20:11 (2)	04:56 22:01
28	08:20 16:58	07:18 18:00	17:26 (4) 17:32 (4)	06:11 18:11 (3)	05:58 20:19 (2)	04:57 22:01
29	08:18 17:00		07:08 19:54	05:56 20:50	20:08 (2) 20:22 (2)	04:57 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	20:07 (2) 20:24 (2)	04:58 22:00
31	08:15 17:04	16:29 (5) 16:32 (5)	07:04 19:58		05:04 21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case	3	226	680	55	433	
Sun reduction	0.24	0.23	0.27	0.35	0.38	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.66	0.66	0.68	0.65	0.65	
Total reduction	0.16	0.15	0.18	0.23	0.25	
Total, real	0	35	125	13	106	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IH - H242

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1 04:59	05:39	20:15 (2) 06:33	07:26	17:54 (4) 07:24	15:57 (5) 08:19	
22:00	21:25	26 20:41 (2) 20:18	19:05	34 18:28 (4) 16:54	21 16:18 (5) 16:10	
2 04:59	05:40	20:15 (2) 06:35	07:28	17:54 (4) 07:26	15:57 (5) 08:21	
22:00	21:23	27 20:42 (2) 20:16	19:02	34 18:28 (4) 16:52	21 16:18 (5) 16:09	
3 05:00	05:42	20:14 (2) 06:36	07:30	17:53 (4) 07:28	15:56 (5) 08:22	
21:59	21:21	27 20:41 (2) 20:13	19:00	35 18:28 (4) 16:50	22 16:18 (5) 16:08	
4 05:01	05:44	20:14 (2) 06:38	07:31	17:53 (4) 07:30	15:56 (5) 08:24	
21:59	21:19	28 20:42 (2) 20:11	18:57	35 18:28 (4) 16:48	21 16:17 (5) 16:08	
5 05:02	05:45	20:14 (2) 06:40	07:33	17:53 (4) 07:32	15:56 (5) 08:25	
21:58	21:17	28 20:42 (2) 20:09	18:55	33 18:26 (4) 16:46	19 16:15 (5) 16:07	
6 05:03	05:47	20:14 (2) 06:42	07:35	17:53 (4) 07:34	15:57 (5) 08:26	
21:58	21:15	28 20:42 (2) 20:06	18:52	31 18:24 (4) 16:44	15 16:12 (5) 16:07	
7 05:04	05:49	20:14 (2) 06:43	07:37	17:52 (4) 07:36	15:57 (5) 08:28	
21:57	21:13	28 20:42 (2) 20:04	18:50	29 18:21 (4) 16:43	13 16:10 (5) 16:06	
8 05:05	05:50	20:13 (2) 06:45	07:39	17:53 (4) 07:38	15:57 (5) 08:29	
21:56	21:11	28 20:41 (2) 20:01	18:48	25 18:18 (4) 16:41	11 16:08 (5) 16:06	
9 05:06	05:52	20:14 (2) 06:47	07:41	17:53 (4) 07:40	15:58 (5) 08:30	
21:55	21:10	25 20:39 (2) 19:59	18:45	23 18:16 (4) 16:39	8 16:06 (5) 16:05	
10 05:07	05:54	20:13 (2) 06:49	07:42	17:54 (4) 07:42	16:00 (5) 08:31	
21:55	21:07	24 20:37 (2) 19:56	18:43	20 18:14 (4) 16:37	5 16:05 (5) 16:05	
11 05:08	05:56	20:14 (2) 06:50	07:44	17:55 (4) 07:44	16:01 (5) 08:33	
21:54	21:05	21 20:35 (2) 19:54	18:40	16 18:11 (4) 16:35	2 16:03 (5) 16:05	
12 05:09	05:57	20:15 (2) 06:52	07:46	17:56 (4) 07:45	08:34	
21:53	21:03	19 20:34 (2) 19:51	18:38	13 18:09 (4) 16:34	16:05	
13 05:10	05:59	20:15 (2) 06:54	07:48	17:58 (4) 07:47	08:35	
21:52	21:01	16 20:31 (2) 19:49	18:36	9 18:07 (4) 16:32	16:05	
14 05:12	06:01	20:16 (2) 06:56	07:50	18:00 (4) 07:49	08:36	
21:51	20:59	13 20:29 (2) 19:47	18:33	4 18:04 (4) 16:31	16:04	
15 05:13	06:03	20:17 (2) 06:58	07:52	07:51	08:37	
21:50	20:57	11 20:28 (2) 19:44	18:31	16:29	16:05	
16 05:14	06:04	20:18 (2) 06:59	10 18:50 (3) 07:54	07:53	08:38	
21:49	20:55	7 20:25 (2) 19:42	18:29	16:27	16:05	
17 05:16	06:06	20:20 (2) 07:01	07:55	07:55	08:38	
21:47	20:53	3 20:23 (2) 19:39	14 19:01 (3) 18:26	16:26	16:05	
18 05:17	06:08	07:03	18:45 (3) 07:57	07:57	08:39	
21:46	20:50	19:37	17 19:02 (3) 18:24	16:24	16:05	
19 05:18	06:10	07:05	18:44 (3) 07:59	07:59	08:40	
21:45	20:48	19:34	19 19:03 (3) 18:22	16:23	16:05	
20 05:20	06:12	07:06	18:43 (3) 08:01	08:00	08:41	
21:44	20:46	19:32	21 19:04 (3) 18:20	16:22	16:06	
21 05:21	06:13	07:08	18:42 (3) 08:03	08:02	08:41	
21:42	20:44	19:29	19 19:01 (3) 18:17	16:20	16:06	
22 05:23	06:15	07:10	18:41 (3) 08:05	08:04	08:42	
21:41	20:42	19:27	17 18:58 (3) 18:15	16:19	16:06	
23 05:24	06:17	07:12	18:10 (4) 08:07	08:06	08:42	
21:39	20:39	19:24	24 18:56 (3) 18:13	16:18	16:07	
24 05:26	20:26 (2) 06:19	07:13	18:06 (4) 08:09	08:08	08:43	
21:38	20:30 (2) 20:37	19:22	30 18:54 (3) 18:11	16:17	16:08	
25 05:27	20:23 (2) 06:20	07:15	18:02 (4) 07:11	08:09	08:43	
21:36	20:34 (2) 20:35	19:19	32 18:51 (3) 17:09	16:16	16:08	
26 05:29	20:21 (2) 06:22	07:17	18:00 (4) 07:13	08:11	08:43	
21:35	15 20:36 (2) 20:32	19:17	32 18:48 (3) 17:06	16:14	16:09	
27 05:30	20:19 (2) 06:24	07:19	17:59 (4) 07:14	16:05 (5) 08:13	08:44	
21:33	17 20:36 (2) 20:30	19:14	31 18:46 (3) 17:04	5 16:10 (5) 16:13	16:10	
28 05:32	20:19 (2) 06:26	07:21	17:58 (4) 07:16	16:01 (5) 08:14	08:44	
21:32	19 20:38 (2) 20:28	19:12	29 18:27 (4) 17:02	12 16:13 (5) 16:12	16:11	
29 05:34	20:17 (2) 06:27	07:22	17:57 (4) 07:18	15:59 (5) 08:16	08:44	
21:30	21 20:38 (2) 20:25	19:09	31 18:28 (4) 17:00	16 16:15 (5) 16:12	16:11	
30 05:35	20:17 (2) 06:29	07:24	17:55 (4) 07:20	15:58 (5) 08:18	08:44	
21:28	23 20:40 (2) 20:23	19:07	33 18:28 (4) 16:58	18 16:16 (5) 16:11	16:12	
31 05:37	20:17 (2) 06:31	07:22	16:56	19 16:16 (5)	08:44	
21:26	24 20:41 (2) 20:21	16:56	19 16:16 (5)	16:13	16:13	
Potential sun hours	512	460	382	328	259	233
Total, worst case	134	359	359	411	158	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.65	0.65	0.68	0.67	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.17	
Total, real	28	79	78	81	28	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: II - H243

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:09 (3) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	20:26 (3) 20:57	21:45 20:58 (4)
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	20:09 (3) 20:59	05:02 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	20:08 (3) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	20:30 (3) 21:03	21:49 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	20:08 (3) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	20:30 (3) 21:06	04:58 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	20:09 (3) 21:08	04:58 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	17:47 (5) 20:15	20:37 (4) 21:10	21:53 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	17:43 (5) 20:17	20:39 (4) 21:11	21:54 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	17:41 (5) 20:19	20:40 (4) 21:13	21:55 21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	17:39 (5) 20:20	20:13 (3) 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	17:38 (5) 20:22	20:42 (4) 21:17	21:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	17:36 (5) 20:24	20:44 (4) 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	17:35 (5) 20:26	20:47 (4) 21:20	21:57 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	17:34 (5) 20:28	20:19 (4) 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	17:34 (5) 20:30	20:50 (4) 21:24	21:59 22:00
18	08:33 16:40	07:41 17:40	06:35 18:34	17:33 (5) 20:31	20:18 (4) 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	17:34 (5) 20:33	20:53 (4) 21:27	22:00 22:01
20	08:31 16:43	07:36 17:44	06:31 18:38	17:33 (5) 20:35	20:18 (4) 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	17:34 (5) 20:37	20:54 (4) 21:30	22:00 22:01
22	08:28 16:47	07:32 17:48	06:26 18:42	17:34 (5) 20:39	20:19 (4) 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	17:35 (5) 20:41	20:57 (4) 21:33	22:01 22:02
24	08:26 16:51	07:28 17:52	06:21 18:45	17:36 (5) 20:42	20:17 (4) 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	17:38 (5) 20:44	20:57 (4) 21:36	22:01 22:02
26	08:23 16:54	07:23 17:56	06:16 18:49	17:42 (5) 20:46	20:17 (4) 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:50 (5) 20:48	20:57 (4) 21:39	22:01 22:02
28	08:20 16:58	07:18 18:00	06:11 18:53	06:01 20:50	20:17 (4) 21:40	04:56 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	20:57 (4) 21:41	22:01 22:02
30	08:17 17:02		07:06 19:56	05:54 20:53	20:17 (4) 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58		20:58 (4) 21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case			364	46	985	1114
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.65	0.64	0.63
Total reduction			0.18	0.23	0.24	0.20
Total, real			66	10	239	225

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: II - H243

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:26 (4)	05:39	20:24 (3)	06:33	07:26	18:17 (5)	07:24	08:19		
	22:00	37 21:03 (4)	21:25	29 20:53 (4)	20:18	19:05	19 18:36 (5)	16:54	16:10		
2	05:00	20:26 (4)	05:40	20:23 (3)	06:35	07:28	18:18 (5)	07:26	08:21		
	22:00	37 21:03 (4)	21:23	29 20:52 (4)	20:16	19:02	15 18:33 (5)	16:52	16:09		
3	05:00	20:25 (4)	05:42	20:21 (3)	06:36	07:30	18:20 (5)	07:28	08:22		
	21:59	38 21:03 (4)	21:21	29 20:50 (4)	20:13	19:00	11 18:31 (5)	16:50	16:08		
4	05:01	20:25 (4)	05:44	20:20 (3)	06:38	07:31	18:23 (5)	07:30	08:24		
	21:59	39 21:04 (4)	21:19	28 20:48 (4)	20:11	18:57	6 18:29 (5)	16:48	16:08		
5	05:02	20:26 (4)	05:45	20:19 (3)	06:40	07:33		07:32	08:25		
	21:58	38 21:04 (4)	21:17	26 20:46 (4)	20:09	18:55		16:46	16:07		
6	05:03	20:26 (4)	05:47	20:19 (3)	06:42	07:35		07:34	08:26		
	21:57	38 21:04 (4)	21:15	21 20:40 (3)	20:06	18:52		16:44	16:07		
7	05:04	20:26 (4)	05:49	20:18 (3)	06:43	07:37		07:36	08:28		
	21:57	39 21:05 (4)	21:13	23 20:41 (3)	20:04	18:50		16:43	16:06		
8	05:05	20:26 (4)	05:51	20:17 (3)	06:45	07:39		07:38	08:29		
	21:56	39 21:05 (4)	21:11	23 20:40 (3)	20:01	18:48		16:41	16:06		
9	05:06	20:26 (4)	05:52	20:18 (3)	06:47	07:41		07:40	08:30		
	21:55	39 21:05 (4)	21:09	21 20:39 (3)	19:59	18:45		16:39	16:05		
10	05:07	20:26 (4)	05:54	20:17 (3)	06:49	07:42		07:42	08:31		
	21:55	40 21:06 (4)	21:07	20 20:37 (3)	19:56	18:43		16:37	16:05		
11	05:08	20:26 (4)	05:56	20:17 (3)	06:50	07:44		07:44	08:33		
	21:54	40 21:06 (4)	21:05	18 20:35 (3)	19:54	18:40		16:36	16:05		
12	05:09	20:26 (4)	05:57	20:18 (3)	06:52	07:46		07:45	08:34		
	21:53	40 21:06 (4)	21:03	16 20:34 (3)	19:51	18:38		16:34	16:05		
13	05:11	20:26 (4)	05:59	20:17 (3)	06:54	07:48		07:47	08:35		
	21:52	40 21:06 (4)	21:01	14 20:31 (3)	19:49	18:36		16:32	16:05		
14	05:12	20:26 (4)	06:01	20:18 (3)	06:56	07:50		07:49	08:36		
	21:51	40 21:06 (4)	20:59	11 20:29 (3)	19:47	18:33		16:31	16:05		
15	05:13	20:26 (4)	06:03	20:19 (3)	06:58	07:52		07:51	08:37		
	21:50	40 21:06 (4)	20:57	9 20:28 (3)	19:44	18:31		16:29	16:05		
16	05:14	20:27 (4)	06:05	20:19 (3)	06:59	07:54		07:53	08:38		
	21:49	40 21:07 (4)	20:55	6 20:25 (3)	19:42	18:29		16:27	16:05		
17	05:16	20:27 (4)	06:06	20:21 (3)	07:01	18:30 (5)	07:55	07:55	08:38		
	21:47	40 21:07 (4)	20:53	2 20:23 (3)	19:39	6 18:36 (5)	18:26	16:26	16:05		
18	05:17	20:27 (4)	06:08		07:03	18:26 (5)	07:57	07:57	08:39		
	21:46	40 21:07 (4)	20:50		19:37	14 18:40 (5)	18:24	16:25	16:05		
19	05:18	20:26 (4)	06:10		07:05	18:24 (5)	07:59	07:59	08:40		
	21:45	40 21:06 (4)	20:48		19:34	18 18:42 (5)	18:22	16:23	16:05		
20	05:20	20:27 (4)	06:12		07:06	18:22 (5)	08:01	08:00	08:41		
	21:44	40 21:07 (4)	20:46		19:32	21 18:43 (5)	18:20	16:22	16:06		
21	05:21	20:27 (4)	06:13		07:08	18:20 (5)	08:03	08:02	08:41		
	21:42	39 21:06 (4)	20:44		19:29	23 18:43 (5)	18:17	16:20	16:06		
22	05:23	20:27 (4)	06:15		07:10	18:19 (5)	08:05	08:04	08:42		
	21:41	39 21:06 (4)	20:42		19:27	25 18:44 (5)	18:15	16:19	16:06		
23	05:24	20:28 (4)	06:17		07:12	18:18 (5)	08:07	08:06	08:42		
	21:39	38 21:06 (4)	20:39		19:24	26 18:44 (5)	18:13	16:18	16:07		
24	05:26	20:28 (4)	06:19		07:13	18:17 (5)	08:09	08:08	08:43		
	21:38	37 21:05 (4)	20:37		19:22	28 18:45 (5)	18:11	16:17	16:08		
25	05:27	20:29 (4)	06:20		07:15	18:16 (5)	07:11	08:09	08:43		
	21:36	35 21:04 (4)	20:35		19:19	28 18:44 (5)	17:09	16:16	16:08		
26	05:29	20:29 (4)	06:22		07:17	18:16 (5)	07:13	08:11	08:43		
	21:35	33 21:02 (4)	20:32		19:17	28 18:44 (5)	17:06	16:15	16:09		
27	05:30	20:30 (4)	06:24		07:19	18:16 (5)	07:14	08:13	08:44		
	21:33	31 21:01 (4)	20:30		19:14	27 18:43 (5)	17:04	16:13	16:10		
28	05:32	20:30 (4)	06:26		07:21	18:16 (5)	07:16	08:14	08:44		
	21:32	29 20:59 (4)	20:28		19:12	27 18:43 (5)	17:02	16:12	16:11		
29	05:34	20:31 (4)	06:28		07:22	18:16 (5)	07:18	08:16	08:44		
	21:30	27 20:58 (4)	20:25		19:09	25 18:41 (5)	17:00	16:12	16:11		
30	05:35	20:31 (4)	06:29		07:24	18:16 (5)	07:20	08:17	08:44		
	21:28	25 20:56 (4)	20:23		19:07	22 18:38 (5)	16:58	16:11	16:12		
31	05:37	20:26 (3)	06:31				07:22		08:44		
	21:26	29 20:55 (4)	20:21				16:56		16:13		
Potential sun hours	512		460		382		328		259		233
Total, worst case	1146		325		318		51				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.63		0.64		0.67		0.67				
Total reduction	0.20		0.22		0.22		0.20				
Total, real	235		71		69		10				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: IJ - H244

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		08:14		07:16				07:01			19:00 (5)	05:52		05:03		20:42 (3)
	16:15		17:06		18:02				20:00	30		19:30 (5)	20:55		21:45	15	20:57 (3)
2	08:44		08:12		07:14				06:59			18:59 (5)	05:50		05:02		20:43 (3)
	16:16		17:08		18:04				20:02	30		19:29 (5)	20:57		21:46	14	20:57 (3)
3	08:43		08:10		07:12				06:56			18:59 (5)	05:48		05:01		20:44 (3)
	16:17		17:10		18:06				20:04	30		19:29 (5)	20:59		21:48	13	20:57 (3)
4	08:43		08:08		07:09				06:54			19:00 (5)	05:46		05:00		20:45 (3)
	16:18		17:12		18:07				20:06	29		19:29 (5)	21:01		21:49	11	20:56 (3)
5	08:43		08:07		07:07				06:51			18:59 (5)	05:44		04:59		20:47 (3)
	16:20		17:14		18:09				20:07	28		19:27 (5)	21:03		21:50	8	20:55 (3)
6	08:42		08:05		07:04				06:49			19:00 (5)	05:42		04:59		20:48 (3)
	16:21		17:16		18:11				20:09	27		19:27 (5)	21:04		21:51	6	20:54 (3)
7	08:42		08:03		07:02				06:47			19:00 (5)	05:40		04:58		
	16:22		17:18		18:13				20:11	25		19:25 (5)	21:06		21:52		
8	08:41		08:01		07:00				06:44			19:01 (5)	05:38		04:57		
	16:24		17:20		18:15				20:13	23		19:24 (5)	21:08		21:53		
9	08:41		07:59		06:57				06:42			19:03 (5)	05:36		04:57		
	16:25		17:22		18:17				20:15	20		19:23 (5)	21:10		21:54		
10	08:40		07:57		06:55				06:39			19:04 (5)	05:34		04:56		
	16:27		17:24		18:19				20:17	16		19:20 (5)	21:11		21:55		
11	08:40		07:55		06:52				06:37			19:07 (5)	05:33		04:56		
	16:28		17:26		18:21				20:19	10		19:17 (5)	21:13	1	20:42 (3)	21:55	
12	08:39		07:53		06:50				06:35				05:31		20:40 (3)	04:55	
	16:30		17:28		18:23				20:20				21:15	3	20:43 (3)	21:56	
13	08:38		07:51		06:48				06:32				05:29		20:39 (3)	04:55	
	16:31		17:30		18:25				20:22				21:17	5	20:44 (3)	21:57	
14	08:37		07:49		06:45				06:30				05:27		20:39 (3)	04:55	
	16:33		17:32		18:27				20:24				21:18	8	20:47 (3)	21:57	
15	08:36		07:47		06:43				06:28				05:26		20:38 (3)	04:55	
	16:34		17:34		18:28				20:26				21:20	10	20:48 (3)	21:58	
16	08:35		07:45		06:40				06:25				05:24		20:38 (3)	04:54	
	16:36		17:36		18:30				20:28				21:22	12	20:50 (3)	21:59	
17	08:34		07:43		06:38				06:23				05:22		20:37 (3)	04:54	
	16:38		17:38		18:32				20:30				21:23	14	20:51 (3)	21:59	
18	08:33		07:41		06:35				06:21				05:21		20:37 (3)	04:54	
	16:40		17:40		18:34				20:31				21:25	16	20:53 (3)	22:00	
19	08:32		07:39		06:33				06:18				05:19		20:37 (3)	04:54	
	16:41		17:42		18:36				20:33				21:27	17	20:54 (3)	22:00	
20	08:31		07:36		06:31				06:16				05:18		20:37 (3)	04:54	
	16:43		17:44		18:38				20:35				21:28	18	20:55 (3)	22:00	
21	08:30		07:34		06:28				06:14				05:16		20:37 (3)	04:54	
	16:45		17:46		18:40				20:37				21:30	20	20:57 (3)	22:00	
22	08:28		07:32		06:26				06:12				05:15		20:37 (3)	04:55	
	16:47		17:48		18:42				20:39				21:31	22	20:59 (3)	22:01	
23	08:27		07:30		06:23				06:09				05:13		20:37 (3)	04:55	
	16:49		17:50		18:43				20:41				21:33	22	20:59 (3)	22:01	
24	08:26		07:28		06:21			18:11 (5)	06:07				05:12		20:37 (3)	04:55	
	16:51		17:52		18:45	7		18:18 (5)	20:42				21:34	23	21:00 (3)	22:01	
25	08:24		07:25		06:18			18:08 (5)	06:05				05:11		20:38 (3)	04:56	
	16:52		17:54		18:47	13		18:21 (5)	20:44				21:36	22	21:00 (3)	22:01	
26	08:23		07:23		06:16			18:07 (5)	06:03				05:09		20:38 (3)	04:56	
	16:54		17:56		18:49	16		18:23 (5)	20:46				21:37	22	21:00 (3)	22:01	
27	08:22		07:21		06:13			18:05 (5)	06:01				05:08		20:39 (3)	04:56	
	16:56		17:58		18:51	19		18:24 (5)	20:48				21:39	21	21:00 (3)	22:01	
28	08:20		07:18		06:11			18:04 (5)	05:58				05:07		20:39 (3)	04:57	
	16:58		18:00		18:53	22		18:26 (5)	20:50				21:40	20	20:59 (3)	22:01	
29	08:18				07:09			19:02 (5)	05:56				05:06		20:40 (3)	04:58	
	17:00				19:54	26		19:28 (5)	20:52				21:41	19	20:59 (3)	22:01	
30	08:17				07:06			19:02 (5)	05:54				05:05		20:41 (3)	04:58	
	17:02				19:56	28		19:30 (5)	20:53				21:43	17	20:58 (3)	22:00	
31	08:15				07:04			19:00 (5)					05:04		20:41 (3)		
	17:04				19:58	29		19:29 (5)					21:44	17	20:58 (3)		
Potential sun hours	250		273		367			420				494			510		
Total, worst case					160			268				329			67		
Sun reduction					0.27			0.35				0.38			0.32		
Oper. time red.					1.00			1.00				1.00			1.00		
Wind dir. red.					0.67			0.67				0.63			0.63		
Total reduction					0.18			0.24				0.24			0.20		
Total, real					29			64				79			13		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: IJ - H244

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:51 (3) 20:53 (3)	06:33 20:18	19:06 (5) 19:16 (5)	07:26 16:54
2	05:00 22:00	05:40 21:23	06:35 20:16	10 16	19:03 (5) 19:19 (5)	07:28 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	20	19:01 (5) 19:21 (5)	07:30 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	23	18:58 (5) 19:21 (5)	07:31 16:48
5	05:02 21:58	05:45 21:17	06:40 20:09	25	18:57 (5) 19:22 (5)	07:33 16:46
6	05:03 21:57	20:55 (3) 20:59 (3)	05:47 21:15	27	18:56 (5) 19:23 (5)	07:35 16:44
7	05:04 21:57	20:54 (3) 21:01 (3)	05:49 21:13	28	18:55 (5) 19:23 (5)	07:37 16:43
8	05:05 21:56	20:53 (3) 21:02 (3)	05:51 21:11	29	18:54 (5) 19:23 (5)	07:39 16:41
9	05:06 21:55	20:52 (3) 21:04 (3)	05:52 21:09	29	18:54 (5) 19:23 (5)	07:41 16:39
10	05:07 21:55	20:51 (3) 21:05 (3)	05:54 21:07	30	18:52 (5) 19:22 (5)	07:42 16:37
11	05:08 21:54	20:51 (3) 21:05 (3)	05:56 21:05	30	18:52 (5) 19:22 (5)	07:44 16:36
12	05:09 21:53	20:50 (3) 21:06 (3)	05:58 21:03	30	18:52 (5) 19:22 (5)	07:46 16:34
13	05:11 21:52	20:49 (3) 21:07 (3)	05:59 21:01	28	18:53 (5) 19:21 (5)	07:48 16:32
14	05:12 21:51	20:49 (3) 21:07 (3)	06:01 20:59	26	18:52 (5) 19:18 (5)	07:50 16:31
15	05:13 21:50	20:48 (3) 21:08 (3)	06:03 20:57	23	18:53 (5) 19:16 (5)	07:52 16:29
16	05:14 21:48	20:49 (3) 21:09 (3)	06:05 20:55	20	18:54 (5) 19:14 (5)	07:54 16:27
17	05:16 21:47	20:48 (3) 21:09 (3)	06:06 20:53	17	18:54 (5) 19:11 (5)	07:55 16:26
18	05:17 21:46	20:48 (3) 21:09 (3)	06:08 20:50	12	18:56 (5) 19:08 (5)	07:57 16:25
19	05:18 21:45	20:47 (3) 21:09 (3)	06:10 20:48	8	18:58 (5) 19:06 (5)	07:59 16:22
20	05:20 21:44	20:48 (3) 21:10 (3)	06:12 20:46		08:01 18:20	08:00 16:22
21	05:21 21:42	20:47 (3) 21:09 (3)	06:13 20:44		08:03 18:17	08:02 16:06
22	05:23 21:41	20:47 (3) 21:07 (3)	06:15 20:42		08:05 18:15	08:04 16:07
23	05:24 21:39	20:47 (3) 21:07 (3)	06:17 20:39		08:07 18:13	08:06 16:07
24	05:26 21:38	20:47 (3) 21:05 (3)	06:19 20:37		08:09 18:11	08:08 16:08
25	05:27 21:36	20:48 (3) 21:04 (3)	06:20 20:35		07:11 17:09	08:09 16:08
26	05:29 21:35	20:47 (3) 21:02 (3)	06:22 20:32		07:13 17:06	08:11 16:09
27	05:30 21:33	20:48 (3) 21:01 (3)	06:24 20:30		07:14 17:04	08:13 16:10
28	05:32 21:32	20:48 (3) 20:59 (3)	06:26 20:28		07:16 17:02	08:14 16:11
29	05:34 21:30	20:49 (3) 20:58 (3)	06:28 20:25		07:18 17:00	08:16 16:11
30	05:35 21:28	20:49 (3) 20:56 (3)	06:29 20:23		07:20 16:58	08:17 16:12
31	05:37 21:26	20:50 (3) 20:55 (3)	06:31 20:21		07:22 16:56	08:18 16:13
Potential sun hours	512	460	382		328	233
Total, worst case	394	2	431		259	
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.63	0.63	0.67			
Total reduction	0.20	0.21	0.22			
Total, real	80	0	93			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: IK - H245
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	19:06 (5) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	19:04 (5) 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	19:04 (5) 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	19:04 (5) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	19:03 (5) 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	19:03 (5) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	19:03 (5) 21:06	04:58 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	19:04 (5) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	19:04 (5) 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	19:04 (5) 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	19:06 (5) 21:13	04:56 21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	19:07 (5) 21:15	04:55 21:57
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:09 (5) 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:13 (5) 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	18:18 (5) 20:46	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	18:13 (5) 20:48	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	18:11 (5) 20:50	05:07 21:40	04:57 22:01
29	08:18 17:00		07:09 19:54	19:09 (5) 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	19:08 (5) 20:53	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	19:06 (5) 21:44	05:04 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			97	345	283	212
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.67	0.63	0.63
Total reduction			0.18	0.24	0.24	0.20
Total, real			18	82	68	42

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: IK - H245

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 9	20:56 (3) 21:05 (3) 21:25	06:33 20:18 21	19:05 (5) 19:26 (5) 19:05	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 11	20:55 (3) 21:06 (3) 21:23	06:35 20:16 25	19:03 (5) 19:28 (5) 19:02	07:28 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 12	20:54 (3) 21:06 (3) 21:21	06:36 20:13 27	19:02 (5) 19:29 (5) 19:00	07:30 16:50 16:08	08:22 16:08 16:08
4	05:01 21:59 13	20:54 (3) 21:07 (3) 21:19	06:38 20:11 27	19:01 (5) 19:28 (5) 18:57	07:31 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 14	20:54 (3) 21:08 (3) 21:17	06:40 20:09 29	19:00 (5) 19:29 (5) 18:55	07:33 16:46 16:07	08:25 16:07 16:07
6	05:03 21:57 15	20:54 (3) 21:09 (3) 21:15	06:42 20:06 29	19:00 (5) 19:29 (5) 18:52	07:35 16:44 16:07	08:26 16:07 16:07
7	05:04 21:57 16	20:53 (3) 21:09 (3) 21:13	06:43 20:04 30	18:58 (5) 19:28 (5) 18:50	07:37 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 17	20:53 (3) 21:10 (3) 21:11	06:45 20:01 30	18:58 (5) 19:28 (5) 18:48	07:39 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 18	20:53 (3) 21:11 (3) 21:09	06:47 19:59 30	18:58 (5) 19:28 (5) 18:45	07:41 16:39 16:05	08:30 16:05 16:05
10	05:07 21:55 18	20:53 (3) 21:11 (3) 21:07	06:49 19:56 30	18:57 (5) 19:27 (5) 18:43	07:42 16:37 16:05	08:31 16:05 16:05
11	05:08 21:54 20	20:52 (3) 21:12 (3) 21:05	06:50 19:54 28	18:58 (5) 19:26 (5) 18:40	07:44 16:36 16:05	08:33 16:05 16:05
12	05:09 21:53 20	20:52 (3) 21:12 (3) 21:03	06:52 19:51 26	18:58 (5) 19:24 (5) 18:38	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 21	20:52 (3) 21:13 (3) 21:01	06:54 19:49 23	18:59 (5) 19:22 (5) 18:36	07:48 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 22	20:51 (3) 21:13 (3) 20:59	06:56 19:47 19	18:59 (5) 19:18 (5) 18:33	07:50 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 22	20:51 (3) 21:13 (3) 20:57	06:58 19:44 16	19:00 (5) 19:16 (5) 18:31	07:52 16:29 16:05	08:37 16:05 16:05
16	05:14 21:48 22	20:52 (3) 21:14 (3) 20:55	06:59 19:42 12	19:02 (5) 19:14 (5) 18:29	07:54 16:27 16:05	08:38 16:05 16:05
17	05:16 21:47 23	20:51 (3) 21:14 (3) 20:53	07:01 19:39 7	19:04 (5) 19:11 (5) 18:26	07:55 16:26 16:05	08:38 16:05 16:05
18	05:17 21:46 21	20:51 (3) 21:12 (3) 20:50	07:03 19:37 19	18:26 18:24 16:25	16:05 16:05 16:05	16:05 16:05 16:05
19	05:18 21:45 20	20:51 (3) 21:11 (3) 20:48	07:05 19:34 19	18:22 18:22 16:23	16:05 16:05 16:05	16:05 16:05 16:05
20	05:20 21:44 19	20:51 (3) 21:10 (3) 20:46	07:06 19:32 19	18:20 18:20 16:22	16:05 16:05 16:05	16:05 16:05 16:05
21	05:21 21:42 18	20:51 (3) 21:09 (3) 20:44	07:08 19:29 19	18:03 18:17 16:20	16:05 16:05 16:05	16:05 16:05 16:05
22	05:23 21:41 16	20:51 (3) 21:07 (3) 20:42	07:10 19:27 19	18:05 18:15 16:19	16:05 16:05 16:05	16:05 16:05 16:05
23	05:24 21:39 15	20:52 (3) 21:07 (3) 20:39	07:12 19:24 19	18:07 18:13 16:18	16:05 16:05 16:05	16:05 16:05 16:05
24	05:26 21:38 13	20:52 (3) 21:05 (3) 20:37	07:13 19:22 19	18:09 18:11 16:17	16:05 16:05 16:05	16:05 16:05 16:05
25	05:27 21:36 11	20:53 (3) 21:04 (3) 20:35	07:15 19:19 19	17:11 17:09 16:16	16:05 16:05 16:05	16:05 16:05 16:05
26	05:29 21:35 9	20:53 (3) 21:02 (3) 20:32	07:17 19:17 19	17:13 17:06 16:15	16:05 16:05 16:05	16:05 16:05 16:05
27	05:30 21:33 7	20:54 (3) 21:01 (3) 20:30	07:19 19:14 19	17:14 17:04 16:13	16:05 16:05 16:10	16:05 16:10 16:10
28	05:32 21:32 5	20:54 (3) 20:59 (3) 20:28	07:21 19:12 19	17:16 17:02 16:13	16:05 16:13 16:11	16:05 16:11 16:11
29	05:34 21:30 3	20:55 (3) 20:58 (3) 20:25	19:13 (5) 19:20 (5) 19:09	07:22 17:00 16:12	16:05 16:12 16:11	16:05 16:11 16:11
30	05:35 21:28 15	20:29 20:23 15	19:09 (5) 19:24 (5) 19:07	17:02 16:58 16:11	16:05 16:11 16:12	16:05 16:12 16:12
31	05:37 21:26 19	06:31 20:21 19	19:06 (5) 19:25 (5) 19	17:22 16:56 16:13	16:05 16:13 16:13	16:05 16:13 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case	450	41	409			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.63	0.67	0.67			
Total reduction	0.20	0.23	0.22			
Total, real	91	9	88			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IL - H246

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IM - H247

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
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15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:30 20:23	07:24 19:07	08:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: IN - H248

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26		07:53 (1)	07:24	08:19
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	20	08:13 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	18	08:12 (1)	16:52	16:09
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	15	08:11 (1)	16:50	16:09
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	13	08:11 (1)	16:48	16:08
5	08:43	08:07	07:07		06:52	05:44	04:59	05:02	05:46	06:40		07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10		20:08	21:03	21:50	21:58	21:18	20:09		18:55	10	08:10 (1)	16:46	16:07
6	08:43	08:05	07:05		07:29 (1)	06:49	05:42	04:59	05:03	05:47		07:35		08:02 (1)	07:34	08:27
	16:21	17:16	18:12	1	07:30 (1)	20:10	21:05	21:51	21:58	21:16		18:53	7	08:09 (1)	16:45	16:07
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	05:49		07:37		08:04 (1)	07:36	08:28
	16:22	17:18	18:13	5	07:32 (1)	20:11	21:06	21:52	21:57	21:14		18:50	3	08:07 (1)	16:43	16:06
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	05:51		07:39			07:38	08:29
	16:24	17:20	18:15	9	07:33 (1)	20:13	21:08	21:53	21:56	21:12		18:48			16:41	16:06
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52		07:41			07:40	08:31
	16:25	17:22	18:17	12	07:34 (1)	20:15	21:10	21:54	21:56	21:10		18:45			16:39	16:06
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54		07:43			07:42	08:32
	16:27	17:24	18:19	14	07:33 (1)	20:17	21:12	21:55	21:55	21:08		18:43			16:37	16:05
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56		07:45			07:44	08:33
	16:28	17:26	18:21	17	07:34 (1)	20:19	21:13	21:56	21:54	21:06		18:41			16:36	16:05
12	08:39	07:53	06:50		07:14 (1)	06:35	05:31	04:56	05:09	05:58		07:46			07:46	08:34
	16:30	17:28	18:23	19	07:33 (1)	20:21	21:15	21:56	21:53	21:04		18:38			16:34	16:05
13	08:38	07:51	06:48		07:13 (1)	06:33	05:29	04:55	05:11	05:59		07:48			07:48	08:35
	16:31	17:30	18:25	20	07:33 (1)	20:22	21:17	21:57	21:52	21:02		18:36			16:32	16:05
14	08:37	07:49	06:45		07:13 (1)	06:30	05:27	04:55	05:12	06:01		07:50			07:50	08:36
	16:33	17:32	18:27	18	07:31 (1)	20:24	21:19	21:58	21:51	20:59		18:34			16:31	16:05
15	08:37	07:47	06:43		07:14 (1)	06:28	05:26	04:55	05:13	06:03		07:52			07:51	08:37
	16:35	17:34	18:29	17	07:31 (1)	20:26	21:20	21:58	21:50	20:57		18:31			16:29	16:05
16	08:36	07:45	06:41		07:15 (1)	06:25	05:24	04:55	05:15	06:05		07:54			07:53	08:38
	16:36	17:36	18:31	13	07:28 (1)	20:28	21:22	21:59	21:49	20:55		18:29			16:28	16:05
17	08:35	07:43	06:38		07:17 (1)	06:23	05:22	04:54	05:16	06:06		07:56			07:55	08:39
	16:38	17:38	18:32	9	07:26 (1)	20:30	21:24	21:59	21:48	20:53		18:27			16:26	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03		07:58			07:57	08:39
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37		18:24			16:25	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05		07:59			07:59	08:40
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34		18:22			16:23	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01			08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20			16:22	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03			08:02	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18			16:21	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05			08:04	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15			16:19	16:07
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07			08:06	08:43
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13			16:18	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09			08:08	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22		18:11			16:17	16:08
25	08:25	07:26	06:19		06:05	05:11	04:56	05:28	06:21	07:15		07:11			08:10	08:43
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20		17:09			16:16	16:08
26	08:23	07:23	06:16		06:03	05:10	04:56	05:29	06:22	07:17		07:13			08:11	08:44
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17		7	08:07 (1)		16:15	16:09
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:57 (1)			08:13	08:44
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15		12	08:09 (1)		16:14	16:10
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:56 (1)			08:15	08:44
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12		15	08:11 (1)		16:13	16:11
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:54 (1)			08:16	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10		18	08:12 (1)		16:12	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		07:53 (1)			08:18	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07		19	08:12 (1)		16:11	16:13
31	08:16		07:04			05:04		05:37	06:31			07:23				08:44
	17:04		19:58			21:44		21:27	20:21			16:56				16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case			154							71		86				
Sun reduction			0.27							0.32		0.29				
Oper. time red.			1.00							1.00		1.00				
Wind dir. red.			0.65							0.65		0.65				
Total reduction			0.18							0.21		0.19				
Total, real			27							15		16				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: IO - H249

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:56 (1) 08:15 (1)	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:55 (1) 08:15 (1)	07:26 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:56 (1) 08:15 (1)	07:28 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:58 (1) 08:14 (1)	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:31 (1) 20:08	06:52 21:03	05:44 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	08:00 (1) 08:14 (1)	07:32 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:29 (1) 20:10	06:49 21:05	05:42 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:02 (1) 08:13 (1)	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:27 (1) 20:11	06:47 21:06	05:40 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:04 (1) 08:12 (1)	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:24 (1) 20:13	06:44 21:08	05:38 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	08:06 (1) 08:10 (1)	07:38 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:22 (1) 20:15	06:42 21:10	05:36 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:10 (1) 08:13 (1)	07:40 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:19 (1) 20:17	06:40 21:12	05:35 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:13 (1) 08:16 (1)	07:42 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:17 (1) 20:19	06:37 21:13	05:33 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	08:14 (1) 08:17 (1)	07:44 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:16 (1) 20:21	06:35 21:15	05:31 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:15 (1) 08:18 (1)	07:46 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:17 (1) 20:22	06:33 21:17	05:29 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:16 (1) 08:19 (1)	07:48 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	07:17 (1) 20:24	06:30 21:19	05:27 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:20 (1) 08:23 (1)	07:50 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	07:19 (1) 20:26	06:28 21:20	05:26 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:21 (1) 08:24 (1)	07:51 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	07:20 (1) 20:28	06:25 21:22	05:24 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	08:22 (1) 08:25 (1)	07:53 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	07:21 (1) 20:30	06:24 21:24	05:23 21:59	05:15 21:48	06:06 20:53	07:01 19:39	07:56 18:27	08:23 (1) 08:26 (1)	07:55 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	07:22 (1) 20:32	06:21 21:25	05:21 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:24 (1) 08:27 (1)	07:57 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	07:23 (1) 20:34	06:19 21:27	05:19 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	08:25 (1) 08:28 (1)	07:59 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	07:24 (1) 20:35	06:16 21:28	05:18 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:26 (1) 08:29 (1)	08:01 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	07:25 (1) 20:37	06:14 21:30	05:16 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:30 (1) 08:33 (1)	08:02 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	07:26 (1) 20:39	06:12 21:32	05:15 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:31 (1) 08:34 (1)	08:04 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	07:27 (1) 20:41	06:10 21:33	05:13 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:32 (1) 08:35 (1)	08:06 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	07:28 (1) 20:43	06:07 21:35	05:12 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:33 (1) 08:36 (1)	08:08 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	07:29 (1) 20:45	06:05 21:36	05:11 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:10 17:09	08:34 (1) 08:37 (1)	08:09 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	07:30 (1) 20:46	06:03 21:37	05:09 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:11 17:07	08:35 (1) 08:38 (1)	08:11 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	07:31 (1) 20:48	06:01 21:39	05:08 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:12 (1) 08:09 (1)	08:36 (1) 08:39 (1)	08:13 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	07:32 (1) 20:50	05:59 21:40	05:07 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:00 (1) 08:12 (1)	08:40 (1) 08:43 (1)	08:15 16:11
29	08:19 17:00	07:17 18:00	07:09 19:55	07:33 (1) 20:56	05:56 21:42	05:06 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:13 (1) 08:16 (1)	08:41 (1) 08:44 (1)	08:16 16:12
30	08:17 17:02	07:15 18:00	07:06 19:57	07:34 (1) 20:54	05:54 21:43	05:05 22:01	05:35 21:28	06:29 20:23	07:24 19:07	08:14 (1) 08:17 (1)	08:42 (1) 08:45 (1)	08:18 16:13
31	08:16 17:04	07:14 18:00	07:04 19:58	07:35 (1) 21:44	05:40 21:44	05:04 22:01	05:37 21:27	06:31 20:21	07:25 16:56	08:15 (1) 08:18 (1)	08:43 (1) 08:46 (1)	08:19 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case			160						52	111		
Sun reduction			0.27						0.32	0.29		
Oper. time red.			1.00						1.00	1.00		
Wind dir. red.			0.65						0.65	0.65		
Total reduction			0.18						0.21	0.19		
Total, real			28						11	21		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IP - H250

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: IQ - H251

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 18:07	07:01 18:02	05:52 18:02	05:03 18:02	04:59 18:02	05:39 18:02	06:33 18:02	07:26 18:02	08:19 18:02
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 18:04	06:59 18:04	05:50 18:04	05:02 18:04	05:00 18:04	05:40 18:04	06:35 18:04	07:28 18:04	08:21 18:04
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 18:06	06:57 18:06	05:48 18:06	05:01 18:06	05:00 18:06	05:42 18:06	06:37 18:06	07:30 18:06	08:22 18:06
4	08:44 16:18	08:09 17:12	07:09 18:08	07:34 (1) 18:08	06:54 18:08	05:46 18:08	05:00 18:08	05:01 18:08	05:44 18:08	06:38 18:08	07:32 18:08	08:24 18:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:31 (1) 18:10	06:52 18:10	05:44 18:10	05:02 18:10	05:00 18:10	05:46 18:10	06:40 18:10	07:33 18:10	08:25 18:10
6	08:43 16:21	08:05 17:16	07:05 18:12	07:29 (1) 18:12	06:49 18:12	05:42 18:12	05:03 18:12	05:03 18:12	05:47 18:12	06:42 18:12	07:35 18:12	08:27 18:12
7	08:42 16:22	08:03 17:18	07:02 18:13	07:48 (1) 18:13	06:47 18:13	05:40 18:13	05:04 18:13	05:04 18:13	05:49 18:13	06:44 18:13	07:37 18:13	08:28 18:13
8	08:42 16:24	08:01 17:20	07:00 18:15	07:29 (1) 18:15	06:44 18:15	05:38 18:15	05:05 18:15	05:05 18:15	05:51 18:15	06:45 18:15	07:39 18:15	08:29 18:15
9	08:41 16:25	07:59 17:22	06:58 18:17	07:31 (1) 18:17	06:42 18:17	05:36 18:17	05:06 18:17	05:06 18:17	05:52 18:17	06:47 18:17	07:41 18:17	08:31 18:17
10	08:41 16:27	07:57 17:24	06:55 18:19	07:46 (1) 18:19	06:40 18:19	05:35 18:19	05:07 18:19	05:07 18:19	05:54 18:19	06:49 18:19	07:43 18:19	08:32 18:19
11	08:40 16:28	07:55 17:26	06:53 18:21	07:44 (1) 18:21	06:37 18:21	05:33 18:21	05:08 18:21	05:08 18:21	05:56 18:21	06:51 18:21	07:45 18:21	08:33 18:21
12	08:39 16:30	07:53 17:28	06:50 18:23	07:41 (1) 18:23	06:35 18:23	05:31 18:23	05:09 18:23	05:09 18:23	05:58 18:23	06:52 18:23	07:46 18:23	08:34 18:23
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 18:25	05:29 18:25	05:25 18:25	05:11 18:25	05:11 18:25	05:59 18:25	06:54 18:25	07:48 18:25	08:35 18:25
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 18:27	05:27 18:27	05:22 18:27	05:12 18:27	05:12 18:27	06:01 18:27	06:56 18:27	07:50 18:27	08:36 18:27
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 18:29	05:26 18:29	05:21 18:29	05:13 18:29	05:13 18:29	06:03 18:29	06:58 18:29	07:52 18:29	08:37 18:29
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 18:31	05:24 18:31	05:19 18:31	05:14 18:31	05:14 18:31	06:05 18:31	07:00 18:31	07:54 18:31	08:38 18:31
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 18:32	05:22 18:32	05:17 18:32	05:16 18:32	05:16 18:32	06:06 18:32	07:01 18:32	07:56 18:32	08:39 18:32
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 18:34	05:21 18:34	05:14 18:34	05:17 18:34	05:17 18:34	06:08 18:34	07:03 18:34	07:58 18:34	08:40 18:34
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 18:36	05:19 18:36	05:14 18:36	05:19 18:36	05:19 18:36	06:10 18:36	07:05 18:36	07:59 18:36	08:40 18:36
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 18:38	05:18 18:38	05:14 18:38	05:20 18:38	05:20 18:38	06:12 18:38	07:07 18:38	08:01 18:38	08:41 18:38
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 18:40	05:16 18:40	05:14 18:40	05:21 18:40	05:21 18:40	06:14 18:40	07:08 18:40	08:03 18:40	08:41 18:40
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 18:42	05:15 18:42	05:15 18:42	05:23 18:42	05:23 18:42	06:15 18:42	07:10 18:42	08:05 18:42	08:42 18:42
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 18:44	05:13 18:44	05:13 18:44	05:24 18:44	05:24 18:44	06:17 18:44	07:12 18:44	08:07 18:44	08:43 18:44
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 18:45	05:12 18:45	05:12 18:45	05:26 18:45	05:26 18:45	06:19 18:45	07:14 18:45	08:09 18:45	08:43 18:45
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 18:47	05:11 18:47	05:11 18:47	05:27 18:47	05:27 18:47	06:21 18:47	07:15 18:47	08:10 18:47	08:43 18:47
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 18:49	05:09 18:49	05:09 18:49	05:29 18:49	05:29 18:49	06:22 18:49	07:17 18:49	08:11 18:49	08:44 18:49
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 18:51	05:08 18:51	05:08 18:51	05:31 18:51	05:31 18:51	06:24 18:51	07:19 18:51	08:13 18:51	08:44 18:51
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 18:53	05:07 18:53	05:07 18:53	05:32 18:53	05:32 18:53	06:26 18:53	07:21 18:53	08:15 18:53	08:44 18:53
29	08:19 17:00		07:09 19:00	05:56 19:00	05:06 19:00	05:06 19:00	05:34 19:00	05:34 19:00	06:28 19:00	07:23 19:00	08:16 19:00	08:44 19:00
30	08:17 17:02		07:06 19:02	05:54 19:02	05:05 19:02	05:05 19:02	05:35 19:02	05:35 19:02	06:29 19:02	07:24 19:02	08:17 19:02	08:44 19:02
31	08:16 17:04		07:04 19:04	05:54 19:04	05:05 19:04	05:05 19:04	05:35 19:04	05:35 19:04	06:29 19:04	07:24 19:04	08:17 19:04	08:44 19:04
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		2	149							151		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		0	26							29		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IR - H252

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

		January	February		March	April	May	June	July	August	September	October		November	December
1	08:44	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24	08:19	
	16:15	17:06		18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05		16:54	16:10	
2	08:44	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26	08:21	
	16:16	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	16:09	
3	08:44	08:10		07:12	06:57	05:48	05:01	05:00	05:42	06:37	07:30		07:28	08:22	
	16:17	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	16:09	
4	08:44	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30	08:24	
	16:18	17:12		18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57		16:48	16:08	
5	08:43	08:07		07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33		07:32	08:25	
	16:20	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	16:07	
6	08:43	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34	08:27	
	16:21	17:16		18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53		16:45	16:07	
7	08:42	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36	08:28	
	16:22	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	16:06	
8	08:42	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38	08:29	
	16:24	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48		16:41	16:06	
9	08:41	07:59		06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40	08:31	
	16:25	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	16:06	
10	08:41	07:57		06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43		07:42	08:32	
	16:27	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	16:05	
11	08:40	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45		07:44	08:33	
	16:28	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	16:05	
12	08:39	07:53		06:50	06:35	05:31	04:56	05:09	05:58	06:52	07:46		07:46	08:34	
	16:30	17:28		18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	16:05	
13	08:38	07:51		06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48	08:35	
	16:31	17:30		18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36		16:32	16:05	
14	08:37	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36 (1)	07:50	08:36	
	16:33	17:32		18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	10 08:46 (1)	16:31	16:05	
15	08:37	07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:34 (1)	07:51	08:37	
	16:35	17:34		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	14 08:48 (1)	16:29	16:05	
16	08:36	07:45	08:11 (1)	06:41	06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:33 (1)	07:53	08:38	
	16:36	17:36	4 08:15 (1)	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16 08:49 (1)	16:28	16:05	
17	08:35	07:43		08:09 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:32 (1)	07:55	08:39
	16:38	17:38	8 08:17 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	18 08:50 (1)	16:26	16:05	
18	08:34	07:41		08:07 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:31 (1)	07:57	08:39
	16:40	17:40	11 08:18 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	19 08:50 (1)	16:25	16:05	
19	08:32	07:39		08:04 (1)	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:30 (1)	07:59	08:40
	16:42	17:42	14 08:18 (1)	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	20 08:50 (1)	16:23	16:05	
20	08:31	07:37		08:02 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:30 (1)	08:01	08:41
	16:43	17:44	17 08:19 (1)	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	20 08:50 (1)	16:22	16:06	
21	08:30	07:34		08:00 (1)	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:31 (1)	08:02	08:41
	16:45	17:46	20 08:20 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	19 08:50 (1)	16:21	16:06	
22	08:29	07:32		07:59 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:33 (1)	08:04	08:42
	16:47	17:48	20 08:19 (1)	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16 08:49 (1)	16:19	16:07	
23	08:27	07:30		07:59 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:35 (1)	08:06	08:43
	16:49	17:50	20 08:19 (1)	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	13 08:48 (1)	16:18	16:07	
24	08:26	07:28		08:00 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:37 (1)	08:08	08:43
	16:51	17:52	19 08:19 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	10 08:47 (1)	16:17	16:08	
25	08:25	07:26		08:01 (1)	06:19	06:05	05:11	04:56	05:27	06:21	07:15	07:11	07:39 (1)	08:10	08:43
	16:53	17:54	17 08:18 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	7 07:46 (1)	16:16	16:08	
26	08:23	07:23		08:01 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	07:41 (1)	08:11	08:44
	16:54	17:56	15 08:16 (1)	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	3 07:44 (1)	16:15	16:09	
27	08:22	07:21		08:03 (1)	06:14	06:01	05:08	04:57	05:31	06:24	07:19	07:15	08:13	08:44	
	16:56	17:58	12 08:15 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05		16:14	16:10	
28	08:20	07:19		08:04 (1)	06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17	08:15	08:44	
	16:58	18:00	8 08:12 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02		16:13	16:11	
29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19		08:16	08:44	
	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00		16:12	16:12	
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21		08:18	08:44	
	17:02			19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58		16:11	16:13	
31	08:16			07:04		05:04		05:37	06:31		07:23			08:44	
	17:04			19:58		21:44		21:27	20:21		16:56			16:14	
Potential sun hours	250	273		367	420	494	510	512	460	382	328		259	233	
Total, worst case		185										185			
Sun reduction		0.23										0.29			
Oper. time red.		1.00										1.00			
Wind dir. red.		0.64										0.64			
Total reduction		0.15										0.19			
Total, real		28										35			

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IS - H253

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IT - H254

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15 08:44 16:16 08:44 16:17	08:14 17:06 08:12 17:08 08:10 17:10	07:16 18:02 07:14 18:04 07:12 18:06	07:01 20:00 06:59 20:02 06:56 20:04	05:52 20:56 05:50 20:57 05:48 20:59	05:03 21:46 05:02 21:47 05:01 21:48	04:59 22:00 05:00 22:00 05:00 21:59	05:39 21:25 05:40 21:23 05:42 21:21	06:33 20:18 06:35 20:16 06:37 20:14	07:26 19:05 07:28 19:02 07:30 19:00	07:24 16:54 07:26 16:52 07:28 16:50	08:19 16:10 08:21 16:09 08:22 16:09
2	08:44 16:16 08:44 16:17 08:44 16:18	08:12 17:08 08:10 17:10 08:09 17:12	07:14 18:04 07:12 18:06 07:09 18:08	06:59 20:02 06:56 20:04 06:54 20:06	05:50 20:57 05:48 20:59 05:46 21:01	05:02 21:47 05:01 21:48 05:01 21:49	05:00 22:00 05:00 22:00 05:01 21:59	05:40 21:23 05:42 21:21 05:44 21:19	06:35 20:16 06:37 20:14 06:38 20:11	07:28 19:02 07:30 19:00 07:32 18:57	07:26 16:52 07:28 16:50 07:30 16:48	08:21 16:09 08:22 16:09 08:24 16:08
3	08:44 16:17 08:44 16:18 08:43 16:20	08:10 17:10 08:09 17:12 08:07 17:14	07:12 18:06 07:09 18:08 07:07 18:10	06:56 20:04 06:54 20:06 06:52 20:08	05:48 20:59 05:46 21:01 05:44 21:03	05:01 21:48 05:01 21:49 05:02 21:50	05:00 21:59 05:01 21:59 05:02 21:58	05:42 21:21 05:44 21:19 05:46 21:18	06:37 20:14 06:38 20:11 06:40 20:09	07:30 19:00 07:32 18:57 07:33 18:55	07:30 16:50 07:32 16:48 07:32 16:46	08:22 16:09 08:24 16:08 08:25 16:07
4	08:44 16:18 08:43 16:20 08:43 16:21	08:09 17:12 08:07 17:14 08:05 17:16	07:09 18:08 07:07 18:10 07:05 18:12	06:54 20:06 06:52 20:08 06:49 20:10	05:46 21:01 05:44 21:03 05:42 21:05	05:01 21:49 05:02 21:50 05:03 21:51	05:01 21:59 05:02 21:58 05:03 21:58	05:44 21:19 05:46 21:18 05:47 21:16	06:38 20:11 06:40 20:09 06:42 20:06	07:32 18:57 07:33 18:55 07:35 18:53	07:30 16:48 07:32 16:46 07:34 16:45	08:24 16:08 08:25 16:07 08:27 16:07
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6	08:43 16:21 08:42 16:22 08:42 16:24	08:05 17:16 08:03 17:18 08:01 17:20	07:05 18:12 07:02 18:13 07:00 18:13	06:49 20:10 06:47 20:11 06:44 20:11	05:42 21:05 05:40 21:06 05:38 21:08	04:59 21:51 04:58 21:52 04:57 21:53	05:03 21:58 05:04 21:57 05:05 21:56	05:47 21:16 05:49 21:14 05:51 21:12	06:42 20:06 06:44 20:04 06:45 20:02	07:35 18:53 07:37 18:50 07:39 18:48	07:34 16:45 07:36 16:43 07:38 16:41	08:27 16:07 08:28 16:06 08:29 16:06
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Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IU - H255

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IV - H256

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IW - H257

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
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17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IX - H258

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IY - H259

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IZ - H260

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JA - H261

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JB - H262

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JC - H263

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JD - H264

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
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22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JE - H265

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JF - H266

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JG - H267

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JH - H268

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JI - H269

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JJ - H270

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JK - H271

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JL - H272

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JM - H273

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JN - H274

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JO - H275

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JP - H276

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JQ - H277

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JR - H278

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JS - H279

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JT - H280

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JU - H281

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JV - H282

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JW - H283

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JX - H284

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JY - H285

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JZ - H286

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KA - H287

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KB - H288

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KC - H289

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
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Sun reduction												
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Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KD - H290

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KE - H291

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:24		
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KF - H292
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	06:18 (5) 06:50 (5)	05:03 21:45	05:33 (4) 05:40 (4)	04:59 22:00	05:32 (4) 05:45 (4)	05:39 21:25	06:31 (5) 06:53 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	06:16 (5) 06:50 (5)	05:02 21:47	05:33 (4) 05:41 (4)	05:00 22:00	05:33 (4) 05:45 (4)	05:40 21:23	06:31 (5) 06:55 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	06:16 (5) 06:50 (5)	05:01 21:48	05:32 (4) 05:41 (4)	05:00 21:59	05:33 (4) 05:45 (4)	05:42 21:21	06:29 (5) 06:55 (5)	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	06:38 (5) 21:59	04:54 21:59	05:27 (4) 05:41 (4)	05:16 21:47	05:48 (4) 05:49 (4)	06:06 20:53	06:35 (5) 06:57 (5)	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	06:41 (5) 21:59	04:54 22:00	05:27 (4) 05:41 (4)	05:17 21:46	06:08 20:51	06:08 20:51	06:37 (5) 06:56 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:40 17:42	06:34 18:36	06:20 20:33	05:20 21:27	06:42 (5) 06:44 (5)	04:54 22:00	05:27 (4) 05:41 (4)	05:17 21:45	06:19 20:48	06:19 20:48	06:36 (5) 06:55 (5)	07:04 19:34	07:58 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:19 21:28	06:44 (5) 06:46 (5)	04:54 22:00	05:27 (4) 05:41 (4)	05:20 21:44	06:12 20:46	06:12 20:46	06:40 (5) 06:54 (5)	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	06:39 (5) 06:48 (5)	04:55 22:01	05:27 (4) 05:41 (4)	05:21 21:42	06:13 20:44	06:13 20:44	06:42 (5) 06:53 (5)	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	06:36 (5) 06:48 (5)	04:55 22:01	05:28 (4) 05:42 (4)	05:23 21:41	06:15 20:42	06:15 20:42	06:43 (5) 06:51 (5)	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	06:34 (5) 06:49 (5)	04:55 22:01	05:28 (4) 05:42 (4)	05:24 21:39	06:17 20:39	06:17 20:39	06:45 (5) 06:50 (5)	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	06:32 (5) 06:49 (5)	04:55 22:01	05:28 (4) 05:42 (4)	05:26 21:38	06:19 20:37	06:19 20:37	06:47 (5) 06:48 (5)	19:24 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	06:30 (5) 06:50 (5)	04:56 22:01	05:29 (4) 05:43 (4)	05:27 21:36	06:21 20:35	06:21 20:35	07:15 19:19	19:22 19:17	08:11 18:16	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	06:16 (5) 06:50 (5)	04:56 22:01	05:29 (4) 05:43 (4)	05:28 21:35	06:22 20:32	06:22 20:32	07:17 19:17	19:23 19:07	08:13 18:17	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	06:26 (5) 06:51 (5)	04:57 22:01	05:30 (4) 05:44 (4)	05:31 21:33	06:24 20:30	06:24 20:30	07:19 19:15	19:17 17:05	08:13 18:14	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	06:24 (5) 06:51 (5)	04:57 21:40	05:30 (4) 05:40 (4)	05:32 22:01	06:26 20:28	06:26 20:28	07:21 19:12	19:17 17:02	08:14 18:16	08:14 16:13	08:44 16:11
29	08:19 17:00	07:09 19:55	05:56 20:52	05:06 21:41	05:06 21:41	06:22 (5) 06:51 (5)	04:58 22:01	05:31 (4) 05:40 (4)	05:34 21:30	06:28 20:25	06:28 20:25	07:23 19:10	19:18 17:00	08:16 18:12	08:16 16:12	08:44 16:12
30	08:17 17:02	07:06 19:56	05:54 20:54	05:05 21:43	05:05 21:43	06:20 (5) 06:51 (5)	04:58 21:43	05:31 (4) 05:40 (4)	05:35 21:28	06:29 20:15	06:29 20:15	07:24 19:07	19:18 16:58	08:18 18:11	08:18 16:11	08:44 16:13
31	08:15 17:04	07:04 19:58	05:04 20:54	05:04 21:44	05:04 21:44	06:20 (5) 06:50 (4)	04:58 21:44	05:31 (4) 05:40 (4)	05:37 21:27	06:33 (5) 06:52 (5)	06:31 20:21	07:22 19:07	19:18 16:56	08:19 18:11	08:19 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233				
Total, worst case				213	411	374	184	563								
Sun reduction				0.35	0.38	0.32	0.32	0.34								
Oper. time red.				1.00	1.00	1.00	1.00	1.00								
Wind dir. red.				0.68	0.68	0.66	0.66	0.68								
Total reduction				0.24	0.26	0.21	0.21	0.23								
Total, real				51	106	79	39	130								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KG - H293

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 07:33 (5)	05:52 20:55
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 07:34 (5)	05:50 20:57
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 07:34 (5)	05:48 20:59
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 07:34 (5)	05:46 21:01
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 07:33 (5)	05:44 21:03
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 07:33 (5)	05:42 21:04
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:11 (5) 07:33 (5)	05:40 21:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:08 (5) 07:32 (5)	05:38 21:08
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:07 (5) 07:31 (5)	05:36 21:10
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:07 (5) 07:29 (5)	05:35 21:12
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:09 (5) 07:28 (5)	05:33 21:13
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	07:10 (5) 07:26 (5)	05:31 21:15
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	07:13 (5) 07:24 (5)	05:29 21:17
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	05:27 (3) 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	05:27 (3) 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	05:27 (3) 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	05:27 (3) 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	05:27 (3) 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	05:27 (3) 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:27 (3) 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:27 (3) 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	05:28 (3) 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	05:28 (3) 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	05:28 (3) 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	05:29 (3) 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	05:29 (3) 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	05:30 (3) 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	05:30 (3) 22:01
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	05:31 (3) 22:01
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	05:31 (3) 22:00
31	08:15 17:04		07:04 19:58	05:52 20:54	05:04 21:44	05:34 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case			7	225		79
Sun reduction			0.27	0.35		0.32
Oper. time red.			1.00	1.00		1.00
Wind dir. red.			0.68	0.68		0.66
Total reduction			0.18	0.24		0.21
Total, real			1	54		17

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KG - H293

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 2	05:32 (3) 05:34 (3) 21:25	05:39 21:25	06:33 20:18 19	07:08 (5) 07:27 (5) 19:05	07:24 16:54 16:10
2	05:00 22:00 1	05:33 (3) 05:34 (3) 21:23	05:40 21:23	06:35 20:16 22	07:06 (5) 07:28 (5) 19:02	07:26 16:52 16:09
3	05:00 21:59 1	05:33 (3) 05:34 (3) 21:21	05:42 21:21	06:37 20:14 24	07:05 (5) 07:29 (5) 19:00	07:28 16:50 16:09
4	05:01 21:59	05:44 21:19	05:44 21:19	06:38 20:11 24	07:05 (5) 07:29 (5) 18:57	07:30 16:48 16:08
5	05:02 21:58	05:46 21:17	05:46 21:17	06:40 20:09 22	07:07 (5) 07:29 (5) 18:55	07:32 16:46 16:07
6	05:03 21:58	05:47 21:16	05:47 21:16	06:42 20:06 20	07:09 (5) 07:29 (5) 18:53	07:34 16:45 16:07
7	05:04 21:57	05:49 21:14	05:49 21:14	06:44 20:04 18	07:10 (5) 07:28 (5) 18:50	07:36 16:43 16:06
8	05:05 21:56	05:51 21:12	05:51 21:12	06:45 20:01 16	07:12 (5) 07:28 (5) 18:48	07:38 16:41 16:06
9	05:06 21:55	05:52 21:10	05:52 21:10	06:47 19:59 14	07:14 (5) 07:28 (5) 18:45	07:40 16:39 16:06
10	05:07 21:55	05:54 21:08	05:54 21:08	06:49 19:57 11	07:16 (5) 07:27 (5) 18:43	07:42 16:37 16:05
11	05:08 21:54	05:56 21:06	05:56 21:06	06:51 19:54 9	07:17 (5) 07:26 (5) 18:41	07:44 16:36 16:05
12	05:09 21:53	05:58 21:03	05:58 21:03	06:52 19:52 6	07:19 (5) 07:25 (5) 18:38	07:46 16:34 16:05
13	05:11 21:52	05:59 21:01	05:59 21:01	06:54 19:49 2	07:21 (5) 07:23 (5) 18:36	07:47 16:32 16:05
14	05:12 21:51	06:01 20:59	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:12 (5) 07:24 (5) 12	07:24 19:07	07:20 16:58	08:44 16:13
31	05:37 21:27	06:31 20:21	07:10 (5) 07:26 (5) 16	07:22 16:56	07:22 16:56	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	4	28	207			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.68	0.68			
Total reduction	0.21	0.23	0.22			
Total, real	1	6	45			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KH - H294

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 21:03	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:16 (5) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:17 (5) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:18 (5) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:20 (5) 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:29 (5) 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	05:52 20:56	05:04 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			31	151	46	529
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.66	0.66
Total reduction			0.18	0.24	0.25	0.21
Total, real			6	36	12	111

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KH - H294

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 18	05:32 (3) 05:50 (3) 21	05:39 21:25 20:18	06:33 20:18 19:05	07:26 19:05 16:54	08:19 16:10 16:10
2	05:00 22:00 18	05:33 (3) 05:51 (3) 21	05:40 21:23 20:16	06:35 20:16 19:02	07:28 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 17	05:33 (3) 05:50 (3) 21	05:42 21:21 20:14	06:37 20:14 19:00	07:30 19:00 16:50	08:22 16:09 16:09
4	05:01 21:59 17	05:34 (3) 05:51 (3) 21	05:44 21:19 20:11	06:38 20:11 19:00	07:32 18:57 16:48	08:24 16:08 16:08
5	05:02 21:58 16	05:35 (3) 05:51 (3) 21	05:46 21:17 20:09	06:40 20:09 18:55	07:33 16:46 16:07	08:25 16:07 16:07
6	05:03 21:58 15	05:36 (3) 05:51 (3) 21	05:47 21:16 20:06	06:42 20:06 18:53	07:35 16:45 16:07	08:26 16:07 16:07
7	05:04 21:57 15	05:37 (3) 05:52 (3) 21	05:49 21:14 20:04	06:44 20:04 18:50	07:36 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 14	05:38 (3) 05:52 (3) 21	05:51 21:12 20:01	06:45 20:01 18:48	07:39 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 13	05:39 (3) 05:52 (3) 21	05:52 21:10 19:59	06:47 19:59 18:45	07:41 16:39 16:06	08:30 16:06 16:06
10	05:07 21:55 12	05:40 (3) 05:52 (3) 21	05:54 21:08 19:57	06:49 19:57 18:43	07:43 16:37 16:05	08:32 16:05 16:05
11	05:08 21:54 12	05:41 (3) 05:53 (3) 21	05:56 21:06 19:54	06:51 19:54 18:41	07:44 16:36 16:05	08:33 16:05 16:05
12	05:10 21:53 11	05:42 (3) 05:53 (3) 21	05:58 21:03 19:52	06:52 19:52 18:38	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 10	05:43 (3) 05:53 (3) 21	05:59 21:01 19:49	06:54 19:49 18:36	07:48 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 8	05:44 (3) 05:52 (3) 20	06:01 20:59 19:47	06:56 19:47 18:34	07:50 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 7	05:45 (3) 05:52 (3) 20	06:03 20:57 19:44	06:58 19:44 18:31	07:51 16:29 16:05	08:37 16:05 16:05
16	05:15 21:49 6	05:47 (3) 05:53 (3) 20	06:05 20:55 19:42	06:59 19:42 18:29	07:53 16:28 16:05	08:38 16:05 16:05
17	05:16 21:47 5	05:48 (3) 05:53 (3) 20	06:06 20:53 19:39	07:01 19:39 18:27	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 3	05:49 (3) 05:52 (3) 20	06:08 20:51 19:37	07:03 19:37 18:24	07:57 16:25 16:05	08:39 16:05 16:05
19	05:19 21:45 2	05:50 (3) 05:52 (3) 20	06:10 20:48 19:34	07:05 19:34 18:22	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	219		188			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	47		41			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KI - H295

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	07:01	07:25 (5)	05:52	05:03	05:34 (3)					
2	08:44	16:16	08:12	17:08	18:04	07:12	18:04	20:00	13 07:38 (5)	20:55	21:45	16 05:50 (3)					
3	08:44	16:17	08:10	17:10	18:06	07:10	18:06	06:59	07:23 (5)	05:50	05:02	05:33 (3)					
4	08:43	16:18	08:09	17:12	18:08	07:09	18:08	20:02	15 07:38 (5)	20:57	21:47	16 05:49 (3)					
5	08:43	16:20	08:07	17:14	18:10	07:07	18:10	06:56	07:20 (5)	05:48	05:01	05:32 (3)					
6	08:43	16:21	08:05	17:16	18:11	07:05	18:11	20:04	17 07:37 (5)	20:59	21:48	17 05:49 (3)					
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	06:54	07:18 (5)	05:46	05:00	05:31 (3)					
8	08:42	16:24	08:01	17:20	18:15	07:00	18:15	20:06	19 07:37 (5)	21:01	21:49	18 05:49 (3)					
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	06:52	07:16 (5)	05:44	04:59	05:31 (3)					
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	20:08	19 07:35 (5)	21:03	21:50	18 05:49 (3)					
11	08:40	16:28	07:55	17:26	18:21	06:53	18:21	06:49	07:17 (5)	05:42	04:59	05:30 (3)					
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	20:09	16 07:33 (5)	21:04	21:51	18 05:48 (3)					
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	06:47	07:19 (5)	05:40	04:58	05:31 (3)					
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	20:11	13 07:32 (5)	21:06	21:52	18 05:49 (3)					
15	08:36	16:35	07:47	17:34	18:29	06:43	18:29	06:44	07:22 (5)	05:38	04:57	05:31 (3)					
16	08:35	16:36	07:45	17:36	18:30	06:41	18:30	20:13	5 07:27 (5)	21:08	21:53	17 05:48 (3)					
17	08:34	16:45	07:43	17:46	18:40	06:38	18:40	06:42		05:36	04:57	05:32 (3)					
18	08:33	16:47	07:41	17:48	18:42	06:36	18:42	20:15		05:36	04:56	05:32 (3)					
19	08:32	16:49	07:39	17:50	18:44	06:33	18:44	20:17		05:35	04:56	05:32 (3)					
20	08:31	16:51	07:37	17:52	18:45	06:31	18:45	20:19		05:33	04:56	05:33 (3)					
21	08:30	16:53	07:34	17:54	18:47	06:28	18:47	20:21		05:31	04:56	05:34 (3)					
22	08:29	16:55	07:32	17:56	18:49	06:26	18:49	20:22		05:29	04:55	05:33 (3)					
23	08:27	16:56	07:30	17:58	18:51	06:23	18:51	20:23		05:27	04:55	05:34 (3)					
24	08:26	16:58	07:28	17:55	18:46	06:21	18:46	20:24		05:26	04:55	05:35 (3)					
25	08:25	17:00	07:25	17:53	18:44	06:18	18:44	20:25		05:24	04:55	05:35 (3)					
26	08:23	17:02	07:23	17:51	18:41	06:16	18:41	20:26		05:22	04:54	05:36 (3)					
27	08:22	17:04	07:21	17:49	18:39	06:14	18:39	20:27		05:21	04:54	05:36 (3)					
28	08:20	17:06	07:19	17:46	18:36	06:11	18:36	20:28		05:19	04:54	05:37 (3)					
29	08:19	17:08	07:17	17:44	18:33	06:09	18:33	20:29		05:18	04:53	05:38 (3)					
30	08:17	17:10	07:15	17:41	18:30	06:06	18:30	20:30		05:17	04:52	05:39 (3)					
31	08:15	17:12	07:13	17:39	18:28	06:03	18:28	20:31		05:16	04:51	05:40 (3)					
Potential sun hours	250	273	367					420		494	510						
Total, worst case				29				117		110	407						
Sun reduction				0.27				0.35		0.38	0.32						
Oper. time red.				1.00				1.00		1.00	1.00						
Wind dir. red.				0.68				0.68		0.66	0.66						
Total reduction				0.18				0.24		0.25	0.21						
Total, real				5				28		27	85						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KI - H295

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 15	05:37 (3) 05:52 (3) 21:25	05:39 21:25 20:18	07:26 19:05 16:10	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 16	05:37 (3) 05:53 (3) 21:23	05:40 21:23 20:16	07:28 19:02 16:52	07:26 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 16	05:36 (3) 05:52 (3) 21:21	05:42 21:21 20:14	07:30 19:00 16:50	07:28 16:50 16:09	08:22 16:09 16:09
4	05:01 21:59 17	05:36 (3) 05:53 (3) 21:19	05:44 21:19 20:11	07:32 18:57 16:48	07:30 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 18	05:36 (3) 05:54 (3) 21:17	05:46 21:17 20:09	07:33 18:55 16:46	07:32 16:46 16:07	08:25 16:07 16:07
6	05:03 21:58 19	05:36 (3) 05:55 (3) 21:16	05:47 21:16 20:06	07:35 18:53 16:45	07:34 16:45 16:07	08:26 16:07 16:07
7	05:04 21:57 18	05:37 (3) 05:55 (3) 21:14	05:49 21:14 20:04	07:37 18:50 16:43	07:36 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 18	05:38 (3) 05:56 (3) 21:12	05:51 21:12 20:01	07:39 18:48 16:41	07:38 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 17	05:39 (3) 05:56 (3) 21:10	05:52 21:10 19:59	07:41 18:45 16:39	07:40 16:39 16:06	08:30 16:06 16:06
10	05:07 21:55 17	05:40 (3) 05:57 (3) 21:08	05:54 21:08 19:57	07:43 18:43 16:37	07:42 16:37 16:05	08:32 16:05 16:05
11	05:08 21:54 16	05:41 (3) 05:57 (3) 21:06	05:56 21:06 19:54	07:44 18:41 16:36	07:44 16:36 16:05	08:33 16:05 16:05
12	05:10 21:53 15	05:42 (3) 05:57 (3) 21:04	05:58 21:04 19:52	07:46 18:38 16:34	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 15	05:43 (3) 05:58 (3) 21:01	05:59 21:01 19:49	07:48 18:36 16:32	07:47 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 14	05:44 (3) 05:58 (3) 20:59	06:01 20:59 19:47	07:50 18:34 16:31	07:49 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 13	05:45 (3) 05:58 (3) 20:57	06:03 20:57 19:44	07:52 18:31 16:29	07:51 16:29 16:05	08:37 16:05 16:05
16	05:15 21:49 12	05:47 (3) 05:59 (3) 20:55	06:05 20:55 19:42	07:54 18:29 16:28	07:53 16:28 16:05	08:38 16:05 16:05
17	05:16 21:47 11	05:48 (3) 05:59 (3) 20:53	06:06 20:53 19:39	07:56 18:27 16:26	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 10	05:49 (3) 05:59 (3) 20:51	06:08 20:51 19:37	07:57 18:24 16:25	07:57 16:25 16:05	08:39 16:05 16:05
19	05:19 21:45 9	05:51 (3) 06:00 (3) 20:48	07:05 20:48 19:34	07:59 18:22 16:23	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44 7	05:52 (3) 05:59 (3) 20:46	07:07 20:46 19:32	08:01 18:20 16:22	08:01 16:22 16:06	08:41 16:06 16:06
21	05:21 21:42 6	05:53 (3) 05:59 (3) 20:44	07:08 20:44 19:29	08:03 18:18 16:21	08:02 16:21 16:06	08:41 16:06 16:06
22	05:23 21:41 4	05:55 (3) 05:59 (3) 20:42	07:10 20:42 19:27	08:05 18:15 16:19	08:04 16:19 16:07	08:42 16:07 16:07
23	05:24 21:39 3	05:56 (3) 05:59 (3) 20:39	07:12 20:39 19:24	08:07 18:13 16:18	08:06 16:18 16:07	08:42 16:07 16:07
24	05:26 21:38 1	05:57 (3) 05:58 (3) 20:37	07:14 20:37 19:22	08:09 18:11 16:17	08:08 16:17 16:08	08:43 16:08 16:08
25	05:28 21:36 0	06:21 20:35 19:19	07:15 19:19 19:19	07:11 17:09 16:16	08:09 16:16 16:08	08:43 16:08 16:08
26	05:29 21:35 0	06:22 20:33 19:17	07:17 19:17 19:17	07:13 17:07 16:15	08:11 16:15 16:09	08:43 16:09 16:09
27	05:31 21:33 0	06:24 20:30 19:15	07:19 19:15 19:15	07:15 17:05 16:14	08:13 16:14 16:10	08:44 16:10 16:10
28	05:32 21:32 0	06:26 20:28 19:12	07:21 19:12 19:12	07:17 17:02 16:13	08:14 16:13 16:11	08:44 16:11 16:11
29	05:34 21:30 0	06:28 20:25 19:10	07:23 19:10 19:10	07:19 17:00 16:12	08:16 16:12 16:12	08:44 16:12 16:12
30	05:35 21:28 0	06:29 20:23 19:07	07:24 19:07 19:07	07:20 16:58 16:11	08:18 16:11 16:13	08:44 16:13 16:13
31	05:37 21:27 0	06:31 20:21 19:05	07:25 19:05 19:05	07:22 16:56 16:14	08:19 16:14 16:14	08:44 16:14 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	307		150			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	65		32			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KJ - H296

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:07 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	08:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KK - H297

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:09 (1) 20:18	06:33 19:05	07:26 16:54	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:11 (1) 20:16	06:35 19:02	07:28 16:52	07:26 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:12 (1) 20:14	06:37 19:00	07:30 16:50	07:28 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:14 (1) 20:11	06:38 18:57	07:32 16:48	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:16 (1) 20:09	07:33 18:55	07:32 16:47	07:32 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	06:09 (1) 21:51	05:03 21:58	05:47 21:16	06:17 (1) 20:06	07:35 18:53	07:35 16:45	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	06:07 (1) 21:52	05:04 21:57	05:49 21:14	06:19 (1) 20:04	07:37 18:50	07:36 16:43	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	06:05 (1) 21:53	05:05 21:56	05:51 21:12	06:20 (1) 20:01	07:39 18:48	07:38 16:41	07:38 16:06
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10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	06:02 (1) 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	07:42 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	06:00 (1) 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	07:44 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	05:58 (1) 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	07:46 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	05:57 (1) 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	07:48 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	06:13 (1) 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	07:49 16:05
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16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	05:53 (1) 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	07:53 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	05:54 (1) 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	07:55 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	05:54 (1) 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	07:57 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	05:55 (1) 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	07:59 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:56 (1) 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:01 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:57 (1) 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:02 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	05:59 (1) 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:04 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	06:06 (1) 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:06 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	06:06 (1) 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:08 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	06:05 (1) 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:09 16:08
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31	08:15 17:04	07:04 19:08	05:04 20:58	05:04 21:44	05:04 21:44	06:08 (1) 22:01	05:37 21:27	06:31 20:21	07:22 16:56	08:20 16:56	08:19 16:14	08:19 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					210		155	55				
Sun reduction					0.38		0.32	0.34				
Oper. time red.					1.00		1.00	1.00				
Wind dir. red.					0.67		0.67	0.67				
Total reduction					0.25		0.22	0.23				
Total, real					53		33	13				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KL - H298
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:09 (1) 20:18	06:33 19:05	07:26 16:54	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:11 (1) 20:16	06:35 19:02	07:28 16:52	07:26 16:09
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4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:14 (1) 20:11	06:38 18:57	07:32 16:48	07:30 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	05:10 21:56	05:10 21:53	05:58 21:04	06:28 (1) 19:52	06:52 18:38	07:46 16:34	07:46 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	05:17 22:00	05:17 21:46	06:08 20:51	06:40 (1) 19:37	07:03 18:24	07:57 16:25	07:57 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	05:19 22:00	05:19 21:45	06:10 20:49	06:42 (1) 19:34	07:05 18:22	07:59 16:23	07:59 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	05:20 22:00	05:20 21:44	06:12 20:46	06:44 (1) 19:32	07:07 18:20	08:01 16:22	08:01 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	05:22 22:01	05:22 21:42	06:14 20:44	06:46 (1) 19:29	07:08 18:18	08:02 16:21	08:02 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	05:23 22:01	05:23 21:41	06:15 20:42	06:48 (1) 19:27	07:10 18:15	08:05 16:19	08:04 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	05:24 22:01	05:24 21:40	06:17 20:39	06:50 (1) 19:24	07:12 18:13	08:07 16:18	08:06 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	05:26 22:01	05:26 21:38	06:19 20:37	06:52 (1) 19:22	07:14 18:11	08:09 16:17	08:08 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	05:28 22:01	05:28 21:37	06:21 20:35	06:54 (1) 19:20	07:15 17:09	08:11 16:16	08:10 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	05:29 22:01	05:29 21:35	06:22 20:33	06:56 (1) 19:17	07:17 17:07	08:13 16:15	08:11 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	05:31 22:01	05:31 21:33	06:24 (1) 20:30	06:58 (1) 19:15	07:19 17:05	08:15 16:14	08:13 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	05:32 22:01	05:32 21:30	06:26 (1) 20:28	06:59 (1) 19:12	07:21 17:02	08:16 16:13	08:14 16:11
29	08:19 17:00	07:09 19:55	05:56 20:52	05:06 21:42	05:06 21:42	05:34 22:01	05:34 21:30	06:28 (1) 20:26	07:23 (1) 19:10	07:19 17:00	08:16 16:12	08:14 16:12
30	08:17 17:02	07:06 19:57	05:54 20:54	05:05 21:43	05:05 21:43	05:36 22:00	05:36 21:28	06:29 (1) 20:23	07:24 (1) 19:07	07:21 16:58	08:18 16:11	08:14 16:13
31	08:15 17:04	07:04 19:58	05:04 21:44	05:04 21:44	05:04 21:44	05:37 21:27	05:37 20:21	06:31 (1) 20:21	07:22 (1) 16:56	07:22 16:56	08:18 16:11	08:14 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					221			106				
Sun reduction					0.38			0.32				
Oper. time red.					1.00			1.00				
Wind dir. red.					0.67			0.67				
Total reduction					0.26			0.22				
Total, real					56			27				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KM - H299

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	06:27 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:56	18 06:45 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	06:28 (1)	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	16 06:44 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48	06:29 (1)	05:01	05:00	05:42	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	13 06:42 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09	
4	08:43	08:09	07:09	06:54	05:46	06:31 (1)	05:00	05:01	05:44	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01	9 06:40 (1)	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44		04:59	05:02	05:46	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03		21:50	21:58	21:18	20:09	18:55	16:47	16:07	
6	08:43	08:05	07:05	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:09	21:05		21:51	21:58	21:16	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:14	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38		04:57	05:05	05:51	06:43 (1)	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:12	3 06:46 (1)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36		04:57	05:06	05:52	06:40 (1)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10		21:54	21:56	21:10	10 06:50 (1)	19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35		04:56	05:07	05:54	06:38 (1)	06:49	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12		21:55	21:55	21:08	14 06:52 (1)	19:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33		04:56	05:08	05:56	06:36 (1)	06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13		21:56	21:54	21:06	17 06:53 (1)	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	06:35 (1)	06:52	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	19 06:54 (1)	19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	06:35 (1)	06:54	07:48	07:48	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	20 06:55 (1)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:33 (1)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	22 06:55 (1)	19:47	18:34	16:31	16:05
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:33 (1)	06:58	07:52	07:51	08:37
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	22 06:55 (1)	19:44	18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	06:34 (1)	07:00	07:54	07:53	08:38
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	21 06:55 (1)	19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22		04:54	05:16	06:06	06:35 (1)	07:01	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	20 06:55 (1)	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08	06:37 (1)	07:03	07:58	07:57	08:39
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51	18 06:55 (1)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19	06:43 (1)	04:54	05:19	06:10	06:39 (1)	07:05	07:59	07:59	08:40
	16:42	17:42	18:36	20:34	1 06:44 (1)	21:27	22:00	21:45	20:49	15 06:54 (1)	19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	06:16	05:18	06:41 (1)	04:55	05:20	06:12	06:40 (1)	07:07	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	5 06:46 (1)	21:28	22:00	21:44	20:46	13 06:53 (1)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	06:39 (1)	04:55	05:21	06:14	06:42 (1)	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	8 06:47 (1)	21:30	22:01	21:42	20:44	11 06:53 (1)	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	06:36 (1)	04:55	05:23	06:15	06:44 (1)	07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	11 06:47 (1)	21:32	22:01	21:41	20:42	8 06:52 (1)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13	06:34 (1)	04:55	05:24	06:17	06:45 (1)	07:12	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	14 06:48 (1)	21:33	22:01	21:40	20:39	4 06:49 (1)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	06:32 (1)	04:55	05:26	06:19	06:47 (1)	07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	16 06:48 (1)	21:35	22:01	21:38	20:37	1 06:48 (1)	19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11	06:30 (1)	04:56	05:28	06:21		07:15	07:11	08:09	08:43
	16:53	17:54	18:47	20:45	18 06:48 (1)	21:36	22:01	21:37	20:35		19:20	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:10	06:28 (1)	04:56	05:29	06:22		07:17	07:13	08:11	08:44
	16:55	17:56	18:49	20:46	20 06:48 (1)	21:37	22:01	21:35	20:33		19:17	17:07	16:15	16:09
27	08:22	07:21	06:14	06:01	05:08	06:26 (1)	04:57	05:31	06:24		07:19	07:15	08:13	08:44
	16:56	17:58	18:51	20:48	22 06:48 (1)	21:39	22:01	21:33	20:30		19:15	17:05	16:14	16:10
28	08:20	07:19	06:11	05:59	05:07	06:26 (1)	04:57	05:32	06:26		07:21	07:17	08:15	08:44
	16:58	18:00	18:53	20:50	21 06:47 (1)	21:40	22:01	21:32	20:28		19:12	17:02	16:13	16:11
29	08:19		07:09	05:56	05:06	06:26 (1)	04:58	05:34	06:28		07:23	07:19	08:16	08:44
	17:00		19:55	20:52	21 06:47 (1)	21:42	22:01	21:30	20:26		19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05	06:27 (1)	04:58	05:36	06:29		07:24	07:21	08:18	08:44
	17:02		19:57	20:54	19 06:46 (1)	21:43	22:01	21:28	20:23		19:07	16:58	16:11	16:13
31	08:15		07:04		05:04			05:37	06:31			07:22		08:44
	17:04		19:58		21:44			21:27	20:21			16:56		16:14
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case				176	56				238					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.68	0.68				0.68					
Total reduction				0.24	0.26				0.23					
Total, real				42	14				55					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KN - H300

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 (1) 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:44 (1) 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:43 (1) 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:42 (1) 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	06:40 (1) 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	06:40 (1) 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	06:40 (1) 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	06:40 (1) 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	06:42 (1) 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	06:44 (1) 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	06:45 (1) 19:24	08:07 18:13	08:07 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	06:47 (1) 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	06:49 (1) 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	06:50 (1) 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	06:52 (1) 19:15	07:19 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	06:56 (1) 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				222				225				
Sun reduction				0.35				0.34				
Oper. time red.				1.00				1.00				
Wind dir. red.				0.68				0.68				
Total reduction				0.24				0.23				
Total, real				53				52				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KO - H301

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:00 (1)	07:26	07:24	08:19
2	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	3 07:03 (1)	19:05	16:54	16:10
3	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35		07:28	07:26	08:21
4	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16		19:02	16:52	16:09
5	08:44	08:10	07:12	06:57	05:48	05:01	05:00	05:42	06:37		07:30	07:28	08:22
6	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14		19:00	16:50	16:09
7	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38		07:32	07:30	08:24
8	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11		18:57	16:48	16:08
9	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:46	06:40		07:33	07:32	08:25
10	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09		18:55	16:46	16:07
11	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42		07:35	07:34	08:27
12	16:21	17:16	18:12	20:09	21:05	21:51	21:58	21:16	20:06		18:53	16:45	16:07
13	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44		07:37	07:36	08:28
14	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04		18:50	16:43	16:06
15	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45		07:39	07:38	08:29
16	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01		18:48	16:41	16:06
17	08:41	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47		07:41	07:40	08:30
18	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59		18:45	16:39	16:06
19	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49		07:43	07:42	08:32
20	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57		18:43	16:37	16:05
21	08:40	07:55	06:53	06:37	07:01 (1)	05:33	04:56	05:08	06:51		07:44	07:44	08:33
22	16:28	17:26	18:21	20:19	3 07:04 (1)	21:13	21:56	21:54	19:54		18:41	16:36	16:05
23	08:39	07:53	06:50	06:35	06:59 (1)	05:31	04:56	05:10	06:52		07:46	07:46	08:34
24	16:30	17:28	18:23	20:21	7 07:06 (1)	21:15	21:56	21:53	19:52		18:38	16:34	16:05
25	08:38	07:51	06:48	06:33	06:57 (1)	05:29	04:55	05:11	06:54		07:48	07:48	08:35
26	16:31	17:30	18:25	20:22	10 07:07 (1)	21:17	21:57	21:52	19:49		18:36	16:32	16:05
27	08:37	07:49	06:45	06:30	06:54 (1)	05:27	04:55	05:12	06:56		07:50	07:49	08:36
28	16:33	17:32	18:27	20:24	13 07:07 (1)	21:19	21:58	21:51	19:47		18:34	16:31	16:05
29	08:37	07:47	06:43	06:28	06:52 (1)	05:26	04:55	05:13	06:58		07:52	07:51	08:37
30	16:35	17:34	18:29	20:26	16 07:08 (1)	21:20	21:58	21:50	19:44		18:31	16:29	16:05
31	08:36	07:45	06:41	06:25	06:50 (1)	05:24	04:55	05:15	06:59		07:54	07:53	08:38
32	16:36	17:36	18:31	20:28	18 07:08 (1)	21:22	21:59	21:49	19:42		18:29	16:28	16:05
33	08:35	07:43	06:38	06:23	06:47 (1)	05:22	04:54	05:16	07:01		07:56	07:55	08:39
34	16:38	17:38	18:32	20:30	21 07:08 (1)	21:24	21:59	21:48	9 07:05 (1)	19:39	18:27	16:26	16:05
35	08:33	07:41	06:36	06:21	06:45 (1)	05:21	04:54	05:17	06:54 (1)	07:03	07:58	07:57	08:39
36	16:40	17:40	18:34	20:32	23 07:08 (1)	21:25	22:00	21:46	14 07:08 (1)	19:37	18:24	16:25	16:05
37	08:32	07:39	06:33	06:19	06:44 (1)	05:19	04:54	05:19	06:52 (1)	07:05	07:59	07:59	08:40
38	16:42	17:42	18:36	20:34	23 07:07 (1)	21:27	22:00	21:45	17 07:09 (1)	19:34	18:22	16:23	16:05
39	08:31	07:37	06:31	06:16	06:44 (1)	05:18	04:54	05:20	06:50 (1)	07:07	08:01	08:01	08:41
40	16:43	17:44	18:38	20:35	23 07:07 (1)	21:28	22:00	21:44	20 07:10 (1)	19:32	18:20	16:22	16:06
41	08:30	07:34	06:28	06:14	06:44 (1)	05:16	04:55	05:21	06:50 (1)	07:08	08:03	08:02	08:41
42	16:45	17:46	18:40	20:37	23 07:07 (1)	21:30	22:01	21:42	21 07:11 (1)	19:29	18:18	16:21	16:06
43	08:29	07:32	06:26	06:12	06:44 (1)	05:15	04:55	05:23	06:49 (1)	07:10	08:05	08:04	08:42
44	16:47	17:48	18:42	20:39	21 07:05 (1)	21:32	22:01	21:41	22 07:11 (1)	19:27	18:15	16:19	16:07
45	08:27	07:30	06:23	06:10	06:45 (1)	05:13	04:55	05:24	06:48 (1)	07:12	08:07	08:06	08:42
46	16:49	17:50	18:44	20:41	19 07:04 (1)	21:33	22:01	21:40	23 07:11 (1)	19:24	18:13	16:18	16:07
47	08:26	07:28	06:21	06:07	06:46 (1)	05:12	04:55	05:26	06:48 (1)	07:14	08:09	08:08	08:43
48	16:51	17:52	18:45	20:43	17 07:03 (1)	21:35	22:01	21:38	23 07:11 (1)	19:22	18:11	16:17	16:08
49	08:25	07:26	06:19	06:05	06:48 (1)	05:11	04:56	05:28	06:49 (1)	07:15	07:11	08:09	08:43
50	16:53	17:54	18:47	20:45	13 07:01 (1)	21:36	22:01	21:37	22 07:11 (1)	19:20	17:09	16:16	16:08
51	08:23	07:23	06:16	06:03	06:50 (1)	05:10	04:56	05:29	06:50 (1)	07:17	07:13	08:11	08:44
52	16:54	17:56	18:49	20:46	8 06:58 (1)	21:37	22:01	21:35	20 07:10 (1)	19:17	17:07	16:15	16:09
53	08:22	07:21	06:14	06:01		05:08	04:57	05:31	06:52 (1)	07:19	07:15	08:13	08:44
54	16:56	17:58	18:51	20:48		21:39	22:01	21:33	18 07:10 (1)	19:15	17:05	16:14	16:10
55	08:20	07:19	06:11	05:59		05:07	04:57	05:32	06:54 (1)	07:21	07:17	08:15	08:44
56	16:58	18:00	18:53	20:50		21:40	22:01	21:32	16 07:10 (1)	19:12	17:02	16:13	16:11
57	08:19		07:09	05:56		05:06	04:58	05:34	06:55 (1)	07:23	07:19	08:16	08:44
58	17:00		19:55	20:52		21:42	22:01	21:30	13 07:08 (1)	19:10	17:00	16:12	16:12
59	08:17		07:06	05:54		05:05	04:58	05:36	06:57 (1)	07:24	07:21	08:18	08:44
60	17:02		19:57	20:54		21:43	22:01	21:28	10 07:07 (1)	19:07	16:58	16:11	16:13
61	08:15		07:04			05:04		05:37	06:59 (1)		07:22		08:44
62	17:04		19:58			21:44		21:27	7 07:06 (1)		16:56		16:14
Potential sun hours	250	273	367	420	494	510	512	460	382		328	259	233
Total, worst case				258					255	3			
Sun reduction				0.35					0.34	0.32			
Oper. time red.				1.00					1.00	1.00			
Wind dir. red.				0.68					0.68	0.68			
Total reduction				0.24					0.23	0.22			
Total, real				61					59	1			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KP - H302

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:02 (1) 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:02 (1) 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:04 (1) 19:00	07:30 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:05 (1) 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:07 (1) 18:55	07:33 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:09 (1) 18:53	07:35 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:10 (1) 18:50	07:37 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:12 (1) 18:48	07:39 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:14 (1) 18:45	07:41 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00	07:19 19:00	06:11 19:55	05:59 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:04	08:16 16:12	08:44 16:12
30	08:17 17:02	07:17 19:07	06:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:29 20:23	07:24 19:07	08:21 17:04	08:18 16:11	08:44 16:13
31	08:15 17:04	07:15 19:08	06:04 19:58	05:54 20:54	05:04 21:44	04:58 22:01	05:37 21:27	06:31 20:21	07:26 19:07	08:22 17:04	08:19 16:11	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				256								
Sun reduction				0.35								
Oper. time red.				1.00								
Wind dir. red.				0.67								
Total reduction				0.24								
Total, real				61								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KQ - H303

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26		07:57 (1)	07:24	08:19
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	22	08:19 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:56 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	22	08:18 (1)	16:52	16:09
3	08:44	08:10	07:12		06:56	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	22	08:18 (1)	16:50	16:09
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	20	08:18 (1)	16:48	16:08
5	08:43	08:07	07:07		07:31 (1)	06:52	05:44	04:59	05:02	05:46		07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10	4	07:35 (1)	20:08	21:03	21:50	21:18	20:09		18:55	17	08:17 (1)	16:46	16:07
6	08:43	08:05	07:05		07:29 (1)	06:49	05:42	04:59	05:03	05:47		07:35		08:02 (1)	07:34	08:27
	16:21	17:16	18:12	9	07:38 (1)	20:10	21:05	21:51	21:16	20:06		18:53	14	08:16 (1)	16:45	16:07
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	05:49		07:37		08:04 (1)	07:36	08:28
	16:22	17:18	18:13	12	07:39 (1)	20:11	21:06	21:52	21:17	20:04		18:50	11	08:15 (1)	16:43	16:06
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	05:51		07:39		08:06 (1)	07:38	08:29
	16:24	17:20	18:15	16	07:40 (1)	20:13	21:08	21:53	21:12	20:02		18:48	7	08:13 (1)	16:41	16:06
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52		07:41		08:07 (1)	07:40	08:30
	16:25	17:22	18:17	18	07:40 (1)	20:15	21:10	21:54	21:10	19:59		18:45	2	08:09 (1)	16:39	16:06
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54		07:43		07:42	08:32	
	16:27	17:24	18:19	21	07:40 (1)	20:17	21:12	21:55	21:08	19:57		18:43		16:37	16:05	
11	08:40	07:55	06:53		07:18 (1)	06:37	05:33	04:56	05:08	05:56		07:44		07:44	08:33	
	16:28	17:26	18:21	23	07:41 (1)	20:19	21:13	21:56	21:06	19:54		18:41		16:36	16:05	
12	08:39	07:53	06:50		07:17 (1)	06:35	05:31	04:56	05:09	05:58		07:46		07:46	08:34	
	16:30	17:28	18:23	23	07:40 (1)	20:21	21:15	21:56	21:04	19:52		18:38		16:34	16:05	
13	08:38	07:51	06:48		07:17 (1)	06:32	05:29	04:55	05:11	05:59		07:48		07:48	08:35	
	16:31	17:30	18:25	23	07:40 (1)	20:22	21:17	21:57	21:02	19:49		18:36		16:32	16:05	
14	08:37	07:49	06:45		07:17 (1)	06:30	05:27	04:55	05:12	06:01		07:50		07:50	08:36	
	16:33	17:32	18:27	21	07:38 (1)	20:24	21:19	21:58	21:01	19:47		18:34		16:31	16:05	
15	08:37	07:47	06:43		07:18 (1)	06:28	05:26	04:55	05:13	06:03		07:52		07:51	08:37	
	16:35	17:34	18:29	20	07:38 (1)	20:26	21:20	21:58	21:50	20:57		18:31		16:29	16:05	
16	08:36	07:45	06:41		07:18 (1)	06:25	05:24	04:55	05:14	06:05		07:54		07:53	08:38	
	16:36	17:36	18:31	18	07:36 (1)	20:28	21:22	21:59	21:49	20:55		18:29		16:28	16:05	
17	08:35	07:43	06:38		07:20 (1)	06:23	05:22	04:54	05:16	06:06		07:56		07:55	08:39	
	16:38	17:38	18:32	14	07:34 (1)	20:30	21:24	21:59	21:48	20:53		18:27		16:26	16:05	
18	08:34	07:41	06:36		07:22 (1)	06:21	05:21	04:54	05:17	06:08		07:58		07:57	08:39	
	16:40	17:40	18:34	9	07:31 (1)	20:32	21:25	22:00	21:46	20:51		18:24		16:25	16:05	
19	08:32	07:39	06:33			06:19	05:19	04:54	05:19	06:10		07:59		07:59	08:40	
	16:42	17:42	18:36			20:34	21:27	22:00	21:45	20:49		18:22		16:23	16:05	
20	08:31	07:37	06:31			06:16	05:18	04:54	05:20	06:12		08:01		08:01	08:41	
	16:43	17:44	18:38			20:35	21:28	22:01	21:44	20:46		18:20		16:22	16:06	
21	08:30	07:34	06:28			06:14	05:16	04:55	05:21	06:14		08:03		08:02	08:41	
	16:45	17:46	18:40			20:37	21:30	22:01	21:42	20:44		18:18		16:21	16:06	
22	08:29	07:32	06:26			06:12	05:15	04:55	05:23	06:15		08:05		08:04	08:42	
	16:47	17:48	18:42			20:39	21:32	22:01	21:41	20:42		18:15		16:19	16:07	
23	08:27	07:30	06:23			06:09	05:13	04:55	05:24	06:17		08:07		08:06	08:42	
	16:49	17:50	18:44			20:41	21:33	22:01	21:40	20:40		18:13		16:18	16:07	
24	08:26	07:28	06:21			06:07	05:12	04:55	05:26	06:19		08:09		08:08	08:43	
	16:51	17:52	18:45			20:43	21:35	22:01	21:38	20:37		18:11		16:17	16:08	
25	08:25	07:26	06:19			06:05	05:11	04:56	05:27	06:21		07:15		08:10	08:43	
	16:53	17:54	18:47			20:45	21:36	22:01	21:37	20:35		19:20	6	08:13 (1)	17:09	
26	08:23	07:23	06:16			06:03	05:09	04:56	05:29	06:22		07:17		08:03 (1)	07:13	
	16:54	17:56	18:49			20:46	21:37	22:01	21:35	20:33		19:17	12	08:15 (1)	17:07	
27	08:22	07:21	06:14			06:01	05:08	04:57	05:31	06:24		07:19		08:01 (1)	07:15	
	16:56	17:58	18:51			20:48	21:39	22:01	21:33	20:30		19:15	16	08:17 (1)	17:05	
28	08:20	07:19	06:11			05:59	05:07	04:57	05:32	06:26		07:21		07:59 (1)	07:17	
	16:58	18:00	18:53			20:50	21:40	22:01	21:32	20:28		19:12	19	08:18 (1)	17:02	
29	08:19		07:09			05:56	05:06	04:58	05:34	06:28		07:23		07:58 (1)	07:19	
	17:00		19:55			20:52	21:42	22:01	21:30	20:26		19:10	21	08:19 (1)	17:00	
30	08:17		07:06			05:54	05:05	04:58	05:35	06:29		07:24		07:58 (1)	07:21	
	17:02		19:57			20:54	21:43	22:01	21:28	20:23		19:07	21	08:19 (1)	16:58	
31	08:16		07:04				05:04		05:37	06:31		07:22			08:44	
	17:04		19:58				21:44		21:27	20:21		16:56			16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case				231							95		137			
Sun reduction				0.27							0.32		0.29			
Oper. time red.				1.00							1.00		1.00			
Wind dir. red.				0.65							0.65		0.65			
Total reduction				0.18							0.21		0.19			
Total, real				41						20		26				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KR - H304

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 07:54 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	08:14 (1) 08:31 (1)	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 07:55 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:12 (1) 08:31 (1)	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 07:56 (1)	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	08:11 (1) 08:32 (1)	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	07:34 (1) 07:57 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:10 (1) 08:33 (1)	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:33 (1) 07:56 (1)	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	08:09 (1) 08:33 (1)	07:32 16:42	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:33 (1) 07:57 (1)	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:09 (1) 08:33 (1)	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:33 (1) 07:57 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:09 (1) 08:33 (1)	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:32 (1) 07:56 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	08:09 (1) 08:33 (1)	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:33 (1) 07:56 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:08 (1) 08:31 (1)	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:32 (1) 07:55 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:58	05:54 21:08	06:49 19:57	07:43 18:43	08:09 (1) 08:30 (1)	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:33 (1) 07:54 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:11 (1) 08:29 (1)	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:34 (1) 07:52 (1)	06:35 20:21	05:31 21:15	04:56 21:53	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:13 (1) 08:28 (1)	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:36 (1) 07:50 (1)	06:32 20:22	05:29 21:17	04:55 21:52	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:15 (1) 08:26 (1)	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	07:38 (1) 07:47 (1)	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:17 (1) 08:23 (1)	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	07:47 (1) 18:29	20:24	21:19	21:58	21:50	20:57	19:44	18:31	07:52	16:29	16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	07:45 (1) 18:31	20:22	21:17	21:58	21:49	20:55	19:42	18:29	07:54	16:28	16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	07:43 (1) 18:32	20:20	21:14	21:59	21:48	20:53	19:39	18:27	07:56	16:25	16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	07:41 (1) 18:34	20:18	21:12	21:59	21:47	20:51	19:37	18:24	07:58	16:22	16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	07:39 (1) 18:36	20:16	21:10	21:59	21:45	20:49	19:34	18:22	07:59	16:21	16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	07:37 (1) 18:38	20:14	21:08	21:59	21:44	20:46	19:32	18:20	08:01	16:20	16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	07:34 (1) 18:40	20:12	21:06	21:59	21:42	20:44	19:29	18:18	08:03	16:19	16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	07:32 (1) 18:42	20:10	21:04	21:59	21:40	20:42	19:27	18:15	08:05	16:18	16:07
23	08:27 16:49	07:30 17:50	06:22 18:44	07:30 (1) 18:44	20:08	21:02	21:59	21:38	20:40	19:24	18:13	08:07	16:17	16:08
24	08:26 16:51	07:28 17:52	06:21 18:45	07:28 (1) 18:45	20:06	21:00	21:59	21:36	20:38	19:22	18:11	08:09	16:16	16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	07:25 (1) 18:47	20:04	21:00	21:59	21:34	20:36	19:20	18:11	08:10	16:15	16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	07:23 (1) 18:49	20:02	21:00	21:59	21:32	20:34	19:17	18:09	08:11	16:14	16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	07:21 (1) 18:51	20:00	21:00	21:59	21:30	20:30	19:15	18:07	08:12	16:13	16:11
28	08:20 16:58	07:19 18:00	06:11 18:53	07:19 (1) 18:53	20:00	21:00	21:59	21:28	20:28	19:12	18:05	08:13	16:12	16:12
29	08:19 17:00	07:18 18:01	07:43 (1) 18:54	07:18 (1) 18:54	20:00	21:00	21:59	21:26	20:26	19:10	18:04	08:14	16:11	16:13
30	08:17 17:02	07:16 18:02	07:51 (1) 18:55	07:16 (1) 18:55	20:00	21:00	21:59	21:24	20:24	19:08	18:03	08:15	16:10	16:14
31	08:15 17:04	07:15 18:03	07:52 (1) 18:56	07:15 (1) 18:56	20:00	21:00	21:59	21:22	20:22	19:06	18:02	08:16	16:09	16:15
Potential sun hours	250	273	367	420	494	510	512	460	382	328	270	259	233	233
Total, worst case		8	275						19		270			
Sun reduction		0.23	0.27						0.32		0.29			
Oper. time red.		1.00	1.00						1.00		1.00			
Wind dir. red.		0.65	0.65						0.65		0.65			
Total reduction		0.15	0.18						0.21		0.19			
Total, real		1	48						4		51			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Assumptions for shadow calculations

Shadow receptor: KS - H305

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February		March	April	May	June	July	August	September	October		November	December		
	1	08:44	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24	08:19		
		16:15	17:06		18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05		16:54	16:10		
	2	08:44	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26	08:21		
		16:16	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	16:09		
	3	08:44	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30		07:28	08:22		
		16:17	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	16:09		
	4	08:43	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30	08:24		
		16:18	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	16:08		
	5	08:43	08:07		07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33		07:32	08:25		
		16:20	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	16:07		
	6	08:43	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34	08:27		
		16:21	17:16		18:12	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:45	16:07		
	7	08:42	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36	08:28		
		16:22	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	16:06		
	8	08:42	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38	08:29		
		16:24	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	16:06		
	9	08:41	07:59		06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40	08:30		
		16:25	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	16:05		
	10	08:41	07:57		06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43		07:42	08:32		
		16:27	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	16:05		
	11	08:40	07:55		08:22 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44	08:33	
		16:28	17:26	5	08:27 (1)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	16:05	
	12	08:39	07:53		08:20 (1)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46	08:34	
		16:30	17:28	10	08:30 (1)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	16:05	
	13	08:38	07:51		08:18 (1)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48	08:35	
		16:31	17:30	13	08:31 (1)	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36		16:32	16:05	
	14	08:37	07:49		08:15 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:51 (1)	07:49	08:36	
		16:33	17:32	16	08:31 (1)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	3	08:54 (1)	16:31	16:05
	15	08:37	07:47		08:13 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		08:46 (1)	07:51	08:37
		16:35	17:34	19	08:32 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	13	08:59 (1)	16:29	16:05
	16	08:36	07:45		08:11 (1)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54		08:44 (1)	07:53	08:38
		16:36	17:36	22	08:33 (1)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	17	09:01 (1)	16:28	16:05
	17	08:35	07:43		08:09 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		08:42 (1)	07:55	08:39
		16:38	17:38	25	08:34 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	20	09:02 (1)	16:26	16:05
	18	08:34	07:41		08:09 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58		08:41 (1)	07:57	08:39
		16:40	17:40	25	08:34 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	22	09:03 (1)	16:25	16:05
	19	08:32	07:39		08:08 (1)	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59		08:40 (1)	07:59	08:40
		16:41	17:42	26	08:34 (1)	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	24	09:04 (1)	16:23	16:05
	20	08:31	07:37		08:08 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01		08:39 (1)	08:01	08:41
		16:43	17:44	26	08:34 (1)	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	25	09:04 (1)	16:22	16:06
	21	08:30	07:34		08:09 (1)	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03		08:39 (1)	08:02	08:41
		16:45	17:46	25	08:34 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	25	09:04 (1)	16:21	16:06
	22	08:29	07:32		08:08 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:39 (1)	08:04	08:42
		16:47	17:48	25	08:33 (1)	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	25	09:04 (1)	16:19	16:07
	23	08:27	07:30		08:09 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:38 (1)	08:06	08:42
		16:49	17:50	23	08:32 (1)	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	26	09:04 (1)	16:18	16:07
	24	08:26	07:28		08:10 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:38 (1)	08:08	08:43
		16:51	17:52	21	08:31 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	26	09:04 (1)	16:17	16:08
	25	08:25	07:26		08:11 (1)	06:19	06:05	05:11	04:56	05:27	06:21	07:15	07:11		07:39 (1)	08:10	08:43
		16:53	17:54	18	08:29 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	24	08:03 (1)	16:16	16:08
	26	08:23	07:23		08:13 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13		07:41 (1)	08:11	08:44
		16:54	17:56	15	08:28 (1)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	22	08:03 (1)	16:15	16:09
	27	08:22	07:21		08:15 (1)	06:14	06:01	05:08	04:57	05:31	06:24	07:19	07:15		07:43 (1)	08:13	08:44
		16:56	17:58	10	08:25 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	19	08:02 (1)	16:14	16:10
	28	08:20	07:19			06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17		07:45 (1)	08:15	08:44
		16:58	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16	08:01 (1)	16:13	16:11
	29	08:19				07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19		07:47 (1)	08:16	08:44
		17:00				19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	12	07:59 (1)	16:12	16:12
	30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21		07:50 (1)	08:18	08:44
		17:02				19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	9	07:59 (1)	16:11	16:13
	31	08:15				07:04		05:04		05:37	06:31		07:22		07:52 (1)		08:44
		17:04				19:58		21:44		21:27	20:21		16:56	4	07:56 (1)		16:14
Potential sun hours		250	273		367	420	494	510	512	460	382	328			259	233	
Total, worst case			324										332				
Sun reduction			0.23										0.29				
Oper. time red.			1.00										1.00				
Wind dir. red.			0.63										0.63				
Total reduction			0.15										0.19				
Total, real			48										62				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KT - H306

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (1)	08:19	
2	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	26	08:20 (1)	16:10
3	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	07:56 (1)	08:21	
4	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	23	08:19 (1)	16:09
5	08:44	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28	07:58 (1)	08:22	
6	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	19	08:17 (1)	16:09
7	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:00 (1)	08:24	
8	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	15	08:15 (1)	16:08
9	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32	08:02 (1)	08:25	
10	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	11	08:13 (1)	16:07
11	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:04 (1)	08:27	
12	16:21	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	5	08:09 (1)	16:07
13	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36		08:28	
14	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43		16:06	
15	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38		08:29	
16	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41		16:06	
17	08:41	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:30	
18	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39		16:05	
19	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42		08:32	
20	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37		16:05	
21	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44		08:33	
22	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36		16:05	
23	08:39	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46		08:34	
24	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34		16:05	
25	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48		08:35	
26	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32		16:05	
27	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	09:04 (1)	16:36	
28	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	8	09:12 (1)	16:31	
29	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	09:00 (1)	07:51	16:05	
30	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16	09:16 (1)	16:29	
31	08:36	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:58 (1)	07:53	16:05	
32	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	20	09:18 (1)	16:28	
33	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:56 (1)	07:55	16:05	
34	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	24	09:20 (1)	16:26	
35	08:33	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:55 (1)	07:57	16:05	
36	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	26	09:21 (1)	16:25	
37	08:32	07:39	06:33	06:18	05:19	04:54	05:19	06:10	07:05	07:59	08:54 (1)	07:59	16:05	
38	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	28	09:22 (1)	16:23	
39	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:53 (1)	08:01	16:05	
40	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	29	09:22 (1)	16:22	
41	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:52 (1)	08:02	16:06	
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	31	09:23 (1)	16:21	
43	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:51 (1)	08:04	16:06	
44	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	32	09:23 (1)	16:19	
45	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:51 (1)	08:06	16:07	
46	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	32	09:23 (1)	16:18	
47	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:50 (1)	08:08	16:07	
48	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	33	09:23 (1)	16:17	
49	08:25	07:26	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	07:50 (1)	08:09	16:08	
50	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	33	08:23 (1)	16:16	
51	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	07:50 (1)	08:11	16:08	
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	33	08:23 (1)	16:15	
53	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	07:15	07:50 (1)	08:13	16:09	
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	33	08:23 (1)	16:14	
55	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17	07:50 (1)	08:15	16:10	
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	32	08:22 (1)	16:13	
57	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	07:51 (1)	08:16	16:11	
58	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	30	08:21 (1)	16:12	
59	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21	07:52 (1)	08:18	16:12	
60	17:02		19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	30	08:22 (1)	16:11	
61	08:15		07:04	05:54	05:04	04:57	05:37	06:31		07:22	07:53 (1)	08:18	16:12	
62	17:04		19:58	21:44	21:44	21:44	21:27	20:21		16:56	28	08:21 (1)	16:13	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	99	233	
Total, worst case			586									99		
Sun reduction			0.23									0.27		
Oper. time red.			1.00									1.00		
Wind dir. red.			0.62									0.62		
Total reduction			0.15									0.17		
Total, real			85									16		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KU - H307

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1 08:44	08:14	08:42 (3)	07:16	08:33 (1)	07:01	05:52
16:15	17:06	10 08:52 (3)	18:02	29 09:02 (1)	20:00	20:56
2 08:44	08:12	08:40 (3)	07:14	08:36 (1)	06:59	05:50
16:16	17:08	12 08:52 (1)	18:04	25 09:01 (1)	20:02	20:57
3 08:44	08:10	08:38 (3)	07:12	08:37 (1)	06:56	05:48
16:17	17:10	19 08:57 (1)	18:06	20 08:57 (1)	20:04	20:59
4 08:43	08:09	08:36 (3)	07:09	08:41 (1)	06:54	05:46
16:18	17:12	24 09:00 (1)	18:08	12 08:53 (1)	20:06	21:01
5 08:43	08:07	08:34 (3)	07:07		06:52	05:44
16:20	17:14	28 09:02 (1)	18:10		20:08	21:03
6 08:43	08:05	08:32 (3)	07:05		06:49	05:42
16:21	17:16	31 09:03 (1)	18:11		20:09	21:05
7 08:42	08:03	08:32 (3)	07:02		06:47	05:40
16:22	17:18	33 09:05 (1)	18:13		20:11	21:06
8 08:42	08:01	08:33 (1)	07:00	07:24 (2)	06:44	05:38
16:24	17:20	33 09:06 (1)	18:15	3 07:27 (2)	20:13	21:08
9 08:41	07:59	08:32 (1)	06:57	07:22 (2)	06:42	05:36
16:25	17:22	35 09:07 (1)	18:17	7 07:29 (2)	20:15	21:10
10 08:41	07:57	08:31 (1)	06:55	07:19 (2)	06:40	05:35
16:27	17:24	37 09:08 (1)	18:19	9 07:28 (2)	20:17	21:12
11 08:40	07:55	08:30 (1)	06:53	07:17 (2)	06:37	05:33
16:28	17:26	39 09:09 (1)	18:21	12 07:29 (2)	20:19	21:13
12 08:39	07:53	08:30 (1)	06:50	07:14 (2)	06:35	05:31
16:30	17:28	40 09:10 (1)	18:23	14 07:28 (2)	20:21	21:15
13 08:38	07:51	08:29 (1)	06:48	07:12 (2)	06:32	05:29
16:31	17:30	42 09:11 (1)	18:25	16 07:28 (2)	20:22	21:17
14 08:37	07:49	08:28 (1)	06:45	07:09 (2)	06:30	05:27
16:33	17:32	42 09:10 (1)	18:27	18 07:27 (2)	20:24	21:19
15 08:37	07:47	08:28 (1)	06:43	07:10 (2)	06:28	05:26
16:35	17:34	43 09:11 (1)	18:29	16 07:26 (2)	20:26	21:20
16 08:36	07:45	08:28 (1)	06:41	07:11 (2)	06:25	05:24
16:36	17:36	43 09:11 (1)	18:30	13 07:24 (2)	20:28	21:22
17 08:35	07:43	08:28 (1)	06:38	07:13 (2)	06:23	05:22
16:38	17:38	44 09:12 (1)	18:32	9 07:22 (2)	20:30	21:24
18 08:33	07:41	08:28 (1)	06:36		06:21	05:21
16:40	17:40	44 09:12 (1)	18:34		20:32	21:25
19 08:32	07:39	08:27 (1)	06:33		06:18	05:19
16:41	17:42	44 09:11 (1)	18:36		20:33	21:27
20 08:31	07:37	08:28 (1)	06:31		06:16	05:18
16:43	17:44	43 09:11 (1)	18:38		20:35	21:28
21 08:30	07:34	08:28 (1)	06:28		06:14	05:16
16:45	17:46	43 09:11 (1)	18:40		20:37	21:30
22 08:29	07:32	08:28 (1)	06:26		06:12	05:15
16:47	17:48	42 09:10 (1)	18:42		20:39	21:31
23 08:27	07:30	08:28 (1)	06:23		06:09	05:13
16:49	17:50	42 09:10 (1)	18:44		20:41	21:33
24 08:26	07:28	08:29 (1)	06:21		06:07	05:12
16:51	17:52	40 09:09 (1)	18:45		20:43	21:35
25 08:25	07:26	08:29 (1)	06:18		06:05	05:11
16:53	17:54	39 09:08 (1)	18:47		20:45	21:36
26 08:23	07:23	08:30 (1)	06:16		06:03	05:09
16:54	17:56	37 09:07 (1)	18:49		20:46	21:37
27 08:22	07:21	08:31 (1)	06:14		06:01	05:08
16:56	17:58	35 09:06 (1)	18:51		20:48	21:39
28 08:20	07:19	08:32 (1)	06:11		05:59	05:07
16:58	18:00	32 09:04 (1)	18:53		20:50	21:40
29 08:19	08:47 (3)		07:09		05:56	05:06
17:00	2 08:49 (3)		19:55		20:52	21:42
30 08:17	08:45 (3)		07:06		05:54	05:05
17:02	5 08:50 (3)		19:57		20:54	21:43
31 08:15	08:44 (3)		07:04			05:04
17:04	7 08:51 (3)		19:58			21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case	14	996	203			
Sun reduction	0.24	0.23	0.27			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.61	0.62	0.64			
Total reduction	0.15	0.14	0.17			
Total, real	2	143	35			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KU - H307

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (2) 16:54	08:01 (1) 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (2) 16:52	08:02 (1) 16:09
3	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:56 (2) 16:50	08:02 (3) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:58 (2) 16:48	08:01 (3) 16:08
5	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	08:00 (2) 16:46	08:02 (3) 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:02 (2) 16:45	08:04 (3) 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:06 (3) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:09 (3) 16:06
9	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	09:20 (1) 16:39	08:11 (3) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	09:13 (1) 16:37	08:13 (3) 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	09:10 (1) 16:36	08:15 (3) 16:05
12	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	09:08 (1) 16:34	08:17 (3) 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	09:06 (1) 16:32	08:19 (3) 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	09:04 (1) 16:31	08:21 (3) 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	09:03 (1) 16:29	08:23 (3) 16:05
16	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	09:02 (1) 16:28	08:25 (3) 16:05
17	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	09:01 (1) 16:26	08:27 (3) 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	09:00 (1) 16:25	08:29 (3) 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	08:59 (1) 16:23	08:31 (3) 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:59 (1) 16:22	08:33 (3) 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:58 (1) 16:21	08:35 (3) 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:58 (1) 16:19	08:37 (3) 16:07
23	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:58 (1) 16:18	08:39 (3) 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:58 (1) 16:17	08:41 (3) 16:08
25	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	07:57 (1) 16:16	08:43 (3) 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 08:02 (2)	07:57 (1) 16:15	08:45 (3) 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 08:05 (2)	07:58 (1) 16:14	08:47 (3) 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 08:06 (2)	07:58 (1) 16:13	08:49 (3) 16:11
29	05:34 21:30	06:28 20:26	07:23 19:10	07:19 08:07 (2)	07:58 (1) 16:12	08:51 (3) 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:21 08:08 (2)	07:58 (1) 16:11	08:53 (3) 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56	08:00 (1) 08:39 (1)	08:55 (3) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case			67	886	272	
Sun reduction			0.32	0.29	0.27	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.66	0.62	0.61	
Total reduction			0.21	0.18	0.16	
Total, real			14	160	44	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KV - H308

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		09:40 (3)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24					07:24		08:19		11:02 (1)	
	16:15	56	11:49 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54					16:54		16:10	28	11:30 (1)	
2	08:44		09:41 (3)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26					07:26		08:21		11:01 (1)	
	16:16	55	11:50 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52					16:52		16:09	31	11:32 (1)	
3	08:44		09:42 (3)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28					07:28		08:22		11:00 (1)	
	16:17	51	11:49 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50					16:50		16:08	32	11:32 (1)	
4	08:43		09:43 (3)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30					07:30		08:24		11:00 (1)	
	16:18	50	11:50 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48					16:48		16:08	34	11:34 (1)	
5	08:43		09:44 (3)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32					07:32		08:25		11:00 (1)	
	16:20	47	11:49 (1)	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46					16:46		16:07	34	11:34 (1)	
6	08:43		09:46 (3)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34					07:34		08:27		10:33 (3)	
	16:21	44	11:50 (1)	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:45					16:45		16:07	43	11:36 (1)	
7	08:42		09:50 (3)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36					07:36		08:28		09:31 (3)	
	16:22	35	11:49 (1)	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43					16:43		16:06	46	11:36 (1)	
8	08:42		11:15 (1)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38					07:38		08:29		09:31 (3)	
	16:24	34	11:49 (1)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41					16:41		16:06	50	11:38 (1)	
9	08:41		11:17 (1)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40					07:40		08:30		09:31 (3)	
	16:25	32	11:49 (1)	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39					16:39		16:05	51	11:38 (1)	
10	08:41		11:18 (1)	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42					07:42		08:32		09:30 (3)	
	16:27	31	11:49 (1)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37					16:37		16:05	54	11:39 (1)	
11	08:40		11:20 (1)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44					07:44		08:33		09:30 (3)	
	16:28	28	11:48 (1)	17:26	1	08:23 (2)	18:21	20:19	21:13	21:56	21:04	19:54	18:41		16:36					16:36		16:05	56	11:40 (1)	
12	08:39		11:21 (1)	07:53		08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52		07:46					07:46		08:34		09:31 (3)	
	16:30	26	11:47 (1)	17:28	4	08:24 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52		16:34					16:34		16:05	56	11:41 (1)	
13	08:38		11:23 (1)	07:51		08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54		07:48					07:48		08:35		09:31 (3)	
	16:31	23	11:46 (1)	17:30	8	08:26 (2)	17:37	20:22	21:17	21:57	21:01	19:49	18:36		16:32					16:32		16:05	58	11:42 (1)	
14	08:37		11:25 (1)	07:49		08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56		07:50					07:50		08:36		09:31 (3)	
	16:33	20	11:45 (1)	17:32	11	08:26 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47		16:34					16:34		16:05	59	11:42 (1)	
15	08:36		11:28 (1)	07:47		08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58		07:52					07:52		08:37		09:31 (3)	
	16:35	15	11:43 (1)	17:34	14	08:27 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44		16:29				08:41 (2)	07:53		16:05	61	11:43 (1)	
16	08:36		11:32 (1)	07:45		08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59		07:54					07:54		08:38		09:31 (3)	
	16:36	7	11:39 (1)	17:36	16	08:27 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42		16:29	11			08:41 (2)	07:53		16:05	60	11:43 (1)	
17	08:35		07:43			08:09 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01		07:56					08:38 (2)	07:55		08:39		09:31 (3)
	16:38		17:38		19	08:28 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39		18:27	16			08:54 (2)	07:52		16:05	61	11:43 (1)	
18	08:33		07:41			08:07 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03		07:57					08:37 (2)	07:57		08:39		09:32 (3)
	16:40		17:40		21	08:28 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37		18:24	19			08:56 (2)	07:52		16:05	61	11:44 (1)	
19	08:32		07:39			08:04 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05		07:59					08:35 (2)	07:59		08:40		09:32 (3)
	16:41		17:42		23	08:27 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34		18:22	21			08:56 (2)	07:53		16:05	63	11:45 (1)	
20	08:31		07:37			08:03 (2)	06:31	06:16	05:17	04:54	05:20	06:12	07:06		08:01				08:34 (2)	07:51		08:41		09:32 (3)	
	16:43		17:44		24	08:27 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32		18:20	23			08:57 (2)	07:52		16:06	63	11:45 (1)	
21	08:30		07:34			08:04 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08		08:03				08:34 (2)	08:02		08:41		09:33 (3)	
	16:45		17:46		23	08:27 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29		18:18	23			08:57 (2)	07:52		16:06	63	11:46 (1)	
22	08:29		07:32			08:03 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10		08:05				08:33 (2)	08:04		08:42		09:33 (3)	
	16:47		17:48		23	08:26 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27		18:15	25			08:58 (2)	07:51		16:07	63	11:46 (1)	
23	08:27		07:30			08:04 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12		08:07				08:35 (2)	08:06		08:42		09:34 (3)	
	16:49		17:50		21	08:25 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24		18:13	23			08:58 (2)	07:51		16:07	63	11:47 (1)	
24	08:26		07:28			08:06 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14		08:09				08:37 (2)	08:08		08:43		09:34 (3)	
	16:51		17:52		18	08:24 (2)	18:45	20:43	21:35	22:01	21:38	20:37	19:22		18:11	20			08:57 (2)	07:51		16:08	63	11:47 (1)	
25	08:25		07:25			08:07 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15		07:11				07:39 (2)	08:09		08:43		09:35 (3)	
	16:52		17:54		14	08:21 (2)	18:47	20:45	21:36	22:01	21:37	20:35	19:19		17:09	18			07:57 (2)	07:51		16:08	61	11:47 (1)	
26	08:23		07:23			08:10 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17		07:13				07:41 (2)	08:11				09:36 (3)	
	16:54		17:56		9	08:19 (2)	18:49	20:46	21:37	22:01	21:35	20:33	19:17		17:07	16			07:57 (2)	07:52		16:09	61	11:48 (1)	
27	08:22		07:21			08:14	06:14	06:01	05:08	04:56	05:31	06:24	07:19		08:13				07:43 (2)	08:13				09:36 (3)	
	16:56		17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04		17:04				07:56 (2)	07:52		16:14	15	11:22 (1)	
28	08:20		07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17		07:17				07:45 (2)	08:14				09:37 (3)	
	16:58		18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02		17:02	10			07:55 (2)	07:52		16:13	20	11:25 (1)	
29	08:19					07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19		07:19				07:47 (2)	08:16				09:38 (3)	
	17:00					19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00		17:00	7			07:54 (2)	07:52		16:12	23	11:26 (1)	
30	08:17					07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20		07:20				07:50 (2)	08:18				09:39 (3)	
	17:02					19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58		16:58	4			07:54 (2)	07:52		16:11	26	11:28 (1)	
31	08:15					07:04																			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KW - H309

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

		January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	12:23 (1)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	
	16:15	30	12:53 (1)	17:06	08:44 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05
2	08:44		12:25 (1)	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28
	16:16	29	12:54 (1)	17:08	08:46 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
3	08:44		12:25 (1)	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
	16:17	28	12:53 (1)	17:10	08:48 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
4	08:43		12:27 (1)	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32
	16:18	26	12:53 (1)	17:12	08:49 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
5	08:43		12:28 (1)	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33
	16:20	24	12:52 (1)	17:14	08:50 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55
6	08:43		12:30 (1)	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35
	16:21	22	12:52 (1)	17:16	08:51 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53
7	08:42		12:31 (1)	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37
	16:22	20	12:51 (1)	17:18	08:51 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
8	08:42		12:32 (1)	08:01	08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
	16:24	18	12:50 (1)	17:20	08:52 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48
9	08:41		12:36 (1)	07:59	08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
	16:25	13	12:49 (1)	17:22	08:52 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45
10	08:40		12:39 (1)	07:57	08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43
	16:27	7	12:46 (1)	17:24	08:53 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43
11	08:40		07:55		08:25 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
	16:28		17:26		08:53 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41
12	08:39		07:53		08:25 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46
	16:30		17:28		08:53 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38
13	08:38		07:51		08:25 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48
	16:31		17:30		08:53 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36
14	08:37		07:49		08:25 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
	16:33		17:32		08:51 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33
15	08:36		07:47		08:26 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52
	16:34		17:34		08:51 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31
16	08:36		07:45		08:27 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54
	16:36		17:36		08:50 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29
17	08:35		07:43		08:28 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56
	16:38		17:38		08:50 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27
18	08:33		07:41		08:29 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57
	16:40		17:40		08:47 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24
19	08:32		07:39		08:30 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
	16:41		17:42		08:46 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22
20	08:31		07:37		08:33 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
	16:43		17:44		08:43 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20
21	08:30		07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03
	16:45		17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17
22	08:29		07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05
	16:47		17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15
23	08:27		07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07
	16:49		17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13
24	08:26		07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09
	16:51		17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11
25	08:25		07:25			06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10
	16:52		17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09
26	08:23		07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:11
	16:54		17:56			18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07
27	08:22		07:21			06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:13
	16:56		17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04
28	08:20		07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:14
	16:58		18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02
29	08:19					07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:16
	17:00					19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00
30	08:17					07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:18
	17:02					19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:02
31	08:15					07:04		05:04		05:37	06:31	07:22	08:16
	17:04					19:58		21:44		21:27	20:21	19:05	18:00
Potential sun hours	250		273		367	420	494	510	512	460	382	328	259
Total, worst case		217	391										160
Sun reduction		0.24	0.23										0.27
Oper. time red.		1.00	1.00										1.00
Wind dir. red.		0.63	0.62										0.62
Total reduction		0.15	0.14										0.13
Total, real		33	56										114

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KX - H310

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KY - H311

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KZ - H312

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	16:26 (5) 18:02	07:16 17:34 (4)	07:01 20:00	05:52 20:25
2	08:44 16:16	08:12 17:08	16:27 (5) 18:04	07:14 17:36 (4)	06:59 20:02	25 20:26 (2)
3	08:43 16:17	08:10 17:10	16:26 (5) 18:06	07:11 17:38 (4)	06:56 20:04	20:01 (2) 05:02
4	08:43 16:18	08:08 17:12	16:26 (5) 18:07	07:09 17:41 (4)	06:54 20:06	20:27 (2) 21:46
5	08:43 16:19	08:07 17:14	16:26 (5) 18:09	07:07 17:42 (4)	06:51 20:07	20:00 (2) 05:01
6	08:42 16:21	08:05 17:16	16:26 (5) 18:11	07:04 17:44 (4)	06:49 20:09	20:28 (2) 21:48
7	08:42 16:22	08:03 17:18	16:26 (5) 18:13	07:02 17:46 (4)	06:47 20:11	20:00 (2) 05:00
8	08:42 16:24	08:01 17:20	16:26 (5) 18:15	07:00 17:47 (4)	06:44 20:13	20:28 (2) 21:49
9	08:41 16:25	07:59 17:22	16:27 (5) 18:17	06:57 17:46 (4)	06:42 20:15	20:00 (2) 04:59
10	08:40 16:26	07:57 17:24	16:28 (5) 18:19	06:55 17:46 (4)	06:39 20:17	20:28 (2) 21:50
11	08:40 16:28	07:55 17:26	16:46 (5) 18:21	06:52 17:44 (4)	06:37 20:19	20:00 (2) 04:58
12	08:39 16:30	07:53 17:28	16:45 (5) 18:23	06:50 17:45 (4)	06:35 20:20	20:01 (2) 04:57
13	08:38 16:31	07:51 17:30	16:32 (5) 18:25	06:48 17:44 (4)	06:32 20:22	20:02 (2) 04:56
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 17:42 (4)	06:28 20:24	20:04 (2) 04:55
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 18:02 (3)	06:26 20:26	20:05 (2) 04:54
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 18:04 (3)	06:25 20:28	20:06 (2) 04:53
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 18:06 (3)	06:23 20:30	20:07 (2) 04:52
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 18:07 (3)	06:21 20:31	20:08 (2) 04:51
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 18:10 (3)	06:18 20:33	20:09 (2) 04:50
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 18:11 (3)	06:16 20:35	20:10 (2) 04:49
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 18:13 (3)	06:14 20:37	20:11 (2) 04:48
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 18:14 (3)	06:12 20:39	20:12 (2) 04:47
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 18:14 (3)	06:09 20:41	20:13 (2) 04:46
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 18:12 (3)	06:07 20:42	20:14 (2) 04:45
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 18:10 (3)	06:05 20:44	20:15 (2) 04:44
26	08:23 16:54	07:23 17:56	06:16 17:24 (4) 18:49	06:03 18:00 (3)	06:03 20:46	20:16 (2) 04:43
27	08:22 16:56	07:21 17:58	06:13 17:22 (4) 18:51	06:01 20:48	06:01 20:19 (2)	20:17 (2) 04:42
28	08:20 16:58	07:18 18:00	06:11 17:19 (4) 18:53	05:58 20:50	05:58 20:21 (2)	20:18 (2) 04:41
29	08:18 17:00		07:08 19:54	05:56 20:52	05:56 20:22 (2)	20:19 (2) 04:40
30	08:17 17:02	16:28 (5) 16:30 (5)	07:06 19:56	05:54 20:53	05:54 20:24 (2)	20:20 (2) 04:39
31	08:15 17:04	16:27 (5) 16:32 (5)	07:04 19:58		05:04 21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case	7	227	616	104	337	
Sun reduction	0.24	0.23	0.27	0.35	0.38	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.66	0.66	0.68	0.65	0.65	
Total reduction	0.16	0.15	0.18	0.23	0.25	
Total, real	1	35	113	24	83	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KZ - H312

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July		August		September		October		November		December		
1	04:59		05:39	20:14 (2)	06:33		07:26	17:53 (4)	07:24	15:57 (5)	08:19		
	22:00		21:25	20	20:34 (2)	20:18	19:05	30	18:23 (4)	16:54	19	16:16 (5)	16:10
2	04:59		05:40		20:14 (2)	06:35	07:28		17:52 (4)	07:26		15:56 (5)	08:21
	22:00		21:23	21	20:35 (2)	20:16	19:02	32	18:24 (4)	16:52	20	16:16 (5)	16:09
3	05:00		05:42		20:12 (2)	06:36	07:30		17:51 (4)	07:28		15:56 (5)	08:22
	21:59		21:21	23	20:35 (2)	20:13	19:00	33	18:24 (4)	16:50	21	16:17 (5)	16:08
4	05:01		05:44		20:12 (2)	06:38	07:31		17:51 (4)	07:30		15:56 (5)	08:24
	21:59		21:19	24	20:36 (2)	20:11	18:57	33	18:24 (4)	16:48	21	16:17 (5)	16:08
5	05:02		05:45		20:11 (2)	06:40	07:33		17:51 (4)	07:32		15:55 (5)	08:25
	21:58		21:17	25	20:36 (2)	20:09	18:55	33	18:24 (4)	16:46	20	16:15 (5)	16:07
6	05:03		05:47		20:11 (2)	06:42	07:35		17:50 (4)	07:34		15:55 (5)	08:26
	21:58		21:15	26	20:37 (2)	20:06	18:52	34	18:24 (4)	16:44	17	16:12 (5)	16:07
7	05:04		05:49		20:11 (2)	06:43	07:37		17:49 (4)	07:36		15:56 (5)	08:28
	21:57		21:13	27	20:38 (2)	20:04	18:50	32	18:21 (4)	16:43	14	16:10 (5)	16:06
8	05:05		05:50		20:10 (2)	06:45	07:39		17:49 (4)	07:38		15:56 (5)	08:29
	21:56		21:11	27	20:37 (2)	20:01	18:48	29	18:18 (4)	16:41	12	16:08 (5)	16:06
9	05:06		05:52		20:10 (2)	06:47	07:41		17:49 (4)	07:40		15:56 (5)	08:30
	21:55		21:10	28	20:38 (2)	19:59	18:45	27	18:16 (4)	16:39	10	16:06 (5)	16:05
10	05:07		05:54		20:09 (2)	06:49	07:42		17:50 (4)	07:42		15:58 (5)	08:31
	21:55		21:07	28	20:37 (2)	19:56	18:43	24	18:14 (4)	16:37	7	16:05 (5)	16:05
11	05:08		05:56		20:09 (2)	06:50	07:44		17:50 (4)	07:44		15:59 (5)	08:33
	21:54		21:05	26	20:35 (2)	19:54	18:40	21	18:11 (4)	16:35	4	16:03 (5)	16:05
12	05:09		05:57		20:10 (2)	06:52	07:46		17:51 (4)	07:45		16:00 (5)	08:34
	21:53		21:03	24	20:34 (2)	19:51	18:38	18	18:09 (4)	16:34	1	16:01 (5)	16:05
13	05:10		05:59		20:09 (2)	06:54	07:48		17:52 (4)	07:47			08:35
	21:52		21:01	22	20:31 (2)	19:49	18:36	15	18:07 (4)	16:32			16:05
14	05:12		06:01		20:10 (2)	06:56	07:50		17:53 (4)	07:49			08:36
	21:51		20:59	19	20:29 (2)	19:47	18:33	11	18:04 (4)	16:31			16:04
15	05:13		06:03		20:11 (2)	06:58	07:52		17:55 (4)	07:51			08:37
	21:50		20:57	17	20:28 (2)	19:44	18:31	7	18:02 (4)	16:29			16:05
16	05:14		06:04		20:11 (2)	06:59	07:54		17:57 (4)	07:53			08:38
	21:49		20:55	14	20:25 (2)	19:42	18:29	2	17:59 (4)	16:27			16:05
17	05:16		06:06		20:12 (2)	07:01	18:51 (3)	07:55		07:55			08:38
	21:47		20:53	11	20:23 (2)	19:39	1 18:52 (3)	18:26		16:26			16:05
18	05:17		06:08		20:13 (2)	07:03	18:46 (3)	07:57		07:57			08:39
	21:46		20:50	9	20:22 (2)	19:37	11 18:57 (3)	18:24		16:24			16:05
19	05:18		06:10		20:14 (2)	07:05	18:44 (3)	07:59		07:59			08:40
	21:45		20:48	5	20:19 (2)	19:34	15 18:59 (3)	18:22		16:23			16:05
20	05:20		06:12			07:06	18:42 (3)	08:01		08:00			08:41
	21:44		20:46			19:32	18 19:00 (3)	18:20		16:22			16:06
21	05:21		06:13			07:08	18:40 (3)	08:03		08:02			08:41
	21:42		20:44			19:29	20 19:00 (3)	18:17		16:20			16:06
22	05:23		06:15			07:10	18:39 (3)	08:05		08:04			08:42
	21:41		20:42			19:27	19 18:58 (3)	18:15		16:19			16:06
23	05:24		06:17			07:12	18:39 (3)	08:07		08:06			08:42
	21:39		20:39			19:24	17 18:56 (3)	18:13		16:18			16:07
24	05:26		06:19			07:13	18:39 (3)	08:09		08:08			08:43
	21:38		20:37			19:22	15 18:54 (3)	18:11		16:17			16:08
25	05:27		06:20			07:15	18:38 (3)	07:11		08:09			08:43
	21:36		20:35			19:19	13 18:51 (3)	17:09		16:16			16:08
26	05:29		06:22			07:17	18:03 (4)	07:13		08:11			08:43
	21:35		20:32			19:17	24 18:48 (3)	17:06		16:14			16:09
27	05:30		06:24			07:19	18:01 (4)	07:14		08:13			08:44
	21:33		20:30			19:14	25 18:46 (3)	17:04		16:13			16:10
28	05:32		06:26			07:21	17:58 (4)	07:16	16:05 (5)	08:14			08:44
	21:32		20:28			19:12	28 18:44 (3)	17:02	2 16:07 (5)	16:12			16:11
29	05:34	20:19 (2)	06:27			07:22	17:57 (4)	07:18		16:01 (5)	08:16		08:44
	21:30	10 20:29 (2)	20:25			19:09	25 18:22 (4)	17:00	10 16:11 (5)	16:12			16:11
30	05:35	20:17 (2)	06:29			07:24	17:54 (4)	07:20		15:59 (5)	08:18		08:44
	21:28	14 20:31 (2)	20:23			19:07	28 18:22 (4)	16:58	14 16:13 (5)	16:11			16:12
31	05:37	20:16 (2)	06:31					07:22		15:57 (5)			08:44
	21:26	17 20:33 (2)	20:21					16:56	17 16:14 (5)				16:13
Potential sun hours	512		460			382		328		259			233
Total, worst case		41		396		259		424		166			
Sun reduction		0.32		0.34		0.32		0.29		0.27			
Oper. time red.		1.00		1.00		1.00		1.00		1.00			
Wind dir. red.		0.65		0.65		0.68		0.68		0.66			
Total reduction		0.21		0.22		0.22		0.20		0.17			
Total, real		9		87		56		84		29			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LA - H313

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	19:09 (3) 19:14 (3)	05:52 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	16:38 (5) 18:06	07:11 20:04	05:48 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	16:36 (5) 18:07	07:09 20:06	05:46 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	16:35 (5) 18:09	07:07 20:07	05:44 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	16:34 (5) 18:11	07:04 17:38 (4)	05:42 17:45 (4)	04:59 21:51
7	08:42 16:22	08:03 17:18	16:34 (5) 18:13	07:02 17:46 (4)	05:40 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	16:33 (5) 18:15	07:00 17:32 (4)	05:38 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	16:33 (5) 18:17	06:57 17:30 (4)	05:36 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	16:33 (5) 18:19	06:55 17:52 (4)	05:34 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	16:33 (5) 18:21	06:52 17:28 (4)	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	16:32 (5) 18:23	06:50 17:25 (4)	05:31 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	16:32 (5) 18:25	06:48 17:26 (4)	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	16:33 (5) 18:27	06:45 17:25 (4)	05:27 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	16:34 (5) 18:28	06:43 17:25 (4)	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	16:35 (5) 18:30	06:40 17:24 (4)	05:24 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	16:37 (5) 18:32	06:38 17:24 (4)	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	16:38 (5) 18:34	06:35 17:24 (4)	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 17:24 (4)	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 18:11 (3)	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 18:13 (3)	05:16 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 18:15 (3)	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 18:17 (3)	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 18:18 (3)	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 18:21 (3)	05:11 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 18:22 (3)	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 18:23 (3)	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 18:23 (3)	05:07 21:40	04:57 22:01
29	08:18 17:00		07:08 19:54	05:56 19:21 (3)	05:06 21:41	04:57 22:01
30	08:17 17:02		07:06 19:56	05:54 19:20 (3)	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	05:53 19:17 (3)	05:04 21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case		242	754	5	582	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.64	
Total reduction		0.15	0.18	0.24	0.24	
Total, real		37	138	1	142	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LA - H313

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	28	20:24 (2) 20:52 (2)	06:33 20:18		07:26 19:05	18:05 (4) 18:36 (4)	07:24 16:54	16:02 (5) 16:23 (5)	08:19 16:10
2	04:59 22:00	05:40 21:23	27	20:25 (2) 20:52 (2)	06:35 20:16		07:28 19:02	18:06 (4) 18:33 (4)	07:26 16:52	16:02 (5) 16:21 (5)	08:21 16:09
3	05:00 21:59	05:42 21:21	26	20:24 (2) 20:50 (2)	06:36 20:13		07:30 19:00	18:07 (4) 18:31 (4)	07:28 16:50	16:03 (5) 16:19 (5)	08:22 16:08
4	05:01 21:59	05:44 21:19	23	20:25 (2) 20:48 (2)	06:38 20:11		07:31 18:57	18:08 (4) 18:29 (4)	07:30 16:48	16:03 (5) 16:17 (5)	08:24 16:08
5	05:02 21:58	05:45 21:17	21	20:25 (2) 20:46 (2)	06:40 20:09		07:33 18:55	18:09 (4) 18:26 (4)	07:32 16:46	16:04 (5) 16:15 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	19	20:26 (2) 20:45 (2)	06:42 20:06		07:35 18:52	18:10 (4) 18:24 (4)	07:34 16:44	16:05 (5) 16:12 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	16	20:27 (2) 20:43 (2)	06:43 20:04		07:37 18:50	18:11 (4) 18:21 (4)	07:36 16:43	16:06 (5) 16:10 (5)	08:28 16:06
8	05:05 21:56	05:50 21:11	14	20:27 (2) 20:41 (2)	06:45 20:01		07:39 18:48	18:15 (4) 18:18 (4)	07:38 16:41	08:29 16:06	
9	05:06 21:55	05:52 21:09	10	20:29 (2) 20:39 (2)	06:47 19:59		07:41 18:45		07:40 16:39		08:30 16:05
10	05:07 21:55	05:54 21:07	7	20:30 (2) 20:37 (2)	06:49 19:56		07:42 18:43		07:42 16:37		08:31 16:05
11	05:08 21:54	05:56 21:05	3	20:32 (2) 20:35 (2)	06:50 19:54	19:02 (3) 19:06 (3)	07:44 18:40		07:44 16:35		08:33 16:05
12	05:09 21:53	05:57 21:03		06:52 19:51	18:58 (3) 19:09 (3)	07:46 18:38		07:45 16:34		08:34 16:05	
13	05:10 21:52	05:59 21:01		06:54 19:49	18:56 (3) 19:11 (3)	07:48 18:36		07:47 16:32		08:35 16:05	
14	05:12 21:51	20:34 (2) 20:41 (2)	7	06:01 20:59	06:56 19:47	18:53 (3) 19:11 (3)	07:50 18:33		07:49 16:31		08:36 16:04
15	05:13 21:50	20:32 (2) 20:43 (2)	6	06:03 20:57	06:58 19:44	18:52 (3) 19:12 (3)	07:52 18:31		07:51 16:29		08:37 16:05
16	05:14 21:49	20:30 (2) 20:44 (2)	11	06:04 20:55	06:59 19:42	18:24 (4) 19:13 (3)	07:54 18:29		07:53 16:27		08:38 16:05
17	05:16 21:47	20:30 (2) 20:46 (2)	14	06:06 20:53	07:01 19:39	18:19 (4) 19:11 (3)	07:55 18:26		07:55 16:26		08:38 16:05
18	05:17 21:46	20:29 (2) 20:47 (2)	16	06:08 20:50	07:03 19:37	18:16 (4) 19:08 (3)	07:57 18:24		07:57 16:24		08:39 16:05
19	05:18 21:45	20:28 (2) 20:47 (2)	18	06:10 20:48	07:05 19:34	18:14 (4) 19:06 (3)	07:59 18:22		07:59 16:23		08:40 16:05
20	05:20 21:44	20:26 (2) 20:49 (2)	19	06:12 20:46	07:06 19:32	18:13 (4) 19:04 (3)	08:01 18:20		08:00 16:22		08:41 16:06
21	05:21 21:42	20:27 (2) 20:49 (2)	21	06:13 20:44	07:08 19:29	18:11 (4) 19:01 (3)	08:03 18:17		08:02 16:20		08:41 16:06
22	05:23 21:41	20:26 (2) 20:49 (2)	22	06:15 20:42	07:10 19:27	18:10 (4) 18:58 (3)	08:05 18:15		08:04 16:19		08:42 16:06
23	05:24 21:39	20:26 (2) 20:51 (2)	23	06:17 20:39	07:12 19:24	18:09 (4) 18:56 (3)	08:07 18:13	17:12 (5) 17:15 (5)	08:06 16:18		08:42 16:07
24	05:26 21:38	20:25 (2) 20:51 (2)	25	06:19 20:37	07:13 19:22	18:08 (4) 18:54 (3)	08:09 18:11	17:08 (5) 17:19 (5)	08:08 16:17		08:43 16:08
25	05:27 21:36	20:25 (2) 20:52 (2)	26	06:20 20:35	07:15 19:19	18:07 (4) 18:42 (4)	07:11 17:09	16:06 (5) 16:21 (5)	08:09 16:16		08:43 16:08
26	05:29 21:35	20:25 (2) 20:52 (2)	27	06:22 20:32	07:17 19:17	18:06 (4) 18:42 (4)	07:13 17:06	16:04 (5) 16:22 (5)	08:11 16:14		08:43 16:09
27	05:30 21:33	20:24 (2) 20:51 (2)	28	06:24 20:30	07:19 19:14	18:06 (4) 18:41 (4)	07:14 17:04	16:03 (5) 16:23 (5)	08:13 16:13		08:44 16:10
28	05:32 21:32	20:24 (2) 20:52 (2)	29	06:26 20:28	07:21 19:12	18:06 (4) 18:41 (4)	07:16 17:02	16:02 (5) 16:23 (5)	08:14 16:12		08:44 16:11
29	05:34 21:30	20:24 (2) 20:52 (2)	30	06:27 20:25	07:22 19:09	18:06 (4) 18:41 (4)	07:18 17:00	16:02 (5) 16:24 (5)	08:16 16:12		08:44 16:11
30	05:35 21:28	20:24 (2) 20:52 (2)	31	06:29 20:23	07:24 19:07	18:05 (4) 18:38 (4)	07:20 16:58	16:02 (5) 16:24 (5)	08:18 16:11		08:44 16:12
31	05:37 21:26	20:24 (2) 20:53 (2)		06:31 20:21			07:22 16:56	16:01 (5) 16:24 (5)			08:44 16:13
Potential sun hours	512			460		382	328		259		233
Total, worst case		396		194		620			92		
Sun reduction		0.32		0.34		0.32	0.29		0.27		
Oper. time red.		1.00		1.00		1.00			1.00		
Wind dir. red.		0.64		0.64		0.68	0.66		0.65		
Total reduction		0.21		0.22		0.22	0.19		0.17		
Total, real		82		42		134	59		16		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LB - H314

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:44 (4) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:44 (4) 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:46 (4) 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:48 (4) 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	18:50 (4) 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	18:54 (4) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	19:20 (3) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	19:24 (3) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	16:51 (5) 18:19	06:55 20:17	05:34 21:11	20:38 (2) 21:55
11	08:40 16:28	07:55 17:26	16:49 (5) 18:21	06:52 20:19	05:33 21:13	20:39 (2) 21:55
12	08:39 16:30	07:53 17:28	16:47 (5) 18:23	06:50 20:20	05:31 21:15	20:34 (2) 21:56
13	08:38 16:31	07:51 17:30	16:46 (5) 18:25	06:48 20:22	05:29 21:17	20:32 (2) 21:57
14	08:37 16:33	07:49 17:32	16:46 (5) 18:27	06:45 20:24	05:27 21:18	20:31 (2) 21:57
15	08:36 16:34	07:47 17:34	16:46 (5) 18:28	06:43 20:26	05:26 21:20	20:30 (2) 21:58
16	08:35 16:36	07:45 17:36	16:46 (5) 18:30	06:40 20:28	05:24 21:22	20:29 (2) 21:59
17	08:34 16:38	07:43 17:38	16:46 (5) 18:32	06:38 20:30	05:22 21:23	20:29 (2) 21:59
18	08:33 16:40	07:41 17:40	16:45 (5) 18:34	06:35 20:31	05:21 21:25	20:29 (2) 22:00
19	08:32 16:41	07:39 17:42	16:45 (5) 18:36	06:33 20:33	05:19 21:27	20:29 (2) 22:00
20	08:31 16:43	07:36 17:44	16:46 (5) 18:38	06:31 20:35	05:18 21:28	20:29 (2) 22:00
21	08:30 16:45	07:34 17:46	16:47 (5) 18:40	06:28 20:37	05:16 21:30	20:29 (2) 22:01
22	08:28 16:47	07:32 17:48	16:48 (5) 18:41	06:26 20:39	05:15 21:31	20:29 (2) 22:01
23	08:27 16:49	07:30 17:50	16:49 (5) 18:43	06:23 20:41	05:13 21:33	20:28 (2) 22:01
24	08:26 16:50	07:28 17:52	16:52 (5) 18:45	06:21 20:42	05:12 21:34	20:29 (2) 22:01
25	08:24 16:52	07:25 17:54	17:01 (5) 18:47	06:18 20:44	05:11 21:36	20:29 (2) 22:01
26	08:23 16:54	07:23 17:56	17:02 (5) 18:49	06:16 20:46	05:09 21:37	20:30 (2) 22:01
27	08:22 16:56	07:21 17:58	17:03 (5) 18:51	06:13 20:48	05:08 21:39	20:30 (2) 22:01
28	08:20 16:58	07:18 18:00	17:04 (5) 18:53	06:11 20:50	05:07 21:40	20:30 (2) 22:01
29	08:18 17:00		17:05 (5) 19:54	06:09 20:52	05:06 21:41	20:31 (2) 22:01
30	08:17 17:02		17:06 (5) 19:56	06:07 20:53	05:05 21:43	20:31 (2) 22:00
31	08:15 17:04		17:07 (5) 19:58	06:05 20:55	05:04 21:44	20:31 (2) 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case		236	513	234	476	401
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.68	0.67	0.63	0.63
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		36	94	56	115	81

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LB - H314

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 14	20:43 (2) 20:57 (2) 10	05:39 21:25 20:53 (2) 20:18	06:33 20:18	07:26 19:05	08:19 16:10
2	04:59 22:00 15	20:43 (2) 20:58 (2) 7	05:40 21:23 20:52 (2) 20:16	06:35 20:16	07:28 19:02	08:21 16:09
3	05:00 21:59 16	20:42 (2) 20:58 (2) 4	05:42 21:21 20:46 (2) 20:13	06:36 20:13	07:30 19:00	08:22 16:08
4	05:01 21:59 17	20:42 (2) 20:59 (2) 5	05:44 21:19 20:40 20:09	06:38 20:11 19:17 (3) 19:21 (3)	07:31 18:57 07:33 18:55	08:24 16:08 08:25 16:07
5	05:02 21:58 17	20:42 (2) 20:59 (2) 6	05:45 21:17 20:42 20:06	06:40 20:09 06:42 20:06	19:17 (3) 19:21 (3) 18:50 (4) 19:25 (3)	07:32 16:46 07:35 16:44
6	05:03 21:58 19	20:41 (2) 21:00 (2) 7	05:47 21:15 20:41 (2) 20:04	06:43 20:04 18:45 (4) 19:26 (3)	07:36 16:43 07:37 18:50	08:26 16:07 08:28 16:06
7	05:04 21:57 20	20:41 (2) 21:01 (2) 8	05:51 21:13 20:41 (2) 20:01	06:45 20:01 18:42 (4) 19:27 (3)	07:39 18:48 07:38 16:41	08:29 16:06 08:30 16:05
8	05:05 21:56 21	20:41 (2) 21:02 (2) 9	05:52 21:09 20:41 (2) 19:59	06:47 19:59 18:40 (4) 19:28 (3)	07:41 16:39 07:41 18:45	08:30 16:05 08:31 16:05
9	05:06 21:55 21	20:41 (2) 21:02 (2) 10	05:54 21:09 20:41 (2) 19:59	06:49 19:59 18:38 (4) 19:27 (3)	07:42 16:39 07:42 16:37	08:31 16:05 08:32 16:05
10	05:07 21:55 22	20:41 (2) 21:03 (2) 11	05:54 21:07 20:40 (2) 06:50	06:49 19:56 18:36 (4) 19:54	07:42 16:37 07:44 16:35	08:31 16:05 08:33 16:05
11	05:08 21:54 23	20:40 (2) 21:03 (2) 12	05:56 21:05 20:40 (2) 06:52	06:50 19:54 18:35 (4) 19:51	07:44 16:35 07:46 16:34	08:33 16:05 08:34 16:05
12	05:09 21:53 24	20:40 (2) 21:04 (2) 13	05:57 21:03 20:40 (2) 06:54	06:52 19:51 18:35 (4) 19:49	07:45 16:34 07:47 16:32	08:34 16:05 08:35 16:05
13	05:10 21:52 24	20:40 (2) 21:04 (2) 14	05:59 21:01 20:39 (2) 06:56	06:54 19:49 18:33 (4) 19:47	07:48 16:32 07:49 16:31	08:35 16:05 08:36 16:04
14	05:12 21:51 25	20:39 (2) 21:04 (2) 15	06:01 20:59 20:39 (2) 06:58	06:56 19:47 18:32 (4) 19:44	07:50 16:31 07:52 16:29	08:36 16:04 08:37 16:05
15	05:13 21:50 25	20:39 (2) 21:04 (2) 16	06:03 20:57 20:39 (2) 06:59	06:58 19:44 18:32 (4) 19:42	07:51 16:29 07:53 16:27	08:37 16:05 08:38 16:05
16	05:14 21:49 25	20:39 (2) 21:04 (2) 17	06:04 20:55 20:39 (2) 07:01	06:59 19:42 18:31 (4) 19:39	07:53 16:27 07:55 16:26	08:38 16:05 08:39 16:05
17	05:16 21:47 27	20:39 (2) 21:06 (2) 18	06:06 20:53 20:39 (2) 07:03	07:01 19:39 18:31 (4) 19:37	07:55 16:26 07:57 16:24	08:38 16:05 08:39 16:05
18	05:17 21:46 27	20:39 (2) 21:06 (2) 19	06:08 20:50 20:39 (2) 07:05	07:03 19:37 18:31 (4) 19:05	07:57 16:24 07:59 17:20 (5)	08:39 16:05 08:40 16:05
19	05:18 21:45 26	20:39 (2) 21:05 (2) 20	06:10 20:48 20:39 (2) 07:06	07:05 19:34 18:31 (4) 19:06 (4)	07:59 16:23 08:01 17:18 (5)	08:40 16:05 08:41 16:06
20	05:20 21:44 27	20:39 (2) 21:06 (2) 21	06:12 20:46 20:39 (2) 07:08	07:06 19:32 18:30 (4) 19:01 (4)	08:00 16:22 08:03 18:17	08:41 16:06 08:42 16:06
21	05:21 21:42 27	20:39 (2) 21:06 (2) 22	06:13 20:44 20:39 (2) 07:10	07:08 19:29 18:31 (4) 19:05	08:03 16:20 08:05 17:16 (5)	08:41 16:06 08:42 16:06
22	05:23 21:41 27	20:39 (2) 21:06 (2) 23	06:15 20:42 20:39 (2) 07:12	07:10 19:27 18:58 (4) 18:31 (4)	08:04 16:19 17:37 (5) 17:16 (5)	08:42 16:06 08:43 16:06
23	05:24 21:39 27	20:39 (2) 21:06 (2) 24	06:17 20:39 20:39 (2) 07:13	07:12 19:24 18:54 (4) 18:32 (4)	08:06 16:18 17:38 (5) 17:15 (5)	08:42 16:07 08:43 16:08
24	05:26 21:38 26	20:39 (2) 21:05 (2) 25	06:19 20:37 20:40 (2) 07:15	07:13 19:22 18:32 (4) 19:19	08:08 16:17 17:38 (5) 16:38 (5)	08:43 16:08 08:44 16:08
25	05:27 21:36 24	20:40 (2) 21:04 (2) 26	06:20 20:35 20:40 (2) 07:17	07:15 19:19 18:34 (4) 18:48 (4)	08:09 16:16 16:15 (5) 17:06	08:43 16:08 08:44 16:09
26	05:29 21:35 22	20:40 (2) 21:02 (2) 27	06:22 20:32 20:40 (2) 07:19	07:17 19:17 18:36 (4) 19:14	08:11 16:14 16:15 (5) 17:04	08:43 16:09 08:44 16:10
27	05:30 21:33 20	20:40 (2) 21:00 (2) 28	06:24 20:30 20:41 (2) 07:21	07:19 19:14 18:38 (4) 19:12	08:13 16:13 16:15 (5) 17:02	08:44 16:10 08:44 16:11
28	05:32 21:32 18	20:41 (2) 20:59 (2) 29	06:26 20:28 20:41 (2) 07:22	07:21 19:12 18:44 (4) 07:18	08:14 16:12 16:16 (5) 17:00	08:44 16:11 08:44 16:12
29	05:34 21:30 16	20:42 (2) 20:57 (2) 30	06:27 20:25 20:42 (2) 07:24	07:22 19:09 17:00 07:20	08:16 16:12 16:17 (5) 16:27 (5)	08:44 16:11 08:44 16:12
30	05:35 21:28 14	20:42 (2) 20:56 (2) 31	06:29 20:23 20:43 (2) 06:31	07:24 19:07 16:58 07:22	08:18 16:11 16:18 (5) 16:25 (5)	08:44 16:12 08:44 16:13
31	05:37 21:26 12	20:43 (2) 20:55 (2) Potential sun hours	06:31 20:21 512	06:31 20:21 382	07:22 16:56 328	08:44 16:13 259
Total, worst case						
Sun reduction						
Oper. time red.						
Wind dir. red.						
Total reduction						
Total, real						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LC - H315

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:02 (3) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	20:02 (3) 20:57	20:02 (3) 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	20:02 (3) 20:59	20:01 (3) 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	20:03 (3) 21:01	20:00 (3) 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	20:03 (3) 21:03	20:04 (3) 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	17:43 (5) 17:45 (5)	20:04 (3) 21:04	20:04 (3) 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	17:37 (5) 17:46 (5)	20:06 (3) 21:06	20:06 (3) 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	17:35 (5) 17:48 (5)	20:08 (4) 21:08	20:07 (4) 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	17:32 (5) 17:50 (5)	20:07 (4) 21:10	20:07 (4) 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	17:31 (5) 17:52 (5)	20:06 (4) 21:11	20:06 (4) 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	17:31 (5) 17:55 (5)	20:06 (4) 21:13	20:06 (4) 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	17:29 (5) 17:55 (5)	20:06 (4) 21:15	20:06 (4) 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	17:29 (5) 17:56 (5)	20:05 (4) 21:17	20:05 (4) 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	17:28 (5) 17:55 (5)	20:05 (4) 21:18	20:05 (4) 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	17:28 (5) 17:55 (5)	20:04 (4) 21:20	20:04 (4) 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	17:28 (5) 17:54 (5)	20:04 (4) 21:22	20:04 (4) 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	17:28 (5) 17:54 (5)	20:04 (4) 21:23	20:04 (4) 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	17:28 (5) 17:53 (5)	20:05 (4) 21:25	20:05 (4) 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	17:29 (5) 17:52 (5)	20:05 (4) 21:27	20:05 (4) 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	17:29 (5) 17:50 (5)	20:04 (4) 21:28	20:04 (4) 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	17:31 (5) 17:49 (5)	20:05 (4) 21:30	20:05 (4) 22:00
22	08:28 16:47	07:32 17:48	06:26 18:42	17:33 (5) 17:46 (5)	20:05 (4) 21:31	20:05 (4) 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	17:37 (5) 17:42 (5)	20:07 (3) 21:33	20:07 (3) 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	20:05 (3) 21:34	20:05 (3) 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	20:04 (3) 21:36	20:04 (3) 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	20:03 (3) 21:37	20:03 (3) 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	20:03 (3) 21:39	20:03 (3) 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	20:02 (3) 21:40	20:02 (3) 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	20:02 (3) 21:41	20:02 (3) 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	20:02 (3) 21:43	20:02 (3) 22:00
31	08:15 17:04		07:04 19:58		20:24 (3) 21:44	21:43 20:43 (4)
Potential sun hours	250	273	367	420	494	510
Total, worst case			351	117	1090	804
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.65	0.64	0.64
Total reduction			0.18	0.23	0.24	0.20
Total, real			64	27	266	165

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LC - H315

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59	20:19 (4)	05:39	20:16 (4)	06:33	07:26	18:08 (5)	07:24	08:19		
	22:00	27	20:46 (4)	21:25	37	20:53 (4)	20:18	19:05	26	18:34 (5)	16:54
2	05:00	20:19 (4)	05:40	20:17 (4)	06:35	07:28	18:08 (5)	07:26	08:21		
	22:00	28	20:47 (4)	21:23	35	20:52 (4)	20:16	19:02	25	18:33 (5)	16:52
3	05:00	20:18 (4)	05:42	20:17 (4)	06:36	07:30	18:09 (5)	07:28	08:22		
	21:59	28	20:46 (4)	21:21	33	20:50 (4)	20:13	19:00	22	18:31 (5)	16:50
4	05:01	20:18 (4)	05:44	20:18 (4)	06:38	07:31	18:10 (5)	07:30	08:24		
	21:59	29	20:47 (4)	21:19	30	20:48 (4)	20:11	18:57	19	18:29 (5)	16:48
5	05:02	20:18 (4)	05:45	20:16 (3)	06:40	07:33	18:11 (5)	07:32	08:25		
	21:58	30	20:48 (4)	21:17	30	20:46 (4)	20:09	18:55	15	18:26 (5)	16:46
6	05:03	20:18 (4)	05:47	20:15 (3)	06:42	07:35	18:13 (5)	07:34	08:26		
	21:57	30	20:48 (4)	21:15	30	20:45 (4)	20:06	18:52	11	18:24 (5)	16:44
7	05:04	20:18 (4)	05:49	20:14 (3)	06:43	07:37	18:14 (5)	07:36	08:28		
	21:57	31	20:49 (4)	21:13	29	20:43 (4)	20:04	18:50	7	18:21 (5)	16:43
8	05:05	20:18 (4)	05:51	20:12 (3)	06:45	07:39	18:15 (5)	07:38	08:29		
	21:56	32	20:50 (4)	21:11	29	20:41 (4)	20:01	18:48		16:41	16:06
9	05:06	20:17 (4)	05:52	20:12 (3)	06:47	07:41	18:16 (5)	07:40	08:30		
	21:55	33	20:50 (4)	21:09	27	20:39 (4)	19:59	18:45		16:39	16:05
10	05:07	20:17 (4)	05:54	20:11 (3)	06:49	07:42	18:17 (5)	07:42	08:31		
	21:55	34	20:51 (4)	21:07	26	20:37 (4)	19:56	18:43		16:37	16:05
11	05:08	20:17 (4)	05:56	20:10 (3)	06:50	07:44	18:18 (5)	07:44	08:33		
	21:54	34	20:51 (4)	21:05	25	20:35 (4)	19:54	18:40		16:36	16:05
12	05:09	20:17 (4)	05:57	20:10 (3)	06:52	07:46	18:19 (5)	07:45	08:34		
	21:53	34	20:51 (4)	21:03	24	20:34 (4)	19:51	18:38		16:34	16:05
13	05:11	20:16 (4)	05:59	20:10 (3)	06:54	07:48	18:20 (5)	07:47	08:35		
	21:52	36	20:52 (4)	21:01	21	20:31 (3)	19:49	18:36		16:32	16:05
14	05:12	20:16 (4)	06:01	20:10 (3)	06:56	07:50	18:21 (5)	07:49	08:36		
	21:51	36	20:52 (4)	20:59	19	20:29 (3)	19:47	18:33		16:31	16:05
15	05:13	20:16 (4)	06:03	20:10 (3)	06:58	07:52	18:22 (5)	07:51	08:37		
	21:50	36	20:52 (4)	20:57	18	20:28 (3)	19:44	18:31		16:29	16:05
16	05:14	20:16 (4)	06:05	20:10 (3)	06:59	07:54	18:23 (5)	07:53	08:38		
	21:49	38	20:54 (4)	20:55	15	20:25 (3)	19:42	18:29		16:27	16:05
17	05:16	20:16 (4)	06:06	20:10 (3)	07:01	07:55	18:24 (5)	07:55	08:38		
	21:47	38	20:54 (4)	20:53	13	20:23 (3)	19:39	18:26		16:26	16:05
18	05:17	20:15 (4)	06:08	20:11 (3)	07:03	07:57	18:25 (5)	07:57	08:39		
	21:46	39	20:54 (4)	20:50	11	20:22 (3)	19:37	18:24		16:25	16:05
19	05:18	20:15 (4)	06:10	20:11 (3)	07:05	07:59	18:26 (5)	07:59	08:40		
	21:45	39	20:54 (4)	20:48	8	20:19 (3)	19:34	18:22		16:23	16:05
20	05:20	20:16 (4)	06:12	20:13 (3)	07:06	08:01	18:27 (5)	08:00	08:41		
	21:44	39	20:55 (4)	20:46	4	20:17 (3)	19:32	18:20		16:22	16:06
21	05:21	20:15 (4)	06:13	07:08		18:19 (5)	08:03	08:02	08:41		
	21:42	39	20:54 (4)	20:44		19:29	12	18:31 (5)	18:17	16:20	16:06
22	05:23	20:15 (4)	06:15	07:10		18:16 (5)	08:05	08:04	08:42		
	21:41	39	20:54 (4)	20:42		19:27	17	18:33 (5)	18:15	16:19	16:06
23	05:24	20:15 (4)	06:17	07:12		18:14 (5)	08:07	08:06	08:42		
	21:39	40	20:55 (4)	20:39		19:24	20	18:34 (5)	18:13	16:18	16:07
24	05:26	20:15 (4)	06:19	07:13		18:13 (5)	08:09	08:08	08:43		
	21:38	40	20:55 (4)	20:37		19:22	22	18:35 (5)	18:11	16:17	16:08
25	05:27	20:15 (4)	06:20	07:15		18:11 (5)	07:11	08:09	08:43		
	21:36	40	20:55 (4)	20:35		19:19	24	18:35 (5)	17:09	16:16	16:08
26	05:29	20:15 (4)	06:22	07:17		18:10 (5)	07:13	08:11	08:43		
	21:35	40	20:55 (4)	20:32		19:17	26	18:36 (5)	17:06	16:15	16:09
27	05:30	20:16 (4)	06:24	07:19		18:10 (5)	07:14	08:13	08:44		
	21:33	39	20:55 (4)	20:30		19:14	26	18:36 (5)	17:04	16:13	16:10
28	05:32	20:15 (4)	06:26	07:21		18:09 (5)	07:16	08:14	08:44		
	21:32	40	20:55 (4)	20:28		19:12	27	18:36 (5)	17:02	16:12	16:11
29	05:34	20:16 (4)	06:28	07:22		18:09 (5)	07:18	08:16	08:44		
	21:30	39	20:55 (4)	20:25		19:09	27	18:36 (5)	17:00	16:12	16:11
30	05:35	20:16 (4)	06:29	07:24		18:08 (5)	07:20	08:17	08:44		
	21:28	38	20:54 (4)	20:23		19:07	27	18:35 (5)	16:58	16:11	16:12
31	05:37	20:16 (4)	06:31	07:22		18:07 (5)	07:22	08:18	08:44		
	21:26	38	20:54 (4)	20:21		19:06	27	18:35 (5)	16:56	16:10	16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	1103		464		228		125				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.64		0.64		0.68		0.68				
Total reduction	0.21		0.22		0.22		0.20				
Total, real	228		102		49		25				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LD - H316

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	11 20:26 (3)	40 21:06 (4)
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	13 20:27 (3)	40 21:07 (4)
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	16 20:29 (3)	40 21:07 (4)
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	17 20:30 (3)	41 21:07 (4)
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	19 20:32 (3)	40 21:07 (4)
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	21 20:33 (3)	40 21:07 (4)
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	23 20:36 (3)	41 21:08 (4)
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	23 20:36 (3)	41 21:08 (4)
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	22 20:35 (3)	40 21:07 (4)
11	08:40 16:28	07:55 17:26	06:52 18:21	17:54 (5) 17:55 (5)	21 20:34 (3)	40 21:08 (4)
12	08:39 16:30	07:53 17:28	06:50 18:23	17:47 (5) 17:56 (5)	21 20:34 (3)	40 21:08 (4)
13	08:38 16:31	07:51 17:30	06:48 18:25	17:45 (5) 17:58 (5)	23 20:43 (4)	40 21:09 (4)
14	08:37 16:33	07:49 17:32	06:45 18:27	17:43 (5) 18:00 (5)	25 20:44 (4)	40 21:08 (4)
15	08:36 16:34	07:47 17:34	06:43 18:28	17:42 (5) 18:02 (5)	27 20:47 (4)	39 21:08 (4)
16	08:35 16:36	07:45 17:36	06:40 18:30	17:40 (5) 18:04 (5)	27 20:48 (4)	40 21:09 (4)
17	08:34 16:38	07:43 17:38	06:38 18:32	17:39 (5) 18:06 (5)	23 20:51 (4)	39 21:09 (4)
18	08:33 16:40	07:41 17:40	06:35 18:34	17:38 (5) 18:06 (5)	21 20:50 (4)	39 21:09 (4)
19	08:32 16:41	07:39 17:42	06:33 18:36	17:38 (5) 18:06 (5)	23 20:53 (4)	39 21:09 (4)
20	08:31 16:43	07:36 17:44	06:31 18:38	17:37 (5) 18:05 (5)	25 20:54 (4)	39 21:09 (4)
21	08:30 16:45	07:34 17:46	06:28 18:40	17:38 (5) 18:05 (5)	27 20:55 (4)	40 21:10 (4)
22	08:28 16:47	07:32 17:48	06:26 18:42	17:37 (5) 18:04 (5)	29 20:57 (4)	40 21:10 (4)
23	08:27 16:49	07:30 17:50	06:23 18:43	17:38 (5) 18:04 (5)	31 20:59 (4)	40 21:11 (4)
24	08:26 16:51	07:28 17:52	06:21 18:45	17:38 (5) 18:02 (5)	32 20:59 (4)	39 21:10 (4)
25	08:24 16:52	07:25 17:54	06:18 18:47	17:39 (5) 18:01 (5)	35 21:01 (4)	39 21:10 (4)
26	08:23 16:54	07:23 17:56	06:16 18:49	17:40 (5) 18:00 (5)	36 21:02 (4)	39 21:11 (4)
27	08:22 16:56	07:21 17:58	06:13 18:51	17:41 (5) 17:58 (5)	38 21:04 (4)	40 21:11 (4)
28	08:20 16:58	07:18 18:00	06:11 18:53	17:44 (5) 17:55 (5)	39 21:05 (4)	40 21:12 (4)
29	08:18 17:00		07:09 19:54	05:56 20:52	40 21:06 (4)	40 21:12 (4)
30	08:17 17:02		07:06 19:56	05:54 20:53	40 21:06 (4)	40 21:12 (4)
31	08:15 17:04		07:04 19:58		40 21:06 (4)	
Potential sun hours	250	273	367	420	494	510
Total, worst case			369	15	825	1195
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.64	0.63	0.63
Total reduction			0.18	0.23	0.24	0.20
Total, real			67	3	199	240

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LD - H316

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		July		August		September		October		November		December	
1	04:59		20:32 (4)	05:39		20:25 (3)	06:33		07:26		18:25 (5)	07:24	08:19
	22:00	40	21:12 (4)	21:25	22	20:53 (4)	20:18		19:05	11	18:36 (5)	16:54	16:10
2	05:00		20:33 (4)	05:40		20:25 (3)	06:35		07:28		18:28 (5)	07:26	08:21
	22:00	40	21:13 (4)	21:23	20	20:45 (3)	20:16		19:02	5	18:33 (5)	16:52	16:09
3	05:00		20:32 (4)	05:42		20:23 (3)	06:36		07:30			07:28	08:22
	21:59	40	21:12 (4)	21:21	22	20:45 (3)	20:13		19:00			16:50	16:08
4	05:01		20:33 (4)	05:44		20:23 (3)	06:38		07:31			07:30	08:24
	21:59	40	21:13 (4)	21:19	23	20:46 (3)	20:11		18:57			16:48	16:08
5	05:02		20:33 (4)	05:45		20:22 (3)	06:40		07:33			07:32	08:25
	21:58	40	21:13 (4)	21:17	23	20:45 (3)	20:09		18:55			16:46	16:07
6	05:03		20:33 (4)	05:47		20:23 (3)	06:42		07:35			07:34	08:26
	21:57	41	21:14 (4)	21:15	22	20:45 (3)	20:06		18:52			16:44	16:07
7	05:04		20:34 (4)	05:49		20:23 (3)	06:43		07:37			07:36	08:28
	21:57	40	21:14 (4)	21:13	20	20:43 (3)	20:04		18:50			16:43	16:06
8	05:05		20:34 (4)	05:51		20:22 (3)	06:45		07:39			07:38	08:29
	21:56	40	21:14 (4)	21:11	19	20:41 (3)	20:01		18:48			16:41	16:06
9	05:06		20:34 (4)	05:52		20:22 (3)	06:47		07:41			07:40	08:30
	21:55	40	21:14 (4)	21:09	17	20:39 (3)	19:59		18:45			16:39	16:05
10	05:07		20:34 (4)	05:54		20:22 (3)	06:49		07:42			07:42	08:31
	21:55	40	21:14 (4)	21:07	15	20:37 (3)	19:56		18:43			16:37	16:05
11	05:08		20:34 (4)	05:56		20:23 (3)	06:50		07:44			07:44	08:33
	21:54	40	21:14 (4)	21:05	12	20:35 (3)	19:54		18:40			16:36	16:05
12	05:09		20:34 (4)	05:57		20:24 (3)	06:52		07:46			07:45	08:34
	21:53	40	21:14 (4)	21:03	10	20:34 (3)	19:51		18:38			16:34	16:05
13	05:11		20:34 (4)	05:59		20:24 (3)	06:54		07:48			07:47	08:35
	21:52	40	21:14 (4)	21:01	7	20:31 (3)	19:49		18:36			16:32	16:05
14	05:12		20:35 (4)	06:01		20:25 (3)	06:56		07:50			07:49	08:36
	21:51	39	21:14 (4)	20:59	4	20:29 (3)	19:47		18:33			16:31	16:05
15	05:13		20:35 (4)	06:03		20:27 (3)	06:58		07:52			07:51	08:37
	21:50	39	21:14 (4)	20:57	1	20:28 (3)	19:44	10	18:44 (5)			16:29	16:05
16	05:14		20:36 (4)	06:05			06:59		18:31 (5)			07:53	08:38
	21:49	39	21:15 (4)	20:55			19:42	16	18:47 (5)			16:27	16:05
17	05:16		20:36 (4)	06:06			07:01		18:28 (5)			07:55	08:38
	21:47	38	21:14 (4)	20:53			19:39	19	18:47 (5)			16:26	16:05
18	05:17		20:36 (4)	06:08			07:03		18:26 (5)			07:57	08:39
	21:46	36	21:12 (4)	20:50			19:37	23	18:49 (5)			16:25	16:05
19	05:18		20:36 (4)	06:10			07:05		18:25 (5)			07:59	08:40
	21:45	35	21:11 (4)	20:48			19:34	25	18:50 (5)			16:23	16:05
20	05:20		20:37 (4)	06:12			07:06		18:24 (5)			08:00	08:41
	21:44	33	21:10 (4)	20:46			19:32	26	18:50 (5)			16:22	16:06
21	05:21		20:37 (4)	06:13			07:08		18:23 (5)			08:02	08:41
	21:42	32	21:09 (4)	20:44			19:29	27	18:50 (5)			16:20	16:06
22	05:23		20:37 (4)	06:15			07:10		18:22 (5)			08:04	08:42
	21:41	30	21:07 (4)	20:42			19:27	28	18:50 (5)			16:19	16:06
23	05:24		20:39 (4)	06:17			07:12		18:22 (5)			08:06	08:42
	21:39	28	21:07 (4)	20:39			19:24	28	18:50 (5)			16:18	16:07
24	05:26		20:39 (4)	06:19			07:13		18:22 (5)			08:08	08:43
	21:38	26	21:05 (4)	20:37			19:22	28	18:50 (5)			16:17	16:08
25	05:27		20:40 (4)	06:20			07:15		18:21 (5)			08:09	08:43
	21:36	24	21:04 (4)	20:35			19:19	27	18:48 (5)			16:16	16:08
26	05:29		20:40 (4)	06:22			07:17		18:21 (5)			08:11	08:43
	21:35	22	21:02 (4)	20:32			19:17	27	18:48 (5)			16:15	16:09
27	05:30		20:42 (4)	06:24			07:19		18:21 (5)			08:13	08:44
	21:33	19	21:01 (4)	20:30			19:14	25	18:46 (5)			16:13	16:10
28	05:32		20:31 (3)	06:26			07:21		18:22 (5)			08:14	08:44
	21:32	25	20:59 (4)	20:28			19:12	22	18:44 (5)			16:12	16:11
29	05:34		20:29 (3)	06:28			07:22		18:23 (5)			08:16	08:44
	21:30	26	20:58 (4)	20:25			19:09	18	18:41 (5)			16:12	16:11
30	05:35		20:27 (3)	06:29			07:24		18:23 (5)			08:17	08:44
	21:28	26	20:56 (4)	20:23			19:07	15	18:38 (5)			16:11	16:12
31	05:37		20:26 (3)	06:31					07:22				08:44
	21:26	24	20:55 (4)	20:21					16:56				16:13
Potential sun hours	512			460			382		328			259	233
Total, worst case		1062			237			364		16			
Sun reduction		0.32			0.34			0.32		0.29			
Oper. time red.		1.00			1.00			1.00		1.00			
Wind dir. red.		0.63			0.64			0.67		0.67			
Total reduction		0.20			0.22			0.22		0.20			
Total, real		216			52			78		3			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LE - H317

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		08:14		07:16				07:01		18:50 (5)	05:52			05:03		20:44 (4)
	16:15		17:06		18:02				20:00	14	19:04 (5)	20:55			21:45	26	21:10 (4)
2	08:44		08:12		07:14				06:59		18:53 (5)	05:50			05:02		20:45 (4)
	16:16		17:08		18:04				20:02	6	18:59 (5)	20:57			21:46	27	21:12 (4)
3	08:43		08:10		07:12				06:56			05:48		20:25 (3)	05:01		20:44 (4)
	16:17		17:10		18:06				20:04			20:59	4	20:29 (3)	21:48	29	21:13 (4)
4	08:43		08:08		07:09				06:54			05:46		20:24 (3)	05:00		20:44 (4)
	16:18		17:12		18:07				20:06			21:01	6	20:30 (3)	21:49	30	21:14 (4)
5	08:43		08:07		07:07				06:51			05:44		20:23 (3)	04:59		20:44 (4)
	16:20		17:14		18:09				20:07			21:03	9	20:32 (3)	21:50	31	21:15 (4)
6	08:42		08:05		07:04				06:49			05:42		20:22 (3)	04:59		20:44 (4)
	16:21		17:16		18:11				20:09			21:04	11	20:33 (3)	21:51	32	21:16 (4)
7	08:42		08:03		07:02				06:47			05:40		20:22 (3)	04:58		20:43 (4)
	16:22		17:18		18:13				20:11			21:06	14	20:36 (3)	21:52	33	21:16 (4)
8	08:41		08:01		07:00				06:44			05:38		20:22 (3)	04:57		20:44 (4)
	16:24		17:20		18:15				20:13			21:08	15	20:37 (3)	21:53	34	21:18 (4)
9	08:41		07:59		06:57				06:42			05:36		20:21 (3)	04:57		20:43 (4)
	16:25		17:22		18:17				20:15			21:10	17	20:38 (3)	21:54	35	21:18 (4)
10	08:40		07:57		06:55				06:39			05:34		20:21 (3)	04:56		20:44 (4)
	16:27		17:24		18:19				20:17			21:11	19	20:40 (3)	21:55	35	21:19 (4)
11	08:40		07:55		06:52				06:37			05:33		20:21 (3)	04:56		20:44 (4)
	16:28		17:26		18:21				20:19			21:13	21	20:42 (3)	21:55	36	21:20 (4)
12	08:39		07:53		06:50				06:35			05:31		20:21 (3)	04:55		20:45 (4)
	16:30		17:28		18:23				20:20			21:15	22	20:43 (3)	21:56	36	21:21 (4)
13	08:38		07:51		06:48				06:32			05:29		20:21 (3)	04:55		20:44 (4)
	16:31		17:30		18:25				20:22			21:17	23	20:44 (3)	21:57	37	21:21 (4)
14	08:37		07:49		06:45				06:30			05:27		20:22 (3)	04:55		20:44 (4)
	16:33		17:32		18:27				20:24			21:18	22	20:44 (3)	21:57	38	21:22 (4)
15	08:36		07:47		06:43			18:00 (5)	06:28			05:26		20:22 (3)	04:55		20:45 (4)
	16:34		17:34		18:28	2		18:02 (5)	20:26			21:20	21	20:43 (3)	21:58	37	21:22 (4)
16	08:35		07:45		06:40			17:54 (5)	06:25			05:24		20:23 (3)	04:54		20:45 (4)
	16:36		17:36		18:30	10		18:04 (5)	20:28			21:22	20	20:43 (3)	21:59	38	21:23 (4)
17	08:34		07:43		06:38			17:52 (5)	06:23			05:22		20:23 (3)	04:54		20:45 (4)
	16:38		17:38		18:32	14		18:06 (5)	20:30			21:23	19	20:42 (3)	21:59	38	21:23 (4)
18	08:33		07:41		06:35			17:50 (5)	06:21			05:21		20:24 (3)	04:54		20:45 (4)
	16:40		17:40		18:34	17		18:07 (5)	20:31			21:25	18	20:42 (3)	22:00	39	21:24 (4)
19	08:32		07:39		06:33			17:49 (5)	06:18			05:19		20:25 (3)	04:54		20:45 (4)
	16:41		17:42		18:36	21		18:10 (5)	20:33			21:27	16	20:41 (3)	22:00	39	21:24 (4)
20	08:31		07:36		06:31			17:47 (5)	06:16			05:18		20:26 (3)	04:54		20:45 (4)
	16:43		17:44		18:38	24		18:11 (5)	20:35			21:28	13	20:39 (3)	22:00	39	21:24 (4)
21	08:30		07:34		06:28			17:46 (5)	06:14			05:16		20:27 (3)	04:54		20:45 (4)
	16:45		17:46		18:40	27		18:13 (5)	20:37			21:30	14	20:57 (4)	22:00	39	21:24 (4)
22	08:28		07:32		06:26			17:45 (5)	06:12			05:15		20:30 (3)	04:55		20:46 (4)
	16:47		17:48		18:42	28		18:13 (5)	20:39			21:31	14	20:59 (4)	22:01	39	21:25 (4)
23	08:27		07:30		06:23			17:45 (5)	06:09			05:13		20:50 (4)	04:55		20:46 (4)
	16:49		17:50		18:43	29		18:14 (5)	20:41			21:33	9	20:59 (4)	22:01	39	21:25 (4)
24	08:26		07:28		06:21			17:44 (5)	06:07			05:12		20:49 (4)	04:55		20:46 (4)
	16:51		17:52		18:45	29		18:13 (5)	20:42			21:34	12	21:01 (4)	22:01	39	21:25 (4)
25	08:24		07:25		06:18			17:44 (5)	06:05			05:11		20:48 (4)	04:56		20:47 (4)
	16:52		17:54		18:47	29		18:13 (5)	20:44			21:36	14	21:02 (4)	22:01	38	21:25 (4)
26	08:23		07:23		06:16			17:45 (5)	06:03			05:09		20:47 (4)	04:56		20:47 (4)
	16:54		17:56		18:49	28		18:13 (5)	20:46			21:37	17	21:04 (4)	22:01	38	21:25 (4)
27	08:22		07:21		06:13			17:44 (5)	06:01			05:08		20:47 (4)	04:56		20:47 (4)
	16:56		17:58		18:51	27		18:11 (5)	20:48			21:39	18	21:05 (4)	22:01	37	21:24 (4)
28	08:20		07:18		06:11			17:45 (5)	05:58			05:07		20:46 (4)	04:57		20:47 (4)
	16:58		18:00		18:53	26		18:11 (5)	20:50			21:40	20	21:06 (4)	22:01	38	21:25 (4)
29	08:18				07:09			18:45 (5)	05:56			05:06		20:46 (4)	04:58		20:48 (4)
	17:00				19:54	24		19:09 (5)	20:52			21:41	21	21:07 (4)	22:01	37	21:25 (4)
30	08:17				07:06			18:46 (5)	05:54			05:05		20:45 (4)	04:58		20:48 (4)
	17:02				19:56	22		19:08 (5)	20:53			21:43	23	21:08 (4)	22:00	36	21:24 (4)
31	08:15				07:04			18:47 (5)				05:04		20:45 (4)			
	17:04				19:58	19		19:06 (5)				21:44	24	21:09 (4)			
Potential sun hours	250		273		367			420				494			510		
Total, worst case					376			20				476			1069		
Sun reduction					0.27			0.35				0.38			0.32		
Oper. time red.					1.00			1.00				1.00			1.00		
Wind dir. red.					0.67			0.67				0.63			0.61		
Total reduction					0.18			0.24				0.24			0.20		
Total, real					69			5				114			210		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LE - H317

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 36	20:48 (4) 21:24 (4) 21:25	05:39 22 20:53 (3) 20:18		07:26 07:24 08:19	
2	05:00 22:00 35	20:49 (4) 21:24 (4) 21:23	05:40 20 20:52 (3) 20:16		19:05 16:54 16:10	
3	05:00 21:59 34	20:49 (4) 21:23 (4) 21:21	05:42 19 20:50 (3) 20:13		07:28 07:26 08:21	
4	05:01 21:59 34	20:49 (4) 21:23 (4) 21:19	05:44 16 20:52 (3) 20:11		19:02 16:52 16:09	
5	05:02 21:58 33	20:50 (4) 21:23 (4) 21:17	05:45 15 20:50 (3) 20:09		07:30 07:28 08:22	
6	05:03 21:57 32	20:50 (4) 21:22 (4) 21:15	05:47 13 20:52 (3) 20:06		19:00 16:50 16:08	
7	05:04 21:57 31	20:51 (4) 21:22 (4) 21:13	05:49 10 20:53 (3) 20:04		07:31 07:30 08:24	
8	05:05 21:56 30	20:51 (4) 21:21 (4) 21:11	05:51 8 20:48 (3) 20:11		18:57 16:48 16:08	
9	05:06 21:55 29	20:52 (4) 21:21 (4) 21:09	05:52 5 20:41 (3) 20:01		07:33 07:32 08:25	
10	05:07 21:55 28	20:52 (4) 21:20 (4) 21:07	05:54 3 20:46 (3) 20:09		18:55 16:46 16:07	
11	05:08 21:54 26	20:54 (4) 21:19 (4) 21:05	05:54 14 20:32 (3) 20:06		07:34 07:34 08:26	
12	05:09 21:53 25	20:54 (4) 21:18 (4) 21:03	05:57 18 20:33 (3) 20:06		18:52 16:44 16:07	
13	05:11 21:52 24	20:54 (4) 21:17 (4) 21:01	05:59 21 20:33 (3) 20:04		07:37 07:36 08:28	
14	05:12 21:51 22	20:54 (4) 21:16 (4) 20:59	06:01 23 20:43 (3) 20:04		18:50 16:43 16:06	
15	05:13 21:50 21	20:54 (4) 21:15 (4) 20:55	06:03 25 20:33 (3) 20:01		07:39 07:38 08:29	
16	05:14 21:48 19	20:54 (4) 21:14 (4) 20:53	06:05 27 20:41 (3) 20:01		18:48 16:41 16:06	
17	05:16 21:47 17	20:54 (4) 21:14 (4) 20:53	06:06 28 20:34 (3) 20:01		07:41 07:40 08:30	
18	05:17 21:46 15	20:54 (4) 21:13 (4) 20:52	06:08 29 20:39 (3) 19:59		18:45 16:39 16:05	
19	05:18 21:45 13	20:54 (4) 21:12 (4) 20:51	06:10 27 20:34 (3) 20:01		07:42 07:42 08:31	
20	05:20 21:44 10	20:54 (4) 21:11 (4) 20:50	06:12 29 20:37 (3) 19:56		18:43 16:37 16:05	
21	05:21 21:42 12	20:54 (4) 21:10 (4) 20:46	06:13 29 20:37 (3) 19:56		07:44 07:44 08:33	
22	05:23 21:41 13	20:54 (4) 21:09 (4) 20:44	06:15 29 20:37 (3) 19:56		18:42 (5) 07:44 08:33	
23	05:24 21:39 14	20:54 (4) 21:08 (4) 20:43	06:17 25 20:37 (3) 19:56		18:40 (5) 07:46 08:34	
24	05:26 21:38 14	20:54 (4) 21:07 (4) 20:42	06:19 22 20:37 (3) 19:56		18:38 (5) 07:48 08:35	
25	05:27 21:36 17	20:54 (4) 20:56 (4) 20:53	06:20 19 20:37 (3) 19:56		18:36 (5) 07:50 08:36	
26	05:29 21:35 18	20:54 (4) 20:55 (4) 20:54	06:22 15 20:37 (3) 19:56		18:35 (5) 07:52 08:37	
27	05:30 21:33 19	20:54 (4) 20:54 (4) 20:53	06:24 11 20:37 (3) 19:56		18:31 (5) 07:51 08:37	
28	05:32 21:32 21	20:54 (4) 20:53 (3) 20:52	06:26 6 20:37 (3) 19:56		18:31 (5) 07:51 08:37	
29	05:34 21:30 22	20:54 (4) 20:52 (3) 20:51	06:28 19 20:37 (3) 19:56		18:31 (5) 07:51 08:37	
30	05:35 21:28 22	20:54 (4) 20:51 (3) 20:50	06:29 19 20:37 (3) 19:56		18:31 (5) 07:51 08:37	
31	05:37 21:26 23	20:54 (4) 20:50 (3) 20:49	06:31 19 20:37 (3) 19:56		18:31 (5) 07:51 08:37	
Potential sun hours	512	460	382	328	259	233
Total, worst case	709	131	400			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.62	0.64	0.67			
Total reduction	0.20	0.22	0.22			
Total, real	142	29	86			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LF - H318

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:56 (5) 20:55	05:52 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:56 (5) 20:57	05:50 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:57 (5) 20:59	05:48 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:58 (5) 20:59	05:46 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	18:58 (5) 21:03	05:44 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	19:00 (5) 21:04	05:42 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	19:02 (5) 21:06	05:40 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	19:13 (5) 21:08	05:38 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	21:08 21:10	20:37 (3) 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	21:11 21:11	20:37 (3) 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	21:13 21:13	20:31 (3) 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	21:15 21:15	20:31 (3) 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	21:17 21:17	20:29 (3) 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	21:17 21:18	20:44 (3) 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	21:18 21:20	20:47 (3) 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	21:22 21:22	20:48 (3) 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	21:22 21:23	20:50 (3) 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	21:23 21:25	20:51 (3) 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	21:25 21:27	20:52 (3) 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	21:27 21:28	20:53 (3) 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	18:09 (5) 20:37	05:16 21:30	20:51 (3) 22:00
22	08:28 16:47	07:32 17:48	06:26 18:42	18:05 (5) 20:39	05:15 21:31	20:51 (3) 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	18:03 (5) 20:41	05:13 21:33	20:53 (3) 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	18:01 (5) 20:42	05:12 21:34	20:49 (3) 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	18:00 (5) 20:44	05:11 21:36	20:48 (3) 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	17:59 (5) 20:46	05:09 21:37	20:46 (3) 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:58 (5) 20:48	05:08 21:39	20:47 (3) 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	17:57 (5) 20:50	05:07 21:40	20:41 (3) 22:01
29	08:18 17:00		07:09 19:54	18:56 (5) 20:52	05:06 21:41	20:43 (3) 22:01
30	08:17 17:02		07:06 19:56	18:57 (5) 20:53	05:05 21:43	21:06 (4) 22:00
31	08:15 17:04		07:04 19:58	18:56 (5) 20:53	05:04 21:44	21:08 (4) 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			229	150	308	563
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.63	0.61
Total reduction			0.18	0.24	0.24	0.19
Total, real			42	36	74	109

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LF - H318

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October	November	December
1	04:59	21:05 (4)	05:39	20:41 (3)	06:33	07:26	07:24	08:19
	22:00	19	21:24 (4)	21:25	12 20:53 (3)	20:18	19:05	16:10
2	05:00	21:06 (4)	05:40	20:41 (3)	06:35	07:28	07:26	08:21
	22:00	18	21:24 (4)	21:23	11 20:52 (3)	20:16	19:02	16:09
3	05:00	21:06 (4)	05:42	20:41 (3)	06:36	07:30	07:28	08:22
	21:59	17	21:23 (4)	21:21	9 20:50 (3)	20:13	19:00	16:08
4	05:01	21:06 (4)	05:44	20:42 (3)	06:38	07:31	07:30	08:24
	21:59	17	21:23 (4)	21:19	6 20:48 (3)	20:11	18:57	16:08
5	05:02	21:07 (4)	05:45	20:42 (3)	06:40	18:59 (5)	07:33	08:25
	21:58	16	21:23 (4)	21:17	4 20:46 (3)	20:09	11 19:10 (5)	18:55
6	05:03	21:08 (4)	05:47	20:44 (3)	06:42	18:57 (5)	07:35	07:34
	21:57	14	21:22 (4)	21:15	1 20:45 (3)	20:06	16 19:13 (5)	18:52
7	05:04	21:08 (4)	05:49		06:43	18:54 (5)	07:37	07:36
	21:57	14	21:22 (4)	21:13		20:04	19 19:13 (5)	18:50
8	05:05	21:09 (4)	05:51		06:45	18:52 (5)	07:39	07:38
	21:56	12	21:21 (4)	21:11		20:01	23 19:15 (5)	18:48
9	05:06	21:10 (4)	05:52		06:47	18:51 (5)	07:41	07:40
	21:55	11	21:21 (4)	21:09		19:59	25 19:16 (5)	18:45
10	05:07	21:11 (4)	05:54		06:49	18:49 (5)	07:42	07:42
	21:55	9	21:20 (4)	21:07		19:56	26 19:15 (5)	18:43
11	05:08	21:12 (4)	05:56		06:50	18:49 (5)	07:44	07:44
	21:54	7	21:19 (4)	21:05		19:54	27 19:16 (5)	18:40
12	05:09	21:13 (4)	05:57		06:52	18:48 (5)	07:46	07:45
	21:53	5	21:18 (4)	21:03		19:51	28 19:16 (5)	18:38
13	05:11	21:14 (4)	05:59		06:54	18:48 (5)	07:48	07:47
	21:52	3	21:17 (4)	21:01		19:49	28 19:16 (5)	18:36
14	05:12	21:15 (4)	06:01		06:56	18:47 (5)	07:50	07:49
	21:51	1	21:16 (4)	20:59		19:47	28 19:15 (5)	18:33
15	05:13		06:03		06:58	18:47 (5)	07:52	07:51
	21:50		20:57		19:44	19:15 (5)	18:31	16:29
16	05:14	20:49 (3)	06:05		06:59	18:47 (5)	07:54	07:53
	21:48	5	20:54 (3)	20:55		19:42	27 19:14 (5)	18:29
17	05:16	20:47 (3)	06:06		07:01	18:46 (5)	07:55	07:55
	21:47	9	20:56 (3)	20:53		19:39	25 19:11 (5)	18:26
18	05:17	20:45 (3)	06:08		07:03	18:47 (5)	07:57	07:57
	21:46	12	20:57 (3)	20:50		19:37	21 19:08 (5)	18:24
19	05:18	20:44 (3)	06:10		07:05	18:48 (5)	07:59	07:59
	21:45	14	20:58 (3)	20:48		19:34	18 19:06 (5)	18:22
20	05:20	20:44 (3)	06:12		07:06	18:49 (5)	08:01	08:00
	21:44	16	21:00 (3)	20:46		19:32	15 19:04 (5)	18:20
21	05:21	20:43 (3)	06:13		07:08	18:50 (5)	08:03	08:02
	21:42	17	21:00 (3)	20:44		19:29	11 19:01 (5)	18:17
22	05:23	20:42 (3)	06:15		07:10	18:52 (5)	08:05	08:04
	21:41	18	21:00 (3)	20:42		19:27	7 18:59 (5)	18:15
23	05:24	20:42 (3)	06:17		07:12		08:07	08:06
	21:39	20	21:02 (3)	20:39		19:24		18:13
24	05:26	20:41 (3)	06:19		07:13		08:09	08:08
	21:38	21	21:02 (3)	20:37		19:22		18:11
25	05:27	20:41 (3)	06:20		07:15		07:11	08:09
	21:36	22	21:03 (3)	20:35		19:19		17:09
26	05:29	20:41 (3)	06:22		07:17		07:13	08:11
	21:35	21	21:02 (3)	20:32		19:17		17:06
27	05:30	20:41 (3)	06:24		07:19		07:14	08:13
	21:33	20	21:01 (3)	20:30		19:14		17:04
28	05:32	20:40 (3)	06:26		07:21		07:16	08:14
	21:32	19	20:59 (3)	20:28		19:12		17:02
29	05:34	20:41 (3)	06:28		07:22		07:18	08:16
	21:30	17	20:58 (3)	20:25		19:09		17:00
30	05:35	20:40 (3)	06:29		07:24		07:20	08:17
	21:28	16	20:56 (3)	20:23		19:07		16:58
31	05:37	20:41 (3)	06:31				07:22	
	21:26	14	20:55 (3)	20:21			16:56	16:13
Potential sun hours	512		460		382		328	259
Total, worst case		424		43	383			233
Sun reduction		0.32		0.34	0.32			
Oper. time red.		1.00		1.00	1.00			
Wind dir. red.		0.62		0.63	0.68			
Total reduction		0.20		0.22	0.22			
Total, real		86		9	83			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LG - H319

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	18:02	07:01	20:00	30	18:56 (5)	20:55	20:55	05:03	20:41 (3)	
2	08:44	16:16	08:12	17:08	18:04	07:14	18:04	18:04	06:59	20:02	29	18:55 (5)	20:50	20:50	05:02	20:44 (3)	
3	08:43	16:17	08:10	17:10	18:06	07:12	18:06	18:06	06:56	20:04	28	18:56 (5)	20:59	20:59	05:01	20:46 (3)	
4	08:43	16:18	08:08	17:12	18:07	07:09	18:07	18:07	06:54	20:06	27	18:57 (5)	20:50	20:50	05:00	20:50 (3)	
5	08:43	16:20	08:07	17:14	18:09	07:07	18:09	18:09	06:51	20:07	25	18:57 (5)	21:03	21:03	04:59		
6	08:42	16:21	08:05	17:16	18:11	07:04	18:11	18:11	06:49	20:09	23	18:58 (5)	21:04	21:04	04:58		
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	18:13	06:47	20:11	19	18:59 (5)	21:06	21:06	04:57		
8	08:41	16:24	08:01	17:20	18:15	07:00	18:15	18:15	06:44	20:13	15	19:01 (5)	21:08	21:08	04:57		
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	18:17	06:42	20:15	9	19:04 (5)	21:10	21:10	04:56		
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	18:19	06:39	20:17		19:13 (5)	21:11	21:11	04:56		
11	08:40	16:28	07:55	17:26	18:21	06:52	18:21	18:21	06:37	20:19			20:37 (3)	21:15	21:15	21:18 (4)	
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	18:23	06:35	20:20			20:37 (3)	21:15	21:15	21:18 (4)	
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	18:25	06:32	20:22			20:42 (3)	21:15	21:15	21:20 (4)	
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	18:27	06:30	20:24			20:36 (3)	21:15	21:15	21:17 (4)	
15	08:36	16:34	07:47	17:34	18:28	06:43	18:28	18:28	06:28	20:26			20:43 (3)	21:15	21:15	21:21 (4)	
16	08:35	16:36	07:45	17:36	18:30	06:40	18:30	18:30	06:25	20:28			20:35 (3)	21:15	21:15	21:16 (4)	
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	18:32	06:23	20:30			20:47 (3)	21:15	21:15	21:22 (4)	
18	08:33	16:40	07:41	17:40	18:34	06:35	18:34	18:34	06:21	20:31			20:34 (3)	21:15	21:15	21:16 (4)	
19	08:32	16:41	07:39	17:42	18:36	06:33	18:36	18:36	06:18	20:33			20:53 (3)	21:15	21:15	21:24 (4)	
20	08:31	16:43	07:36	17:44	18:38	06:31	18:38	18:38	06:16	20:35			20:34 (3)	21:15	21:15	21:16 (4)	
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	18:40	06:14	20:37			20:55 (3)	21:15	21:15	21:24 (4)	
22	08:28	16:47	07:32	17:48	18:42	06:26	18:42	18:42	06:12	20:39			20:34 (3)	21:15	21:15	21:17 (4)	
23	08:27	16:49	07:30	17:50	18:43	06:23	18:43	18:43	06:09	20:41			20:58 (3)	21:15	21:15	21:25 (4)	
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45	18:45	06:07	20:42			20:35 (3)	21:15	21:15	21:17 (4)	
25	08:24	16:52	07:25	17:54	18:47	06:18	18:47	18:47	06:05	20:44			20:56 (3)	21:15	21:15	21:25 (4)	
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	18:49	06:03	20:46			20:36 (3)	21:15	21:15	21:18 (4)	
27	08:22	16:56	07:21	17:58	18:51	06:13	18:51	18:51	06:01	20:48			20:56 (3)	21:15	21:15	21:25 (4)	
28	08:20	16:58	07:18	18:00	18:53	06:11	18:53	18:53	05:58	20:50			20:37 (3)	21:15	21:15	21:18 (4)	
29	08:18	17:00			18:55	06:09	18:55	18:55	05:56	20:52			20:38 (3)	21:15	21:15	21:19 (4)	
30	08:17	17:02			18:57	06:07	18:57	18:57	05:54	20:54			20:55 (3)	21:15	21:15	21:20 (4)	
31	08:15	17:04			18:59	06:05	18:59	18:59	05:52	20:56			20:56 (3)	21:15	21:15	21:24 (4)	
Potential sun hours	250	273	367						420				494		510		
Total, worst case						219			205				351		152		
Sun reduction						0.27			0.35				0.38		0.32		
Oper. time red.						1.00			1.00				1.00		1.00		
Wind dir. red.						0.68			0.68				0.63		0.61		
Total reduction						0.18			0.24				0.24		0.20		
Total, real						40			49				84		30		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LG - H319
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July			August			September			October	November	December
1	04:59		21:22 (4)	05:39		20:46 (3)	06:33		07:26		07:24	08:19
	22:00	2	21:24 (4)	21:25	7	20:53 (3)	20:18		19:05		16:54	16:10
2	05:00		21:23 (4)	05:40		20:48 (3)	06:35		07:28		07:26	08:21
	22:00	1	21:24 (4)	21:23	4	20:52 (3)	20:16		19:02		16:52	16:09
3	05:00			05:42		20:48 (3)	06:36		19:02 (5)	07:30	07:28	08:22
	21:59			21:21	2	20:50 (3)	20:13	9	19:11 (5)	19:00	16:50	16:08
4	05:01			05:44			06:38		18:58 (5)	07:31	07:30	08:24
	21:59			21:19			20:11	15	19:13 (5)	18:57	16:48	16:08
5	05:02			05:45			06:40		18:56 (5)	07:33	07:32	08:25
	21:58			21:17			20:09	19	19:15 (5)	18:55	16:46	16:07
6	05:03			05:47			06:42		18:54 (5)	07:35	07:34	08:26
	21:57			21:15			20:06	23	19:17 (5)	18:52	16:44	16:07
7	05:04			05:49			06:43		18:52 (5)	07:37	07:36	08:28
	21:57			21:13			20:04	25	19:17 (5)	18:50	16:43	16:06
8	05:05			05:51			06:45		18:51 (5)	07:39	07:38	08:29
	21:56			21:11			20:01	27	19:18 (5)	18:48	16:41	16:06
9	05:06			05:52			06:47		18:50 (5)	07:41	07:40	08:30
	21:55			21:09			19:59	28	19:18 (5)	18:45	16:39	16:05
10	05:07		20:52 (3)	05:54			06:49		18:49 (5)	07:42	07:42	08:31
	21:55	6	20:58 (3)	21:07			19:56	29	19:18 (5)	18:43	16:37	16:05
11	05:08		20:50 (3)	05:56			06:50		18:48 (5)	07:44	07:44	08:33
	21:54	10	21:00 (3)	21:05			19:54	30	19:18 (5)	18:40	16:36	16:05
12	05:09		20:49 (3)	05:57			06:52		18:48 (5)	07:46	07:45	08:34
	21:53	12	21:01 (3)	21:03			19:51	30	19:18 (5)	18:38	16:34	16:05
13	05:11		20:48 (3)	05:59			06:54		18:48 (5)	07:48	07:47	08:35
	21:52	14	21:02 (3)	21:01			19:49	30	19:18 (5)	18:36	16:32	16:05
14	05:12		20:48 (3)	06:01			06:56		18:47 (5)	07:50	07:49	08:36
	21:51	15	21:03 (3)	20:59			19:47	29	19:16 (5)	18:33	16:31	16:05
15	05:13		20:47 (3)	06:03			06:58		18:47 (5)	07:52	07:51	08:37
	21:50	16	21:03 (3)	20:57			19:44	29	19:16 (5)	18:31	16:29	16:05
16	05:14		20:47 (3)	06:05			06:59		18:48 (5)	07:54	07:53	08:38
	21:48	18	21:05 (3)	20:55			19:42	26	19:14 (5)	18:29	16:27	16:05
17	05:16		20:46 (3)	06:06			07:01		18:47 (5)	07:55	07:55	08:38
	21:47	19	21:05 (3)	20:53			19:39	24	19:11 (5)	18:26	16:26	16:05
18	05:17		20:46 (3)	06:08			07:03		18:48 (5)	07:57	07:57	08:39
	21:46	20	21:06 (3)	20:50			19:37	20	19:08 (5)	18:24	16:25	16:05
19	05:18		20:45 (3)	06:10			07:05		18:49 (5)	07:59	07:59	08:40
	21:45	21	21:06 (3)	20:48			19:34	17	19:06 (5)	18:22	16:23	16:05
20	05:20		20:45 (3)	06:12			07:06		18:51 (5)	08:01	08:00	08:41
	21:44	22	21:07 (3)	20:46			19:32	13	19:04 (5)	18:20	16:22	16:06
21	05:21		20:45 (3)	06:13			07:08		18:52 (5)	08:03	08:02	08:41
	21:42	22	21:07 (3)	20:44			19:29	9	19:01 (5)	18:17	16:20	16:06
22	05:23		20:44 (3)	06:15			07:10			08:05	08:04	08:42
	21:41	23	21:07 (3)	20:42			19:27			18:15	16:19	16:07
23	05:24		20:45 (3)	06:17			07:12		08:07		08:06	08:42
	21:39	22	21:07 (3)	20:39			19:24		18:13		16:18	16:07
24	05:26		20:44 (3)	06:19			07:13		08:09		08:08	08:43
	21:38	21	21:05 (3)	20:37			19:22		18:11		16:17	16:08
25	05:27		20:45 (3)	06:20			07:15		07:11		08:09	08:43
	21:36	19	21:04 (3)	20:35			19:19		17:09		16:16	16:08
26	05:29		20:44 (3)	06:22			07:17		07:13		08:11	08:43
	21:35	18	21:02 (3)	20:32			19:17		17:06		16:15	16:09
27	05:30		20:45 (3)	06:24			07:19		07:14		08:13	08:44
	21:33	16	21:01 (3)	20:30			19:14		17:04		16:13	16:10
28	05:32		20:45 (3)	06:26			07:21		07:16		08:14	08:44
	21:32	14	20:59 (3)	20:28			19:12		17:02		16:13	16:11
29	05:34		20:45 (3)	06:28			07:22		07:18		08:16	08:44
	21:30	13	20:58 (3)	20:25			19:09		17:00		16:12	16:11
30	05:35		20:45 (3)	06:29			07:24		07:20		08:17	08:44
	21:28	11	20:56 (3)	20:23			19:07		16:58		16:11	16:12
31	05:37		20:46 (3)	06:31					07:22			08:44
	21:26	9	20:55 (3)	20:21					16:56			16:13
Potential sun hours	512			460			382		328		259	233
Total, worst case		364			13		432					
Sun reduction		0.32			0.34		0.32					
Oper. time red.		1.00			1.00		1.00					
Wind dir. red.		0.63			0.63		0.68					
Total reduction		0.20			0.22		0.22					
Total, real		74			3		93					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LH - H320

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LI - H321

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LJ - H322

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LK - H323

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LL - H324

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LM - H325

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June			
1	08:44 16:15	08:14 17:06	16:22 (5) 16:34 (5)	07:16 18:02	17:07 (4) 17:34 (4)	07:01 20:00	05:52 20:55	19:51 (2) 20:14 (2)	05:03 21:45
2	08:44 16:16	08:12 17:08	16:22 (5) 16:37 (5)	07:14 18:04	17:06 (4) 17:36 (4)	06:59 20:02	05:50 20:57	19:52 (2) 20:13 (2)	05:02 21:46
3	08:43 16:17	08:10 17:10	16:22 (5) 16:39 (5)	07:11 18:06	17:06 (4) 17:38 (4)	06:56 20:04	05:48 20:59	19:53 (2) 20:12 (2)	05:01 21:48
4	08:43 16:18	08:08 17:12	16:22 (5) 16:41 (5)	07:09 18:07	17:07 (4) 17:38 (4)	06:54 20:06	05:46 21:01	19:54 (2) 20:10 (2)	05:00 21:49
5	08:43 16:19	08:07 17:14	16:23 (5) 16:43 (5)	07:07 18:09	17:06 (4) 17:37 (4)	06:51 20:07	05:44 21:03	19:56 (2) 20:08 (2)	04:59 21:50
6	08:42 16:21	08:05 17:16	16:23 (5) 16:42 (5)	07:04 18:11	17:07 (4) 17:37 (4)	06:49 20:09	05:42 21:04	19:59 (2) 20:04 (2)	04:59 21:51
7	08:42 16:22	08:03 17:18	16:24 (5) 16:42 (5)	07:02 18:13	17:07 (4) 17:35 (4)	06:47 20:11	05:40 21:06		04:58 21:52
8	08:42 16:24	08:01 17:20	16:25 (5) 16:41 (5)	07:00 18:15	17:08 (4) 17:34 (4)	06:44 20:13	05:38 21:08		04:57 21:53
9	08:41 16:25	07:59 17:22	16:26 (5) 16:40 (5)	06:57 18:17	17:09 (4) 17:32 (4)	06:42 20:15	05:36 21:10		04:57 21:54
10	08:40 16:26	07:57 17:24	16:28 (5) 16:38 (5)	06:55 18:19	17:11 (4) 17:31 (4)	06:39 20:17	05:34 21:11		04:56 21:55
11	08:40 16:28	07:55 17:26		06:52 18:21	17:14 (4) 17:55 (3)	06:37 20:19	05:33 21:13		04:56 21:55
12	08:39 16:30	07:53 17:28		06:50 18:23	17:18 (4) 17:56 (3)	06:35 20:20	05:31 21:15		04:55 21:56
13	08:38 16:31	07:51 17:30		06:48 18:25	17:51 (3) 17:58 (3)	06:32 20:22	05:29 21:17		04:55 21:57
14	08:37 16:33	07:49 17:32		06:45 18:27	17:50 (3) 18:00 (3)	06:30 20:24	05:27 21:18		04:55 21:57
15	08:36 16:34	07:47 17:34		06:43 18:28	17:50 (3) 18:02 (3)	06:28 20:26	05:26 21:20		04:54 21:58
16	08:35 16:36	07:45 17:36		06:40 18:30	17:49 (3) 18:04 (3)	06:25 20:28	05:24 21:22		04:54 21:59
17	08:34 16:38	07:43 17:38		06:38 18:32	17:49 (3) 18:06 (3)	06:23 20:30	19:58 (2) 20:01 (2)	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40		06:35 18:34	17:49 (3) 18:07 (3)	06:21 20:31	19:56 (2) 20:03 (2)	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42		06:33 18:36	17:50 (3) 18:07 (3)	06:18 20:33	19:54 (2) 20:05 (2)	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44		06:31 18:38	17:50 (3) 18:05 (3)	06:16 20:35	19:53 (2) 20:07 (2)	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	17:15 (4)	06:28 18:40	17:53 (3) 18:03 (3)	06:14 20:37	19:51 (2) 20:08 (2)	05:16 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	17:13 (4)	06:26 18:41		06:12 20:39	19:51 (2) 20:10 (2)	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	17:11 (4)	06:23 18:43		06:09 20:41	19:50 (2) 20:12 (2)	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	17:11 (4)	06:21 18:45		06:07 20:42	19:50 (2) 20:14 (2)	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	17:09 (4)	06:18 18:47		06:05 20:44	19:50 (2) 20:15 (2)	05:11 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	17:08 (4)	06:16 18:49		06:03 20:46	19:50 (2) 20:17 (2)	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	17:08 (4)	06:13 18:51		06:00 20:48	19:50 (2) 20:17 (2)	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 16:24 (5)	17:07 (4)	06:11 18:53		05:58 20:50	19:50 (2) 20:16 (2)	05:07 21:40	04:57 22:01
29	08:18 17:00	16:23 (5) 16:28 (5)		07:08 19:54		05:56 20:52	19:50 (2) 20:16 (2)	05:06 21:41	04:57 22:01
30	08:17 17:02	16:22 (5) 16:30 (5)		07:06 19:56		05:54 20:53	19:51 (2) 20:15 (2)	05:05 21:43	04:58 22:00
31	08:15 17:04	16:22 (5) 16:32 (5)		07:04 19:58			05:04 21:44		
Potential sun hours	250	273	367	420	494				510
Total, worst case	25	278	425	272	96				
Sun reduction	0.24	0.23	0.27	0.35	0.38				
Oper. time red.	1.00	1.00	1.00	1.00	1.00				
Wind dir. red.	0.66	0.67	0.68	0.65	0.65				
Total reduction	0.16	0.15	0.18	0.23	0.25				
Total, real	4	43	78	62	24				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LM - H325

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:30 (3) 16:54	15:58 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:53 (4) 16:52	15:56 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:50 (4) 16:50	15:54 (5) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:48 (4) 16:48	15:54 (5) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:46 (4) 16:46	15:53 (5) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:45 (4) 16:44	15:52 (5) 16:07
7	05:04 21:57	05:49 21:13	20:08 (2) 20:16 (2)	06:43 20:04	17:43 (4) 16:43	15:52 (5) 16:06
8	05:05 21:56	05:50 21:11	20:05 (2) 20:18 (2)	06:45 20:01	17:42 (4) 16:41	15:52 (5) 16:06
9	05:06 21:55	05:52 21:09	20:03 (2) 20:20 (2)	06:47 19:59	17:41 (4) 16:39	15:52 (5) 16:05
10	05:07 21:55	05:54 21:07	20:01 (2) 20:20 (2)	06:49 19:56	17:41 (4) 16:37	15:53 (5) 16:05
11	05:08 21:54	05:56 21:05	20:00 (2) 20:22 (2)	06:50 19:54	17:40 (4) 16:35	15:54 (5) 16:05
12	05:09 21:53	05:57 21:03	19:59 (2) 20:23 (2)	06:52 19:51	17:40 (4) 16:34	15:54 (5) 16:05
13	05:10 21:52	05:59 21:01	19:58 (2) 20:23 (2)	06:54 19:49	17:40 (4) 16:32	15:55 (5) 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 20:23 (2)	06:56 19:47	17:40 (4) 16:31	15:56 (5) 16:04
15	05:13 21:50	06:03 20:57	19:57 (2) 20:24 (2)	06:58 19:44	17:40 (4) 16:29	15:58 (5) 16:05
16	05:14 21:49	06:04 20:55	19:56 (2) 20:23 (2)	06:59 19:42	17:41 (4) 16:27	15:58 (5) 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 20:23 (2)	07:01 19:39	17:41 (4) 16:26	15:58 (5) 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 20:22 (2)	07:03 19:37	17:42 (4) 16:24	15:58 (5) 16:05
19	05:18 21:45	06:10 20:48	19:56 (2) 20:19 (2)	07:05 19:34	17:43 (4) 16:23	15:58 (5) 16:05
20	05:20 21:44	06:12 20:46	19:56 (2) 20:17 (2)	07:06 19:32	17:45 (4) 16:22	15:58 (5) 16:06
21	05:21 21:42	06:13 20:44	19:57 (2) 20:15 (2)	07:08 19:29	17:46 (4) 16:20	15:58 (5) 16:06
22	05:23 21:41	06:15 20:42	19:56 (2) 20:12 (2)	07:10 19:27	18:38 (3) 18:15	16:00 (5) 16:19
23	05:24 21:39	06:17 20:39	19:57 (2) 20:10 (2)	07:12 19:24	18:36 (3) 18:13	16:00 (5) 16:18
24	05:26 21:38	06:19 20:37	19:58 (2) 20:09 (2)	07:13 19:22	18:34 (3) 18:11	16:00 (5) 16:17
25	05:27 21:36	06:20 20:35	19:59 (2) 20:06 (2)	07:15 19:19	18:32 (3) 18:09	16:00 (5) 16:16
26	05:29 21:35	06:22 20:32	20:01 (2) 20:04 (2)	07:17 19:17	18:31 (3) 18:06	16:00 (5) 16:14
27	05:30 21:33	06:24 20:30	19:59 (2) 19:14	07:19 18:46	18:31 (3) 17:04	16:00 (5) 16:13
28	05:32 21:32	06:26 20:28	19:58 (2) 19:12	07:21 18:44	18:30 (3) 17:02	16:00 (5) 16:12
29	05:34 21:30	06:27 20:25	19:57 (2) 19:09	07:22 18:41	18:30 (3) 17:00	16:00 (5) 16:12
30	05:35 21:28	06:29 20:23	19:56 (2) 19:07	07:24 18:38	18:30 (3) 16:58	16:00 (5) 16:11
31	05:37 21:26	06:31 20:21	19:55 (2) 18:32	07:25 16:56	18:29 (3) 16:04	16:00 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		372	122	431	180	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		82	26	85	31	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LN - H326

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	19:54 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:55	20:18 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	19:55 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	20:17 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48	19:55 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	20:17 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46	19:55 (5)	05:00	05:01	05:44	06:38	07:31	07:30	08:23	
	16:18	17:12	18:07	20:06	21:01	20:16 (5)	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44	19:56 (5)	04:59	05:02	05:45	20:10 (5)	06:40	07:33	08:25	
	16:20	17:14	18:09	20:07	21:03	20:14 (5)	21:50	21:58	21:17	20:20 (5)	07:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	19:57 (5)	04:59	05:03	05:47	20:08 (5)	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	20:13 (5)	21:51	21:57	21:15	20:22 (5)	07:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	20:00 (5)	04:58	05:04	05:49	20:07 (5)	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	20:12 (5)	21:52	21:57	21:13	20:24 (5)	07:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	20:02 (5)	04:57	05:05	05:51	20:05 (5)	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	20:10 (5)	21:53	21:56	21:11	20:24 (5)	07:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	20:05 (5)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	20:25 (5)	07:06	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	20:03 (5)	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	20:25 (5)	07:06	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:03 (5)	06:50	07:44	07:43	08:33
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	20:26 (5)	07:06	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:57	20:03 (5)	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	20:27 (5)	07:01	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	20:02 (5)	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	20:26 (5)	07:06	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	20:02 (5)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	20:26 (5)	07:06	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	20:02 (5)	06:58	07:52	07:51	08:37
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	20:26 (5)	07:06	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	20:01 (5)	06:59	07:54	07:53	08:37
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	20:25 (5)	07:06	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06	20:02 (5)	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	20:23 (5)	07:06	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	05:21		04:54	05:17	06:08	20:02 (5)	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31	21:25		21:59	21:46	20:50	20:22 (5)	07:03	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	05:19		04:54	05:18	06:10	20:02 (5)	07:05	07:59	07:59	08:40
	16:41	17:42	18:36	20:33	21:27		22:00	21:45	20:48	20:19 (5)	07:06	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	20:04 (5)	05:18	04:54	05:20	06:12	20:03 (5)	07:06	08:01	08:00	08:41
	16:43	17:44	18:38	20:35	20:07 (5)	21:28	22:00	21:43	20:46	20:17 (5)	07:06	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	20:00 (5)	05:16	04:54	05:21	06:13	20:05 (5)	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	20:08 (5)	21:30	22:00	21:42	20:44	20:15 (5)	07:09	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:59 (5)	05:15	04:55	05:23	06:15	20:05 (5)	07:10	08:05	08:04	08:42
	16:47	17:48	18:41	20:39	20:10 (5)	21:31	22:01	21:41	20:42	20:12 (5)	07:12	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:57 (5)	05:13	04:55	05:24	06:17	20:09 (5)	07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	20:12 (5)	21:33	22:01	21:39	20:39	20:10 (5)	07:14	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:56 (5)	05:12	04:55	05:26	06:19		07:13	08:09	08:07	08:43
	16:51	17:52	18:45	20:42	20:13 (5)	21:34	22:01	21:38	20:37		07:14	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:56 (5)	05:11	04:56	05:27	06:20		07:15	07:11	08:09	08:43
	16:52	17:54	18:47	20:44	20:15 (5)	21:36	22:01	21:36	20:35		07:16	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:55 (5)	05:09	04:56	05:29	06:22		07:17	07:13	08:11	08:43
	16:54	17:56	18:49	20:46	20:17 (5)	21:37	22:01	21:35	20:32		07:18	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	19:55 (5)	05:08	04:56	05:30	06:24		07:19	07:14	08:13	08:43
	16:56	17:58	18:51	20:48	20:19 (5)	21:39	22:01	21:33	20:30		07:20	17:04	16:13	16:10
28	08:20	07:18	06:11	05:58	19:54 (5)	05:07	04:57	05:32	06:26		07:21	07:16	08:14	08:44
	16:58	18:00	18:53	20:50	20:19 (5)	21:40	22:01	21:32	20:28		07:22	17:02	16:13	16:11
29	08:18		07:08	05:56	19:54 (5)	05:06	04:58	05:34	06:28		07:22	07:18	08:16	08:44
	17:00		19:54	20:52	20:19 (5)	21:41	22:00	21:30	20:25		07:23	17:00	16:12	16:11
30	08:17		07:06	05:54	19:54 (5)	05:05	04:58	05:35	06:29		07:24	07:20	08:17	08:44
	17:02		19:56	20:53	20:18 (5)	21:43	22:00	21:28	20:23		07:25	16:58	16:11	16:12
31	08:15		07:04		05:04			05:37	06:31		07:26	16:58	16:11	16:12
	17:04		19:58		21:44			21:26	20:21		07:27	16:56	16:11	16:13
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233	
Total, worst case				193	143				335					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.65	0.65				0.65					
Total reduction				0.23	0.25				0.22					
Total, real				44	35				74					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LO - H327

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:51 (5) 20:10 (5)	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:52 (5) 20:09 (5)	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:53 (5) 20:07 (5)	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:55 (5) 20:05 (5)	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03		04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04		04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06		04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08		04:57 21:53	05:05 21:56	05:51 21:11	20:07 (5) 20:11 (5)	06:45 20:01	07:39 18:48	08:29 16:41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10		04:57 21:54	05:06 21:55	05:52 21:09	20:04 (5) 20:15 (5)	06:47 19:59	07:41 18:45	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11		04:56 21:54	05:07 21:54	05:54 21:07	20:01 (5) 20:16 (5)	06:49 19:56	07:42 18:43	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13		04:56 21:55	05:08 21:54	05:56 21:05	20:00 (5) 20:17 (5)	06:50 19:54	07:44 18:40	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15		04:55 21:56	05:09 21:53	05:57 21:03	19:59 (5) 20:19 (5)	06:52 19:51	07:46 18:38	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	19:58 (5) 20:19 (5)	06:54 19:49	07:48 18:36	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	05:12 21:51	06:01 20:59	19:57 (5) 20:19 (5)	06:56 19:47	07:50 18:33	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	05:13 21:50	06:03 20:57	19:57 (5) 20:20 (5)	06:58 19:44	07:52 18:31	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	19:56 (5) 20:19 (5)	06:59 19:42	07:54 18:29	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	19:59 (5) 20:01 (5)	04:54 21:59	05:16 21:47	06:06 20:53	19:56 (5) 20:20 (5)	07:01 19:39	07:55 18:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	19:56 (5) 20:03 (5)	04:54 21:59	05:17 21:46	06:08 20:50	19:56 (5) 20:20 (5)	07:03 19:37	07:57 18:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	19:54 (5) 20:05 (5)	04:54 22:00	05:18 21:45	06:10 20:48	19:55 (5) 20:19 (5)	07:05 19:34	07:59 18:22	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	19:53 (5) 20:07 (5)	04:54 22:00	05:20 21:43	06:12 20:46	19:56 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	19:51 (5) 20:08 (5)	04:54 22:00	05:21 21:42	06:13 20:44	19:56 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:42 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	19:50 (5) 20:10 (5)	04:55 22:01	05:23 21:41	06:15 20:42	19:56 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	19:50 (5) 20:12 (5)	04:55 22:01	05:24 21:39	06:17 20:39	19:57 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	19:49 (5) 20:13 (5)	04:55 22:01	05:26 21:38	06:19 20:37	19:58 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	19:49 (5) 20:13 (5)	04:56 22:01	05:27 21:36	06:20 20:35	19:59 (5) 20:06 (5)	07:15 19:19	07:11 17:09	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	19:49 (5) 20:13 (5)	04:56 22:01	05:29 21:35	06:22 20:32	20:03 (5) 20:04 (5)	07:17 19:17	07:13 17:06	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	19:49 (5) 20:13 (5)	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	19:49 (5) 20:12 (5)	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	19:50 (5) 20:12 (5)	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	19:50 (5) 20:11 (5)	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44			05:37 21:26	06:31 20:21		07:22 16:56		08:42 16:13
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233
Total, worst case				255	60				316				
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.65	0.65				0.65				
Total reduction				0.23	0.25				0.22				
Total, real				58	15				70				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LP - H328

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	19:53 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:55	20:02 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50		05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57		21:46	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48		05:01	05:00	05:42	06:36	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59		21:48	21:59	21:21	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46		05:00	05:01	05:44	06:38	07:31	07:30	08:23	
	16:18	17:12	18:07	20:06	21:01		21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44		04:59	05:02	05:45	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:02		21:50	21:58	21:17	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04		21:51	21:57	21:15	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:13	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38		04:57	05:05	05:51	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:11	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:04 (5)	06:50	07:44	08:33	
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	4 20:08 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:57	20:01 (5)	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	11 20:12 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:58 (5)	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	15 20:13 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:57 (5)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	17 20:14 (5)	19:46	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	19:56 (5)	06:58	07:52	07:51	08:37
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	19 20:15 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	5 19:55 (5)	05:24	04:54	05:14	06:05	19:54 (5)	06:59	07:54	07:53	08:37
	16:36	17:36	18:30	20:28	20:00 (5)	21:22	21:59	21:48	20:55	21 20:15 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	19:52 (5)	05:22	04:54	05:16	06:06	19:54 (5)	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30	9 20:01 (5)	21:23	21:59	21:47	20:53	22 20:16 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	19:51 (5)	05:21	04:54	05:17	06:08	19:54 (5)	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31	12 20:03 (5)	21:25	21:59	21:46	20:50	22 20:16 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	19:50 (5)	05:19	04:54	05:18	06:10	19:53 (5)	07:05	07:59	07:59	08:40
	16:41	17:42	18:36	20:33	15 20:05 (5)	21:27	22:00	21:45	20:48	22 20:15 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:49 (5)	05:18	04:54	05:20	06:12	19:53 (5)	07:06	08:01	08:00	08:41
	16:43	17:44	18:38	20:35	18 20:07 (5)	21:28	22:00	21:43	20:46	23 20:16 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:48 (5)	05:16	04:54	05:21	06:13	19:53 (5)	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	20 20:08 (5)	21:30	22:00	21:42	20:44	22 20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:47 (5)	05:15	04:55	05:23	06:15	19:52 (5)	07:10	08:05	08:04	08:42
	16:47	17:48	18:41	20:39	23 20:10 (5)	21:31	22:01	21:41	20:42	20 20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:47 (5)	05:13	04:55	05:24	06:17	19:53 (5)	07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	23 20:10 (5)	21:33	22:01	21:39	20:39	17 20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:47 (5)	05:12	04:55	05:26	06:19	19:54 (5)	07:13	08:09	08:07	08:43
	16:51	17:52	18:45	20:42	23 20:10 (5)	21:34	22:01	21:38	20:37	15 20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:47 (5)	05:11	04:56	05:27	06:20	19:54 (5)	07:15	07:11	08:09	08:43
	16:52	17:54	18:47	20:44	22 20:09 (5)	21:36	22:01	21:36	20:35	12 20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:48 (5)	05:09	04:56	05:29	06:22	19:55 (5)	07:17	07:13	08:11	08:43
	16:54	17:56	18:49	20:46	21 20:09 (5)	21:37	22:01	21:35	20:32	9 20:04 (5)	19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	19:48 (5)	05:08	04:56	05:30	06:24	19:58 (5)	07:19	07:14	08:13	08:43
	16:56	17:58	18:51	20:48	20 20:08 (5)	21:39	22:01	21:33	20:30	4 20:02 (5)	19:14	17:04	16:13	16:10
28	08:20	07:18	06:11	05:58	19:49 (5)	05:07	04:57	05:32	06:26		07:21	07:16	08:14	08:44
	16:58	18:00	18:53	20:50	18 20:07 (5)	21:40	22:01	21:32	20:28		19:12	17:02	16:13	16:11
29	08:18		07:08	05:56	19:50 (5)	05:06	04:58	05:34	06:28		07:22	07:18	08:16	08:44
	17:00		19:54	20:52	16 20:06 (5)	21:41	22:00	21:30	20:25		19:09	17:00	16:12	16:11
30	08:17		07:06	05:54	19:51 (5)	05:05	04:58	05:35	06:29		07:24	07:20	08:17	08:44
	17:02		19:56	20:53	14 20:05 (5)	21:43	22:00	21:28	20:23		19:07	16:58	16:11	16:12
31	08:15		07:04			05:04		05:37	06:31			07:22		08:44
	17:04		19:58			21:44		21:26	20:21			16:56		16:13
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233	
Total, worst case				259	9				275					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.65	0.65				0.65					
Total reduction				0.23	0.25				0.22					
Total, real				59	2				61					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LQ - H329

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:52 (5) 21:17	05:29 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:49 (5) 21:18	05:27 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:47 (5) 21:20	05:26 21:58	05:13 21:50	06:03 20:57	19:56 (5) 20:05 (5)	07:52 19:44	07:51 18:31	08:37 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:58 (5) 21:22	05:24 21:59	05:14 21:48	06:05 20:55	19:53 (5) 20:06 (5)	07:54 19:42	07:53 18:29	08:37 16:27
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:46 (5) 21:23	05:22 21:59	05:16 21:47	06:06 20:53	19:51 (5) 20:08 (5)	07:01 19:39	07:55 18:26	08:38 16:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:44 (5) 21:25	05:21 21:59	05:17 21:46	06:08 20:50	19:50 (5) 20:09 (5)	07:03 19:37	07:57 18:24	08:39 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	20:03 (5) 21:27	05:19 22:00	05:18 21:45	06:10 20:48	19:49 (5) 20:09 (5)	07:05 19:34	07:59 18:22	08:40 16:23
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:43 (5) 21:28	05:18 22:00	05:20 21:43	06:12 20:46	19:48 (5) 20:10 (5)	07:06 19:32	08:01 18:20	08:41 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:42 (5) 21:30	05:16 22:00	05:21 21:42	06:13 20:44	19:48 (5) 20:10 (5)	07:08 19:29	08:03 18:17	08:42 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	19:42 (5) 21:31	05:15 22:01	05:23 21:41	06:15 20:42	19:47 (5) 20:09 (5)	07:10 19:27	08:05 18:15	08:44 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:43 (5) 21:33	05:13 22:01	05:24 21:39	06:17 20:39	19:47 (5) 20:09 (5)	07:12 19:24	08:07 18:13	08:42 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:43 (5) 21:34	05:12 22:01	05:26 21:38	06:19 20:37	19:47 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:43 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	20:03 (5) 21:36	05:11 22:01	05:27 21:36	06:20 20:35	19:47 (5) 20:06 (5)	07:15 19:19	07:11 17:09	08:43 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:45 (5) 21:37	05:09 22:01	05:29 21:35	06:22 20:32	19:47 (5) 20:04 (5)	07:17 19:17	07:13 17:06	08:43 16:15
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:46 (5) 21:39	05:08 22:01	05:30 21:33	06:24 20:30	19:48 (5) 20:02 (5)	07:19 19:14	07:14 17:04	08:43 16:13
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	19:49 (5) 21:40	05:07 22:01	05:32 21:32	06:26 20:28	19:48 (5) 19:59 (5)	07:21 19:12	07:16 17:02	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	19:57 (5) 21:41	05:06 22:00	05:34 21:30	06:28 20:25	19:50 (5) 19:57 (5)	07:22 19:09	07:18 17:00	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53		05:05 22:00	05:35 21:27	06:29 20:23	19:53 (5) 19:55 (5)	07:24 19:07	07:20 16:58	08:44 16:11
31	08:15 17:04		07:04 19:58			05:04 21:44	05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				257				258				
Sun reduction				0.35				0.34				
Oper. time red.				1.00				1.00				
Wind dir. red.				0.65				0.65				
Total reduction				0.23				0.22				
Total, real				59				57				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LR - H330
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	3 19:53 (5) 05:26	04:55 21:58	05:13 21:50	06:03 20:57	06:57 20:01 (5)	07:52 19:44	07:51 18:31	08:37 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	7 19:58 (5) 05:24	04:54 21:59	05:14 21:48	06:05 20:55	3 20:04 (5) 19:57 (5)	07:54 19:42	07:53 18:29	08:37 16:27
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	10 19:59 (5) 05:22	04:54 21:58	05:16 21:48	06:06 20:55	10 20:07 (5) 19:55 (5)	07:55 19:42	07:55 18:29	08:38 16:27
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	13 20:01 (5) 05:21	21:59 04:54	21:47 05:17	20:53 06:08	14 20:09 (5) 19:54 (5)	18:26 07:03	16:26 07:57	16:05 08:39
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	16 20:03 (5) 05:19	21:59 04:54	21:46 05:18	20:50 06:10	16 20:10 (5) 19:52 (5)	18:24 07:05	16:25 07:59	16:05 08:40
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	18 20:05 (5) 05:18	22:00 04:54	21:45 05:20	20:48 06:12	18 20:10 (5) 19:52 (5)	18:22 07:06	16:23 08:01	16:05 08:40
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	21 20:07 (5) 05:16	22:00 04:54	21:43 05:21	20:46 06:13	19 20:11 (5) 19:51 (5)	18:20 07:08	16:22 08:03	16:06 08:41
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	21 20:06 (5) 05:15	22:00 04:55	21:42 05:23	20:44 06:15	20 20:11 (5) 19:50 (5)	18:17 07:10	16:20 08:05	16:06 08:42
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19 20:05 (5) 05:13	22:01 04:55	21:41 05:24	20:41 06:17	20 20:10 (5) 19:50 (5)	18:15 07:12	16:19 08:07	16:06 08:42
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19 20:05 (5) 05:12	22:01 04:55	21:39 05:26	20:39 06:19	20 20:10 (5) 19:50 (5)	18:13 07:13	16:18 08:09	16:07 08:43
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	17 20:04 (5) 05:11	22:01 04:56	21:38 05:27	20:37 06:20	19 20:09 (5) 19:50 (5)	18:11 07:15	16:17 07:11	16:08 08:43
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	16 20:03 (5) 05:10	22:01 04:56	21:36 05:29	20:35 06:22	16 20:06 (5) 19:51 (5)	17:09 07:17	16:16 08:11	16:08 08:43
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	13 20:02 (5) 05:08	22:01 04:56	21:35 05:30	20:32 06:24	13 20:04 (5) 19:52 (5)	17:06 07:19	16:15 08:13	16:09 08:43
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	9 20:00 (5) 05:07	22:01 04:57	21:33 05:32	20:30 06:26	10 20:02 (5) 19:52 (5)	17:14 07:21	16:13 08:14	16:10 08:44
29	08:18 17:00	07:08 17:54	05:56 18:54	05:56 20:52	16 20:03 (5) 05:06	22:01 04:58	21:36 05:34	20:28 06:27	7 20:06 (5) 19:54 (5)	17:02 07:22	16:12 08:16	16:11 08:44
30	08:17 17:02	07:06 17:56	05:54 18:54	05:54 20:53	13 20:02 (5) 05:05	22:00 04:58	21:35 05:35	20:25 06:29	3 20:04 (5) 19:57 (5)	17:00 07:24	16:12 08:17	16:11 08:44
31	08:15 17:04	07:04 17:58	05:54 18:58	05:54 20:53	9 20:00 (5) 05:04	22:00 04:58	21:33 05:37	20:23 06:31	10 20:02 (5) 19:52 (5)	17:14 07:21	16:13 08:14	16:10 08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				202				208				
Sun reduction				0.35				0.34				
Oper. time red.				1.00				1.00				
Wind dir. red.				0.65				0.65				
Total reduction				0.23				0.22				
Total, real				46				46				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LS - H331

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:21 (4) 21:24 (4)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:22 (4) 21:24 (4)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	21:22 (4) 21:23 (4)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	21:22 (4) 21:23 (4)	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	21:22 (4) 21:23 (4)	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	21:22 (4) 21:23 (4)	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	21:22 (4) 21:23 (4)	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	21:22 (4) 21:23 (4)	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:17 (4) 21:18 (4)	21:22 (4) 21:23 (4)	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:51	21:17 (4) 21:19 (4)	21:22 (4) 21:23 (4)	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:17 (4) 21:20 (4)	21:22 (4) 21:23 (4)	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:17 (4) 21:21 (4)	21:22 (4) 21:23 (4)	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:17 (4) 21:21 (4)	21:22 (4) 21:23 (4)	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:53 (5) 19:56 (5)	05:27 21:18	21:17 (4) 21:22 (4)	21:22 (4) 21:23 (4)	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:51 (5) 19:58 (5)	05:26 21:20	21:17 (4) 21:22 (4)	21:22 (4) 21:23 (4)	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:49 (5) 19:59 (5)	05:24 21:22	21:17 (4) 21:23 (4)	21:22 (4) 21:23 (4)	06:04 20:55	06:59 19:59 (5)	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:48 (5) 20:01 (5)	05:22 21:23	21:17 (4) 21:23 (4)	21:22 (4) 21:23 (4)	06:06 20:53	06:56 19:56 (5)	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:47 (5) 20:03 (5)	05:21 21:25	21:17 (4) 21:24 (4)	21:22 (4) 21:23 (4)	06:08 20:50	06:55 19:55 (5)	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	19:47 (5) 20:05 (5)	05:19 21:26	21:17 (4) 21:24 (4)	21:22 (4) 21:23 (4)	06:10 20:48	06:53 19:53 (5)	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:47 (5) 20:06 (5)	05:18 21:28	21:18 (4) 21:24 (4)	21:22 (4) 21:23 (4)	06:12 20:46	06:52 19:52 (5)	07:59 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:46 (5) 20:05 (5)	05:16 21:30	21:18 (4) 21:24 (4)	21:22 (4) 21:23 (4)	06:13 20:44	06:51 19:51 (5)	07:59 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:41	06:12 20:39	19:46 (5) 20:05 (5)	05:15 21:31	21:19 (4) 21:25 (4)	21:22 (4) 21:23 (4)	06:15 20:41	06:50 19:51 (5)	07:59 18:15	08:05 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:47 (5) 20:04 (5)	05:13 21:33	21:18 (4) 21:25 (4)	21:22 (4) 21:23 (4)	06:17 20:39	06:50 19:51 (5)	07:59 18:13	08:07 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:47 (5) 20:03 (5)	05:12 21:34	21:18 (4) 21:25 (4)	21:22 (4) 21:23 (4)	06:19 20:37	06:51 19:51 (5)	07:59 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19:49 (5) 20:02 (5)	05:11 21:36	21:19 (4) 21:25 (4)	21:22 (4) 21:23 (4)	06:20 20:35	06:50 19:50 (5)	07:59 17:15	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:50 (5) 20:00 (5)	05:09 21:37	21:19 (4) 21:25 (4)	21:22 (4) 21:23 (4)	06:22 20:32	06:51 19:52 (5)	07:59 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:54 (5) 19:56 (5)	05:08 21:39	21:19 (4) 21:24 (4)	21:22 (4) 21:23 (4)	06:24 20:30	06:52 19:52 (5)	07:59 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 20:02 (5)	04:57 21:40	21:20 (4) 21:25 (4)	21:22 (4) 21:23 (4)	06:26 20:28	06:53 19:53 (5)	07:59 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00	07:08 18:08	06:08 19:04	05:56 20:52	05:06 20:03 (5)	04:58 21:41	21:21 (4) 21:26 (4)	21:22 (4) 21:23 (4)	06:27 20:25	06:54 19:54 (5)	07:59 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02	07:06 18:10	06:06 19:06	05:54 20:53	05:05 20:04 (5)	04:58 21:43	21:21 (4) 21:24 (4)	21:22 (4) 21:23 (4)	06:29 20:23	06:55 19:57 (5)	07:59 17:00	08:17 16:12	08:44 16:12
31	08:15 17:04	07:04 18:12	06:04 19:08	05:53 20:54	05:04 20:05 (5)	04:57 21:44	21:21 (4) 21:25 (4)	21:22 (4) 21:23 (4)	06:31 20:21	06:56 19:58 (5)	07:59 17:00	08:18 16:13	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case				182		111		6		188			
Sun reduction				0.35		0.32		0.32		0.34			
Oper. time red.				1.00		1.00		1.00		1.00			
Wind dir. red.				0.65		0.61		0.61		0.65			
Total reduction				0.23		0.19		0.20		0.22			
Total, real				42		22		1		42			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LT - H332

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52		05:03	04:59	05:39	20:38 (4)	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:55		21:45	22:00	21:25	15	20:53 (4)	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50		05:02	05:00	05:40		20:39 (4)	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57		21:46	21:59	21:23	13	20:52 (4)	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48		05:01	05:00	05:42		20:38 (4)	06:36	07:30	07:28	08:22	
	16:17	17:10	18:05	20:04	20:59		21:48	21:59	21:21	12	20:50 (4)	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46		05:00	05:01	05:44		20:39 (4)	06:38	07:31	07:30	08:23	
	16:18	17:12	18:07	20:06	21:01		21:49	21:59	21:19	9	20:48 (4)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44		04:59	05:02	05:45		20:39 (4)	06:40	07:33	07:32	08:25	
	16:19	17:14	18:09	20:07	21:02		21:50	21:58	21:17	7	20:46 (4)	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42	20:31 (4)	04:59	05:03	05:47		20:40 (4)	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04	2	20:33 (4)	21:51	21:57	5	20:45 (4)	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40		20:31 (4)	04:58	05:04		20:42 (4)	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	5	20:36 (4)	21:52	21:57	1	20:43 (4)	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38		20:29 (4)	04:57	05:05		20:41 (4)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	8	20:37 (4)	21:53	21:56		20:01	18:48	16:41	16:06		
9	08:41	07:59	06:57	06:42	05:36		20:29 (4)	04:57	05:06		20:42 (4)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	9	20:38 (4)	21:54	21:55		21:09	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34		20:28 (4)	04:56	05:07		20:43 (4)	06:49	07:42	07:42	08:31	
	16:26	17:24	18:19	20:17	21:11	12	20:40 (4)	21:54	21:54		21:07	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33		20:28 (4)	04:56	05:08		20:44 (4)	06:50	07:44	07:43	08:32	
	16:28	17:26	18:21	20:18	21:13	14	20:42 (4)	21:55	21:54		21:05	19:54	18:40	16:35	16:05	
12	08:39	07:53	06:50	06:35	05:31		20:27 (4)	04:55	05:09		20:45 (4)	06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15	16	20:43 (4)	21:56	21:53		21:03	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29		20:27 (4)	04:55	05:10		20:46 (4)	06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17	17	20:44 (4)	21:57	21:52		21:01	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		20:28 (4)	04:55	05:12		20:47 (4)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:26	20:24	21:18	19	20:47 (4)	21:57	21:51		20:59	19:46	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26		20:27 (4)	04:55	05:13		20:57	06:57	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20	20	20:47 (4)	21:58	21:50		20:57	19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24		20:28 (4)	04:54	05:14		20:58	06:59	07:54	07:53	08:37	
	16:36	17:36	18:30	20:28	21:22	20	20:48 (4)	21:59	21:48		20:55	19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22		20:28 (4)	04:54	05:16		20:59	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23	19	20:47 (4)	21:59	21:47		20:53	19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21		20:29 (4)	04:54	05:17		20:54	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	21:25	18	20:47 (4)	21:59	21:46		20:50	19:37	18:24	16:24	16:05	
19	08:32	07:39	06:33	06:18	05:19		20:30 (4)	04:54	05:18		20:51	07:05	07:59	07:58	08:40	
	16:41	17:42	18:36	20:33	21:26	17	20:47 (4)	22:00	21:45		20:48	19:34	18:22	16:23	16:05	
20	08:31	07:36	06:31	06:16	05:18		20:30 (4)	04:54	05:20	20:45 (4)	06:12	07:06	08:01	08:00	08:40	
	16:43	17:44	18:38	20:35	21:28	15	20:45 (4)	22:00	21:43	7	20:52 (4)	20:46	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16		20:31 (4)	04:54	05:21		20:43 (4)	06:13	07:08	08:03	08:41	
	16:45	17:46	18:40	20:37	21:30	14	20:45 (4)	22:00	21:42	10	20:53 (4)	20:44	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	05:15		20:33 (4)	04:55	05:23		20:41 (4)	06:15	07:10	08:05	08:04	08:42
	16:47	17:48	18:41	20:39	21:31	11	20:44 (4)	22:01	21:41	13	20:54 (4)	20:41	19:27	18:15	16:19	16:06
23	08:27	07:30	06:23	06:09	05:13		20:33 (4)	04:55	05:24		20:41 (4)	06:17	07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	21:33	9	20:42 (4)	22:01	21:39	15	20:56 (4)	20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12		20:36 (4)	04:55	05:26		20:40 (4)	06:19	07:13	08:09	08:07	08:43
	16:50	17:52	18:45	20:42	21:34	4	20:40 (4)	22:01	21:38	16	20:56 (4)	20:37	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	05:11		20:34 (4)	04:56	05:27		20:40 (4)	06:20	07:15	07:11	08:09	08:43
	16:52	17:54	18:47	20:44	21:36		22:01	21:36	17	20:57 (4)	20:35	19:19	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:09		20:35 (4)	04:56	05:29		20:39 (4)	06:22	07:17	07:13	08:11	08:43
	16:54	17:56	18:49	20:46	21:37		22:01	21:35	18	20:57 (4)	20:32	19:17	17:06	16:14	16:09	
27	08:21	07:21	06:13	06:00	05:08		20:34 (4)	04:56	05:30		20:38 (4)	06:24	07:19	07:14	08:13	08:43
	16:56	17:58	18:51	20:48	21:39		22:01	21:33	19	20:57 (4)	20:30	19:14	17:04	16:13	16:10	
28	08:20	07:18	06:11	05:58	05:07		20:35 (4)	04:57	05:32		20:38 (4)	06:26	07:21	07:16	08:14	08:44
	16:58	18:00	18:53	20:50	21:40		22:01	21:31	20	20:58 (4)	20:28	19:12	17:02	16:12	16:11	
29	08:18		07:08	05:56	05:06		20:36 (4)	04:57	05:34		20:38 (4)	06:27	07:22	07:18	08:16	08:44
	17:00		19:54	20:52	21:41		22:00	21:30	19	20:57 (4)	20:25	19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	05:05		20:37 (4)	04:58	05:35		20:38 (4)	06:29	07:24	07:20	08:17	08:44
	17:02		19:56	20:53	21:43		22:00	21:28	18	20:56 (4)	20:23	19:07	16:58	16:11	16:12	
31	08:15		07:04	05:54	05:04		20:38 (4)	05:37	06:31		20:38 (4)	06:31	07:22	07:18	08:14	08:44
	17:04		19:58	21:44	22:00		22:00	21:26	17	20:55 (4)	20:21	19:07	16:56	16:11	16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233		
Total, worst case					249				189		62					
Sun reduction					0.38				0.32		0.34					
Oper. time red.					1.00				1.00		1.00					
Wind dir. red.					0.64				0.64		0.64					
Total reduction					0.24				0.21		0.22					
Total, real					60				39		13					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LU - H333

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LV - H334

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June	
1	08:44		08:14	16:28 (5)	07:16	17:19 (4)	07:01		05:52	19:58 (2)	05:03	
	16:15		17:06	6 16:34 (5)	18:02	15 17:34 (4)	20:00		20:55	27 20:25 (2)	21:45	
2	08:44		08:12	16:29 (5)	07:14	17:17 (4)	06:59		05:50	19:58 (2)	05:02	
	16:16		17:08	8 16:37 (5)	18:04	19 17:36 (4)	20:02		20:57	27 20:25 (2)	21:46	
3	08:43		08:10	16:28 (5)	07:11	17:17 (4)	06:56		05:48	19:58 (2)	05:01	
	16:17		17:10	16:39 (5)	18:06	21 17:38 (4)	20:04		20:59	26 20:24 (2)	21:48	
4	08:43		08:08	16:28 (5)	07:09	17:16 (4)	06:54		05:46	19:58 (2)	05:00	
	16:18		17:12	13 16:41 (5)	18:07	25 17:41 (4)	20:06		21:01	26 20:24 (2)	21:49	
5	08:43		08:07	16:28 (5)	07:07	17:15 (4)	06:51		05:44	19:58 (2)	04:59	
	16:19		17:14	15 16:43 (5)	18:09	27 17:42 (4)	20:07		21:03	25 20:23 (2)	21:50	
6	08:42		08:05	16:28 (5)	07:04	17:15 (4)	06:49		05:42	19:59 (2)	04:59	
	16:21		17:16	17 16:45 (5)	18:11	30 17:45 (4)	20:09		21:04	23 20:22 (2)	21:51	
7	08:42		08:03	16:28 (5)	07:02	17:14 (4)	06:47		05:40	20:00 (2)	04:58	
	16:22		17:18	19 16:47 (5)	18:13	32 17:46 (4)	20:11		21:06	22 20:22 (2)	21:52	
8	08:42		08:01	16:28 (5)	07:00	17:15 (4)	06:44		05:38	20:01 (2)	04:57	
	16:24		17:20	21 16:49 (5)	18:15	32 17:47 (4)	20:13		21:08	20 20:21 (2)	21:53	
9	08:41		07:59	16:29 (5)	06:57	17:14 (4)	06:42		05:36	20:02 (2)	04:57	
	16:25		17:22	19 16:48 (5)	18:17	32 17:46 (4)	20:15		21:10	17 20:19 (2)	21:54	
10	08:40		07:57	16:30 (5)	06:55	17:15 (4)	06:39		05:34	20:03 (2)	04:56	
	16:26		17:24	18 16:48 (5)	18:19	31 17:46 (4)	20:17		21:11	14 20:17 (2)	21:55	
11	08:40		07:55	16:31 (5)	06:52	17:16 (4)	06:37		05:33	20:06 (2)	04:56	
	16:28		17:26	16 16:47 (5)	18:21	29 17:45 (4)	20:19		21:13	10 20:16 (2)	21:55	
12	08:39		07:53	16:31 (5)	06:50	17:16 (4)	06:35		05:31		04:55	
	16:30		17:28	14 16:45 (5)	18:23	28 17:44 (4)	20:20		21:15		21:56	
13	08:38		07:51	16:33 (5)	06:48	17:17 (4)	06:32		05:29		04:55	
	16:31		17:30	10 16:43 (5)	18:25	26 17:43 (4)	20:22		21:17		21:57	
14	08:37		07:49		06:45	17:17 (4)	06:30		05:27		04:55	
	16:33		17:32		18:27	25 18:00 (3)	20:24		21:18		21:57	
15	08:36		07:47		06:43	17:20 (4)	06:28		05:26		04:54	
	16:34		17:34		18:28	23 18:02 (3)	20:26		21:20		21:58	
16	08:35		07:45		06:40	17:21 (4)	06:25		05:24		04:54	
	16:36		17:36		18:30	23 18:04 (3)	20:28		21:22		21:59	
17	08:34		07:43		06:38	17:26 (4)	06:23		05:22		04:54	
	16:38		17:38		18:32	15 18:06 (3)	20:30		21:23		21:59	
18	08:33		07:41		06:35	17:55 (3)	06:21		05:21		04:54	
	16:40		17:40		18:34	12 18:07 (3)	20:31		21:25		22:00	
19	08:32		07:39		06:33	17:55 (3)	06:18		05:19		04:54	
	16:41		17:42		18:36	15 18:10 (3)	20:33		21:27		22:00	
20	08:31		07:36		06:31	17:54 (3)	06:16		05:18		04:54	
	16:43		17:44		18:38	17 18:11 (3)	20:35		21:28		22:00	
21	08:30		07:34		06:28	17:55 (3)	06:14		20:07 (2)	05:16	04:54	
	16:45		17:46		18:40	18 18:13 (3)	20:37	1	20:08 (2)	21:30	22:01	
22	08:28		07:32		06:26	17:55 (3)	06:12		20:04 (2)	05:15	04:55	
	16:47		17:48		18:41	18 18:13 (3)	20:39	6	20:10 (2)	21:31	22:01	
23	08:27		07:30		06:23	17:56 (3)	06:09		20:03 (2)	05:13	04:55	
	16:49		17:50		18:43	16 18:12 (3)	20:41	9	20:12 (2)	21:33	22:01	
24	08:26		07:28		06:21	17:57 (3)	06:07		20:02 (2)	05:12	04:55	
	16:50		17:52		18:45	12 18:09 (3)	20:42	12	20:14 (2)	21:34	22:01	
25	08:24		07:25		06:18	18:00 (3)	06:05		20:01 (2)	05:11	04:55	
	16:52		17:54		18:47	6 18:06 (3)	20:44	14	20:15 (2)	21:36	22:01	
26	08:23		07:23	17:24 (4)	06:16		06:03		20:00 (2)	05:09	04:56	
	16:54		17:56	4 17:28 (4)	18:49		20:46	17	20:17 (2)	21:37	22:01	
27	08:22		07:21	17:22 (4)	06:13		06:00		19:59 (2)	05:08	04:56	
	16:56		17:58	9 17:31 (4)	18:51		20:48	20	20:19 (2)	21:39	22:01	
28	08:20		07:18	17:20 (4)	06:11		05:58		19:59 (2)	05:07	04:57	
	16:58		18:00	12 17:32 (4)	18:53		20:50	22	20:21 (2)	21:40	22:01	
29	08:18				07:08		05:56		19:58 (2)	05:06	04:57	
	17:00				19:54		20:52	24	20:22 (2)	21:41	22:01	
30	08:17				07:06		05:54		19:58 (2)	05:05	04:58	
	17:02				19:56		20:53	26	20:24 (2)	21:43	22:00	
31	08:15	16:30 (5)			07:04				05:04			
	17:04	2 16:32 (5)			19:58				21:44			
Potential sun hours	250		273		367		420		494		510	
Total, worst case	2		212		547		151		237			
Sun reduction	0.24		0.23		0.27		0.35		0.38			
Oper. time red.	1.00		1.00		1.00		1.00		1.00			
Wind dir. red.	0.66		0.66		0.68		0.65		0.65			
Total reduction	0.16		0.15		0.18		0.23		0.25			
Total, real	0		32		100		34		58			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LV - H334

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:18 (2) 20:24 (2)	06:33 20:18	07:26 19:05	17:55 (4) 16:54
2	04:59 22:00	05:40 21:23	20:15 (2) 20:27 (2)	06:35 20:16	07:26 19:02	17:54 (4) 16:52
3	05:00 21:59	05:42 21:21	20:13 (2) 20:28 (2)	06:36 20:13	07:28 19:00	17:53 (4) 16:50
4	05:01 21:59	05:44 21:19	20:12 (2) 20:30 (2)	06:38 20:11	07:30 18:57	17:52 (4) 16:48
5	05:02 21:58	05:45 21:17	20:10 (2) 20:30 (2)	06:40 20:09	07:32 18:55	17:52 (4) 16:46
6	05:03 21:58	05:47 21:15	20:09 (2) 20:32 (2)	06:42 20:06	07:34 18:52	17:51 (4) 16:44
7	05:04 21:57	05:49 21:13	20:09 (2) 20:33 (2)	06:43 20:04	07:36 18:50	17:50 (4) 16:43
8	05:05 21:56	05:50 21:11	20:08 (2) 20:32 (2)	06:45 20:01	07:38 18:48	17:50 (4) 16:41
9	05:06 21:55	05:52 21:09	20:07 (2) 20:33 (2)	06:47 19:59	07:40 18:45	17:50 (4) 16:39
10	05:07 21:55	05:54 21:07	20:06 (2) 20:33 (2)	06:49 19:56	07:42 18:43	17:50 (4) 16:37
11	05:08 21:54	05:56 21:05	20:06 (2) 20:33 (2)	06:50 19:54	07:44 18:40	17:51 (4) 16:35
12	05:09 21:53	05:57 21:03	20:06 (2) 20:33 (2)	06:52 19:51	07:46 18:38	17:51 (4) 16:34
13	05:10 21:52	05:59 21:01	20:05 (2) 20:31 (2)	06:54 19:49	07:48 18:36	17:52 (4) 16:32
14	05:12 21:51	06:01 20:59	20:06 (2) 20:29 (2)	06:56 19:47	07:50 18:33	17:53 (4) 16:31
15	05:13 21:50	06:03 20:57	20:06 (2) 20:28 (2)	06:58 19:44	07:52 18:31	17:55 (4) 16:29
16	05:14 21:49	06:04 20:55	20:06 (2) 20:25 (2)	06:59 19:42	07:54 18:29	17:57 (4) 16:27
17	05:16 21:47	06:06 20:53	20:06 (2) 20:23 (2)	07:01 19:39	07:55 18:26	17:59 (4) 16:26
18	05:17 21:46	06:08 20:50	20:07 (2) 20:22 (2)	07:03 19:37	07:57 18:24	16:26 16:24
19	05:18 21:45	06:10 20:48	20:07 (2) 20:19 (2)	07:05 19:34	07:59 18:22	16:26 16:23
20	05:20 21:44	06:12 20:46	20:09 (2) 20:17 (2)	07:06 19:32	08:01 18:20	16:23 16:22
21	05:21 21:42	06:13 20:44	20:10 (2) 20:15 (2)	07:08 19:29	08:03 18:17	16:22 16:20
22	05:23 21:41	06:15 20:42	20:11 (2) 19:27	07:10 19:27	08:05 18:15	16:20 16:19
23	05:24 21:39	06:17 20:39	20:12 (2) 19:24	07:12 19:24	08:07 18:13	16:19 16:18
24	05:26 21:38	06:19 20:37	20:13 (2) 19:22	07:13 19:22	08:09 18:11	16:18 16:17
25	05:27 21:36	06:20 20:35	20:14 (2) 19:19	07:15 19:19	08:11 18:09	16:17 16:16
26	05:29 21:35	06:22 20:32	20:15 (2) 19:17	07:17 19:17	08:13 18:07	16:16 16:15
27	05:30 21:33	06:24 20:30	20:16 (2) 19:14	07:19 19:14	08:15 18:05	16:15 16:14
28	05:32 21:32	06:26 20:28	20:17 (2) 19:12	07:21 19:12	08:17 18:03	16:14 16:13
29	05:34 21:30	06:27 20:25	20:18 (2) 19:09	07:22 19:09	08:19 18:01	16:13 16:12
30	05:35 21:28	06:29 20:23	20:19 (2) 19:07	07:24 19:07	08:21 18:00	16:12 16:11
31	05:37 21:26	06:31 20:21	20:20 (2) 19:06	07:26 19:06	08:23 18:00	16:11 16:10
Potential sun hours	512	460	382	328	259	233
Total, worst case		396	218	412	147	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.68	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		87	47	81	26	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LW - H335

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1 08:44		08:14	16:25 (5) 07:16	17:13 (4) 07:01	05:52	19:55 (2) 05:03
16:15		17:06	9 16:34 (5) 18:02	21 17:34 (4) 20:00	26 20:21 (2) 21:45	
2 08:44		08:12	16:26 (5) 07:14	17:12 (4) 06:59	05:50	19:55 (2) 05:02
16:16		17:08	11 16:37 (5) 18:04	24 17:36 (4) 20:02	25 20:20 (2) 21:46	
3 08:43		08:10	16:25 (5) 07:11	17:11 (4) 06:56	05:48	19:55 (2) 05:01
16:17		17:10	14 16:39 (5) 18:06	27 17:38 (4) 20:04	24 20:19 (2) 21:48	
4 08:43		08:08	16:25 (5) 07:09	17:12 (4) 06:54	05:46	19:56 (2) 05:00
16:18		17:12	16 16:41 (5) 18:07	29 17:41 (4) 20:06	22 20:18 (2) 21:49	
5 08:43		08:07	16:25 (5) 07:07	17:11 (4) 06:51	05:44	19:57 (2) 04:59
16:19		17:14	18 16:43 (5) 18:09	31 17:42 (4) 20:07	21:03	20:17 (2) 21:50
6 08:42		08:05	16:25 (5) 07:04	17:11 (4) 06:49	05:42	19:57 (2) 04:59
16:21		17:16	20 16:45 (5) 18:11	32 17:43 (4) 20:09	19 20:16 (2) 21:51	
7 08:42		08:03	16:26 (5) 07:02	17:11 (4) 06:47	05:40	20:00 (2) 04:58
16:22		17:18	20 16:46 (5) 18:13	31 17:42 (4) 20:11	21:06	20:15 (2) 21:52
8 08:42		08:01	16:27 (5) 07:00	17:11 (4) 06:44	05:38	20:01 (2) 04:57
16:24		17:20	18 16:45 (5) 18:15	31 17:42 (4) 20:13	21:08	20:13 (2) 21:53
9 08:41		07:59	16:27 (5) 06:57	17:11 (4) 06:42	05:36	20:04 (2) 04:57
16:25		17:22	18 16:45 (5) 18:17	29 17:40 (4) 20:15	21:10	20:10 (2) 21:54
10 08:40		07:57	16:29 (5) 06:55	17:12 (4) 06:39	05:34	04:56
16:26		17:24	15 16:44 (5) 18:19	28 17:40 (4) 20:17	21:11	21:55
11 08:40		07:55	16:30 (5) 06:52	17:14 (4) 06:37	05:33	04:56
16:28		17:26	12 16:42 (5) 18:21	25 17:39 (4) 20:19	21:13	21:55
12 08:39		07:53	16:32 (5) 06:50	17:15 (4) 06:35	05:31	04:55
16:30		17:28	7 16:39 (5) 18:23	22 17:37 (4) 20:20	21:15	21:56
13 08:38		07:51	06:48	17:17 (4) 06:32	05:29	04:55
16:31		17:30	18:25	20 17:58 (3) 20:22	21:17	21:57
14 08:37		07:49	06:45	17:19 (4) 06:30	05:27	04:55
16:33		17:32	18:27	18 18:00 (3) 20:24	21:18	21:57
15 08:36		07:47	06:43	17:54 (3) 06:28	05:26	04:54
16:34		17:34	18:28	8 18:02 (3) 20:26	21:20	21:58
16 08:35		07:45	06:40	17:53 (3) 06:25	05:24	04:54
16:36		17:36	18:30	11 18:04 (3) 20:28	21:22	21:59
17 08:34		07:43	06:38	17:53 (3) 06:23	05:22	04:54
16:38		17:38	18:32	13 18:06 (3) 20:30	21:23	21:59
18 08:33		07:41	06:35	17:52 (3) 06:21	05:21	04:54
16:40		17:40	18:34	15 18:07 (3) 20:31	21:25	22:00
19 08:32		07:39	06:33	17:52 (3) 06:18	20:04 (2) 05:19	04:54
16:41		17:42	18:36	18 18:10 (3) 20:33	1 20:05 (2) 21:27	22:00
20 08:31		07:36	06:31	17:52 (3) 06:16	20:02 (2) 05:18	04:54
16:43		17:44	18:38	19 18:11 (3) 20:35	5 20:07 (2) 21:28	22:00
21 08:30		07:34	06:28	17:53 (3) 06:14	19:59 (2) 05:16	04:54
16:45		17:46	18:40	17 18:10 (3) 20:37	9 20:08 (2) 21:30	22:01
22 08:28		07:32	06:26	17:54 (3) 06:12	19:58 (2) 05:15	04:55
16:47		17:48	18:41	14 18:08 (3) 20:39	12 20:10 (2) 21:31	22:01
23 08:27		07:30	17:21 (4) 06:23	17:56 (3) 06:09	19:57 (2) 05:13	04:55
16:49		17:50	1 17:22 (4) 18:43	10 18:06 (3) 20:41	15 20:12 (2) 21:33	22:01
24 08:26		07:28	17:19 (4) 06:21	06:07	19:56 (2) 05:12	04:55
16:50		17:52	5 17:24 (4) 18:45	20:42	18 20:14 (2) 21:34	22:01
25 08:24		07:25	17:17 (4) 06:18	06:05	19:56 (2) 05:11	04:55
16:52		17:54	9 17:26 (4) 18:47	20:44	19 20:15 (2) 21:36	22:01
26 08:23		07:23	17:16 (4) 06:16	06:03	19:55 (2) 05:09	04:56
16:54		17:56	12 17:28 (4) 18:49	20:46	22 20:17 (2) 21:37	22:01
27 08:22		07:21	17:15 (4) 06:13	06:00	19:55 (2) 05:08	04:56
16:56		17:58	16 17:31 (4) 18:51	20:48	24 20:19 (2) 21:39	22:01
28 08:20		07:18	17:13 (4) 06:11	05:58	19:55 (2) 05:07	04:57
16:58		18:00	19 17:32 (4) 18:53	20:50	26 20:21 (2) 21:40	22:01
29 08:18			07:08	05:56	19:54 (2) 05:06	04:57
17:00			19:54	20:52	28 20:22 (2) 21:41	22:01
30 08:17		16:26 (5)	07:06	05:54	19:55 (2) 05:05	04:58
17:02	4	16:30 (5)	19:56	20:53	26 20:21 (2) 21:43	22:00
31 08:15		16:26 (5)	07:04		05:04	
17:04	6	16:32 (5)	19:58		21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case	10	240	493	205	169	
Sun reduction	0.24	0.23	0.27	0.35	0.38	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.66	0.66	0.68	0.65	0.65	
Total reduction	0.16	0.15	0.18	0.23	0.25	
Total, real	2	37	90	47	42	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LW - H335

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:54 (4) 16:54	15:58 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:52 (4) 16:52	15:57 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:51 (4) 16:50	15:56 (5) 16:08
4	05:01 21:59	05:44 21:19	20:13 (2) 20:11	07:31 18:57	17:50 (4) 16:48	15:56 (5) 16:08
5	05:02 21:58	05:45 21:17	20:10 (2) 20:09	07:33 18:55	17:49 (4) 16:46	15:55 (5) 16:07
6	05:03 21:58	05:47 21:15	20:08 (2) 20:06	07:35 18:52	17:48 (4) 16:44	15:55 (5) 16:07
7	05:04 21:57	05:49 21:13	20:07 (2) 20:04	07:37 18:50	17:46 (4) 16:43	15:55 (5) 16:06
8	05:05 21:56	05:50 21:11	20:06 (2) 20:01	07:39 18:48	17:46 (4) 16:41	15:55 (5) 16:06
9	05:06 21:55	05:52 21:09	20:05 (2) 19:59	07:41 18:45	17:46 (4) 16:39	15:55 (5) 16:05
10	05:07 21:55	05:54 21:07	20:04 (2) 19:56	07:42 18:43	17:46 (4) 16:37	15:57 (5) 16:05
11	05:08 21:54	05:56 21:05	20:03 (2) 19:54	07:44 18:40	17:46 (4) 16:35	15:58 (5) 16:05
12	05:09 21:53	05:57 21:03	20:03 (2) 19:51	07:46 18:38	17:46 (4) 16:34	15:58 (5) 16:05
13	05:10 21:52	05:59 21:01	20:02 (2) 19:49	07:48 18:36	17:46 (4) 16:32	16:01 (5) 16:05
14	05:12 21:51	06:01 20:59	20:02 (2) 19:47	07:50 18:33	17:47 (4) 16:31	16:02 (5) 16:04
15	05:13 21:50	06:03 20:57	20:02 (2) 19:44	07:52 18:31	17:47 (4) 16:29	16:03 (5) 16:05
16	05:14 21:49	06:04 20:55	20:01 (2) 19:42	07:54 18:29	17:48 (4) 16:27	16:04 (5) 16:05
17	05:16 21:47	06:06 20:53	20:02 (2) 19:39	07:55 18:26	17:50 (4) 16:26	16:05 (5) 16:05
18	05:17 21:46	06:08 20:50	20:02 (2) 19:37	07:57 18:24	17:51 (4) 16:24	16:06 (5) 16:05
19	05:18 21:45	06:10 20:48	20:02 (2) 19:34	07:59 18:22	17:55 (4) 16:23	16:07 (5) 16:05
20	05:20 21:44	06:12 20:46	20:03 (2) 19:32	08:01 18:20	16:22 (5) 16:22	16:08 (5) 16:06
21	05:21 21:42	06:13 20:44	20:04 (2) 19:29	08:03 18:17	16:23 (5) 16:20	16:09 (5) 16:06
22	05:23 21:41	06:15 20:42	20:04 (2) 19:27	08:05 18:15	16:24 (5) 16:19	16:10 (5) 16:06
23	05:24 21:39	06:17 20:39	20:06 (2) 19:24	08:07 18:13	16:25 (5) 16:18	16:11 (5) 16:07
24	05:26 21:38	06:19 20:37	20:08 (2) 19:22	08:09 18:11	16:26 (5) 16:17	16:12 (5) 16:08
25	05:27 21:36	06:20 20:35	20:09 (2) 19:19	08:11 18:09	16:18 (5) 16:16	16:13 (5) 16:08
26	05:29 21:35	06:22 20:32	20:10 (2) 19:17	08:13 18:07	16:19 (5) 16:14	16:14 (5) 16:09
27	05:30 21:33	06:24 20:30	20:11 (2) 19:14	08:15 18:04	16:20 (5) 16:13	16:15 (5) 16:10
28	05:32 21:32	06:26 20:28	20:12 (2) 19:12	08:17 18:02	16:21 (5) 16:12	16:16 (5) 16:11
29	05:34 21:30	06:27 20:25	20:13 (2) 19:09	08:19 18:00	16:22 (5) 16:12	16:17 (5) 16:11
30	05:35 21:28	06:29 20:23	20:14 (2) 19:07	08:21 18:00	16:23 (5) 16:11	16:18 (5) 16:12
31	05:37 21:26	06:31 20:21	20:15 (2) 19:05	08:23 18:00	16:24 (5) 16:11	16:19 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		378	158	425	165	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		84	34	84	29	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LX - H336

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:24 (5)	07:16	17:10 (4)	07:01				05:52		19:52 (2)	05:03			
	16:15			17:06	10 16:34 (5)	18:02	24 17:34 (4)	20:00				20:55	21	20:13 (2)	21:45			
2	08:44			08:12	16:25 (5)	07:14	17:09 (4)	06:59				05:50		19:52 (2)	05:02			
	16:16			17:08	12 16:37 (5)	18:04	27 17:36 (4)	20:02				20:57	19	20:11 (2)	21:46			
3	08:43			08:10	16:25 (5)	07:11	17:09 (4)	06:56				05:48		19:54 (2)	05:01			
	16:17			17:10	14 16:39 (5)	18:06	29 17:38 (4)	20:04				20:59	16	20:10 (2)	21:48			
4	08:43			08:08	16:25 (5)	07:09	17:09 (4)	06:54				05:46		19:55 (2)	05:00			
	16:18			17:12	16 16:41 (5)	18:07	31 17:40 (4)	20:06				21:01	13	20:08 (2)	21:49			
5	08:43			08:07	16:25 (5)	07:07	17:09 (4)	06:51				05:44		19:58 (2)	04:59			
	16:19			17:14	18 16:43 (5)	18:09	30 17:39 (4)	20:07				21:03	6	20:04 (2)	21:50			
6	08:42			08:05	16:25 (5)	07:04	17:10 (4)	06:49				05:42			04:59			
	16:21			17:16	20 16:45 (5)	18:11	29 17:39 (4)	20:09				21:04			21:51			
7	08:42			08:03	16:26 (5)	07:02	17:09 (4)	06:47				05:40			04:58			
	16:22			17:18	19 16:45 (5)	18:13	29 17:38 (4)	20:11				21:06			21:52			
8	08:42			08:01	16:27 (5)	07:00	17:10 (4)	06:44				05:38			04:57			
	16:24			17:20	17 16:44 (5)	18:15	27 17:37 (4)	20:13				21:08			21:53			
9	08:41			07:59	16:28 (5)	06:57	17:11 (4)	06:42				05:36			04:57			
	16:25			17:22	15 16:43 (5)	18:17	24 17:35 (4)	20:15				21:10			21:54			
10	08:40			07:57	16:29 (5)	06:55	17:13 (4)	06:39				05:34			04:56			
	16:26			17:24	13 16:42 (5)	18:19	21 17:34 (4)	20:17				21:11			21:55			
11	08:40			07:55	16:31 (5)	06:52	17:15 (4)	06:37				05:33			04:56			
	16:28			17:26	10 16:41 (5)	18:21	17 17:32 (4)	20:19				21:13			21:55			
12	08:39			07:53		06:50	17:17 (4)	06:35				05:31			04:55			
	16:30			17:28		18:23	15 17:56 (3)	20:20				21:15			21:56			
13	08:38			07:51		06:48	17:52 (3)	06:32				05:29			04:55			
	16:31			17:30		18:25	6 17:58 (3)	20:22				21:17			21:57			
14	08:37			07:49		06:45	17:51 (3)	06:30				05:27			04:55			
	16:33			17:32		18:27	9 18:00 (3)	20:24				21:18			21:57			
15	08:36			07:47		06:43	17:51 (3)	06:28				05:26			04:54			
	16:34			17:34		18:28	11 18:02 (3)	20:26				21:20			21:58			
16	08:35			07:45		06:40	17:50 (3)	06:25				05:24			04:54			
	16:36			17:36		18:30	14 18:04 (3)	20:28				21:22			21:59			
17	08:34			07:43		06:38	17:50 (3)	06:23			19:57 (2)	05:22			04:54			
	16:38			17:38		18:32	16 18:06 (3)	20:30		4	20:01 (2)	21:23			21:59			
18	08:33			07:41		06:35	17:50 (3)	06:21			19:55 (2)	05:21			04:54			
	16:40			17:40		18:34	17 18:07 (3)	20:31		8	20:03 (2)	21:25			22:00			
19	08:32			07:39		06:33	17:51 (3)	06:18			19:54 (2)	05:19			04:54			
	16:41			17:42		18:36	17 18:08 (3)	20:33		11	20:05 (2)	21:27			22:00			
20	08:31			07:36		06:31	17:51 (3)	06:16			19:53 (2)	05:18			04:54			
	16:43			17:44		18:38	15 18:06 (3)	20:35		14	20:07 (2)	21:28			22:00			
21	08:30			07:34		06:28	17:53 (3)	06:14			19:51 (2)	05:16			04:54			
	16:45			17:46		18:40	12 18:05 (3)	20:37		17	20:08 (2)	21:30			22:01			
22	08:28			07:32		17:18 (4)	06:26	17:56 (3)	06:12		19:50 (2)	05:15			04:55			
	16:47			17:48	1	17:19 (4)	18:41	5 18:01 (3)	20:39		20 20:10 (2)	21:31			22:01			
23	08:27			07:30		17:16 (4)	06:23		06:09		19:50 (2)	05:13			04:55			
	16:49			17:50	6	17:22 (4)	18:43		20:41		22 20:12 (2)	21:33			22:01			
24	08:26			07:28		17:15 (4)	06:21		06:07		19:50 (2)	05:12			04:55			
	16:50			17:52	9	17:24 (4)	18:45		20:42		24 20:14 (2)	21:34			22:01			
25	08:24			07:25		17:13 (4)	06:18		06:05		19:50 (2)	05:11			04:55			
	16:52			17:54	13	17:26 (4)	18:47		20:44		25 20:15 (2)	21:36			22:01			
26	08:23			07:23		17:12 (4)	06:16		06:03		19:50 (2)	05:09			04:56			
	16:54			17:56	16	17:28 (4)	18:49		20:46		26 20:16 (2)	21:37			22:01			
27	08:22			07:21		17:11 (4)	06:13		06:00		19:50 (2)	05:08			04:56			
	16:56			17:58	20	17:31 (4)	18:51		20:48		26 20:16 (2)	21:39			22:01			
28	08:20			07:18		17:10 (4)	06:11		05:58		19:50 (2)	05:07			04:57			
	16:58			18:00	22	17:32 (4)	18:53		20:50		25 20:15 (2)	21:40			22:01			
29	08:18		16:27 (5)			07:08		05:56			19:50 (2)	05:06			04:57			
	17:00	1	16:28 (5)			19:54		20:52		25	20:15 (2)	21:41			22:01			
30	08:17		16:26 (5)			07:06		05:54			19:51 (2)	05:05			04:58			
	17:02	4	16:30 (5)			19:56		20:53		23	20:14 (2)	21:43			22:00			
31	08:15		16:25 (5)			07:04					05:04							
	17:04	7	16:32 (5)			19:58					21:44							
Potential sun hours	250			273			367		420		494				510			
Total, worst case		12			251		425		270		75							
Sun reduction		0.24			0.23		0.27		0.35		0.38							
Oper. time red.		1.00			1.00		1.00		1.00		1.00							
Wind dir. red.		0.66			0.66		0.68		0.65		0.65							
Total reduction		0.16			0.15		0.18		0.23		0.25							
Total, real		2			39		78		62		19							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LX - H336

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:58 (4) 16:54	15:58 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:54 (4) 16:52	15:57 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:51 (4) 16:50	15:56 (5) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:49 (4) 16:48	15:55 (5) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:48 (4) 16:46	15:55 (5) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:47 (4) 16:44	15:55 (5) 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	17:45 (4) 16:43	15:55 (5) 16:06
8	05:05 21:56	05:50 21:11	20:06 (2) 20:01	07:39 18:48	17:44 (4) 16:41	15:55 (5) 16:06
9	05:06 21:55	05:52 21:09	20:04 (2) 19:59	07:41 18:45	17:44 (4) 16:39	15:55 (5) 16:05
10	05:07 21:55	05:54 21:07	20:02 (2) 19:56	07:42 18:43	17:43 (4) 16:37	15:56 (5) 16:05
11	05:08 21:54	05:56 21:05	20:01 (2) 19:54	07:44 18:40	17:43 (4) 16:35	15:57 (5) 16:05
12	05:09 21:53	05:57 21:03	20:00 (2) 19:51	07:46 18:38	17:43 (4) 16:34	15:58 (5) 16:05
13	05:10 21:52	05:59 21:01	19:58 (2) 19:49	07:48 18:36	17:43 (4) 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 19:47	07:50 18:33	17:43 (4) 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	19:57 (2) 19:44	07:52 18:31	17:44 (4) 16:29	08:37 16:05
16	05:14 21:49	06:04 20:55	19:56 (2) 19:42	07:54 18:29	17:44 (4) 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 19:39	07:55 18:26	17:45 (4) 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 19:37	07:57 18:24	17:46 (4) 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	19:55 (2) 19:34	07:59 18:22	17:48 (4) 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	19:56 (2) 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	19:56 (2) 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	19:56 (2) 19:27	18:38 (3) 18:15	08:05 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	19:57 (2) 19:24	18:36 (3) 18:13	08:07 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	19:58 (2) 19:22	18:35 (3) 18:11	08:09 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	19:58 (2) 19:19	18:33 (3) 18:51 (3)	08:09 17:09	08:43 16:08
26	05:29 21:35	06:22 20:32	20:00 (2) 19:17	18:32 (3) 18:48 (3)	07:13 17:06	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	18:32 (3) 18:46 (3)	07:14 17:04	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	18:31 (3) 18:44 (3)	07:16 17:02	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	18:32 (3) 18:41 (3)	07:18 17:00	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	18:31 (3) 18:38 (3)	07:20 16:58	08:44 16:12
31	05:37 21:26	06:31 20:21		07:22 16:56	15:59 (5) 16:10 (5)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		348	120	416	161	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		77	26	82	28	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LY - H337

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	17:15 (4) 17:34 (4)	07:01 20:00	05:52 19:53 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	17:14 (4) 17:36 (4)	06:59 20:02	05:50 20:10 (2)
3	08:43 16:17	08:10 17:10	07:11 18:06	17:14 (4) 17:38 (4)	06:56 20:04	05:48 20:08 (2)
4	08:43 16:18	08:08 17:12	07:09 18:07	17:14 (4) 17:41 (4)	06:54 20:06	05:46 20:05 (2)
5	08:43 16:19	08:07 17:14	07:07 18:09	17:13 (4) 17:42 (4)	06:51 20:07	05:44 21:03
6	08:42 16:21	08:05 17:16	07:04 18:11	17:13 (4) 17:43 (4)	06:49 20:09	05:42 21:04
7	08:42 16:22	08:03 17:18	07:02 18:13	17:13 (4) 17:42 (4)	06:47 20:11	05:40 21:06
8	08:42 16:24	08:01 17:20	07:00 18:15	17:14 (4) 17:42 (4)	06:44 20:13	05:38 21:08
9	08:41 16:25	07:59 17:22	06:57 18:17	17:14 (4) 17:40 (4)	06:42 20:15	05:36 21:10
10	08:40 16:26	07:57 17:24	06:55 18:19	17:15 (4) 17:39 (4)	06:39 20:17	05:34 21:11
11	08:40 16:28	07:55 17:26	06:52 18:21	17:17 (4) 17:38 (4)	06:37 20:19	05:33 21:13
12	08:39 16:30	07:53 17:28	06:50 18:23	17:18 (4) 17:36 (4)	06:35 20:20	05:31 21:15
13	08:38 16:31	07:51 17:30	06:48 18:25	17:21 (4) 17:58 (3)	06:32 20:22	05:29 21:17
14	08:37 16:33	07:49 17:32	06:45 18:27	17:53 (3) 18:00 (3)	06:30 20:24	05:27 21:18
15	08:36 16:34	07:47 17:34	06:43 18:28	17:53 (3) 18:02 (3)	06:28 20:26	05:26 21:20
16	08:35 16:36	07:45 17:36	06:40 18:30	17:52 (3) 18:04 (3)	06:25 20:28	05:24 21:22
17	08:34 16:38	07:43 17:38	06:38 18:32	17:52 (3) 18:06 (3)	06:23 20:30	05:22 21:23
18	08:33 16:40	07:41 17:40	06:35 18:34	17:51 (3) 18:07 (3)	06:21 20:31	05:21 21:25
19	08:32 16:41	07:39 17:42	06:33 18:36	17:52 (3) 18:10 (3)	06:18 20:33	05:19 21:27
20	08:31 16:43	07:36 17:44	06:31 18:38	17:52 (3) 18:09 (3)	06:16 20:35	05:18 21:28
21	08:30 16:45	07:34 17:46	06:28 18:40	17:54 (3) 18:07 (3)	06:14 20:37	05:16 21:30
22	08:28 16:47	07:32 17:48	06:26 18:41	17:55 (3) 18:04 (3)	06:12 20:39	05:15 21:31
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 20:42	05:13 21:33
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 20:14 (2)	05:12 21:34
25	08:24 16:52	07:25 17:54	06:18 17:26 (4)	06:05 20:44	05:11 20:15 (2)	05:11 21:36
26	08:23 16:54	07:23 17:56	06:16 17:18 (4)	06:03 20:46	05:09 20:15 (2)	05:09 21:37
27	08:22 16:56	07:21 17:58	06:13 17:17 (4)	06:00 20:48	05:08 20:15 (2)	05:08 21:39
28	08:20 16:58	07:18 18:00	06:11 17:15 (4)	05:58 20:50	05:07 20:14 (2)	05:07 21:40
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 20:14 (2)	05:06 21:41
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 20:13 (2)	05:05 21:43
31	08:15 17:04		07:04 19:58		05:04 21:44	05:04 21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case		50	427	262	55	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.68	0.68	0.65	0.65	
Total reduction		0.16	0.18	0.23	0.25	
Total, real		8	78	60	14	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LY - H337

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:58 (4) 18:36 (3)	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:55 (4) 18:15 (4)	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:54 (4) 18:17 (4)	07:28 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:52 (4) 18:18 (4)	07:30 16:48
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:51 (4) 18:18 (4)	07:32 16:46
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:50 (4) 18:19 (4)	07:34 16:44
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	17:49 (4) 18:18 (4)	07:36 16:43
8	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	17:48 (4) 18:18 (4)	07:38 16:41
9	05:06 21:55	05:52 21:09	20:06 (2) 20:16 (2)	06:47 19:59	17:48 (4) 18:16 (4)	07:40 16:39
10	05:07 21:55	05:54 21:07	20:03 (2) 20:17 (2)	06:49 19:56	17:48 (4) 18:14 (4)	07:42 16:37
11	05:08 21:54	05:56 21:05	20:02 (2) 20:19 (2)	06:50 19:54	17:48 (4) 18:11 (4)	07:44 16:35
12	05:09 21:53	05:57 21:03	20:01 (2) 20:20 (2)	06:52 19:51	17:48 (4) 18:09 (4)	07:45 16:34
13	05:10 21:52	05:59 21:01	19:59 (2) 20:20 (2)	06:54 19:49	17:48 (4) 18:07 (4)	07:47 16:32
14	05:12 21:51	06:01 20:59	19:58 (2) 20:21 (2)	06:56 19:47	17:49 (4) 18:04 (4)	07:49 16:31
15	05:13 21:50	06:03 20:57	19:58 (2) 20:22 (2)	06:57 19:44	17:50 (4) 18:02 (4)	07:51 16:29
16	05:14 21:49	06:04 20:55	19:57 (2) 20:22 (2)	06:59 19:42	17:51 (4) 17:59 (4)	07:53 16:27
17	05:16 21:47	06:06 20:53	19:57 (2) 20:22 (2)	07:01 19:39	17:52 (4) 17:57 (4)	07:55 16:26
18	05:17 21:46	06:08 20:50	19:57 (2) 20:22 (2)	07:03 19:37	17:54 (4) 17:55 (4)	07:57 16:24
19	05:18 21:45	06:10 20:48	19:56 (2) 20:19 (2)	07:05 19:34	07:59 18:22	08:00 16:23
20	05:20 21:44	06:12 20:46	19:56 (2) 20:17 (2)	07:06 19:32	08:01 18:20	08:00 16:22
21	05:21 21:42	06:13 20:44	19:56 (2) 20:15 (2)	07:08 19:29	18:42 (3) 18:49 (3)	08:03 16:20
22	05:23 21:41	06:15 20:42	19:56 (2) 20:12 (2)	07:10 19:27	18:39 (3) 18:52 (3)	08:05 16:19
23	05:24 21:39	06:17 20:39	19:57 (2) 20:10 (2)	07:12 19:24	18:37 (3) 18:53 (3)	08:07 16:18
24	05:26 21:38	06:19 20:37	19:58 (2) 20:09 (2)	07:13 19:22	18:36 (3) 18:54 (3)	08:09 16:17
25	05:27 21:36	06:20 20:35	19:58 (2) 20:06 (2)	07:15 19:19	18:34 (3) 18:51 (3)	08:09 16:16
26	05:29 21:35	06:22 20:32	19:59 (2) 20:04 (2)	07:17 19:17	18:34 (3) 18:48 (3)	07:13 17:06
27	05:30 21:33	06:24 20:30	07:19 19:14	18:34 (3) 18:46 (3)	07:14 17:04	08:13 16:13
28	05:32 21:32	06:26 20:28	07:21 19:12	18:34 (3) 18:44 (3)	07:16 17:02	08:14 16:12
29	05:34 21:30	06:27 20:25	07:22 19:09	18:34 (3) 18:41 (3)	07:18 17:00	08:16 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	18:01 (4) 18:38 (3)	07:20 16:58	08:18 16:11
31	05:37 21:26	06:31 20:21	07:22 16:56	07:22 16:56	07:22 16:56	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		319	128	360		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.67	0.68		
Total reduction		0.22	0.22	0.20		
Total, real		71	28	71		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LZ - H338

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	05:52	19:57 (2) 05:03
	16:15	17:06	18:02	20:00	20:55	20:17 (2) 21:45
2	08:44	08:12	07:14	06:59	05:50	19:58 (2) 05:02
	16:16	17:08	18:04	20:02	20:57	20:16 (2) 21:46
3	08:43	08:10	07:11	17:36 (4) 06:56	05:48	19:59 (2) 05:01
	16:17	17:10	18:05	2 17:38 (4) 20:04	20:59	20:15 (2) 21:48
4	08:43	08:08	07:09	17:34 (4) 06:54	05:46	20:00 (2) 05:00
	16:18	17:12	18:07	7 17:41 (4) 20:06	21:01	20:13 (2) 21:49
5	08:43	08:07	07:07	17:32 (4) 06:51	05:44	20:02 (2) 04:59
	16:19	17:14	18:09	10 17:42 (4) 20:07	21:03	20:10 (2) 21:50
6	08:42	08:05	07:04	17:31 (4) 06:49	05:42	20:10 (2) 04:58
	16:21	17:16	18:11	14 17:45 (4) 20:09	21:04	21:51
7	08:42	08:03	07:02	17:30 (4) 06:47	05:40	21:52
	16:22	17:18	18:13	16 17:46 (4) 20:11	21:06	21:52
8	08:41	08:01	07:00	17:29 (4) 06:44	05:38	21:53
	16:24	17:20	18:15	19 17:48 (4) 20:13	21:08	21:53
9	08:41	07:59	06:57	17:28 (4) 06:42	05:36	21:54
	16:25	17:22	18:17	22 17:50 (4) 20:15	21:10	21:54
10	08:40	07:57	06:55	17:28 (4) 06:39	05:34	21:55
	16:26	17:24	18:19	24 17:52 (4) 20:17	21:11	21:55
11	08:40	07:55	06:52	17:28 (4) 06:37	05:33	21:56
	16:28	17:26	18:21	27 17:55 (4) 20:18	21:13	21:55
12	08:39	07:53	06:50	17:28 (4) 06:35	05:31	21:55
	16:30	17:28	18:23	27 17:55 (4) 20:20	21:15	21:56
13	08:38	07:51	06:48	17:28 (4) 06:32	05:29	21:56
	16:31	17:30	18:25	27 17:55 (4) 20:22	21:17	21:57
14	08:37	07:49	06:45	17:28 (4) 06:30	05:27	21:57
	16:33	17:32	18:27	26 17:54 (4) 20:24	21:18	21:57
15	08:36	07:47	06:43	17:29 (4) 06:28	05:26	21:58
	16:34	17:34	18:28	24 17:53 (4) 20:26	21:20	21:58
16	08:35	07:45	06:40	17:30 (4) 06:25	05:24	21:58
	16:36	17:36	18:30	21 17:51 (4) 20:28	21:22	21:59
17	08:34	07:43	06:38	17:31 (4) 06:23	05:22	21:59
	16:38	17:38	18:32	19 17:50 (4) 20:30	21:23	21:59
18	08:33	07:41	06:35	17:33 (4) 06:21	05:21	21:59
	16:40	17:40	18:34	14 17:47 (4) 20:31	21:25	22:00
19	08:32	07:39	06:33	17:36 (4) 06:18	20:03 (2) 05:19	22:00
	16:41	17:42	18:36	8 17:44 (4) 20:33	2 20:05 (2) 21:27	22:00
20	08:31	07:36	06:31	06:16	20:01 (2) 05:18	22:00
	16:43	17:44	18:38	20:35	6 20:07 (2) 21:28	22:00
21	08:30	07:34	06:28	06:14	19:59 (2) 05:16	22:00
	16:45	17:46	18:40	20:37	9 20:08 (2) 21:30	22:01
22	08:28	07:32	06:26	06:12	19:58 (2) 05:15	22:01
	16:47	17:48	18:41	20:39	12 20:10 (2) 21:31	22:01
23	08:27	07:30	06:23	06:09	19:57 (2) 05:13	22:01
	16:49	17:50	18:43	20:41	15 20:12 (2) 21:33	22:01
24	08:26	07:28	06:21	06:07	19:56 (2) 05:12	22:01
	16:50	17:52	18:45	20:42	18 20:14 (2) 21:34	22:01
25	08:24	07:25	06:18	06:05	19:56 (2) 05:11	22:01
	16:52	17:54	18:47	20:44	19 20:15 (2) 21:36	22:01
26	08:23	07:23	06:16	06:03	19:56 (2) 05:09	22:01
	16:54	17:56	18:49	20:46	21 20:17 (2) 21:37	22:01
27	08:22	07:21	06:13	06:00	19:56 (2) 05:08	22:01
	16:56	17:58	18:51	20:48	23 20:19 (2) 21:39	22:01
28	08:20	07:18	06:11	05:58	19:56 (2) 05:07	22:01
	16:58	18:00	18:53	20:50	23 20:19 (2) 21:40	22:01
29	08:18		07:08	05:56	19:56 (2) 05:06	22:01
	17:00		19:54	20:52	23 20:19 (2) 21:41	22:01
30	08:17		07:06	05:54	19:56 (2) 05:05	22:01
	17:02		19:56	20:53	22 20:18 (2) 21:43	22:00
31	08:15		07:04		05:04	
	17:04		19:58		21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case			307	193	75	
Sun reduction			0.27	0.35	0.38	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.68	0.65	0.65	
Total reduction			0.18	0.23	0.25	
Total, real			56	44	19	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LZ - H338

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:07 (4) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:06 (4) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:06 (4) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:06 (4) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:06 (4) 16:46	08:25 16:07
6	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	18:07 (4) 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	18:06 (4) 16:43	08:28 16:06
8	05:05 21:56	05:50 21:11	20:11 (2) 20:01	07:39 18:48	18:07 (4) 16:41	08:29 16:06
9	05:06 21:55	05:52 21:09	20:09 (2) 20:23 (2)	07:41 18:45	18:08 (4) 16:39	08:30 16:05
10	05:07 21:55	05:54 21:07	20:07 (2) 20:24 (2)	07:42 18:43	18:16 (4) 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	20:06 (2) 20:25 (2)	07:44 18:40	18:14 (4) 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	20:05 (2) 20:26 (2)	07:46 18:38	18:16 (4) 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	20:04 (2) 20:26 (2)	07:48 18:36	18:18 (4) 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	20:03 (2) 20:26 (2)	07:50 18:33	18:20 (4) 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	20:03 (2) 20:27 (2)	07:52 18:31	18:22 (4) 16:29	08:37 16:04
16	05:14 21:49	06:04 20:55	20:02 (2) 20:25 (2)	07:54 18:29	18:24 (4) 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	20:02 (2) 20:23 (2)	07:55 18:26	18:26 (4) 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:03 (2) 20:22 (2)	07:57 18:24	18:28 (4) 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	20:02 (2) 20:19 (2)	07:59 18:22	18:30 (4) 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	20:03 (2) 20:17 (2)	08:01 18:20	18:32 (4) 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	20:03 (2) 20:15 (2)	08:03 18:17	18:34 (4) 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	20:04 (2) 20:12 (2)	08:05 18:15	18:36 (4) 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	20:05 (2) 20:10 (2)	08:07 18:13	18:38 (4) 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	20:07 (2) 20:09 (2)	08:09 18:11	18:40 (4) 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	07:15 19:19	18:16 (4) 18:29 (4)	18:42 (4) 17:09	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	18:14 (4) 18:31 (4)	18:44 (4) 17:06	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	18:12 (4) 18:33 (4)	18:46 (4) 17:04	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	18:10 (4) 18:34 (4)	18:48 (4) 17:02	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	18:09 (4) 18:34 (4)	18:50 (4) 17:00	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	18:07 (4) 18:34 (4)	18:52 (4) 16:58	08:44 16:12
31	05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		271	130	178		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.68	0.68		
Total reduction		0.22	0.22	0.20		
Total, real		60	28	35		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: MA - H339

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:53 (5) 20:18 (5)	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10	
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:53 (5) 20:17 (5)	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:53 (5) 20:16 (5)	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08	
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:54 (5) 20:15 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:10 (5) 20:19 (5)	06:38 20:11	07:31 18:57	08:24 16:48	
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:54 (5) 20:14 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:07 (5) 20:21 (5)	06:40 20:09	07:33 18:55	08:25 16:46	
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:55 (5) 20:13 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:06 (5) 20:22 (5)	06:42 20:06	07:35 18:52	07:34 16:44	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:57 (5) 20:12 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:05 (5) 20:24 (5)	06:43 20:04	07:37 18:50	08:28 16:43	
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	19:59 (5) 20:10 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:03 (5) 20:24 (5)	06:45 20:01	07:39 18:48	08:29 16:41	
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:01 (5) 20:07 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:03 (5) 20:25 (5)	06:47 19:59	07:41 18:45	08:30 16:39	
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11		04:56 21:54	05:07 21:54	05:54 21:07	20:01 (5) 20:25 (5)	06:49 19:56	07:42 18:43	08:31 16:37	
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13		04:56 21:55	05:08 21:54	05:56 21:05	20:01 (5) 20:26 (5)	06:50 19:54	07:44 18:40	08:33 16:36	
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15		04:55 21:56	05:09 21:53	05:58 21:03	20:01 (5) 20:26 (5)	06:52 19:51	07:46 18:38	08:34 16:34	
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	20:00 (5) 20:26 (5)	06:54 19:49	07:48 18:36	08:35 16:32	
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	05:12 21:51	06:01 20:59	20:00 (5) 20:26 (5)	06:56 19:47	07:50 18:33	08:36 16:31	
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	05:13 21:50	06:03 20:57	20:00 (5) 20:26 (5)	06:58 19:44	07:52 18:31	08:37 16:29	
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	20:00 (5) 20:25 (5)	06:59 19:42	07:54 18:29	08:38 16:27	
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	20:00 (5) 20:23 (5)	07:01 19:39	07:55 18:26	08:38 16:26	
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25		04:54 21:59	05:17 21:46	06:08 20:50	20:01 (5) 20:22 (5)	07:03 19:37	07:57 18:24	08:39 16:25	
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27		04:54 22:00	05:18 21:45	06:10 20:48	20:01 (5) 20:19 (5)	07:05 19:34	07:59 18:22	08:40 16:23	
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:02 (5)	04:54 22:00	05:20 21:43	06:12 20:46	20:02 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:41 16:22	
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	19:59 (5)	04:54 22:00	05:21 21:42	06:13 20:44	20:03 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:41 16:20	
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	19:57 (5)	04:55 22:01	05:23 21:41	06:15 20:42	20:04 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:42 16:19	
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	19:56 (5)	04:55 22:01	05:24 21:39	06:17 20:39	20:06 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:18	
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	19:55 (5)	04:55 22:01	05:26 21:38	06:19 20:37		07:13 19:22	08:09 18:11	08:43 16:17	
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	19:54 (5)	04:56 22:01	05:27 21:36	06:20 20:35		07:15 19:19	08:09 17:09	08:43 16:16	
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	19:53 (5)	04:56 22:01	05:29 21:35	06:22 20:32		07:17 19:17	08:11 17:06	08:43 16:15	
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	19:53 (5)	04:56 22:01	05:30 21:33	06:24 20:30		07:19 19:14	08:13 17:04	08:44 16:13	
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	19:53 (5)	04:57 22:01	05:32 21:32	06:26 20:28		07:21 19:12	08:14 17:02	08:44 16:13	
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	19:53 (5)	04:58 22:00	05:34 21:30	06:28 20:25		07:22 19:09	08:16 17:00	08:44 16:12	
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	19:53 (5)	04:58 22:00	05:35 21:28	06:29 20:23		07:24 19:07	08:17 16:58	08:44 16:12	
31	08:15 17:04		07:04 19:58		05:04 21:44			05:37 21:26	06:31 20:21			07:22 16:56	08:44 16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case				206	163				379					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.65	0.65				0.65					
Total reduction				0.23	0.25				0.22					
Total, real				47	40				84					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: MB - H340

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	19:52 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:55	20:16 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10			
2	08:44	08:12	07:14	06:59	05:50	19:52 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	20:15 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09			
3	08:43	08:10	07:11	06:56	05:48	19:53 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	20:14 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08			
4	08:43	08:08	07:09	06:54	05:46	19:54 (5)	05:00	05:01	05:44	06:38	07:31	07:30	08:23			
	16:18	17:12	18:07	20:06	21:01	20:13 (5)	21:49	21:59	21:19	20:11	18:57	16:48	16:08			
5	08:43	08:07	07:07	06:51	05:44	19:54 (5)	04:59	05:02	05:45	20:10 (5)	06:40	07:33	08:25			
	16:20	17:14	18:09	20:07	21:03	20:12 (5)	21:50	21:58	21:17	6	20:16 (5)	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42	19:56 (5)	04:59	05:03	05:47	20:07 (5)	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	20:10 (5)	21:51	21:57	21:15	12	20:19 (5)	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40	19:58 (5)	04:58	05:04	05:49	20:06 (5)	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	20:09 (5)	21:52	21:57	21:13	15	20:21 (5)	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38		04:57	05:05	05:51	20:03 (5)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:11	18	20:21 (5)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	20:03 (5)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	20	20:23 (5)	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	20:01 (5)	06:49	07:42	07:42	08:31		
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	22	20:23 (5)	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:01 (5)	06:50	07:44	07:43	08:33		
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	23	20:24 (5)	19:54	18:40	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:58	20:00 (5)	06:52	07:46	07:45	08:34		
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	24	20:24 (5)	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:59 (5)	06:54	07:48	07:47	08:35		
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	25	20:24 (5)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:59 (5)	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	25	20:24 (5)	19:47	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	19:59 (5)	06:58	07:52	07:51	08:37		
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	25	20:24 (5)	19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	19:58 (5)	06:59	07:54	07:53	08:38		
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	26	20:24 (5)	19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06	19:59 (5)	07:01	07:55	07:55	08:38		
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	24	20:23 (5)	19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21		04:54	05:17	06:08	19:59 (5)	07:03	07:57	07:57	08:39		
	16:40	17:40	18:34	20:31	21:25		21:59	21:46	20:50	23	20:22 (5)	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:18	20:02 (5)	05:19	04:54	05:18	06:10	19:59 (5)	07:05	07:59	07:59	08:40		
	16:41	17:42	18:36	20:33	3	20:05 (5)	21:27	22:00	21:45	20:48	20	20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:59 (5)	05:18	04:54	05:20	06:12	20:00 (5)	07:06	08:01	08:00	08:41		
	16:43	17:44	18:38	20:35	8	20:07 (5)	21:28	22:00	21:43	20:46	17	20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:56 (5)	05:16	04:54	05:21	06:13	20:01 (5)	07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	12	20:08 (5)	21:30	22:00	21:42	20:44	14	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:55 (5)	05:15	04:55	05:23	06:15	20:01 (5)	07:10	08:05	08:04	08:42		
	16:47	17:48	18:41	20:39	15	20:10 (5)	21:31	22:01	21:41	20:42	11	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:54 (5)	05:13	04:55	05:24	06:17	20:03 (5)	07:12	08:07	08:06	08:42		
	16:49	17:50	18:43	20:41	18	20:12 (5)	21:33	22:01	21:39	20:39	7	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:53 (5)	05:12	04:55	05:26	06:19	20:06 (5)	07:13	08:09	08:07	08:43		
	16:51	17:52	18:45	20:42	20	20:13 (5)	21:34	22:01	21:38	20:37	3	20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:53 (5)	05:11	04:56	05:27	06:20	20:07 (5)	07:15	07:11	08:09	08:43		
	16:52	17:54	18:47	20:44	22	20:15 (5)	21:36	22:01	21:36	20:35	19:19	17:09	16:16	16:08		
26	08:23	07:23	06:16	06:03	19:52 (5)	05:09	04:56	05:29	06:22	20:07 (5)	07:17	07:13	08:11	08:43		
	16:54	17:56	18:49	20:46	25	20:17 (5)	21:37	22:01	21:35	20:32	19:17	17:06	16:15	16:09		
27	08:21	07:21	06:13	06:01	19:52 (5)	05:08	04:56	05:30	06:24	20:07 (5)	07:19	07:14	08:13	08:44		
	16:56	17:58	18:51	20:48	25	20:17 (5)	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:10		
28	08:20	07:18	06:11	05:58	19:52 (5)	05:07	04:57	05:32	06:26	20:07 (5)	07:21	07:16	08:14	08:44		
	16:58	18:00	18:53	20:50	25	20:17 (5)	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16:11		
29	08:18		07:08	05:56	19:52 (5)	05:06	04:58	05:34	06:28	20:07 (5)	07:22	07:18	08:16	08:44		
	17:00		19:54	20:52	25	20:17 (5)	21:41	22:00	21:30	20:25	19:09	17:00	16:12	16:11		
30	08:17		07:06	05:54	19:52 (5)	05:05	04:58	05:35	06:29	20:07 (5)	07:24	07:20	08:17	08:44		
	17:02		19:56	20:53	24	20:16 (5)	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:12		
31	08:15		07:04						05:37	06:31		07:22		08:44		
	17:04		19:58						21:26	20:21		16:56		16:13		
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233		
Total, worst case				222	130				360							
Sun reduction				0.35	0.38				0.34							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.65	0.65				0.65							
Total reduction				0.23	0.25				0.22							
Total, real				51	32				80							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MC - H341

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	05:03	21:07 (4)	04:59	21:11 (4)	05:39	06:33	07:26	07:24	08:19		
2	16:15	17:06	18:02	20:00	20:55	21:45	3	21:10 (4)	22:00	13	21:24 (4)	21:25	20:18	19:05	16:54	16:10
	08:44	08:12	07:14	06:59	05:50	05:02	21:08 (4)	05:00	21:12 (4)	05:40	06:35	07:28	07:26	08:21		
3	16:16	17:08	18:04	20:02	20:57	21:46	4	21:12 (4)	21:59	12	21:24 (4)	21:23	20:16	19:02	16:52	16:09
	08:43	08:10	07:11	06:56	05:48	05:01	21:07 (4)	05:00	21:11 (4)	05:42	06:36	07:30	07:28	08:22		
4	16:17	17:10	18:05	20:04	20:59	21:48	6	21:13 (4)	21:59	12	21:23 (4)	21:21	20:13	19:00	16:50	16:08
	08:43	08:08	07:09	06:54	05:46	05:00	21:07 (4)	05:01	21:12 (4)	05:44	06:38	07:31	07:30	08:23		
5	16:18	17:12	18:07	20:06	21:01	21:49	7	21:14 (4)	21:59	11	21:23 (4)	21:19	20:11	18:57	16:48	16:08
	08:43	08:07	07:07	06:51	05:44	04:59	21:07 (4)	05:02	21:12 (4)	05:45	06:40	07:33	07:32	08:25		
6	16:20	17:14	18:09	20:07	21:02	21:50	8	21:15 (4)	21:58	11	21:23 (4)	21:17	20:09	18:55	16:46	16:07
	08:42	08:05	07:04	06:49	05:42	04:59	21:07 (4)	05:03	21:13 (4)	05:47	06:42	07:35	07:34	08:26		
7	16:21	17:16	18:11	20:09	21:04	21:51	9	21:16 (4)	21:57	9	21:22 (4)	21:15	20:06	18:52	16:44	16:07
	08:42	08:03	07:02	06:47	05:40	04:58	21:06 (4)	05:04	21:13 (4)	05:49	06:43	07:37	07:36	08:28		
8	16:22	17:18	18:13	20:11	21:06	21:52	10	21:16 (4)	21:57	9	21:22 (4)	21:13	20:04	18:50	16:43	16:06
	08:41	08:01	07:00	06:44	05:38	04:57	21:07 (4)	05:05	21:14 (4)	05:51	06:45	07:39	07:38	08:29		
9	16:24	17:20	18:15	20:13	21:08	21:53	10	21:17 (4)	21:56	7	21:21 (4)	21:11	20:01	18:48	16:41	16:06
	08:41	07:59	06:57	06:42	05:36	04:57	21:06 (4)	05:06	21:14 (4)	05:52	06:47	07:41	07:40	08:30		
10	16:25	17:22	18:17	20:15	21:10	21:54	12	21:18 (4)	21:55	7	21:21 (4)	21:09	19:59	18:45	16:39	16:05
	08:40	07:57	06:55	06:39	05:34	04:56	21:06 (4)	05:07	21:15 (4)	05:54	06:49	07:42	07:42	08:31		
11	16:27	17:24	18:19	20:17	21:11	21:54	13	21:19 (4)	21:54	5	21:20 (4)	21:07	19:56	18:43	16:37	16:05
	08:40	07:55	06:52	06:37	05:33	04:56	21:07 (4)	05:08	21:16 (4)	05:56	06:50	07:44	07:43	08:32		
12	16:28	17:26	18:21	20:18	21:13	21:55	13	21:20 (4)	21:54	3	21:19 (4)	21:05	19:54	18:40	16:35	16:05
	08:39	07:53	06:50	06:35	05:31	04:55	21:06 (4)	05:09	21:16 (4)	05:57	06:52	07:46	07:45	08:34		
13	16:30	17:28	18:23	20:20	21:15	21:56	14	21:20 (4)	21:53	2	21:18 (4)	21:03	19:51	18:38	16:34	16:05
	08:38	07:51	06:48	06:32	05:29	04:55	21:07 (4)	05:11	21:18 (4)	05:59	06:54	07:48	07:47	08:35		
14	16:31	17:30	18:25	20:22	21:17	21:57	14	21:21 (4)	21:52	21:01	19:49	18:36	16:32	16:05		
	08:37	07:49	06:45	06:30	05:27	04:55	21:07 (4)	05:12	21:19 (4)	06:01	06:56	07:50	07:49	08:36		
15	16:33	17:32	18:27	20:24	21:18	21:57	15	21:22 (4)	21:51	20:59	19:46	18:33	16:31	16:06		
	08:36	07:47	06:43	06:28	05:26	04:55	21:07 (4)	05:13	21:20 (4)	06:03	06:57	07:52	07:51	08:37		
16	16:34	17:34	18:28	20:26	21:20	21:58	15	21:22 (4)	21:50	20:57	19:44	18:31	16:29	16:05		
	08:35	07:45	06:40	06:25	05:24	04:54	21:07 (4)	05:14	21:21 (4)	06:04	06:59	07:54	07:53	08:37		
17	16:36	17:36	18:30	20:28	21:22	21:59	16	21:23 (4)	21:48	20:55	19:42	18:29	16:27	16:05		
	08:34	07:43	06:38	06:23	05:22	04:54	21:08 (4)	05:16	21:22 (4)	06:06	07:01	07:55	07:55	08:38		
18	16:38	17:38	18:32	20:30	21:23	21:59	15	21:23 (4)	21:47	20:53	19:39	18:26	16:26	16:05		
	08:33	07:41	06:35	06:21	05:21	04:54	21:08 (4)	05:17	21:23 (4)	06:08	07:03	07:57	07:57	08:39		
19	16:40	17:40	18:34	20:31	21:25	21:59	16	21:24 (4)	21:46	20:50	19:37	18:24	16:25	16:05		
	08:32	07:39	06:33	06:18	05:19	04:54	21:08 (4)	05:18	21:24 (4)	06:10	07:05	07:59	07:59	08:40		
20	16:41	17:42	18:36	20:33	21:26	22:00	16	21:24 (4)	21:45	20:48	19:34	18:22	16:23	16:05		
	08:31	07:36	06:31	06:16	05:18	04:54	21:08 (4)	05:20	21:25 (4)	06:12	07:06	08:01	08:00	08:40		
21	16:43	17:44	18:38	20:35	21:28	22:00	16	21:24 (4)	21:43	20:46	19:32	18:20	16:22	16:06		
	08:30	07:34	06:28	06:14	05:16	04:54	21:08 (4)	05:21	21:26 (4)	06:13	07:08	08:03	08:02	08:41		
22	16:45	17:46	18:40	20:37	21:30	22:00	16	21:24 (4)	21:42	20:44	19:29	18:17	16:20	16:06		
	08:28	07:32	06:26	06:12	05:15	04:55	21:09 (4)	05:23	21:27 (4)	06:15	07:10	08:05	08:04	08:42		
23	16:47	17:48	18:41	20:39	21:31	22:01	16	21:25 (4)	21:41	20:41	19:27	18:15	16:19	16:06		
	08:27	07:30	06:23	06:09	05:13	04:55	21:09 (4)	05:24	21:28 (4)	06:17	07:12	08:07	08:06	08:42		
24	16:49	17:50	18:43	20:41	21:33	22:01	16	21:25 (4)	21:39	20:39	19:24	18:13	16:18	16:07		
	08:26	07:28	06:21	06:07	05:12	04:55	21:09 (4)	05:26	21:30 (4)	06:19	07:13	08:09	08:07	08:43		
25	16:50	17:52	18:45	20:42	21:34	22:01	16	21:25 (4)	21:38	20:37	19:22	18:11	16:17	16:08		
	08:24	07:25	06:18	06:05	05:11	04:56	21:10 (4)	05:27	21:31 (4)	06:20	07:15	08:11	08:09	08:43		
26	16:52	17:54	18:47	20:44	21:36	22:01	15	21:25 (4)	21:36	20:35	19:19	17:09	16:16	16:08		
	08:23	07:23	06:16	06:03	05:09	04:56	21:09 (4)	05:29	21:32 (4)	06:22	07:17	08:13	08:11	08:43		
27	16:54	17:56	18:49	20:46	21:37	22:01	16	21:25 (4)	21:35	20:32	19:17	17:06	16:15	16:09		
	08:21	07:21	06:13	06:01	05:08	04:56	21:09 (4)	05:30	21:33 (4)	06:24	07:19	08:14	08:13	08:43		
28	16:56	17:58	18:51	20:48	21:39	22:01	15	21:24 (4)	21:33	20:30	19:14	17:04	16:13	16:10		
	08:20	07:18	06:11	05:58	05:07	04:57	21:10 (4)	05:32	21:34 (4)	06:26	07:21	08:16	08:14	08:44		
29	16:58	18:00	18:53	20:50	21:40	22:01	15	21:25 (4)	21:32	20:28	19:12	17:02	16:12	16:11		
	08:18		07:08	05:56	05:06	04:57	21:11 (4)	05:34	21:35 (4)	06:27	07:22	08:18	08:16	08:44		
30	17:00		19:54	20:52	21:41	22:00	14	21:25 (4)	21:30	20:25	19:09	17:00	16:12	16:11		
	08:17		07:06	05:54	05:05	04:58	21:10 (4)	05:35	21:36 (4)	06:29	07:24	08:20	08:17	08:44		
31	17:02		19:56	20:53	21:43	22:00	14	21:24 (4)	21:28	20:23	19:07	16:58	16:11	16:12		
	08:15		07:04		05:04				05:37	06:31		07:22		08:44		
	17:04		19:58		21:44	1	21:09 (4)		21:26	20:21		16:56		16:13		
Potential sun hours	250	273	367	420	494	510		512		460	382	328	259	233		
Total, worst case					1	385		101								
Sun reduction					0.38	0.32		0.32								
Oper. time red.					1.00	1.00		1.00								
Wind dir. red.					0.61	0.61		0.61								
Total reduction					0.23	0.19		0.20								
Total, real					0	75		20								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MD - H342

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: ME - H343

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MF - H344

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MG - H345

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MH - H346

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MI - H347

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MJ - H348

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:54	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MK - H349

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: ML - H350

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:44 (4) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	19:33 (3) 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:47 (4) 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:49 (4) 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	18:53 (4) 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	19:18 (3) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	16:50 (5) 16:54 (5)	06:55 18:19	05:34 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	16:49 (5) 16:56 (5)	06:52 18:21	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	16:47 (5) 16:58 (5)	06:50 18:23	05:31 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	16:46 (5) 17:00 (5)	06:48 18:25	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	16:46 (5) 17:02 (5)	06:45 18:27	05:27 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	16:45 (5) 17:05 (5)	06:43 18:28	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	16:45 (5) 17:07 (5)	06:40 18:30	05:24 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	16:45 (5) 17:08 (5)	06:38 18:32	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	16:45 (5) 17:07 (5)	06:35 18:34	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	16:45 (5) 17:07 (5)	06:33 18:36	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	16:46 (5) 17:06 (5)	06:31 18:38	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	16:47 (5) 17:06 (5)	06:28 18:40	05:16 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	16:48 (5) 17:04 (5)	06:26 18:41	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	16:50 (5) 17:02 (5)	06:23 18:43	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	16:53 (5) 16:59 (5)	06:21 18:45	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	17:42 (4) 18:21 (3)	05:11 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	17:41 (4) 18:22 (3)	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:42 (4) 18:24 (3)	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	17:42 (4) 18:26 (3)	05:07 21:40	04:57 22:01
29	08:18 17:00		07:08 19:54	18:42 (4) 19:28 (3)	05:06 21:41	04:57 22:01
30	08:17 17:02		07:06 19:56	18:43 (4) 19:30 (3)	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	18:43 (4) 19:31 (3)	05:04 21:44	04:58 22:02
Potential sun hours	250	273	367	420	494	510
Total, worst case		234	538	191	500	174
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.67	0.67	0.63	0.63
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		36	98	45	121	35

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: ML - H350

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59	20:44 (2)	05:39	20:40 (2)	06:33		07:26	07:24	16:20 (5)	08:19	
	22:00	7	20:51 (2)	21:25	13	20:53 (2)	20:18		16:54	3	16:23 (5)
2	04:59	20:44 (2)	05:40	20:42 (2)	06:35		07:28	07:26		08:21	
	22:00	9	20:53 (2)	21:23	10	20:52 (2)	20:16		16:52		16:09
3	05:00	20:42 (2)	05:42	20:42 (2)	06:36		07:30	07:28		08:22	
	21:59	11	20:53 (2)	21:21	8	20:50 (2)	20:13		16:50		16:08
4	05:01	20:42 (2)	05:44	20:44 (2)	06:38		07:31	07:30		08:24	
	21:59	12	20:54 (2)	21:19	4	20:48 (2)	20:11		16:48		16:08
5	05:02	20:42 (2)	05:45		06:40		07:33	07:32		08:25	
	21:58	13	20:55 (2)	21:17		20:09	18:55		16:46		16:07
6	05:03	20:41 (2)	05:47		06:42		19:14 (3)	07:35	07:34		08:26
	21:58	15	20:56 (2)	21:15		20:06	8	19:22 (3)	18:52		16:07
7	05:04	20:41 (2)	05:49		06:43		18:48 (4)	07:37	07:36		08:28
	21:57	16	20:57 (2)	21:13		20:04	19	19:23 (3)	18:50		16:06
8	05:05	20:41 (2)	05:51		06:45		18:44 (4)	07:39	07:38		08:29
	21:56	17	20:58 (2)	21:11		20:01	31	19:25 (3)	18:48		16:06
9	05:06	20:40 (2)	05:52		06:47		18:41 (4)	07:41	07:40		08:30
	21:55	19	20:59 (2)	21:09		19:59	38	19:26 (3)	18:45		16:05
10	05:07	20:40 (2)	05:54		06:49		18:38 (4)	07:42	07:42		08:31
	21:55	19	20:59 (2)	21:07		19:56	44	19:26 (3)	18:43		16:05
11	05:08	20:39 (2)	05:56		06:50		18:36 (4)	07:44	07:44		08:33
	21:54	21	21:00 (2)	21:05		19:54	48	19:26 (3)	18:40		16:05
12	05:09	20:39 (2)	05:57		06:52		18:35 (4)	07:46	07:45		08:34
	21:53	21	21:00 (2)	21:03		19:51	48	19:24 (3)	18:38		16:05
13	05:10	20:38 (2)	05:59		06:54		18:34 (4)	07:48	07:47		08:35
	21:52	23	21:01 (2)	21:01		19:49	48	19:22 (3)	18:36		16:05
14	05:12	20:38 (2)	06:01		06:56		18:32 (4)	07:50	07:49		08:36
	21:51	23	21:01 (2)	20:59		19:47	46	19:18 (3)	18:33		16:04
15	05:13	20:38 (2)	06:03		06:58		18:32 (4)	07:52	07:51		08:37
	21:50	24	21:02 (2)	20:57		19:44	44	19:16 (3)	18:31		16:05
16	05:14	20:37 (2)	06:04		06:59		18:31 (4)	07:54	07:53		08:38
	21:49	25	21:02 (2)	20:55		19:42	43	19:14 (3)	18:29		16:05
17	05:16	20:38 (2)	06:06		07:01		18:30 (4)	07:55	07:55		08:38
	21:47	25	21:03 (2)	20:53		19:39	40	19:11 (3)	18:26		16:05
18	05:17	20:37 (2)	06:08		07:03		18:29 (4)	07:57	17:23 (5)	07:57	08:39
	21:46	26	21:03 (2)	20:50		19:37	37	19:08 (3)	18:24	9	17:32 (5)
19	05:18	20:37 (2)	06:10		07:05		18:29 (4)	07:59	17:20 (5)	07:59	08:40
	21:45	26	21:03 (2)	20:48		19:34	35	19:04 (4)	18:22	14	17:34 (5)
20	05:20	20:37 (2)	06:12		07:06		18:29 (4)	08:01	17:19 (5)	08:00	08:41
	21:44	27	21:04 (2)	20:46		19:32	35	19:04 (4)	18:20	16	17:35 (5)
21	05:21	20:37 (2)	06:13		07:08		18:29 (4)	08:03	17:17 (5)	08:02	08:41
	21:42	27	21:04 (2)	20:44		19:29	32	19:01 (4)	18:17	19	17:36 (5)
22	05:23	20:37 (2)	06:15		07:10		18:29 (4)	08:05	17:16 (5)	08:04	08:42
	21:41	27	21:04 (2)	20:42		19:27	29	18:58 (4)	18:15	21	17:37 (5)
23	05:24	20:37 (2)	06:17		07:12		18:29 (4)	08:07	17:16 (5)	08:06	08:42
	21:39	27	21:04 (2)	20:39		19:24	27	18:56 (4)	18:13	21	17:37 (5)
24	05:26	20:37 (2)	06:19		07:13		18:30 (4)	08:09	17:15 (5)	08:08	08:43
	21:38	27	21:04 (2)	20:37		19:22	24	18:54 (4)	18:11	22	17:37 (5)
25	05:27	20:38 (2)	06:20		07:15		18:30 (4)	07:11	16:15 (5)	08:09	08:43
	21:36	26	21:04 (2)	20:35		19:19	21	18:51 (4)	17:09	22	16:37 (5)
26	05:29	20:37 (2)	06:22		07:17		18:31 (4)	07:13	16:15 (5)	08:11	08:43
	21:35	25	21:02 (2)	20:32		19:17	17	18:48 (4)	17:06	21	16:36 (5)
27	05:30	20:37 (2)	06:24		07:19		18:33 (4)	07:14	16:15 (5)	08:13	08:44
	21:33	23	21:00 (2)	20:30		19:14	13	18:46 (4)	17:04	19	16:34 (5)
28	05:32	20:38 (2)	06:26		07:21		18:35 (4)	07:16	16:15 (5)	08:14	08:44
	21:32	21	20:59 (2)	20:28		19:12	9	18:44 (4)	17:02	16	16:31 (5)
29	05:34	20:38 (2)	06:27		07:22		18:38 (4)	07:18	16:16 (5)	08:16	08:44
	21:30	19	20:57 (2)	20:25		19:09	3	18:41 (4)	17:00	13	16:29 (5)
30	05:35	20:39 (2)	06:29		07:24			07:20	16:16 (5)	08:18	08:44
	21:28	17	20:56 (2)	20:23		19:07		16:58	11	16:27 (5)	16:11
31	05:37	20:40 (2)	06:31					07:22			08:44
	21:26	15	20:55 (2)	20:21				16:56	7	16:25 (5)	16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	633		35		739		231		3		
Sun reduction	0.32		0.34		0.32		0.29		0.27		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.63		0.63		0.67		0.66		0.66		
Total reduction	0.20		0.22		0.22		0.19		0.18		
Total, real	130		8		160		45		1		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MM - H351

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MN - H352

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MO - H353

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:07 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:25 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	08:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MP - H354

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
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31	08:16 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MQ - H355

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	08:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MR - H356

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:04 (5)		07:16	16:43 (4)		07:01			05:52		19:48 (2)	05:03		
	16:15			17:06	16:20 (5)	16	18:02	17:14 (4)	31	20:00			20:55	32	20:20 (2)	21:45		
2	08:44			08:12	16:06 (5)		07:14	16:43 (4)		06:59			05:50		19:48 (2)	05:02		
	16:16			17:08	16:19 (5)	13	18:04	17:12 (4)	29	20:02			20:57	32	20:20 (2)	21:46		
3	08:44			08:10	16:08 (5)		07:12	16:45 (4)		06:56			05:48		19:48 (2)	05:01		
	16:17			17:10	16:16 (5)	8	18:06	17:10 (4)	25	20:04			20:59	31	20:19 (2)	21:48		
4	08:43			08:08			07:09	16:48 (4)		06:54			05:46		19:48 (2)	05:00		
	16:18			17:12			18:07	17:09 (4)	21	20:06			21:01	31	20:19 (2)	21:49		
5	08:43			08:07			07:07	16:50 (4)		06:51			05:44		19:49 (2)	04:59		
	16:19			17:14			18:09	17:05 (4)	15	20:07			21:03	29	20:18 (2)	21:50		
6	08:42			08:05			07:04	16:56 (4)		06:49			05:42		19:49 (2)	04:59		
	16:21			17:16			18:11	16:59 (4)	3	20:09			21:04	28	20:17 (2)	21:51		
7	08:42			08:03			07:02	17:43 (3)		06:47			05:40		19:51 (2)	04:58		
	16:22			17:18			18:13	17:46 (3)	3	20:11			21:06	26	20:17 (2)	21:52		
8	08:42			08:01			07:00	17:42 (3)		06:44			05:38		19:51 (2)	04:57		
	16:24			17:20			18:15	17:48 (3)	6	20:13			21:08	25	20:16 (2)	21:53		
9	08:41			07:59		16:51 (4)	06:57	17:40 (3)		06:42			05:36		19:52 (2)	04:57		
	16:25			17:22	1	16:52 (4)	18:17	17:50 (3)	10	20:15			21:10	22	20:14 (2)	21:54		
10	08:40			07:57		16:49 (4)	06:55	17:40 (3)		06:39			05:34		19:53 (2)	04:56		
	16:26			17:24	5	16:54 (4)	18:19	17:52 (3)	12	20:17			21:11	20	20:13 (2)	21:55		
11	08:40			07:55		16:47 (4)	06:52	17:40 (3)		06:37			05:33		19:56 (2)	04:56		
	16:28			17:26	9	16:56 (4)	18:21	17:55 (3)	15	20:19			21:13	16	20:12 (2)	21:55		
12	08:39			07:53		16:45 (4)	06:50	17:39 (3)		06:35			05:31		19:57 (2)	04:55		
	16:30			17:28	13	16:58 (4)	18:23	17:56 (3)	17	20:20			21:15	12	20:09 (2)	21:56		
13	08:38			07:51		16:44 (4)	06:48	17:39 (3)		06:32			05:29		20:02 (2)	04:55		
	16:31			17:30	16	17:00 (4)	18:25	17:58 (3)	19	20:22			21:17	2	20:04 (2)	21:57		
14	08:37			07:49		16:43 (4)	06:45	17:39 (3)		06:30			05:27			04:55		
	16:33			17:32	19	17:02 (4)	18:27	18:00 (3)	21	20:24			21:18			21:58		
15	08:36			07:47		16:42 (4)	06:43	17:39 (3)		06:28			05:26			04:54		
	16:34			17:34	23	17:05 (4)	18:28	18:01 (3)	22	20:26			21:20			21:58		
16	08:35		15:59 (5)	07:45		16:42 (4)	06:40	17:39 (3)		06:25			05:24			04:54		
	16:36	1	16:00 (5)	17:36	25	17:07 (4)	18:30	17:59 (3)	20	20:28			21:22			21:59		
17	08:34		15:59 (5)	07:43		16:41 (4)	06:38	17:41 (3)		06:23			05:22			04:54		
	16:38	4	16:03 (5)	17:38	28	17:09 (4)	18:32	17:58 (3)	17	20:30			21:23			21:59		
18	08:33		15:59 (5)	07:41		16:40 (4)	06:35	17:42 (3)		06:21		20:00 (2)	05:21			04:54		
	16:40	6	16:05 (5)	17:40	31	17:11 (4)	18:34	17:56 (3)	14	20:31	3	20:03 (2)	21:25			22:00		
19	08:32		15:59 (5)	07:39		16:40 (4)	06:33	17:45 (3)		06:18		19:57 (2)	05:19			04:54		
	16:41	8	16:07 (5)	17:42	33	17:13 (4)	18:36	17:53 (3)	8	20:33	8	20:05 (2)	21:27			22:00		
20	08:31		15:58 (5)	07:36		16:40 (4)	06:31			06:16		19:55 (2)	05:18			04:54		
	16:43	10	16:08 (5)	17:44	36	17:16 (4)	18:38			20:35	12	20:07 (2)	21:28			22:00		
21	08:30		15:59 (5)	07:34		16:40 (4)	06:28			06:14		19:53 (2)	05:16			04:54		
	16:45	12	16:11 (5)	17:46	38	17:18 (4)	18:40			20:37	15	20:08 (2)	21:30			22:01		
22	08:29		15:58 (5)	07:32		16:39 (4)	06:26			06:12		19:52 (2)	05:15			04:55		
	16:47	14	16:12 (5)	17:48	39	17:18 (4)	18:42			20:39	18	20:10 (2)	21:31			22:01		
23	08:27		15:59 (5)	07:30		16:40 (4)	06:23			06:09		19:51 (2)	05:13			04:55		
	16:49	16	16:15 (5)	17:50	38	17:18 (4)	18:43			20:41	21	20:12 (2)	21:33			22:01		
24	08:26		15:58 (5)	07:28		16:40 (4)	06:21			06:07		19:50 (2)	05:12			04:55		
	16:50	19	16:17 (5)	17:52	38	17:18 (4)	18:45			20:43	24	20:14 (2)	21:34			22:01		
25	08:24		15:59 (5)	07:25		16:40 (4)	06:18			06:05		19:50 (2)	05:11			04:55		
	16:52	20	16:19 (5)	17:54	37	17:17 (4)	18:47			20:44	25	20:15 (2)	21:36			22:01		
26	08:23		15:59 (5)	07:23		16:41 (4)	06:16			06:03		19:49 (2)	05:09			04:56		
	16:54	22	16:21 (5)	17:56	36	17:17 (4)	18:49			20:46	28	20:17 (2)	21:37			22:01		
27	08:22		15:59 (5)	07:21		16:41 (4)	06:13			06:01		19:49 (2)	05:08			04:56		
	16:56	22	16:21 (5)	17:58	35	17:16 (4)	18:51			20:48	30	20:19 (2)	21:39			22:01		
28	08:20		16:00 (5)	07:18		16:41 (4)	06:11			05:58		19:48 (2)	05:07			04:57		
	16:58	22	16:22 (5)	18:00	33	17:14 (4)	18:53			20:50	33	20:21 (2)	21:40			22:01		
29	08:18		16:01 (5)				07:08			05:56		19:48 (2)	05:06			04:57		
	17:00	20	16:21 (5)				19:54			20:52	33	20:21 (2)	21:41			22:01		
30	08:17		16:01 (5)				07:06			05:54		19:48 (2)	05:05			04:58		
	17:02	20	16:21 (5)				19:56			20:54	33	20:21 (2)	21:43			22:00		
31	08:15		16:02 (5)				07:04						05:04					
	17:04	18	16:20 (5)				19:58						21:44					
Potential sun hours	250			273			367			420			494			510		
Total, worst case		234			570			308			283			306				
Sun reduction		0.24			0.23			0.27			0.35			0.38				
Oper. time red.		1.00			1.00			1.00			1.00			1.00				
Wind dir. red.		0.66			0.67			0.67			0.65			0.65				
Total reduction		0.16			0.16			0.18			0.23			0.25				
Total, real		38			88			56			65			76				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MR - H356

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September	October	November	December				
1	04:59 22:00	05:39 21:25 13	20:07 (2) 20:20 (2)	06:33 20:18	07:26 19:05 18	18:18 (3) 18:36 (3)	07:24 16:54 4	16:19 (4) 16:23 (4)	08:19 16:10	
2	04:59 22:00	05:40 21:23 18	20:05 (2) 20:23 (2)	06:35 20:16	07:28 19:02 15	18:18 (3) 18:33 (3)	07:26 16:52		08:21 16:09	
3	05:00 21:59	05:42 21:21 21	20:03 (2) 20:24 (2)	06:36 20:13	07:30 19:00 13	18:18 (3) 18:31 (3)	07:28 16:50		08:22 16:08	
4	05:01 21:59	05:44 21:19 23	20:02 (2) 20:25 (2)	06:38 20:11	07:31 18:57 11	18:18 (3) 18:29 (3)	07:30 16:48		08:24 16:08	
5	05:02 21:58	05:45 21:17 25	20:00 (2) 20:25 (2)	06:40 20:09	07:33 18:55 7	18:19 (3) 18:26 (3)	07:32 16:46		08:25 16:07	
6	05:03 21:58	05:47 21:15 27	20:00 (2) 20:27 (2)	06:42 20:06	07:35 18:52 5	18:19 (3) 18:24 (3)	07:34 16:44		08:26 16:07	
7	05:04 21:57	05:49 21:13 29	19:59 (2) 20:28 (2)	06:43 20:04	07:37 18:50 1	18:20 (3) 18:21 (3)	07:36 16:43		08:28 16:06	
8	05:05 21:56	05:51 21:12 30	19:58 (2) 20:28 (2)	06:45 20:01	07:39 18:48 11	17:27 (4) 17:38 (4)	07:38 16:41	8	15:38 (5) 15:46 (5)	08:29 16:06
9	05:06 21:55	05:52 21:10 30	19:58 (2) 20:28 (2)	06:47 19:59	07:41 18:45 18	17:23 (4) 17:41 (4)	07:40 16:39	14	15:35 (5) 15:49 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07 31	19:57 (2) 20:28 (2)	06:49 19:56	07:42 18:43 24	17:20 (4) 17:44 (4)	07:42 16:37	16	15:35 (5) 15:51 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05 33	19:56 (2) 20:29 (2)	06:50 19:54	07:44 18:40 27	17:18 (4) 17:45 (4)	07:44 16:35	18	15:34 (5) 15:52 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03 33	19:56 (2) 20:29 (2)	06:52 19:51	07:46 18:38 29	17:17 (4) 17:46 (4)	07:45 16:34	20	15:33 (5) 15:53 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01 32	19:56 (2) 20:28 (2)	06:54 19:49	07:48 18:36 32	17:15 (4) 17:47 (4)	07:47 16:32	20	15:33 (5) 15:53 (5)	08:35 16:05
14	05:12 21:51	06:01 20:59 32	19:56 (2) 20:28 (2)	06:56 19:47	07:50 18:33 34	17:14 (4) 17:48 (4)	07:49 16:31	22	15:32 (5) 15:54 (5)	08:36 16:04
15	05:13 21:50	06:03 20:57 32	19:56 (2) 20:28 (2)	06:58 19:44	07:52 18:31 35	17:13 (4) 17:48 (4)	07:51 16:29	22	15:32 (5) 15:54 (5)	08:37 16:05
16	05:14 21:49	06:04 20:55 30	19:55 (2) 20:25 (2)	06:59 19:42	07:54 18:29 37	17:12 (4) 17:49 (4)	07:53 16:27	22	15:32 (5) 15:54 (5)	08:38 16:05
17	05:16 21:47	06:06 20:53 27	19:56 (2) 20:23 (2)	07:01 19:39	07:55 18:26 37	17:12 (4) 17:49 (4)	07:55 16:26	20	15:32 (5) 15:52 (5)	08:38 16:05
18	05:17 21:46	06:08 20:51 26	19:56 (2) 20:22 (2)	07:03 19:37	07:57 18:24 38	17:11 (4) 17:49 (4)	07:57 16:24	19	15:32 (5) 15:51 (5)	08:39 16:05
19	05:18 21:45	06:10 20:48 23	19:56 (2) 20:19 (2)	07:05 19:34	07:59 18:22 38	17:11 (4) 17:49 (4)	07:59 16:23	16	15:33 (5) 15:49 (5)	08:40 16:05
20	05:20 21:44	06:12 20:46 20	19:57 (2) 20:17 (2)	07:06 19:32	08:01 18:20 38	17:11 (4) 17:49 (4)	08:00 16:22	14	15:33 (5) 15:47 (5)	08:41 16:06
21	05:21 21:42	06:13 20:44 17	19:58 (2) 20:15 (2)	07:08 19:29	08:03 18:17 38	17:10 (4) 17:48 (4)	08:02 16:20	12	15:34 (5) 15:46 (5)	08:41 16:06
22	05:23 21:41	06:15 20:42 14	19:58 (2) 20:12 (2)	07:10 19:27	08:05 18:15 35	17:10 (4) 17:45 (4)	08:04 16:19	10	15:34 (5) 15:44 (5)	08:42 16:06
23	05:24 21:39	06:17 20:39 11	19:59 (2) 20:10 (2)	07:12 19:24	08:07 18:13 33	17:10 (4) 17:43 (4)	08:06 16:18	8	15:35 (5) 15:43 (5)	08:42 16:07
24	05:26 21:38	06:19 20:37 8	20:01 (2) 20:09 (2)	07:13 19:22 5	08:09 18:30 (3) 18:11 30	17:11 (4) 17:41 (4)	08:08 16:17	6	15:36 (5) 15:42 (5)	08:43 16:08
25	05:27 21:36	06:20 20:35 3	20:03 (2) 20:06 (2)	07:15 19:19	07:11 18:25 (3) 17:09 27	16:11 (4) 16:38 (4)	08:09 16:16	4	15:37 (5) 15:41 (5)	08:43 16:08
26	05:29 21:35	06:22 20:32		07:17 19:17 17	07:13 18:23 (3) 17:06 25	16:11 (4) 16:36 (4)	08:11 16:14	2	15:38 (5) 15:40 (5)	08:43 16:09
27	05:30 21:33	06:24 20:30		07:19 19:14 19	07:15 18:22 (3) 17:04 22	16:12 (4) 16:34 (4)	08:13 16:13			08:44 16:10
28	05:32 21:32	06:26 20:28		07:21 19:12 22	07:16 18:20 (3) 17:02 18	16:13 (4) 16:31 (4)	08:14 16:12			08:44 16:11
29	05:34 21:30	06:27 20:25		07:22 19:09 21	07:18 18:20 (3) 17:00 15	16:14 (4) 16:29 (4)	08:16 16:12			08:44 16:11
30	05:35 21:28	06:29 20:23		07:24 19:07 20	07:20 18:18 (3) 16:58 12	16:15 (4) 16:27 (4)	08:18 16:11			08:44 16:12
31	05:37 21:26	20:10 (2) 20:18 (2) 8	06:31 20:21		07:22 16:56 9	16:16 (4) 16:25 (4)				08:44 16:13
Potential sun hours	512	460	382	328	259	233				
Total, worst case	8	588	117	732	277					
Sun reduction	0.32	0.34	0.32	0.29	0.27					
Oper. time red.	1.00	1.00	1.00	1.00	1.00					
Wind dir. red.	0.65	0.65	0.67	0.67	0.66					
Total reduction	0.21	0.22	0.22	0.20	0.18					
Total, real	2	130	25	143	49					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: MS - H357

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:16 (4) 21:25	05:39 20:18	06:33 19:05	07:26 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:16 (4) 21:23	05:40 20:16	06:35 19:02	07:28 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	21:16 (4) 21:21	05:42 20:13	06:36 19:00	07:30 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:12 (4) 21:59	05:01 21:23 (4)	05:44 21:19	06:38 20:11	07:31 18:57	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	21:12 (4) 21:58	05:02 21:17 (4)	05:45 21:17	06:40 20:09	07:33 18:55	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:12 (4) 21:57	05:03 21:18 (4)	05:47 21:15	06:42 20:06	07:35 18:52	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:11 (4) 21:57	05:04 21:11 (4)	05:49 21:13	06:43 20:04	07:37 18:50	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:11 (4) 21:56	05:05 21:21 (4)	05:51 21:11	06:45 20:01	07:39 18:48	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:11 (4) 21:55	05:06 21:21 (4)	05:52 21:09	06:47 19:59	07:41 18:45	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:11 (4) 21:54	05:07 21:07	05:54 19:56	06:49 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:11 (4) 21:54	05:08 21:05	05:56 19:54	06:50 18:40	07:44 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:11 (4) 21:53	05:09 21:03	05:57 19:51	06:52 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:11 (4) 21:52	05:11 21:01	05:59 19:49	06:54 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:11 (4) 21:51	05:12 21:01	06:01 19:46	06:56 18:33	07:50 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:12 (4) 21:50	05:13 21:04	06:03 19:44	06:57 18:31	07:52 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:12 (4) 21:48	05:14 21:06	06:04 19:42	06:59 18:29	07:54 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:12 (4) 21:47	05:16 21:07	06:06 19:39	07:01 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:12 (4) 21:46	05:17 21:05	06:08 19:37	07:03 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:12 (4) 21:45	05:18 21:06	06:10 19:34	07:05 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:12 (4) 21:43	05:20 21:06	06:12 19:32	07:06 18:20	08:01 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:12 (4) 21:42	05:21 21:04	06:13 19:29	07:08 18:17	08:03 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:13 (4) 21:41	05:23 21:05	06:15 19:27	07:10 18:15	08:05 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:13 (4) 21:39	05:24 21:06	06:17 19:24	07:12 18:13	08:07 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:13 (4) 21:38	05:26 21:07	06:19 19:22	07:13 18:11	08:09 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:14 (4) 21:36	05:27 21:05	06:20 19:19	07:15 17:09	07:11 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:14 (4) 21:35	05:29 21:06	06:22 19:17	07:17 17:06	07:13 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:14 (4) 21:33	05:30 21:06	06:24 19:14	07:19 17:04	07:14 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:14 (4) 21:31	05:32 21:05	06:26 19:12	07:21 17:02	07:16 16:12	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:58 22:00	21:15 (4) 21:30	05:34 21:06	06:27 19:09	07:22 17:00	07:18 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	21:15 (4) 21:28	05:35 21:07	06:29 19:07	07:24 16:58	07:20 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26		06:31 20:21	07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case						252						
Sun reduction						0.32						
Oper. time red.						1.00						
Wind dir. red.						0.61						
Total reduction						0.19						
Total, real						49						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MT - H358

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:36 (5)	08:14	16:13 (4)	07:16	17:28 (3)	07:01	05:52	19:33 (2)	05:03	
	16:15	1	15:37 (5)	17:06	22	16:35 (4)	18:02	6	17:34 (3)	20:00	20:55
2	08:44		15:37 (5)	08:12		16:12 (4)	07:14		17:26 (3)	06:59	32
	16:16	2	15:39 (5)	17:08	25	16:37 (4)	18:04	10	17:36 (3)	20:02	20:57
3	08:44		15:36 (5)	08:10		16:12 (4)	07:12		17:26 (3)	06:56	30
	16:17	3	15:39 (5)	17:10	27	16:39 (4)	18:06	12	17:38 (3)	20:04	20:58
4	08:43		15:36 (5)	08:08		16:11 (4)	07:09		17:25 (3)	06:54	27
	16:18	5	15:41 (5)	17:12	30	16:41 (4)	18:07	16	17:41 (3)	20:06	20:59
5	08:43		15:36 (5)	08:07		16:11 (4)	07:07		17:24 (3)	06:51	25
	16:19	6	15:42 (5)	17:14	32	16:43 (4)	18:09	18	17:42 (3)	20:07	21:01
6	08:43		15:37 (5)	08:05		16:10 (4)	07:04		17:24 (3)	06:49	23
	16:21	7	15:44 (5)	17:16	35	16:45 (4)	18:11	21	17:45 (3)	20:09	21:03
7	08:42		15:36 (5)	08:03		16:10 (4)	07:02		17:24 (3)	06:47	20
	16:22	9	15:45 (5)	17:18	37	16:47 (4)	18:13	22	17:46 (3)	20:11	19:58
8	08:42		15:36 (5)	08:01		16:10 (4)	07:00		17:24 (3)	06:44	16
	16:24	10	15:46 (5)	17:20	40	16:50 (4)	18:15	24	17:48 (3)	20:13	21:06
9	08:41		15:37 (5)	07:59		16:10 (4)	06:57		17:24 (3)	06:42	9
	16:25	12	15:49 (5)	17:22	40	16:50 (4)	18:17	23	17:47 (3)	20:15	19:53
10	08:40		15:37 (5)	07:57		16:10 (4)	06:55		17:25 (3)	06:39	21
	16:26	13	15:50 (5)	17:24	40	16:50 (4)	18:19	21	17:46 (3)	20:17	20:57
11	08:40		15:37 (5)	07:55		16:10 (4)	06:52		17:26 (3)	06:37	9
	16:28	15	15:52 (5)	17:26	40	16:50 (4)	18:21	19	17:45 (3)	20:19	20:53
12	08:39		15:37 (5)	07:53		16:09 (4)	06:50		17:27 (3)	06:35	21
	16:30	17	15:54 (5)	17:28	40	16:49 (4)	18:23	16	17:43 (3)	20:20	20:53
13	08:38		15:38 (5)	07:51		16:10 (4)	06:48		17:29 (3)	06:32	5
	16:31	17	15:55 (5)	17:30	39	16:49 (4)	18:25	12	17:41 (3)	20:22	19:48
14	08:37		15:38 (5)	07:49		16:10 (4)	06:45		17:34 (3)	06:30	25
	16:33	19	15:57 (5)	17:32	39	16:49 (4)	18:27	1	17:35 (3)	20:24	19:54
15	08:36		15:38 (5)	07:47		16:11 (4)	06:43		17:28 (3)	06:28	28
	16:34	21	15:59 (5)	17:34	38	16:49 (4)	18:28	18	17:45 (3)	20:26	19:56
16	08:35		15:38 (5)	07:45		16:12 (4)	06:40		17:25 (3)	06:25	30
	16:36	22	16:00 (5)	17:36	37	16:49 (4)	18:30	22	17:46 (3)	20:28	19:58
17	08:34		15:38 (5)	07:43		16:12 (4)	06:38		17:23 (3)	06:23	22
	16:38	23	16:01 (5)	17:38	36	16:48 (4)	18:32	25	17:47 (3)	20:30	19:36
18	08:33		15:39 (5)	07:41		16:13 (4)	06:35		17:24 (3)	06:21	25
	16:40	23	16:02 (5)	17:40	34	16:47 (4)	18:34	28	17:48 (3)	20:31	20:01
19	08:32		15:40 (5)	07:39		16:14 (4)	06:33		17:26 (3)	06:18	28
	16:41	22	16:02 (5)	17:42	32	16:46 (4)	18:36	30	17:49 (3)	20:33	20:03
20	08:31		15:40 (5)	07:36		16:15 (4)	06:31		17:24 (3)	06:16	30
	16:43	22	16:02 (5)	17:44	30	16:45 (4)	18:38	33	17:50 (3)	20:35	20:05
21	08:30		15:41 (5)	07:34		16:17 (4)	06:28		17:23 (3)	06:14	33
	16:45	21	16:02 (5)	17:46	27	16:44 (4)	18:40	35	17:51 (3)	20:37	19:32
22	08:29		15:41 (5)	07:32		16:18 (4)	06:26		17:21 (3)	06:12	35
	16:47	20	16:01 (5)	17:48	23	16:41 (4)	18:42	36	17:52 (3)	20:39	20:07
23	08:27		15:43 (5)	07:30		16:21 (4)	06:23		17:20 (3)	06:09	36
	16:49	18	16:01 (5)	17:50	18	16:39 (4)	18:43	36	17:53 (3)	20:41	19:32
24	08:26		15:43 (5)	07:28		16:25 (4)	06:21		17:19 (3)	06:07	36
	16:50	18	16:01 (5)	17:52	10	16:35 (4)	18:45	36	17:54 (3)	20:43	20:08
25	08:24		15:45 (5)	07:25		16:28 (4)	06:18		17:17 (3)	06:05	36
	16:52	15	16:00 (5)	17:54		16:32 (4)	06:16		17:14 (3)	06:03	36
26	08:23		15:47 (5)	07:23		16:16 (4)	06:16		17:11 (3)	06:04	36
	16:54	13	16:21 (4)	17:56		16:18 (4)	06:13		17:08 (3)	06:01	35
27	08:22		15:49 (5)	07:21		16:23 (4)	06:13		17:05 (3)	06:01	35
	16:56	13	16:23 (4)	17:58		16:26 (4)	06:13		17:02 (3)	06:01	35
28	08:20		16:17 (4)	07:18		17:29 (3)	06:11		16:59 (3)	05:58	35
	16:58	9	16:26 (4)	18:00	3	17:32 (3)	18:53	35	17:00 (3)	20:50	20:07
29	08:18		16:16 (4)			17:29 (3)	06:08		16:56 (3)	20:56	20:07
	17:00	12	16:28 (4)			17:29 (3)	06:08		16:53 (3)	20:56	20:07
30	08:17		16:14 (4)			17:29 (3)	06:06		16:50 (3)	20:54	20:06
	17:02	16	16:30 (4)			17:29 (3)	06:04		16:47 (3)	20:54	20:06
31	08:15		16:13 (4)			17:29 (3)	06:04		16:44 (3)	20:54	20:05
	17:04	18	16:31 (4)			17:29 (3)	06:04		16:41 (3)	20:54	20:05
Potential sun hours	250		273			367			420		494
Total, worst case		442		774		221		537		182	510
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.66		0.68		0.65		0.65	
Total reduction		0.16		0.15		0.18		0.23		0.25	
Total, real		71		118		41		123		45	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: MT - H358

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	July	August	September		October		November		December		
1	04:59 22:00	05:39 21:25		06:33 20:18		07:26 19:05	18:06 (3) 18:21 (3)	07:24 16:54	15:40 (4) 16:20 (4)	08:19 16:10	15:19 (5) 15:34 (5)
2	04:59 22:00	05:40 21:23		06:35 20:16		07:28 19:02	18:05 (3) 18:23 (3)	07:26 16:52	15:40 (4) 16:20 (4)	08:21 16:09	15:19 (5) 15:33 (5)
3	05:00 21:59	05:42 21:21		06:36 20:13		07:30 19:00	18:03 (3) 18:24 (3)	07:28 16:50	15:40 (4) 16:19 (4)	08:22 16:08	15:20 (5) 15:32 (5)
4	05:01 21:59	05:44 21:19		06:38 20:11		07:31 18:57	18:02 (3) 18:25 (3)	07:30 16:48	15:40 (4) 16:17 (4)	08:24 16:08	15:21 (5) 15:32 (5)
5	05:02 21:58	05:45 21:17	12	19:52 (2) 20:04 (2)	06:40 20:09	07:33 18:55	18:01 (3) 18:25 (3)	07:32 16:46	15:40 (4) 16:15 (4)	08:25 16:07	15:22 (5) 15:30 (5)
6	05:03 21:58	05:47 21:15	17	19:50 (2) 20:07 (2)	06:42 20:06	07:35 18:52	18:01 (3) 18:24 (3)	07:34 16:44	15:41 (4) 16:12 (4)	08:26 16:07	15:23 (5) 15:30 (5)
7	05:04 21:57	05:49 21:13	21	19:48 (2) 20:09 (2)	06:43 20:04	07:37 18:50	17:59 (3) 18:21 (3)	07:36 16:43	15:41 (4) 16:10 (4)	08:28 16:06	15:23 (5) 15:29 (5)
8	05:05 21:56	05:51 21:12	24	19:46 (2) 20:10 (2)	06:45 20:01	07:39 18:48	17:59 (3) 18:18 (3)	07:38 16:41	15:42 (4) 16:08 (4)	08:29 16:06	15:24 (5) 15:28 (5)
9	05:06 21:55	05:52 21:10	26	19:45 (2) 20:11 (2)	06:47 19:59	07:41 18:45	17:59 (3) 18:16 (3)	07:40 16:39	15:42 (4) 16:06 (4)	08:30 16:05	15:25 (5) 15:28 (5)
10	05:07 21:55	05:54 21:07	28	19:43 (2) 20:11 (2)	06:49 19:56	07:42 18:43	18:00 (3) 18:14 (3)	07:42 16:37	15:44 (4) 16:05 (4)	08:31 16:05	15:26 (5) 15:28 (5)
11	05:08 21:54	05:56 21:05	30	19:42 (2) 20:12 (2)	06:50 19:54	07:44 18:40	18:00 (3) 18:11 (3)	07:44 16:35	15:45 (4) 16:03 (4)	08:33 16:05	15:26 (5) 15:27 (5)
12	05:09 21:53	05:57 21:03	31	19:42 (2) 20:13 (2)	06:52 19:51	07:46 18:38	18:01 (3) 18:09 (3)	07:45 16:34	15:46 (4) 16:01 (4)	08:34 16:05	15:27 (5)
13	05:10 21:52	05:59 21:01	33	19:40 (2) 20:13 (2)	06:54 19:49	07:48 18:36	18:02 (3) 18:07 (3)	07:47 16:32	15:47 (4) 15:59 (4)	08:35 16:05	
14	05:12 21:51	06:01 20:59	34	19:40 (2) 20:14 (2)	06:56 19:47	07:50 18:33	18:03 (3) 18:04 (3)	07:49 16:31	15:49 (4) 15:58 (4)	08:36 16:04	
15	05:13 21:50	06:03 20:57	34	19:40 (2) 20:14 (2)	06:58 19:44	07:52 18:31		07:51 16:29	15:52 (5) 15:56 (4)	08:37 16:05	
16	05:14 21:49	06:04 20:55	36	19:38 (2) 20:14 (2)	06:59 19:42	07:54 18:29		07:53 16:27	15:20 (5) 15:54 (4)	08:38 16:05	
17	05:16 21:47	06:06 20:53	36	19:38 (2) 20:14 (2)	07:01 19:39	07:55 18:26		07:55 16:26	15:18 (5) 15:33 (5)	08:38 16:05	
18	05:17 21:46	06:08 20:51	36	19:38 (2) 20:14 (2)	07:03 19:37	07:57 18:24	16:55 (4) 17:08 (4)	07:57 16:24	15:17 (5) 15:35 (5)	08:39 16:05	
19	05:18 21:45	06:10 20:48	36	19:37 (2) 20:13 (2)	07:05 19:34	07:59 18:22	16:51 (4) 17:11 (4)	07:59 16:23	15:17 (5) 15:35 (5)	08:40 16:05	
20	05:20 21:44	06:12 20:46	35	19:38 (2) 20:13 (2)	07:06 19:32	08:01 18:20	16:49 (4) 17:13 (4)	08:00 16:22	15:16 (5) 15:36 (5)	08:41 16:06	
21	05:21 21:42	06:13 20:44	35	19:38 (2) 20:13 (2)	07:08 19:29	08:03 18:17	16:47 (4) 17:14 (4)	08:02 16:20	15:16 (5) 15:37 (5)	08:41 16:06	
22	05:23 21:41	06:15 20:42	35	19:37 (2) 20:12 (2)	07:10 19:27	08:05 18:15	16:45 (4) 17:16 (4)	08:04 16:19	15:16 (5) 15:38 (5)	08:42 16:06	
23	05:24 21:39	06:17 20:39	32	19:38 (2) 20:10 (2)	07:12 19:24	08:07 18:13	16:44 (4) 17:17 (4)	08:06 16:18	15:16 (5) 15:38 (5)	08:42 16:07	
24	05:26 21:38	06:19 20:37	31	19:38 (2) 20:09 (2)	07:13 19:22	08:09 18:11	16:43 (4) 17:17 (4)	08:08 16:17	15:16 (5) 15:39 (5)	08:43 16:08	
25	05:27 21:36	06:20 20:35	28	19:38 (2) 20:06 (2)	07:15 19:19	07:11 17:09	15:42 (4) 16:18 (4)	08:09 16:16	15:17 (5) 15:39 (5)	08:43 16:08	
26	05:29 21:35	06:22 20:32	25	19:39 (2) 20:04 (2)	07:17 19:17	07:13 17:06	15:41 (4) 16:18 (4)	08:11 16:14	15:17 (5) 15:40 (5)	08:43 16:09	
27	05:30 21:33	06:24 20:30	22	19:40 (2) 20:02 (2)	07:19 19:14	07:15 17:04	15:40 (4) 16:19 (4)	08:13 16:13	15:17 (5) 15:38 (5)	08:44 16:10	
28	05:32 21:32	06:26 20:28	19	19:40 (2) 19:59 (2)	07:21 19:12	07:16 17:02	15:40 (4) 16:19 (4)	08:14 16:12	15:18 (5) 15:37 (5)	08:44 16:11	
29	05:34 21:30	06:27 20:25	15	19:42 (2) 19:57 (2)	07:22 19:09	07:18 17:00	15:39 (4) 16:19 (4)	08:16 16:12	15:18 (5) 15:36 (5)	08:44 16:11	
30	05:35 21:28	06:29 20:23	11	19:44 (2) 19:55 (2)	07:24 19:07	07:20 16:58	15:39 (4) 16:19 (4)	08:18 16:11	15:18 (5) 15:35 (5)	08:44 16:12	
31	05:37 21:27	06:31 20:21	5	19:47 (2) 19:52 (2)		07:22 16:56	15:39 (4) 16:19 (4)			08:44 16:13	
Potential sun hours	512	460		382		328		259		233	
Total, worst case		727		10		674		681		83	
Sun reduction		0.34		0.32		0.29		0.27		0.21	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.65		0.68		0.66		0.66		0.66	
Total reduction		0.22		0.22		0.19		0.17		0.14	
Total, real		161		2		131		119		11	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MU - H359

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MV - H360

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MW - H361

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MX - H362

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MY - H363

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

IE-F91 RHH9 Sligo

+353719161416

abyrne / abyrne@jodireland.com

Calculated:

11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: MZ - H364

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26	18:24 (4)	07:24	08:19	
	16:15	17:06	18:02		20:00	20:55	21:45	22:00	21:25	20:18		19:05	12	18:36 (4)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	04:59	05:40	06:35		07:28		18:24 (4)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:46	22:00	21:23	20:16		19:02	9	18:33 (4)	16:52	16:09
3	08:43	08:10	07:11		06:56	05:48	05:01	05:00	05:42	06:36		07:30		18:25 (4)	07:28	08:22
	16:17	17:10	18:05		20:04	20:59	21:48	21:59	21:21	20:13		19:00	6	18:31 (4)	16:50	16:08
4	08:43	08:08	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:31		18:26 (4)	07:30	08:24
	16:18	17:12	18:07		20:06	21:01	21:49	21:59	21:19	20:11		18:57	3	18:29 (4)	16:48	16:08
5	08:43	08:07	07:07		06:51	05:44	04:59	05:02	05:45	06:40		07:33			07:32	08:25
	16:19	17:14	18:09		20:07	21:03	21:50	21:58	21:17	20:09		18:55			16:46	16:07
6	08:42	08:05	07:04		06:49	05:42	04:58	05:03	05:47	06:42		07:35			07:34	08:26
	16:21	17:16	18:11		20:09	21:04	21:51	21:57	21:15	20:06		18:52			16:44	16:07
7	08:42	08:03	07:02		06:47	05:40	04:58	05:04	05:49	06:43		07:37			07:36	08:28
	16:22	17:18	18:13		20:11	21:06	21:52	21:57	21:13	20:04		18:50			16:43	16:06
8	08:41	08:01	07:00		06:44	05:38	04:57	05:05	05:50	06:45		07:39			07:38	08:29
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:11	20:01		18:48			16:41	16:06
9	08:41	07:59	06:57		06:42	05:36	04:57	05:06	05:52	06:47		07:41			07:40	08:30
	16:25	17:22	18:17	1	17:50 (4)	20:15	21:10	21:54	21:55	21:09	19:59	18:45			16:39	16:05
10	08:40	07:57	06:55		17:48 (4)	06:39	05:34	04:56	05:07	05:54	06:49	07:42			07:42	08:31
	16:26	17:24	18:19	4	17:52 (4)	20:17	21:11	21:55	21:57	21:07	19:56	18:43			16:37	16:05
11	08:40	07:55	06:52		17:46 (4)	06:37	05:32	04:56	05:08	05:56	06:50	07:44			07:43	08:33
	16:28	17:26	18:21	8	17:54 (4)	20:18	21:13	21:55	21:54	21:05	19:54	18:40			16:35	16:05
12	08:39	07:53	06:50		17:45 (4)	06:35	05:31	04:55	05:09	05:57	06:52	07:46			07:45	08:34
	16:30	17:28	18:23	11	17:56 (4)	20:20	21:15	21:56	21:53	21:03	19:51	18:38			16:34	16:05
13	08:38	07:51	06:48		17:45 (4)	06:32	05:29	04:55	05:10	05:59	06:54	07:48			07:47	08:35
	16:31	17:30	18:25	13	17:58 (4)	20:22	21:17	21:57	21:52	21:01	19:49	18:36			16:32	16:04
14	08:37	07:49	06:45		17:44 (4)	06:30	05:27	04:55	05:12	06:01	06:56	07:50			07:49	08:36
	16:33	17:32	18:26	16	18:00 (4)	20:24	21:18	21:57	21:51	20:59	19:46	18:33			16:30	16:04
15	08:36	07:47	06:43		17:44 (4)	06:28	05:25	04:54	05:13	06:03	06:57	07:52			07:51	08:37
	16:34	17:34	18:28	18	18:02 (4)	20:26	21:20	21:58	21:50	20:57	19:44	18:31			16:29	16:04
16	08:35	07:45	06:40		17:44 (4)	06:25	05:24	04:54	05:14	06:04	06:59	07:54			07:53	08:38
	16:36	17:36	18:30	20	18:04 (4)	20:28	21:22	21:59	21:48	20:55	19:42	18:29			16:27	16:05
17	08:34	07:43	06:38		17:44 (4)	06:23	05:22	04:54	05:16	06:06	07:01	07:55			07:55	08:38
	16:38	17:38	18:32	20	18:04 (4)	20:30	21:23	21:59	21:47	20:53	19:39	18:26			16:26	16:05
18	08:33	07:41	06:35		17:44 (4)	06:21	05:21	04:54	05:17	06:08	07:03	07:57			07:57	08:39
	16:40	17:40	18:34	19	18:03 (4)	20:31	21:25	22:00	21:46	20:50	19:37	18:24			16:24	16:05
19	08:32	07:39	06:33		17:46 (4)	06:18	05:19	04:54	05:18	06:10	07:05	07:59			07:59	08:40
	16:41	17:42	18:36	16	18:02 (4)	20:33	21:27	22:00	21:45	20:48	19:34	18:22			16:23	16:05
20	08:31	07:36	06:31		17:47 (4)	06:16	05:18	04:54	05:20	06:12	07:06	08:01			08:00	08:41
	16:43	17:44	18:38	12	17:59 (4)	20:35	21:28	22:00	21:44	20:46	19:32	18:20			16:22	16:06
21	08:30	07:34	06:28		17:50 (4)	06:14	05:16	04:54	05:21	06:13	07:08	08:03			08:02	08:41
	16:45	17:46	18:40	6	17:56 (4)	20:37	21:30	22:00	21:42	20:44	19:29	18:17			16:20	16:06
22	08:28	07:32	06:26		06:11	05:15	04:55	05:23	06:15	07:10		08:05			08:04	08:42
	16:47	17:48	18:41		20:39	21:31	22:01	21:41	20:42	19:27	2	18:39 (4)			16:19	16:06
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12		18:32 (4)			08:06	08:42
	16:49	17:50	18:43		20:41	21:33	22:01	21:39	20:39	19:24	11	18:43 (4)			16:18	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:13		18:30 (4)			08:07	08:43
	16:50	17:52	18:45		20:42	21:34	22:01	21:38	20:37	19:22	15	18:45 (4)			16:17	16:08
25	08:24	07:25	06:18		06:05	05:11	04:55	05:27	06:20	07:15		18:27 (4)			08:09	08:43
	16:52	17:54	18:47		20:44	21:36	22:01	21:36	20:35	19:19	18	18:45 (4)			16:16	16:08
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17		18:26 (4)			08:11	08:43
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:32	19:17	20	18:46 (4)			16:14	16:09
27	08:21	07:21	06:13		06:00	05:08	04:56	05:30	06:24	07:19		18:26 (4)			08:13	08:44
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:14	20	18:46 (4)			16:13	16:10
28	08:20	07:18	06:11		05:58	05:07	04:57	05:32	06:26	07:21		18:25 (4)			08:14	08:44
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	19	18:44 (4)			16:12	16:10
29	08:18		07:08		05:56	05:06	04:57	05:34	06:27	07:22		18:25 (4)			08:16	08:44
	17:00		19:54		20:52	21:41	22:01	21:30	20:25	19:09	16	18:41 (4)			16:11	16:11
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		18:24 (4)			08:17	08:44
	17:02		19:56		20:53	21:43	22:00	21:28	20:23	19:07	14	18:38 (4)			16:11	16:12
31	08:15		07:04			05:04		05:37	06:31			07:22				08:44
	17:04		19:58			21:44		21:26	20:21			16:56				16:13
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case			164							135		30				
Sun reduction			0.27							0.32		0.29				
Oper. time red.			1.00							1.00		1.00				
Wind dir. red.			0.67							0.67		0.67				
Total reduction			0.18							0.22		0.20				
Total, real			30							29		6				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: NA - H365

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:12 (4) 21:24 (4)	05:39 21:25	06:33 20:18	19:47 (5) 19:50 (5)	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	21:10 (4) 21:12 (4)	05:00 21:59	06:35 21:23	06:36 21:24	07:28 21:23	07:26 19:02	08:21 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	21:09 (4) 21:13 (4)	05:00 21:59	06:36 21:23	06:37 21:21	07:30 21:21	07:28 19:00	08:22 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:08 (4) 21:14 (4)	05:01 21:59	06:38 21:23	06:38 21:19	07:31 21:19	07:30 18:57	08:23 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	21:09 (4) 21:15 (4)	05:02 21:58	06:40 21:23	06:40 21:17	07:33 21:17	07:32 18:55	08:25 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:08 (4) 21:16 (4)	05:03 21:57	06:42 21:22	06:42 21:15	07:35 21:15	07:34 18:52	08:26 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:08 (4) 21:16 (4)	05:04 21:57	06:43 21:22	06:43 21:13	07:37 21:13	07:36 18:50	08:28 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:08 (4) 21:17 (4)	05:05 21:56	06:45 21:21	06:45 21:11	07:39 21:11	07:38 18:48	08:29 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:07 (4) 21:18 (4)	05:06 21:55	06:47 21:21	06:47 21:09	07:40 21:09	07:40 18:45	08:30 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:08 (4) 21:19 (4)	05:07 21:54	06:49 21:20	06:49 21:07	07:42 21:07	07:42 18:43	08:31 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	19:48 (5) 19:51 (5)	05:33 21:13	21:08 (4) 21:20 (4)	05:08 21:54	06:50 21:05	06:50 21:07	07:44 21:07	07:43 18:40	08:32 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	19:46 (5) 19:53 (5)	05:31 21:15	21:08 (4) 21:20 (4)	05:09 21:53	06:52 21:03	06:52 21:03	07:46 21:03	07:45 19:51	08:34 18:38	08:34 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:44 (5) 19:54 (5)	05:29 21:17	21:08 (4) 21:21 (4)	05:11 21:52	06:54 21:01	06:54 21:01	07:48 21:01	07:47 18:36	08:35 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:43 (5) 19:56 (5)	05:27 21:18	21:08 (4) 21:22 (4)	05:12 21:51	06:01 20:59	06:56 20:59	07:50 21:01	07:49 18:33	08:36 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:42 (5) 19:58 (5)	05:26 21:20	21:08 (4) 21:22 (4)	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:41 (5) 19:59 (5)	05:24 21:22	21:09 (4) 21:23 (4)	05:14 21:48	06:04 20:55	06:59 20:55	07:54 18:29	07:53 16:27	08:37 16:05	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:41 (5) 20:00 (5)	05:22 21:23	21:09 (4) 21:23 (4)	05:16 21:47	06:06 20:53	06:06 19:39	07:55 18:26	07:55 16:26	08:38 16:05	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:41 (5) 20:00 (5)	05:21 21:25	21:09 (4) 21:24 (4)	05:17 21:46	06:08 20:50	06:08 20:50	07:57 18:24	07:57 16:25	08:39 16:05	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	19:41 (5) 20:00 (5)	05:19 21:26	21:09 (4) 21:24 (4)	05:18 21:45	06:10 20:48	06:10 20:48	07:59 18:22	07:58 16:23	08:40 16:05	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:42 (5) 19:59 (5)	05:18 21:28	21:09 (4) 21:24 (4)	05:20 21:43	06:12 20:46	06:12 20:46	08:01 18:20	08:00 16:22	08:40 16:06	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:42 (5) 19:57 (5)	05:16 21:30	21:09 (4) 21:24 (4)	05:21 21:42	06:13 20:44	06:13 20:44	08:03 18:17	08:02 16:20	08:41 16:06	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	19:43 (5) 19:56 (5)	05:15 21:31	21:10 (4) 21:25 (4)	05:23 21:41	06:15 20:41	06:15 20:41	08:05 18:15	08:04 16:19	08:42 16:06	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:45 (5) 19:54 (5)	05:13 21:33	21:10 (4) 21:25 (4)	05:24 21:39	06:17 20:39	06:17 20:39	08:07 18:13	08:06 16:18	08:42 16:07	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:45 (5) 19:54 (5)	05:12 21:34	21:10 (4) 21:25 (4)	05:26 21:38	06:19 20:37	06:19 20:37	08:09 18:11	08:07 16:17	08:43 16:08	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19:44 (5) 19:57 (5)	05:11 21:36	21:11 (4) 21:25 (4)	05:27 21:36	06:20 20:35	06:20 20:35	08:11 18:13	08:09 16:16	08:43 16:08	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:43 (5) 19:56 (5)	05:09 21:37	21:11 (4) 21:25 (4)	05:29 21:35	06:22 20:32	06:22 20:32	08:12 18:14	08:11 16:15	08:43 16:09	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:41 (5) 19:59 (5)	05:08 21:39	21:11 (4) 21:24 (4)	05:30 21:33	06:24 20:30	06:24 20:30	08:14 18:16	08:13 16:13	08:43 16:10	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	19:40 (5) 19:57 (5)	05:07 21:40	21:11 (4) 21:25 (4)	05:32 21:32	06:26 20:28	06:26 20:28	08:14 18:16	08:14 16:12	08:44 16:11	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	19:39 (5) 19:54 (5)	05:06 21:41	21:12 (4) 21:25 (4)	05:34 21:30	06:27 20:25	06:27 20:25	08:16 18:18	08:16 16:12	08:44 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	19:38 (5) 19:56 (5)	05:05 21:43	21:12 (4) 21:24 (4)	05:35 21:28	06:29 20:23	06:29 20:23	08:17 18:19	08:17 16:12	08:44 16:12	08:44 16:12
31	08:15 17:04		07:04 19:58		19:37 (5) 19:58 (5)	05:04 21:44		05:37 21:26	06:31 20:21	06:31 20:21	08:18 18:20	08:18 16:13	08:44 16:13	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case				178		343		81	182	3				
Sun reduction				0.35		0.32		0.32	0.34	0.32				
Oper. time red.				1.00		1.00		1.00	1.00	1.00				
Wind dir. red.				0.65		0.61		0.61	0.65	0.65				
Total reduction				0.23		0.19		0.20	0.22	0.21				
Total, real				41		67		16	41	1				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NB - H366

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	05:03 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:54	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: NC - H367

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		08:14		15:41 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24					08:19				15:24 (2)		
	16:15		17:06	27	16:08 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54					16:10	10			15:34 (2)		
2	08:44		08:12		15:41 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26					08:21				15:26 (2)		
	16:16		17:08	26	16:07 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52					16:09	6			15:32 (2)		
3	08:44		08:10		15:42 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28					08:22						
	16:17		17:10	24	16:06 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50					16:08						
4	08:43		08:08		15:43 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30				15:19 (2)	08:24						
	16:18		17:12	23	16:06 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	12			15:31 (2)	16:08						
5	08:43		08:07		15:45 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32				15:16 (2)	08:25						
	16:19		17:14	19	16:04 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	17			15:33 (2)	16:07						
6	08:43		08:05		15:47 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34				15:14 (2)	08:26						
	16:21		17:16	16	16:03 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	20			15:34 (2)	16:07						
7	08:42		08:03		15:49 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				15:13 (2)	08:28						
	16:22		17:18	11	16:00 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	22			15:35 (2)	16:06						
8	08:42		08:01			07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38				15:12 (2)	08:29						
	16:24		17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	24			15:36 (2)	16:06						
9	08:41		07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				15:12 (2)	08:30						
	16:25		17:22			18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	26			15:38 (2)	16:05						
10	08:40		15:44 (2)	07:57		06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42				15:12 (2)	08:32						
	16:26	6	15:50 (2)	17:24		18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	27			15:39 (2)	16:05						
11	08:40		15:42 (2)	07:55		06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44				15:11 (2)	08:33						
	16:28	10	15:52 (2)	17:26		18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	28			15:39 (2)	16:05						
12	08:39		15:41 (2)	07:53		06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46				15:11 (2)	08:34						
	16:29	13	15:54 (2)	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	29			15:40 (2)	16:05						
13	08:38		15:40 (2)	07:51		06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47				15:11 (2)	08:35						
	16:31	15	15:55 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	29			15:40 (2)	16:04						
14	08:37		15:40 (2)	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				15:10 (2)	08:36						
	16:33	17	15:57 (2)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	30			15:40 (2)	16:04						
15	08:36		15:39 (2)	07:47		06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51				15:10 (2)	08:37						
	16:34	20	15:59 (2)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	30			15:40 (2)	16:04						
16	08:35		15:38 (2)	07:45		06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53				15:11 (2)	08:38						
	16:36	22	16:00 (2)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	29			15:40 (2)	16:05						
17	08:34		15:38 (2)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55				15:11 (2)	08:38						
	16:38	23	16:01 (2)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	29			15:40 (2)	16:05						
18	08:33		15:38 (2)	07:41		06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				15:11 (2)	08:39						
	16:40	25	16:03 (2)	17:40		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	29			15:40 (2)	16:05						
19	08:32		15:38 (2)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				15:12 (2)	08:40						
	16:41	26	16:04 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	28			15:40 (2)	16:05						
20	08:31		15:37 (2)	07:36		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00				15:12 (2)	08:41						
	16:43	27	16:04 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	28			15:40 (2)	16:06						
21	08:30		15:38 (2)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				15:13 (2)	08:41						
	16:45	27	16:05 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	27			15:40 (2)	16:06						
22	08:29		15:37 (2)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04				15:13 (2)	08:42						
	16:47	28	16:05 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	27			15:40 (2)	16:06						
23	08:27		15:38 (2)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				15:14 (2)	08:42						
	16:49	28	16:06 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	26			15:40 (2)	16:07						
24	08:26		15:37 (2)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08				15:15 (2)	08:43						
	16:50	29	16:06 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	25			15:40 (2)	16:08						
25	08:25		15:38 (2)	07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09				15:16 (2)	08:43						
	16:52	29	16:07 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	24			15:40 (2)	16:08						
26	08:23		15:38 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11				15:17 (2)	08:43						
	16:54	29	16:07 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	22			15:39 (2)	16:09						
27	08:22		15:37 (2)	07:21		06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13				15:18 (2)	08:44						
	16:56	30	16:07 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	20			15:38 (2)	16:10						
28	08:20		15:39 (2)	07:18		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14				15:20 (2)	08:44						
	16:58	29	16:08 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	17			15:37 (2)	16:10						
29	08:19		15:39 (2)			07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16				15:20 (2)	08:44						
	17:00	29	16:08 (2)			19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	15			15:35 (2)	16:11						
30	08:17		15:39 (2)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18				15:22 (2)	08:44						
	17:02	29	16:08 (2)			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	13			15:35 (2)	16:12						
31	08:15		15:39 (2)			07:04		05:04		05:37	06:31		07:22					08:44							
	17:04	28	16:07 (2)			19:58		21:44		21:27	20:21		16:56					16:13							
Potential sun hours	250		273			367		420		494		510		512		460		382		328		259		233	
Total, worst case	519		146															653							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: ND - H368

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NE - H369

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:08 (5)	07:16	16:49 (4)	07:01		05:52		19:50 (2)	05:03					
	16:15			17:06	20 16:28 (5)	18:02	35 17:24 (4)	20:00		20:55	31 20:21 (2)	21:45						
2	08:44			08:12	16:09 (5)	07:14	16:49 (4)	06:59		05:50		19:50 (2)	05:02					
	16:16			17:08	18 16:27 (5)	18:04	33 17:22 (4)	20:02		20:57	31 20:21 (2)	21:46						
3	08:44			08:10	16:10 (5)	07:12	16:51 (4)	06:56		05:48		19:51 (2)	05:01					
	16:17			17:10	16 16:26 (5)	18:06	31 17:22 (4)	20:04		20:59	29 20:20 (2)	21:48						
4	08:43			08:08	16:11 (5)	07:09	16:52 (4)	06:54		05:46		19:51 (2)	05:00					
	16:18			17:12	14 16:25 (5)	18:07	29 17:21 (4)	20:06		21:01	28 20:19 (2)	21:49						
5	08:43			08:07	16:14 (5)	07:07	16:53 (4)	06:51		05:44		19:51 (2)	04:59					
	16:19			17:14	9 16:23 (5)	18:09	26 17:19 (4)	20:07		21:03	28 20:19 (2)	21:50						
6	08:42			08:05		07:04	16:55 (4)	06:49		05:42		19:52 (2)	04:59					
	16:21			17:16		18:11	22 17:17 (4)	20:09		21:04	26 20:18 (2)	21:51						
7	08:42			08:03		07:02	16:56 (4)	06:47		05:40		19:53 (2)	04:58					
	16:22			17:18		18:13	18 17:14 (4)	20:11		21:06	25 20:18 (2)	21:52						
8	08:42			08:01		07:00	17:00 (4)	06:44		05:38		19:54 (2)	04:57					
	16:24			17:20		18:15	11 17:11 (4)	20:13		21:08	22 20:16 (2)	21:53						
9	08:41			07:59		06:57	17:46 (3)	06:42		05:36		19:55 (2)	04:57					
	16:25			17:22		18:17	4 17:50 (3)	20:15		21:10	20 20:15 (2)	21:54						
10	08:40			07:57		06:55	17:45 (3)	06:39		05:34		19:56 (2)	04:56					
	16:26			17:24		18:19	7 17:52 (3)	20:17		21:11	17 20:13 (2)	21:55						
11	08:40			07:55		06:52	17:44 (3)	06:37		05:33		19:59 (2)	04:56					
	16:28			17:26		18:21	11 17:55 (3)	20:19		21:13	13 20:12 (2)	21:55						
12	08:39			07:53		06:50	17:43 (3)	06:35		05:31		20:02 (2)	04:55					
	16:30			17:28		18:23	13 17:56 (3)	20:20		21:15	6 20:08 (2)	21:56						
13	08:38			07:51	16:59 (4)	06:48	17:43 (3)	06:32		05:29		04:55						
	16:31			17:30	1 17:00 (4)	18:25	15 17:58 (3)	20:22		21:17		21:57						
14	08:37			07:49	16:57 (4)	06:45	17:42 (3)	06:30		05:27		04:55						
	16:33			17:32	5 17:02 (4)	18:27	18 18:00 (3)	20:24		21:18		21:58						
15	08:36			07:47	16:55 (4)	06:43	17:43 (3)	06:28		05:26		04:54						
	16:34			17:34	10 17:05 (4)	18:28	19 18:02 (3)	20:26		21:20		21:58						
16	08:35			07:45	16:54 (4)	06:40	17:43 (3)	06:25		05:24		04:54						
	16:36			17:36	13 17:07 (4)	18:30	21 18:04 (3)	20:28		21:22		21:59						
17	08:34			07:43	16:53 (4)	06:38	17:43 (3)	06:23		05:22		04:54						
	16:38			17:38	16 17:09 (4)	18:32	20 18:03 (3)	20:30		21:23		21:59						
18	08:33			07:41	16:51 (4)	06:35	17:44 (3)	06:21		05:21		04:54						
	16:40			17:40	20 17:11 (4)	18:34	17 18:01 (3)	20:31		21:25		22:00						
19	08:32			07:39	16:51 (4)	06:33	17:46 (3)	06:18		05:19		04:54						
	16:41			17:42	22 17:13 (4)	18:36	14 18:00 (3)	20:33	5 20:05 (2)	21:27		22:00						
20	08:31	16:06 (5)		07:36	16:50 (4)	06:31	17:47 (3)	06:16		19:58 (2)	05:18	04:54						
	16:43	2 16:08 (5)		17:44	26 17:16 (4)	18:38	10 17:57 (3)	20:35	9 20:07 (2)	21:28		22:00						
21	08:30	16:06 (5)		07:34	16:50 (4)	06:28		06:14		19:56 (2)	05:16	04:54						
	16:45	5 16:11 (5)		17:46	28 17:18 (4)	18:40		20:37	12 20:08 (2)	21:30		22:01						
22	08:29	16:06 (5)		07:32	16:49 (4)	06:26		06:12		19:54 (2)	05:15	04:55						
	16:47	6 16:12 (5)		17:48	30 17:19 (4)	18:42		20:39	16 20:10 (2)	21:31		22:01						
23	08:27	16:06 (5)		07:30	16:49 (4)	06:23		06:09		19:53 (2)	05:13	04:55						
	16:49	9 16:15 (5)		17:50	33 17:22 (4)	18:43		20:41	19 20:12 (2)	21:33		22:01						
24	08:26	16:05 (5)		07:28	16:49 (4)	06:21		06:07		19:53 (2)	05:12	04:55						
	16:50	12 16:17 (5)		17:52	35 17:24 (4)	18:45		20:42	21 20:14 (2)	21:34		22:01						
25	08:24	16:06 (5)		07:25	16:48 (4)	06:18		06:05		19:52 (2)	05:11	04:55						
	16:52	13 16:19 (5)		17:54	37 17:25 (4)	18:47		20:44	23 20:15 (2)	21:36		22:01						
26	08:23	16:05 (5)		07:23	16:49 (4)	06:16		06:03		19:51 (2)	05:09	04:56						
	16:54	16 16:21 (5)		17:56	36 17:25 (4)	18:49		20:46	26 20:17 (2)	21:37		22:01						
27	08:22	16:05 (5)		07:21	16:49 (4)	06:13		06:01		19:51 (2)	05:08	04:56						
	16:56	18 16:23 (5)		17:58	36 17:25 (4)	18:51		20:48	28 20:19 (2)	21:39		22:01						
28	08:20	16:06 (5)		07:18	16:49 (4)	06:11		05:58		19:51 (2)	05:07	04:57						
	16:58	20 16:26 (5)		18:00	35 17:24 (4)	18:53		20:50	30 20:21 (2)	21:40		22:01						
29	08:18	16:06 (5)				07:08		05:56		19:50 (2)	05:06	04:57						
	17:00	22 16:28 (5)				19:54		20:52	32 20:22 (2)	21:41		22:01						
30	08:17	16:06 (5)				07:06		05:54		19:50 (2)	05:05	04:58						
	17:02	22 16:28 (5)				19:56		20:53	32 20:22 (2)	21:43		22:00						
31	08:15	16:07 (5)				07:04				05:04								
	17:04	21 16:28 (5)				19:58				21:44								
Potential sun hours	250			273		367		420		494		510						
Total, worst case	166			460		374		253		276								
Sun reduction	0.24			0.23		0.27		0.35		0.38								
Oper. time red.	1.00			1.00		1.00		1.00		1.00								
Wind dir. red.	0.66			0.67		0.67		0.65		0.65								
Total reduction	0.16			0.16		0.18		0.23		0.25								
Total, real	27			72		68		58		68								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: NE - H369

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September		October		November		December
1	04:59 22:00	05:39 21:25	20:11 (2) 9 20:20 (2)	06:33 20:18	07:26 19:05	18:22 (3) 14 18:36 (3)	07:24 16:54		08:19 16:10
2	04:59 22:00	05:40 21:23	20:08 (2) 15 20:23 (2)	06:35 20:16	07:28 19:02	18:22 (3) 11 18:33 (3)	07:26 16:52		08:21 16:09
3	05:00 21:59	05:42 21:21	20:06 (2) 18 20:24 (2)	06:36 20:13	07:30 19:00	18:23 (3) 8 18:31 (3)	07:28 16:50		08:22 16:08
4	05:01 21:59	05:44 21:19	20:05 (2) 21 20:26 (2)	06:38 20:11	07:31 18:57	18:23 (3) 6 18:29 (3)	07:30 16:48		08:24 16:08
5	05:02 21:58	05:45 21:17	20:03 (2) 23 20:26 (2)	06:40 20:09	07:33 18:55	17:41 (4) 5 18:26 (3)	07:32 16:46	15:48 (5) 1 15:49 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	20:02 (2) 25 20:27 (2)	06:42 20:06	07:35 18:52	17:35 (4) 15 17:50 (4)	07:34 16:44	15:43 (5) 10 15:53 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	20:02 (2) 26 20:28 (2)	06:43 20:04	07:37 18:50	17:31 (4) 20 17:51 (4)	07:36 16:43	15:41 (5) 14 15:55 (5)	08:28 16:06
8	05:05 21:56	05:50 21:12	20:00 (2) 28 20:28 (2)	06:45 20:01	07:39 18:48	17:29 (4) 24 17:53 (4)	07:38 16:41	15:40 (5) 16 15:56 (5)	08:29 16:06
9	05:06 21:55	05:52 21:10	20:00 (2) 29 20:29 (2)	06:47 19:59	07:41 18:45	17:27 (4) 27 17:54 (4)	07:40 16:39	15:39 (5) 18 15:57 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	19:59 (2) 30 20:29 (2)	06:49 19:56	07:42 18:43	17:25 (4) 30 17:55 (4)	07:42 16:37	15:39 (5) 20 15:59 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	19:59 (2) 30 20:29 (2)	06:50 19:54	07:44 18:40	17:24 (4) 32 17:56 (4)	07:44 16:35	15:38 (5) 21 15:59 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	19:59 (2) 31 20:30 (2)	06:52 19:51	07:46 18:38	17:23 (4) 34 17:57 (4)	07:45 16:34	15:38 (5) 22 16:00 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01	19:58 (2) 31 20:29 (2)	06:54 19:49	07:48 18:36	17:22 (4) 35 17:57 (4)	07:47 16:32	15:38 (5) 21 15:59 (5)	08:35 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 31 20:29 (2)	06:56 19:47	07:50 18:33	17:22 (4) 35 17:57 (4)	07:49 16:31	15:38 (5) 20 15:58 (5)	08:36 16:04
15	05:13 21:50	06:03 20:57	19:58 (2) 30 20:28 (2)	06:58 19:44	07:52 18:31	17:21 (4) 37 17:58 (4)	07:51 16:29	15:38 (5) 18 15:56 (5)	08:37 16:05
16	05:14 21:49	06:04 20:55	19:58 (2) 27 20:25 (2)	06:59 19:42	07:54 18:29	17:21 (4) 37 17:58 (4)	07:53 16:27	15:38 (5) 16 15:54 (5)	08:38 16:05
17	05:16 21:47	06:06 20:53	19:58 (2) 25 20:23 (2)	07:01 19:39	07:55 18:26	17:20 (4) 37 17:57 (4)	07:55 16:26	15:39 (5) 13 15:52 (5)	08:38 16:05
18	05:17 21:46	06:08 20:51	19:59 (2) 23 20:22 (2)	07:03 19:37	07:57 18:24	17:20 (4) 35 17:55 (4)	07:57 16:24	15:39 (5) 12 15:51 (5)	08:39 16:05
19	05:18 21:45	06:10 20:48	19:58 (2) 21 20:19 (2)	07:05 19:34	07:59 18:22	17:20 (4) 32 17:52 (4)	07:59 16:23	15:40 (5) 9 15:49 (5)	08:40 16:05
20	05:20 21:44	06:12 20:46	19:59 (2) 18 20:17 (2)	07:06 19:32	08:01 18:20	17:20 (4) 30 17:50 (4)	08:00 16:22	15:41 (5) 6 15:47 (5)	08:41 16:06
21	05:21 21:42	06:13 20:44	20:00 (2) 15 20:15 (2)	07:08 19:29	08:03 18:17	17:20 (4) 28 17:48 (4)	08:02 16:20	15:41 (5) 5 15:46 (5)	08:41 16:06
22	05:23 21:41	06:15 20:42	20:00 (2) 12 20:12 (2)	07:10 19:27	08:05 18:15	17:21 (4) 24 17:45 (4)	08:04 16:19	15:42 (5) 2 15:44 (5)	08:42 16:06
23	05:24 21:39	06:17 20:39	20:02 (2) 8 20:10 (2)	07:12 19:24	08:07 18:40 (3)	17:21 (4) 22 17:43 (4)	08:06 16:18		08:42 16:07
24	05:26 21:38	06:19 20:37	20:04 (2) 5 20:09 (2)	07:13 19:22	08:09 18:43 (3)	17:22 (4) 19 17:41 (4)	08:08 16:17		08:43 16:08
25	05:27 21:36	06:20 20:35		07:15 19:19	07:11 18:27 (3)	16:23 (4) 15 16:38 (4)	08:09 16:16		08:43 16:08
26	05:29 21:35	06:22 20:32		07:17 19:17	07:13 18:26 (3)	16:24 (4) 12 16:36 (4)	08:11 16:14		08:43 16:09
27	05:30 21:33	06:24 20:30		07:19 19:14	07:15 18:25 (3)	16:25 (4) 9 16:34 (4)	08:13 16:13		08:44 16:10
28	05:32 21:32	06:26 20:28		07:21 19:12	07:16 18:24 (3)	16:27 (4) 4 16:31 (4)	08:14 16:12		08:44 16:11
29	05:34 21:30	06:27 20:25		07:22 19:09	07:18 18:23 (3)		08:16 16:12		08:44 16:11
30	05:35 21:28	06:29 20:23		07:24 19:07	07:20 18:22 (3)		08:18 16:11		08:44 16:12
31	05:37 21:26	06:31 20:21			07:22 16:58				08:44 16:13
Potential sun hours	512	460		382		328		259	233
Total, worst case		531		131		637		244	
Sun reduction		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00	
Wind dir. red.		0.65		0.67		0.67		0.66	
Total reduction		0.22		0.22		0.20		0.18	
Total, real		117		28		125		43	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NF - H370

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NG - H371

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NH - H372

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NI - H373

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NJ - SAINT PATRICK'S NATIONAL SCHOOL

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: NK - H374

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

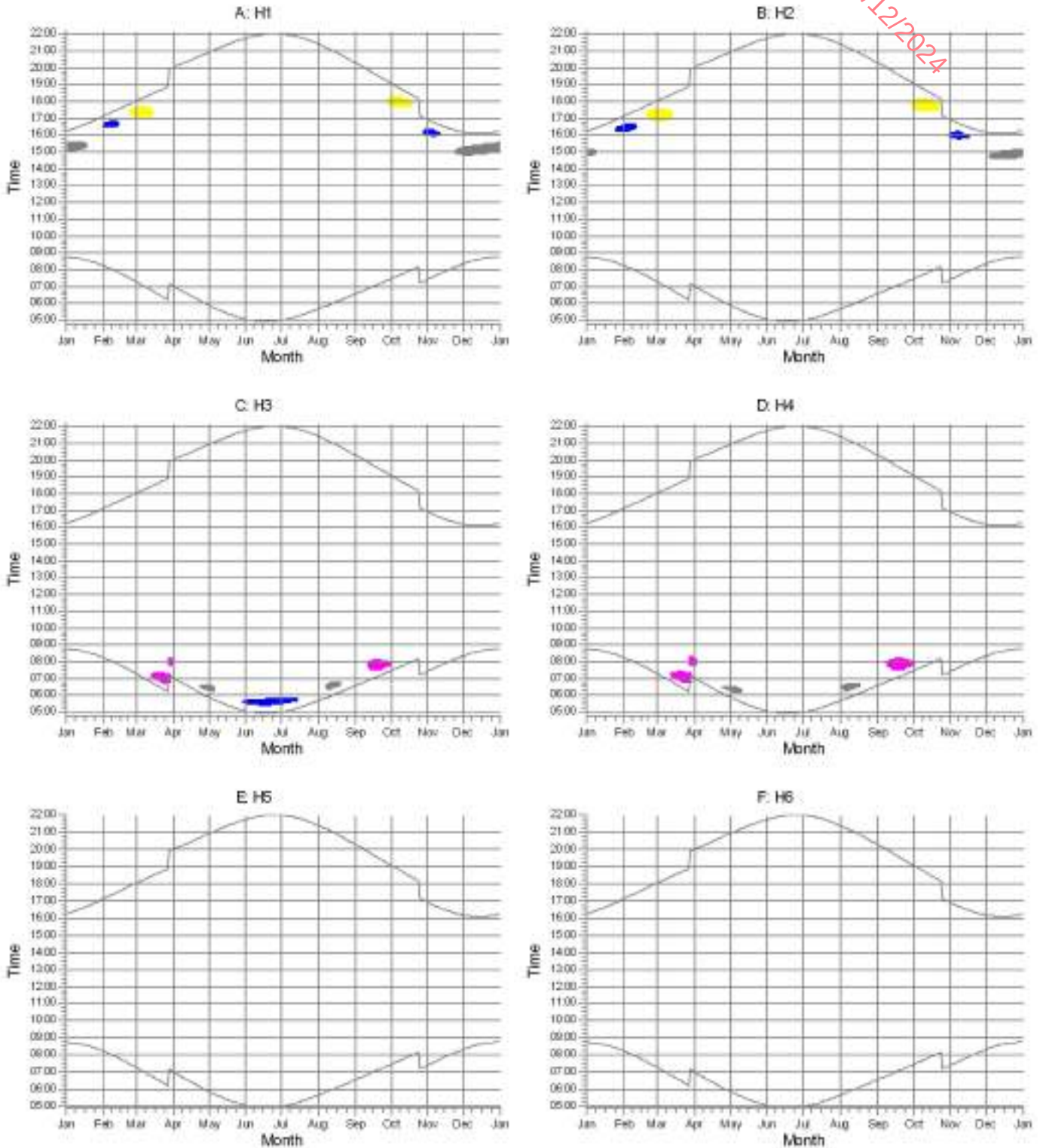
	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	20:03 (5) 21:03 (5)	04:59 22:00	20:08 (5) 21:12 (5)	05:39 21:25	13 20:36 (5) 20:49 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	20:04 (5) 21:04 (5)	05:00 22:00	20:08 (5) 21:12 (5)	05:40 21:23		06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	20:04 (5) 21:04 (5)	05:00 21:59	20:08 (5) 21:11 (5)	05:42 21:21		06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	20:03 (5) 21:04 (5)	05:01 21:59	20:09 (5) 21:12 (5)	05:44 21:19		06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	20:04 (5) 21:06 (5)	05:02 21:58	20:09 (5) 21:12 (5)	05:45 21:17		06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	20:03 (5) 21:05 (5)	05:03 21:58	20:10 (5) 21:12 (5)	05:47 21:15		06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	20:03 (5) 21:05 (5)	05:04 21:57	20:10 (5) 21:12 (5)	05:49 21:13		06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	20:03 (5) 21:06 (5)	05:05 21:56	20:10 (5) 21:12 (5)	05:51 21:12		06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:09
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	20:04 (5) 21:07 (5)	05:06 21:55	20:11 (5) 21:12 (5)	05:52 21:10		06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	20:03 (5) 21:07 (5)	05:07 21:55	20:11 (5) 21:12 (5)	05:54 21:07		06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	20:31 (5) 20:33 (5)	20:04 (5) 21:07 (5)	05:08 21:54	20:12 (5) 21:12 (5)	05:56 21:05		06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:24 (5) 20:40 (5)	20:04 (5) 21:08 (5)	05:09 21:53	20:12 (5) 21:11 (5)	05:58 21:03		06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:21 (5) 20:44 (5)	20:03 (5) 21:07 (5)	05:11 21:52	20:12 (5) 21:11 (5)	05:59 21:01		06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:18 (5) 20:46 (5)	20:04 (5) 21:08 (5)	05:12 21:51	20:13 (5) 21:11 (5)	06:01 20:59		06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:16 (5) 20:48 (5)	20:04 (5) 21:08 (5)	05:13 21:50	20:13 (5) 21:10 (5)	06:03 20:57		06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:14 (5) 20:50 (5)	20:04 (5) 21:09 (5)	05:14 21:49	20:14 (5) 21:11 (5)	06:05 20:55		06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:12 (5) 20:51 (5)	20:04 (5) 21:09 (5)	05:16 21:47	20:15 (5) 21:10 (5)	06:06 20:53		07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	20:12 (5) 20:52 (5)	20:05 (5) 21:09 (5)	05:17 21:46	20:15 (5) 21:09 (5)	06:08 20:51		07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:11 (5) 20:54 (5)	20:05 (5) 21:09 (5)	05:19 21:45	20:16 (5) 21:08 (5)	06:10 20:48		07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:09 (5) 20:55 (5)	20:05 (5) 21:09 (5)	05:20 21:44	20:17 (5) 21:08 (5)	06:12 20:46		07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:09 (5) 20:56 (5)	20:05 (5) 21:09 (5)	05:21 21:42	20:17 (5) 21:07 (5)	06:13 20:44		07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	20:08 (5) 20:57 (5)	20:06 (5) 21:10 (5)	05:23 21:41	20:18 (5) 21:06 (5)	06:15 20:42		07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:07 (5) 20:57 (5)	20:06 (5) 21:10 (5)	05:24 21:39	20:19 (5) 21:06 (5)	06:17 20:39		07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	20:06 (5) 20:58 (5)	20:06 (5) 21:10 (5)	05:26 21:38	20:20 (5) 21:05 (5)	06:19 20:37		07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:06 (5) 20:59 (5)	20:06 (5) 21:11 (5)	05:27 21:36	20:22 (5) 21:04 (5)	06:20 20:35		07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	20:06 (5) 21:00 (5)	20:06 (5) 21:11 (5)	05:29 21:35	20:22 (5) 21:02 (5)	06:22 20:32		07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:05 (5) 21:01 (5)	20:07 (5) 21:11 (5)	05:31 21:33	20:24 (5) 21:01 (5)	06:24 20:30		07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	20:05 (5) 21:01 (5)	20:07 (5) 21:11 (5)	05:32 21:32	20:25 (5) 20:59 (5)	06:26 20:28		07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	20:04 (5) 21:02 (5)	20:07 (5) 21:12 (5)	05:34 21:30	20:28 (5) 20:58 (5)	06:28 20:25		07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	20:04 (5) 21:02 (5)	20:07 (5) 21:11 (5)	05:35 21:28	20:29 (5) 20:56 (5)	06:29 20:23		07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44	20:04 (5) 21:03 (5)		05:37 21:26	20:32 (5) 20:54 (5)	06:31 20:21			07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460				382	328	259	233
Total, worst case					897	1901	1609	13							
Sun reduction					0.38	0.32	0.32	0.34							
Oper. time red.					1.00	1.00	1.00	1.00							
Wind dir. red.					0.63	0.63	0.63	0.63							
Total reduction					0.24	0.20	0.20	0.21							
Total, real					215	382	327	3							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

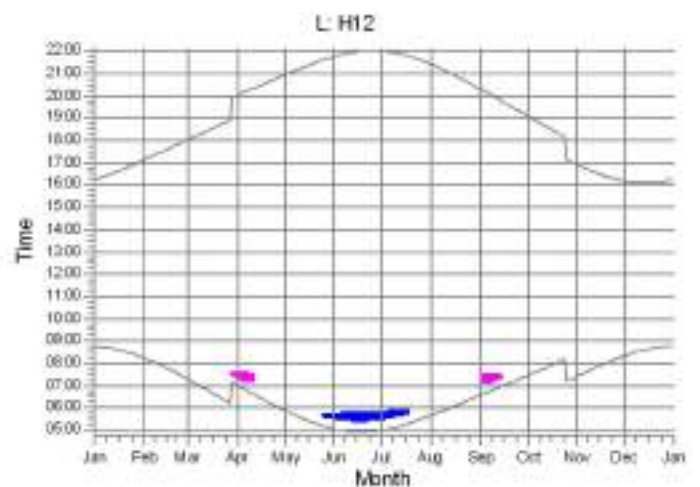
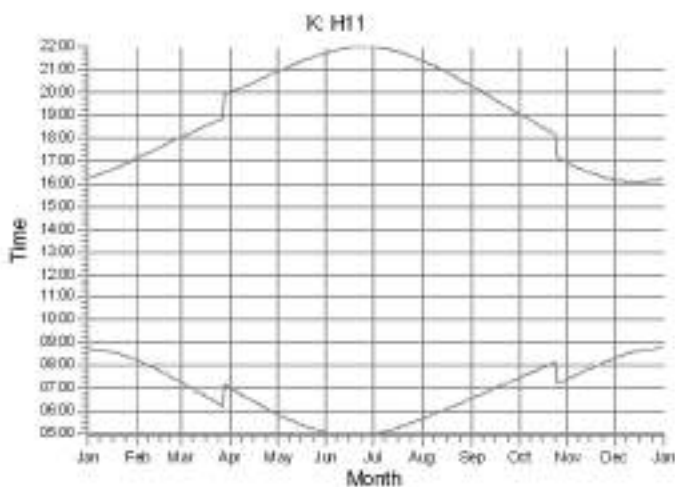
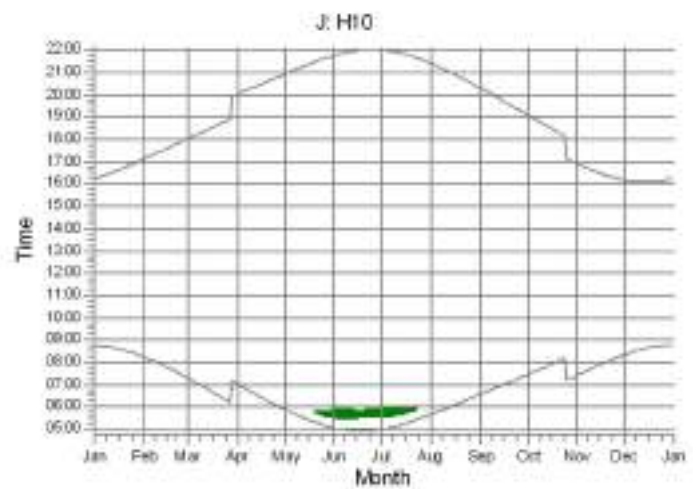
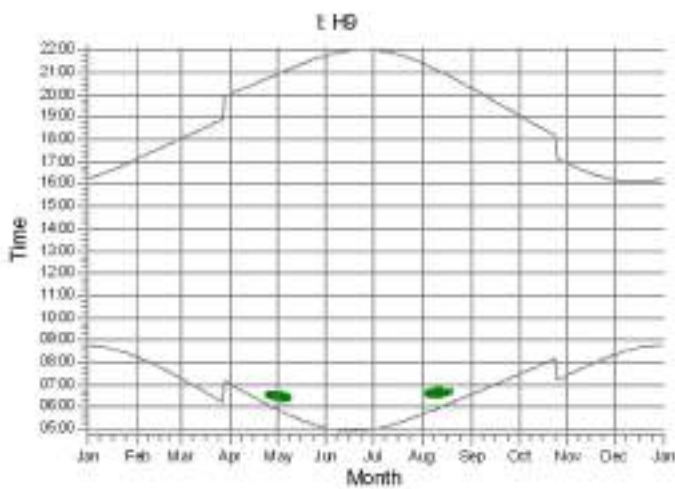
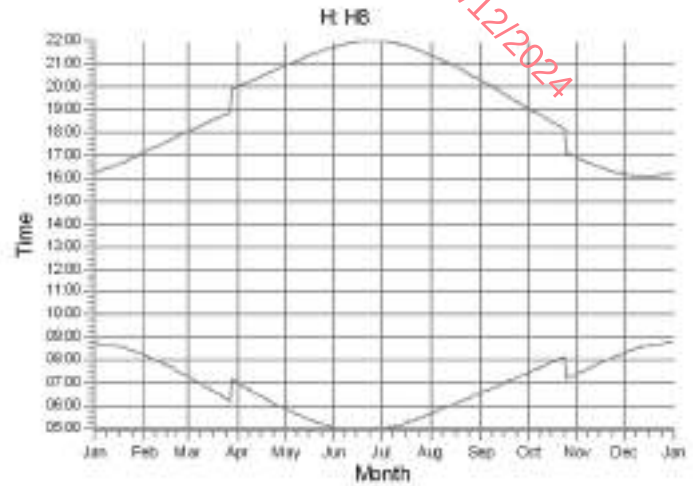
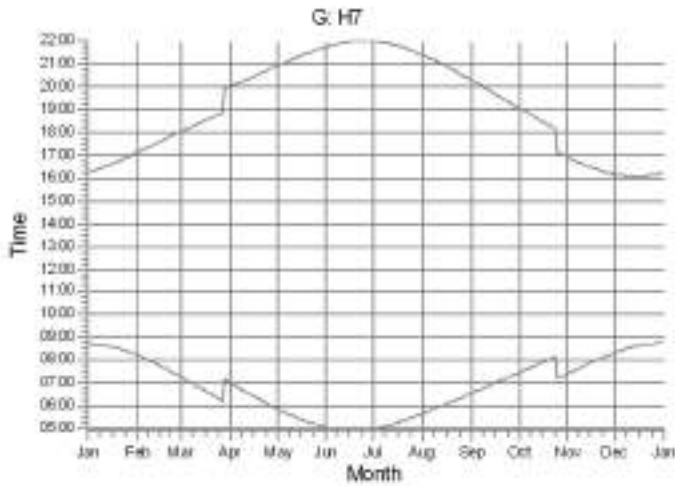


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

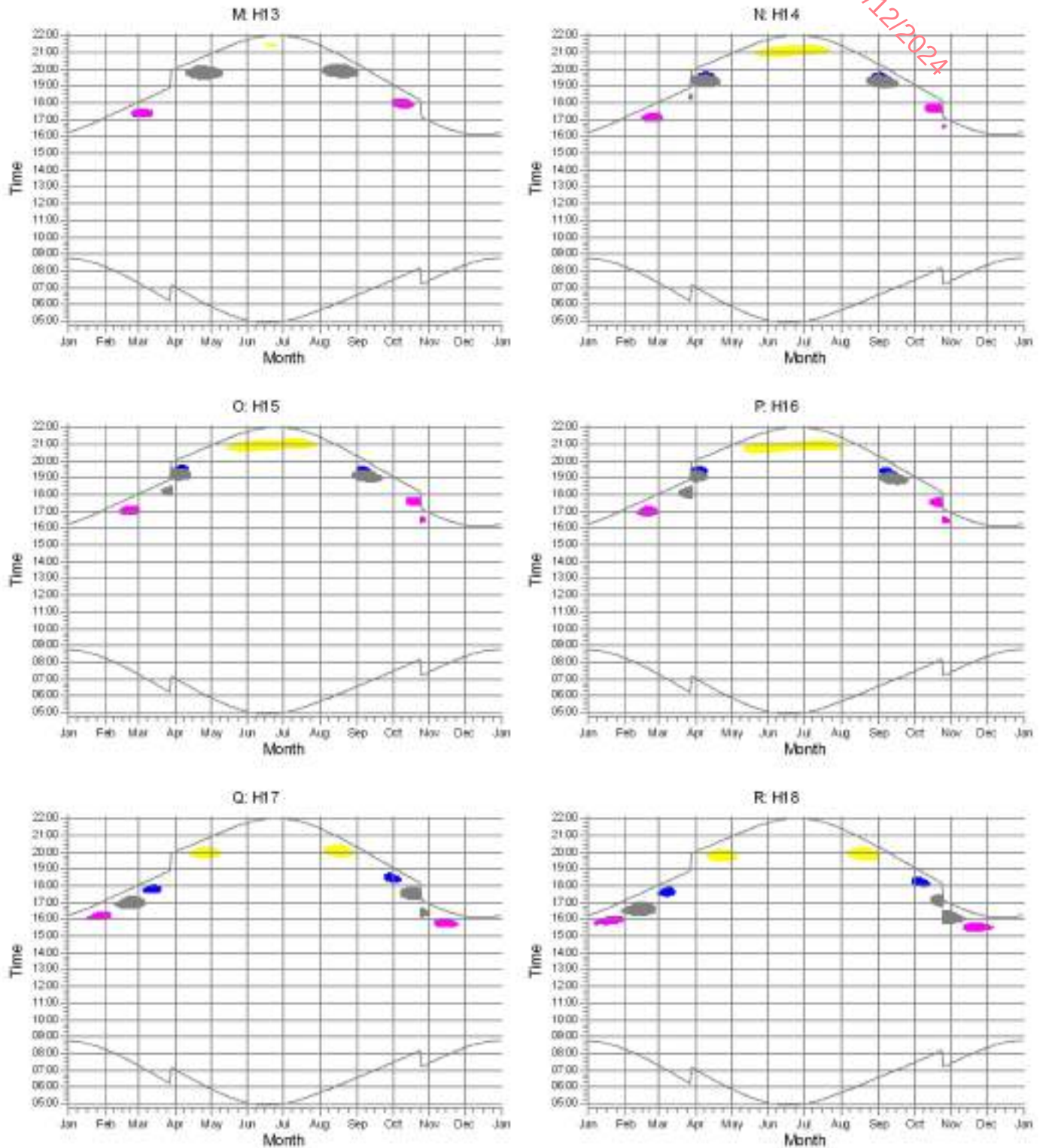


WTGs

1: T01 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

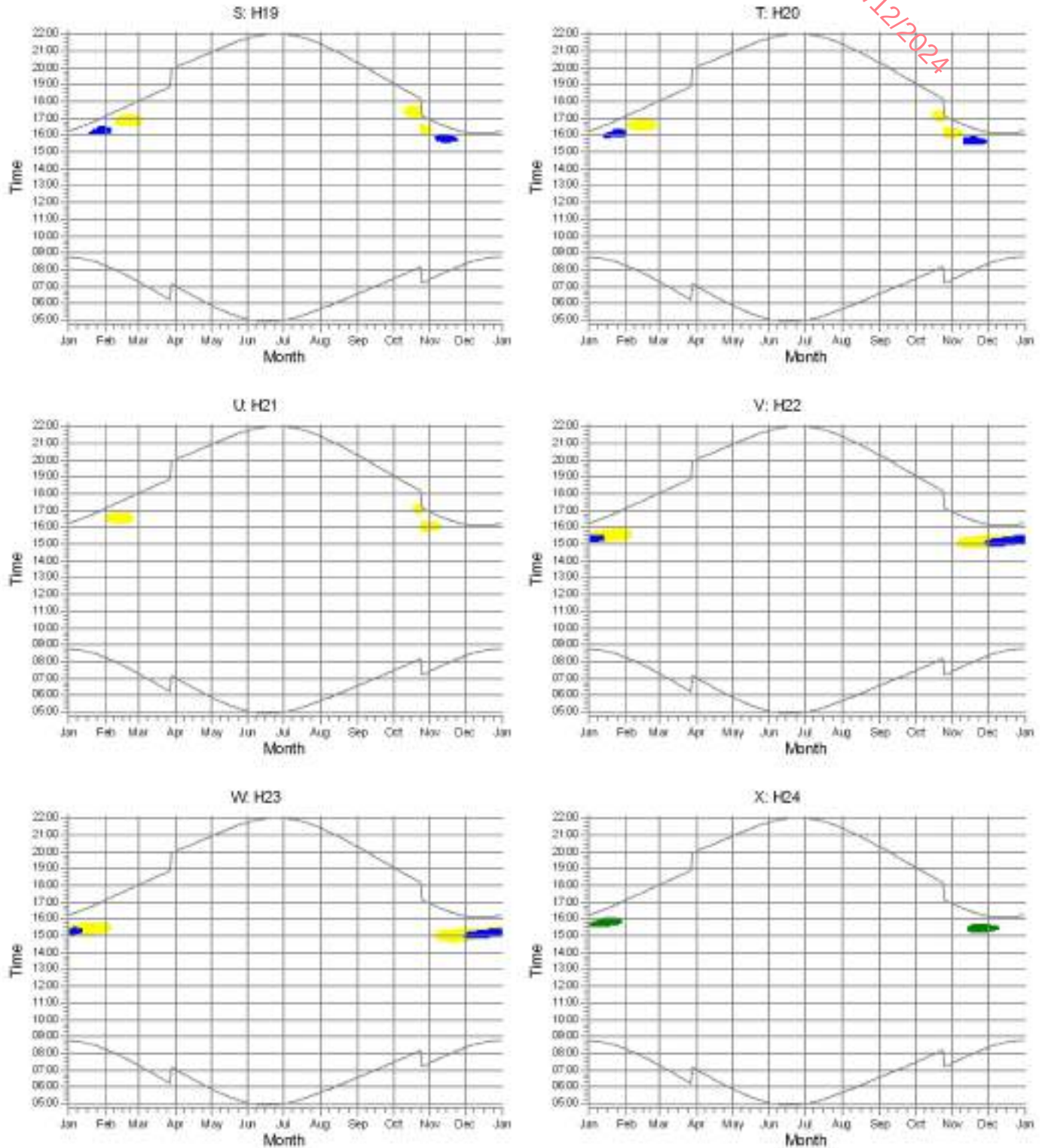


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

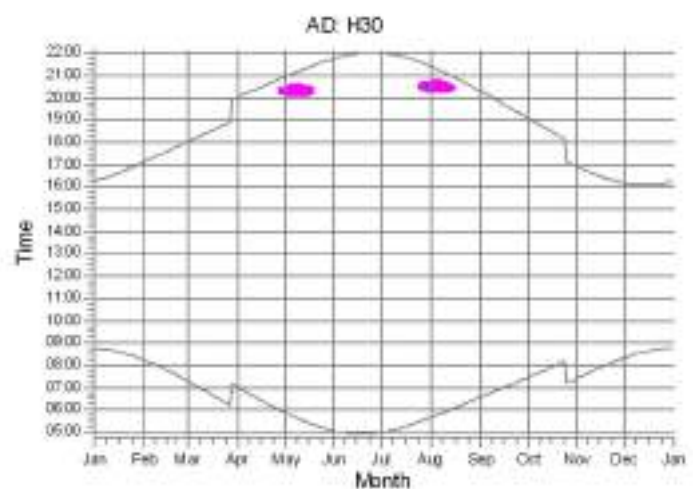
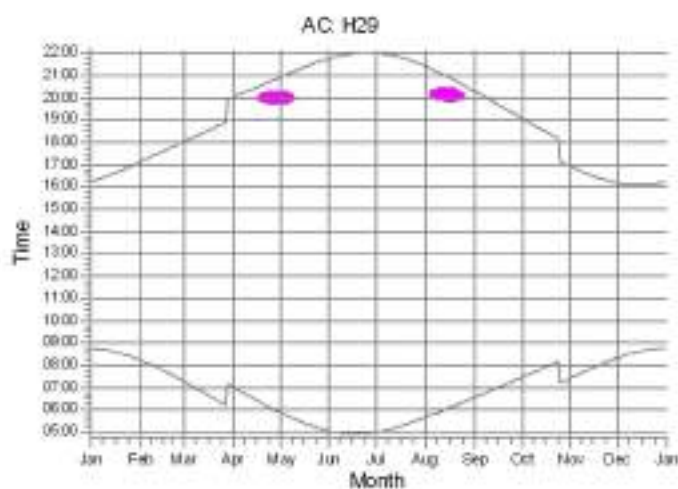
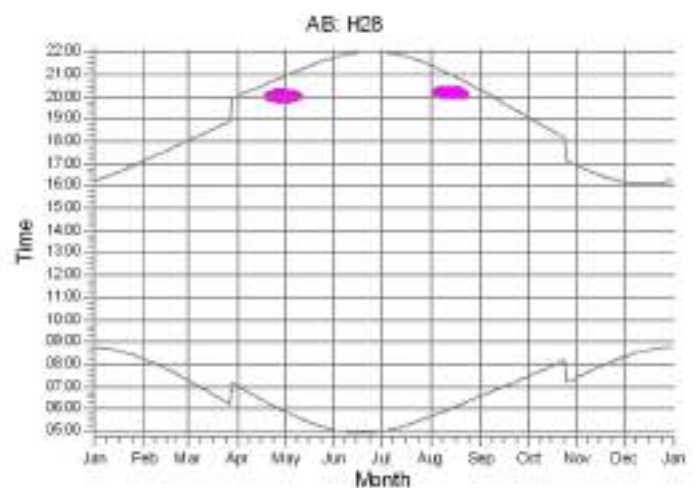
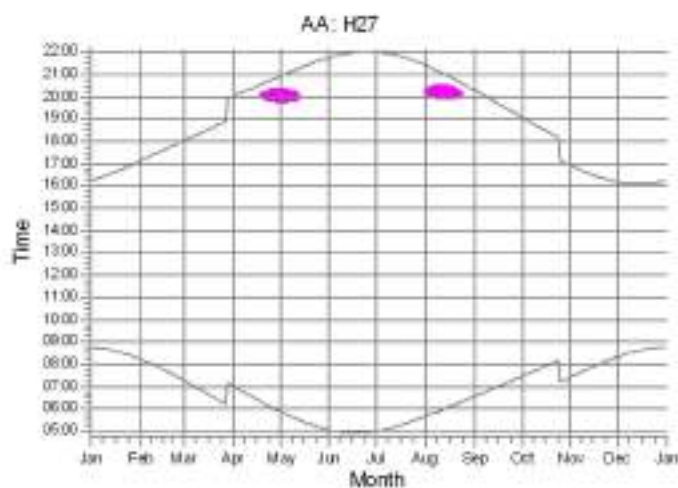
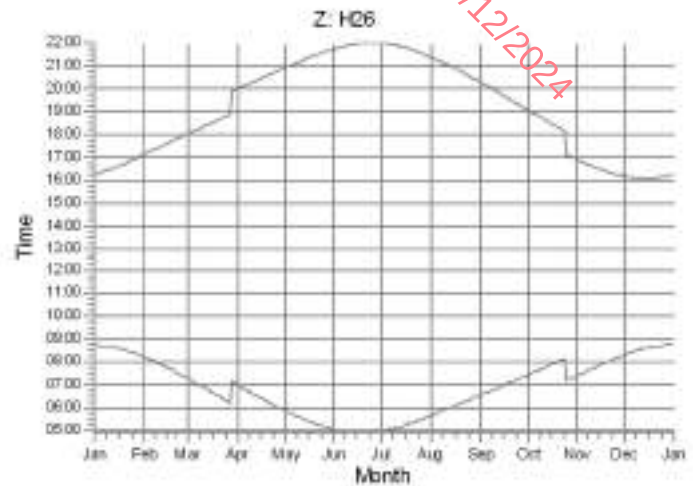
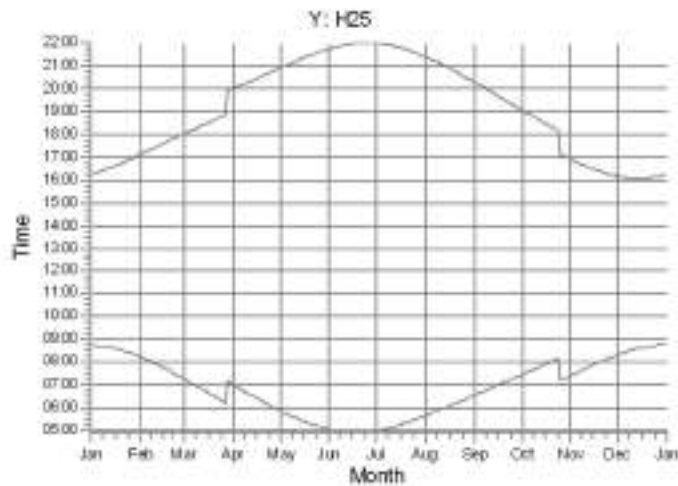


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

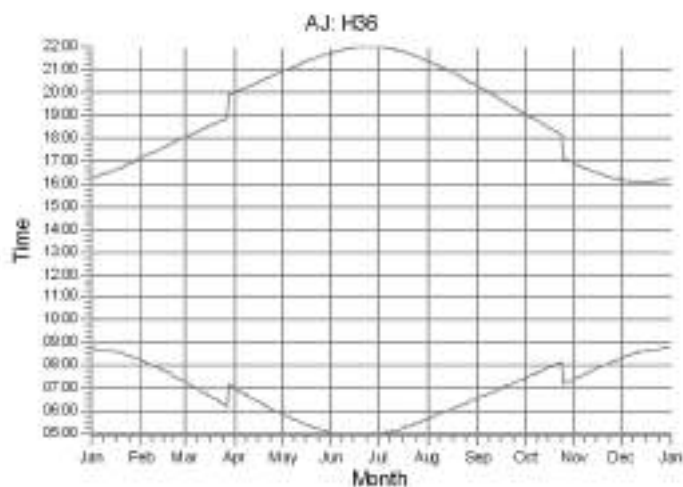
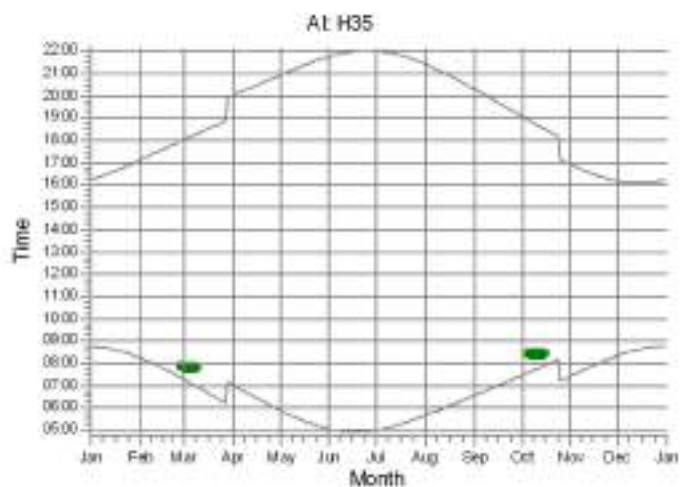
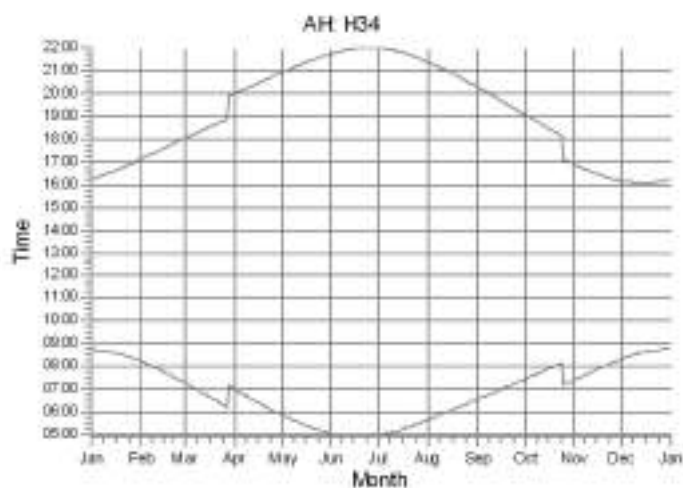
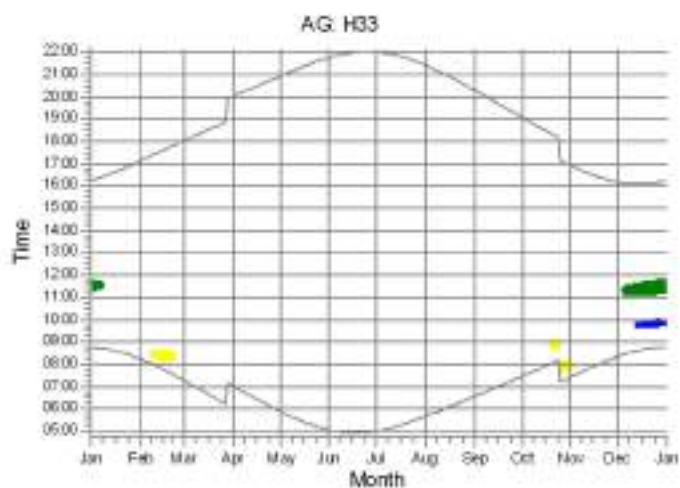
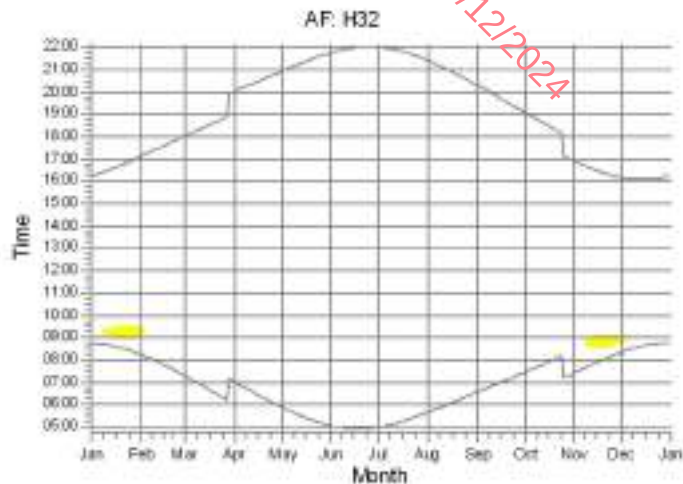
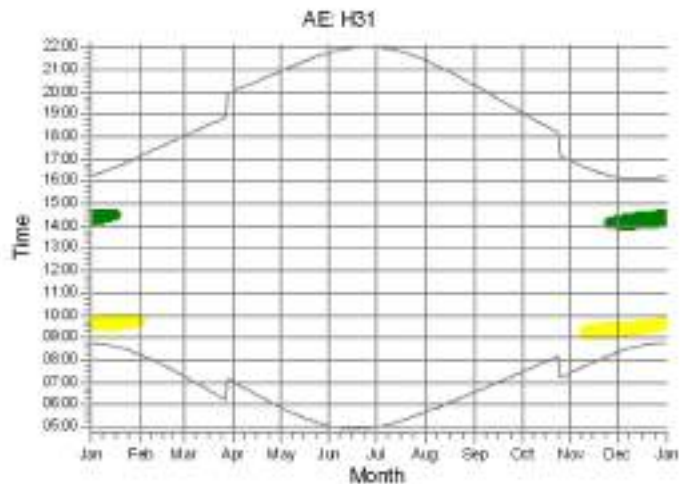


WTGs

5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



WTGs

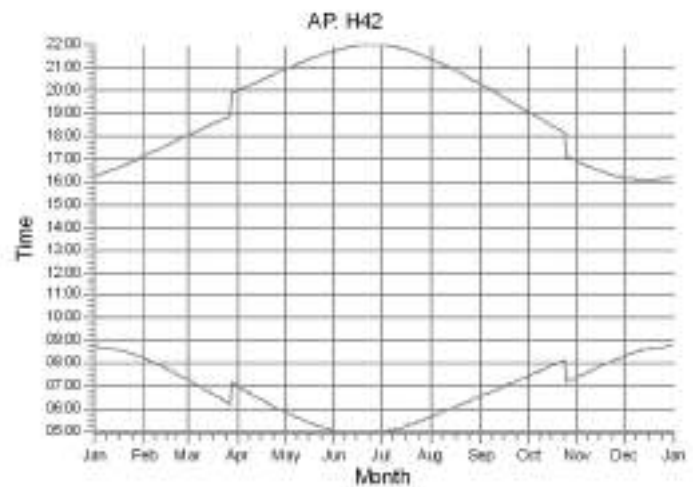
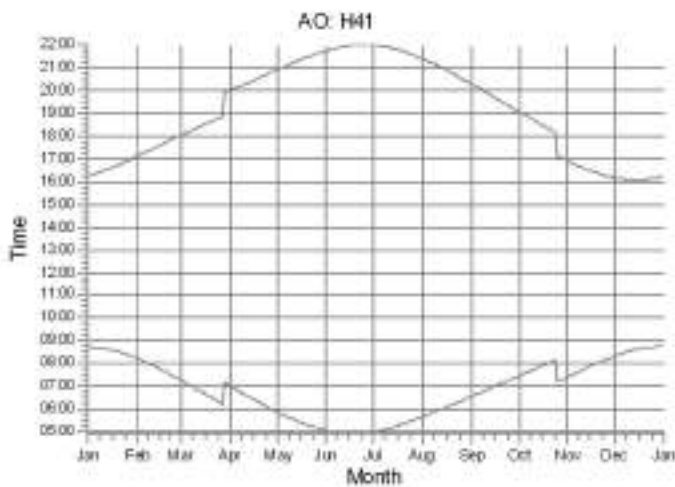
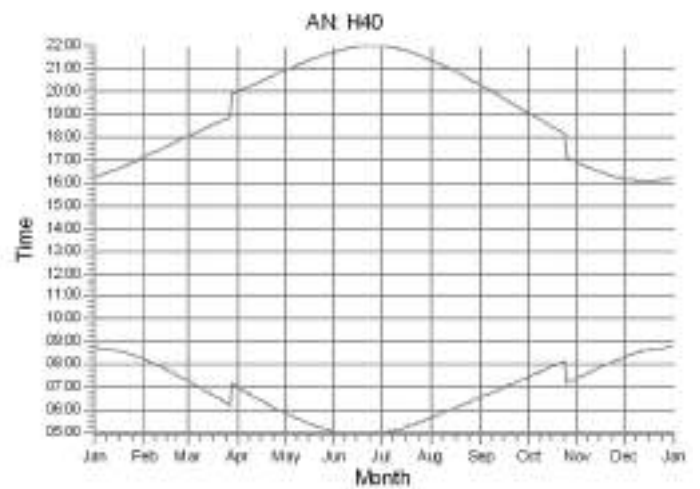
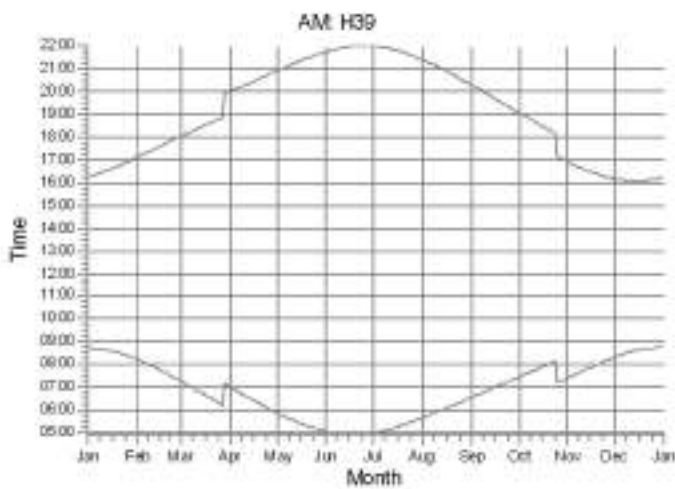
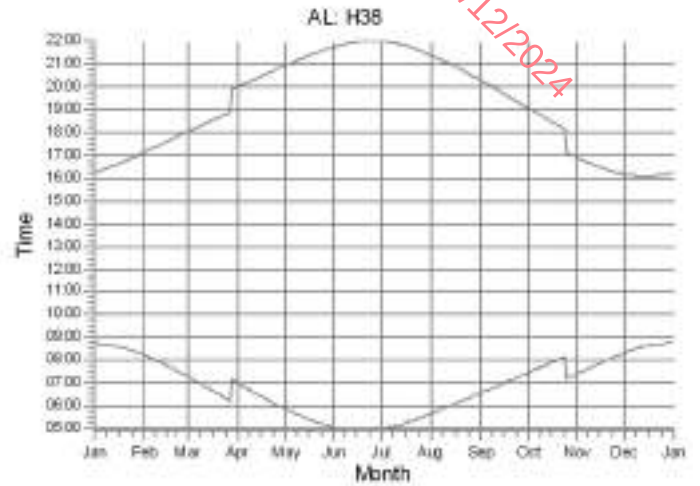
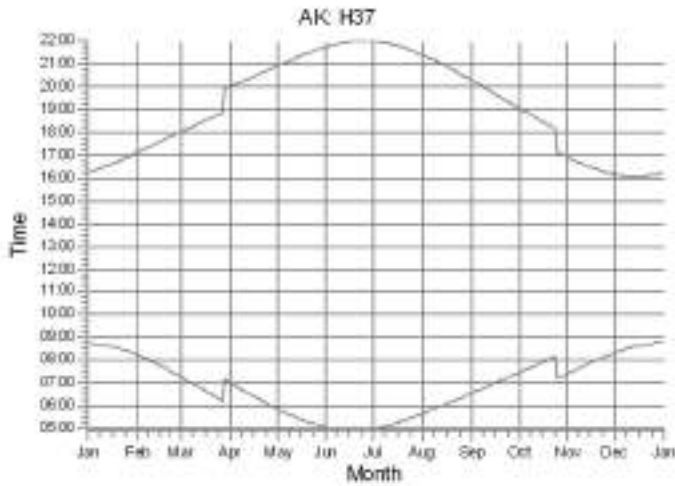
1: T01 2: T02 3: T03

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar, graphical

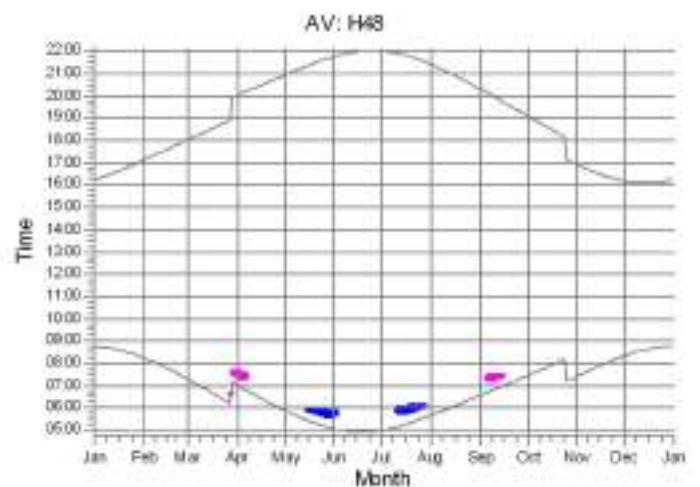
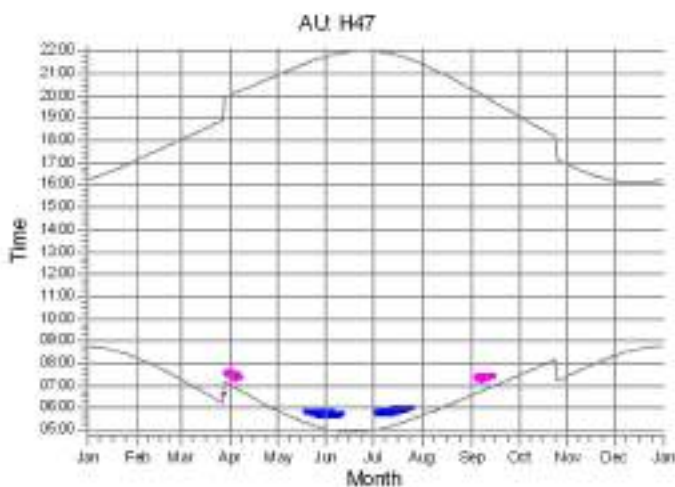
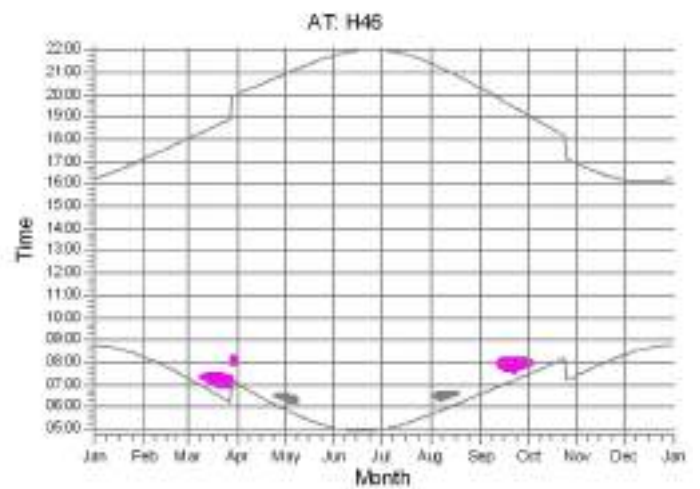
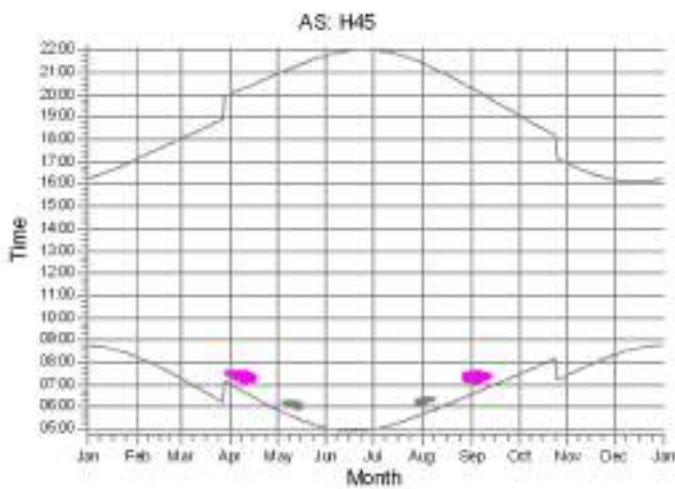
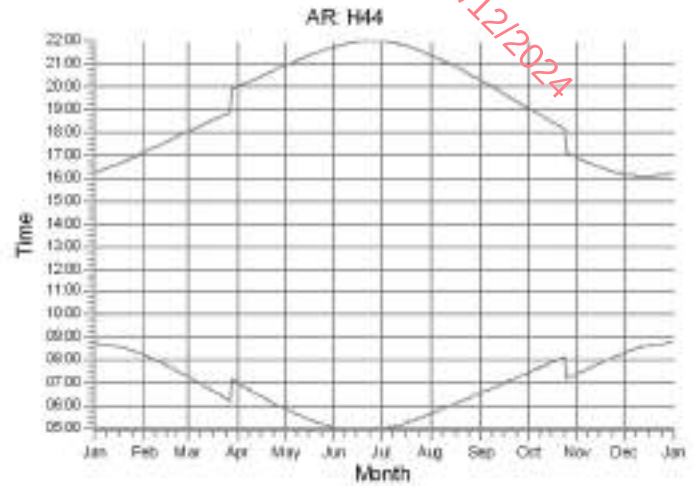
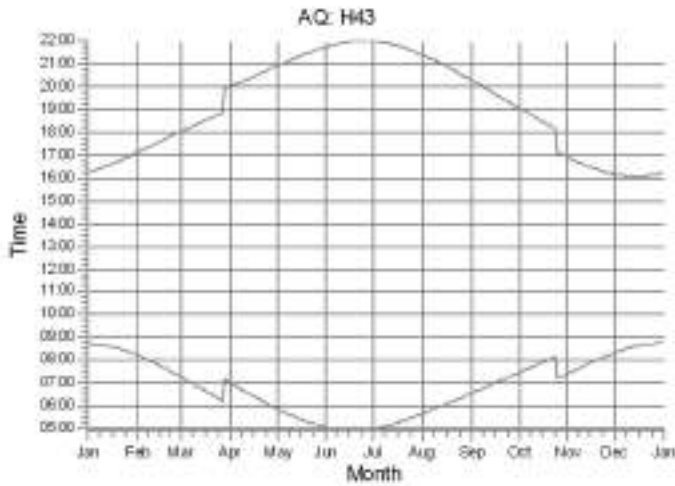
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

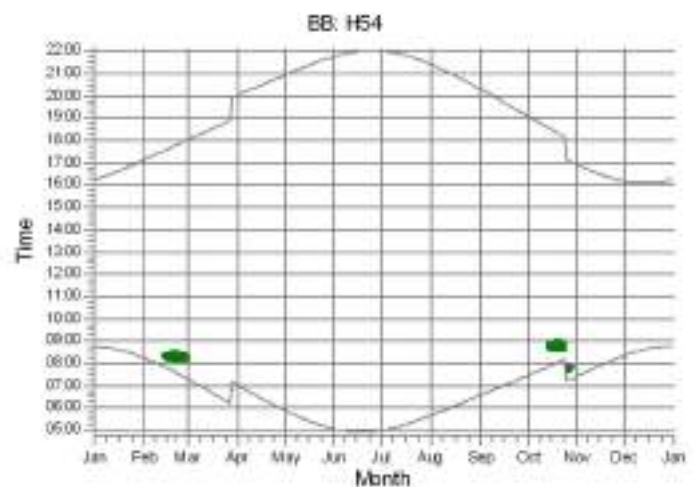
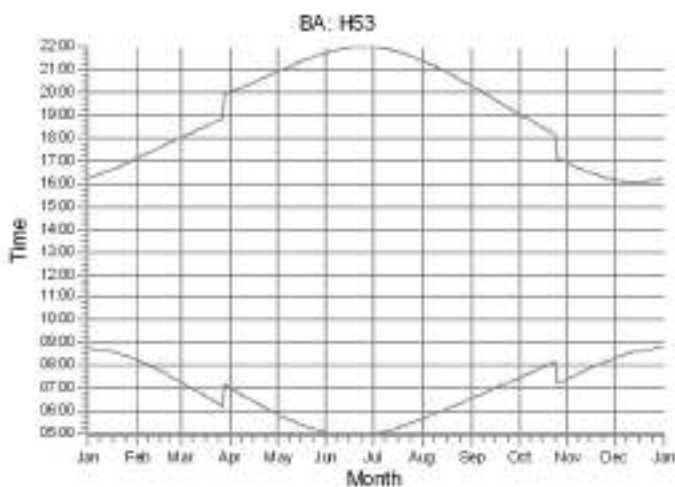
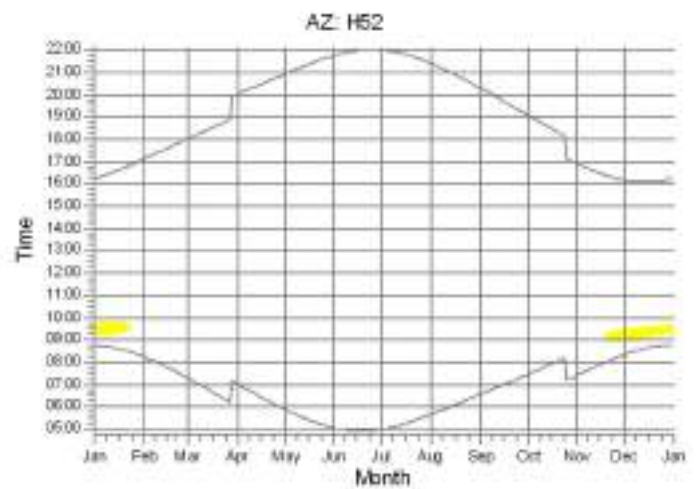
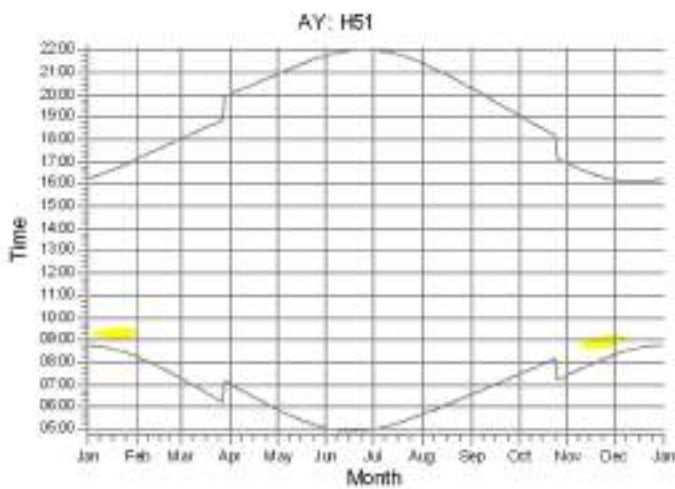
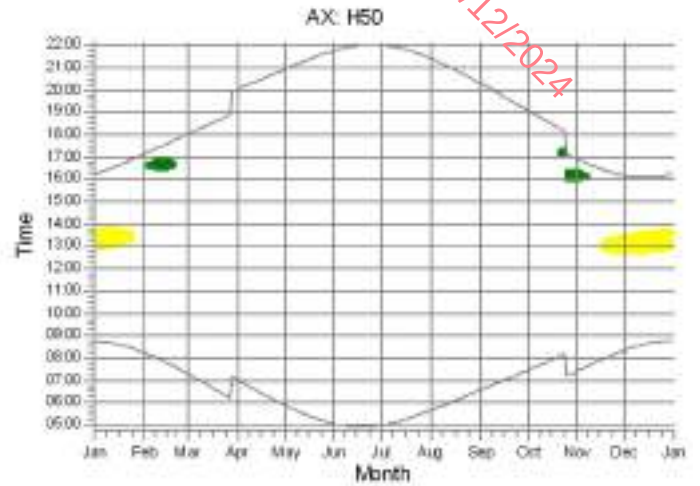
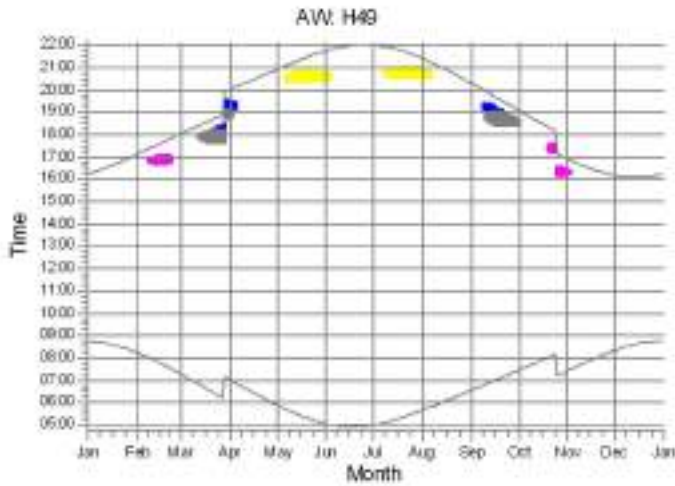


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

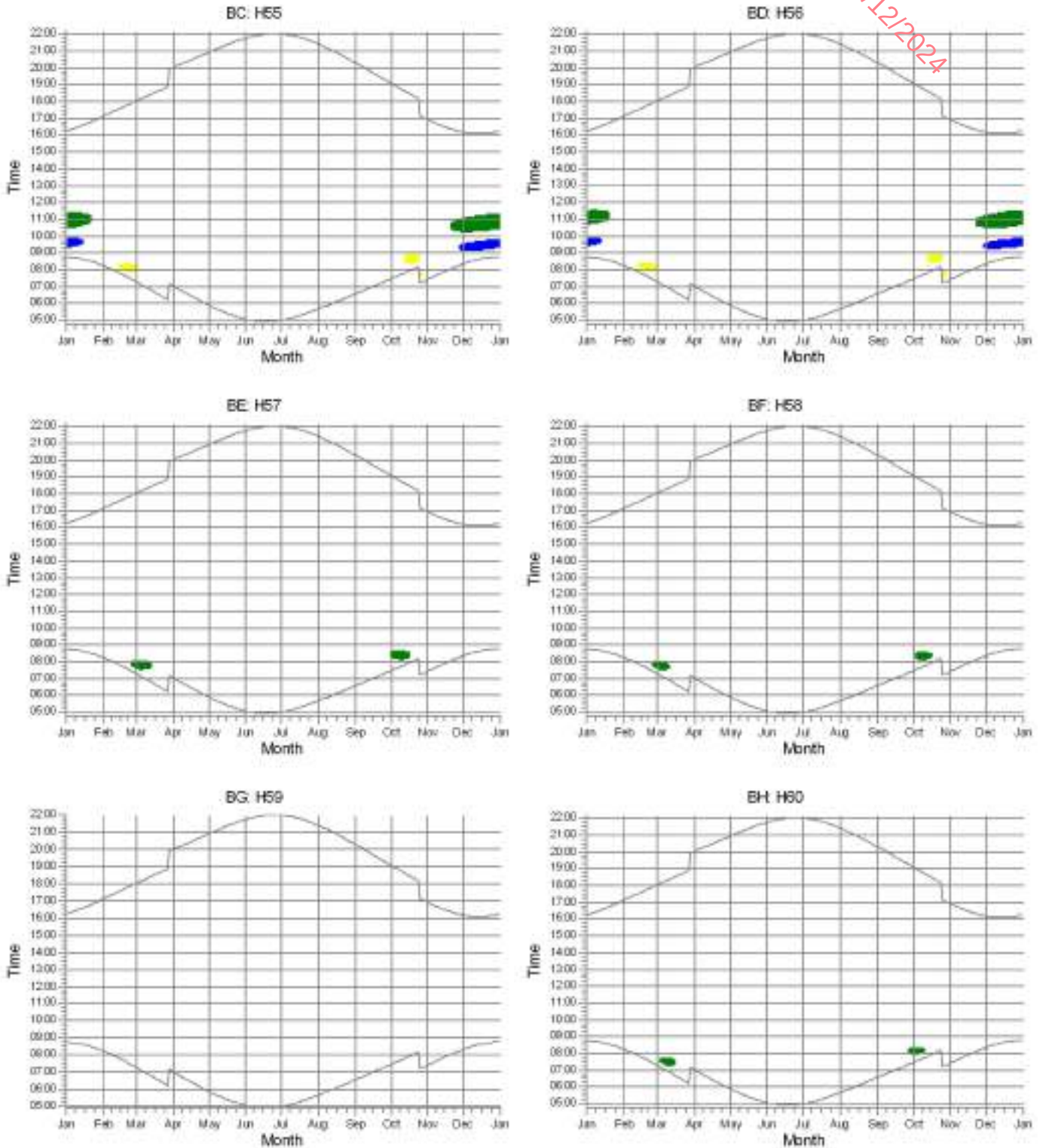


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

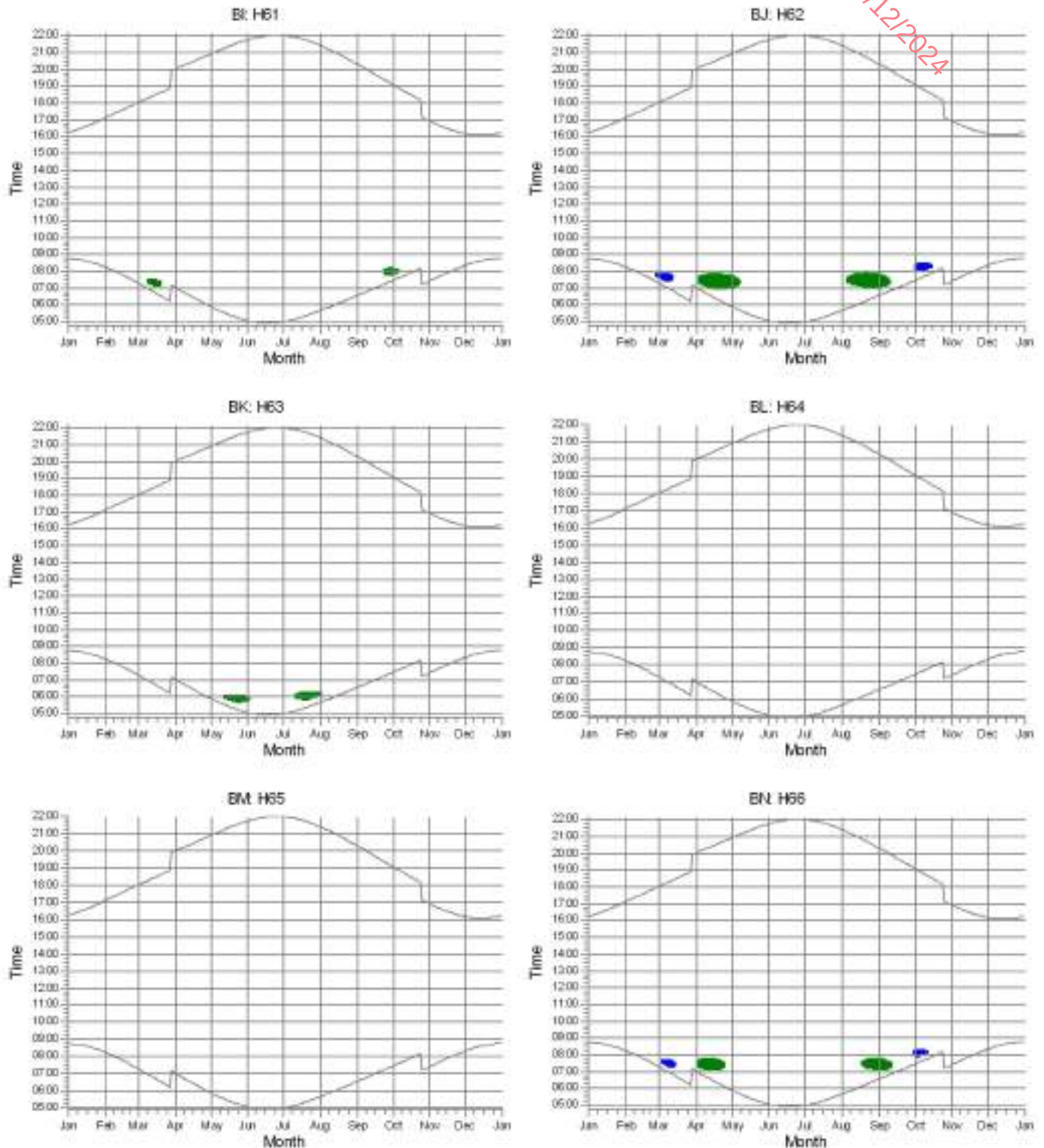


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

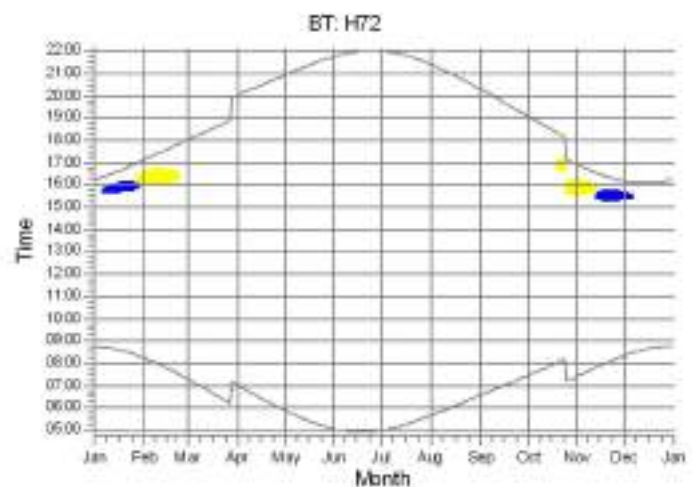
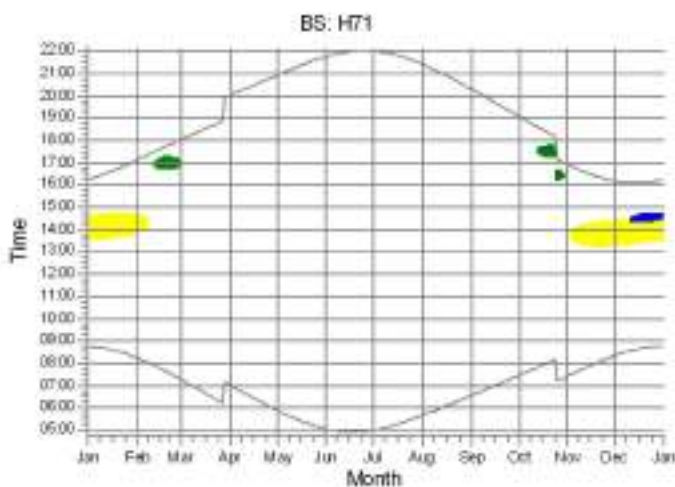
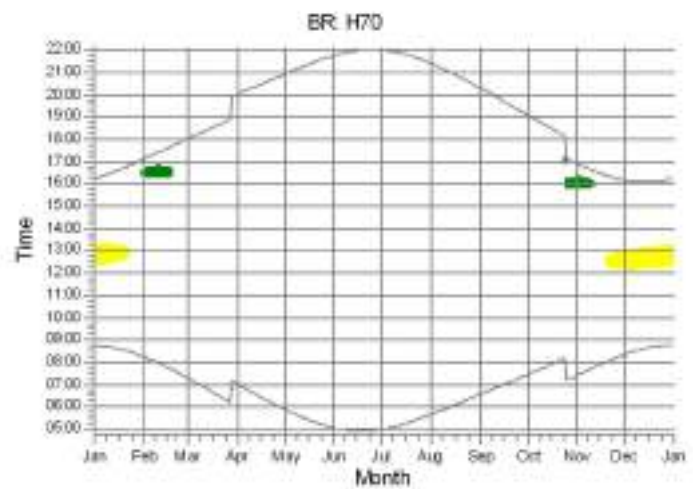
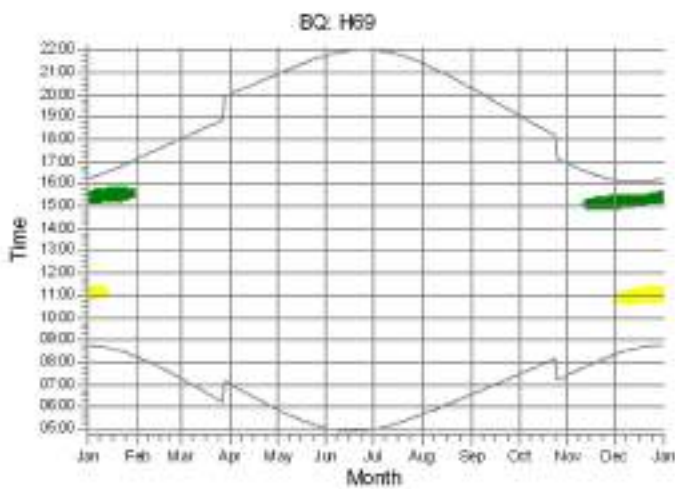
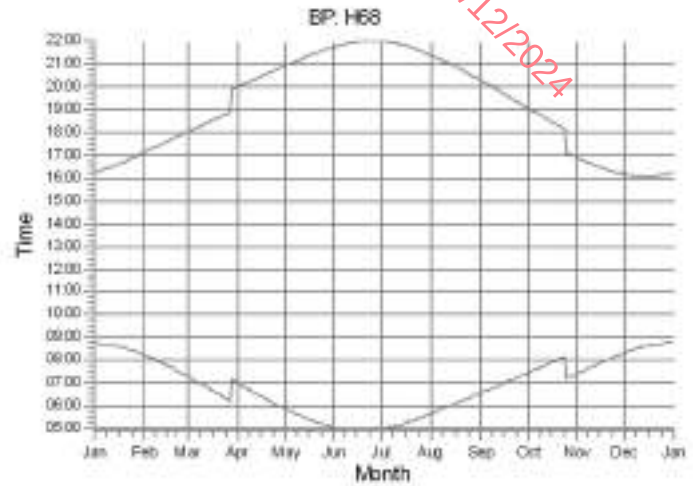
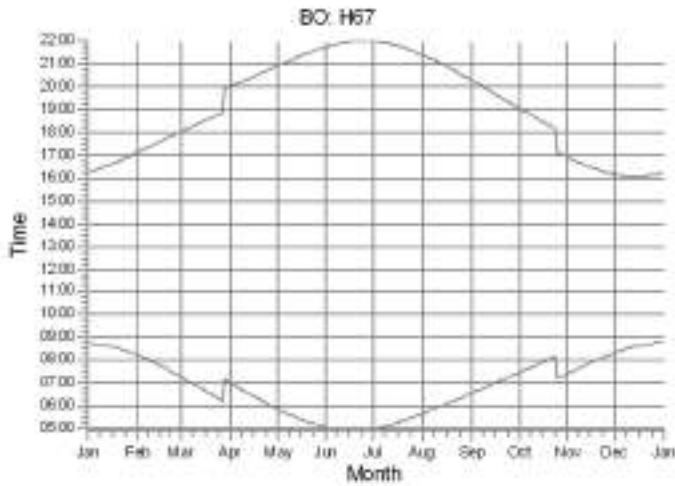


WTGs

1: T01 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

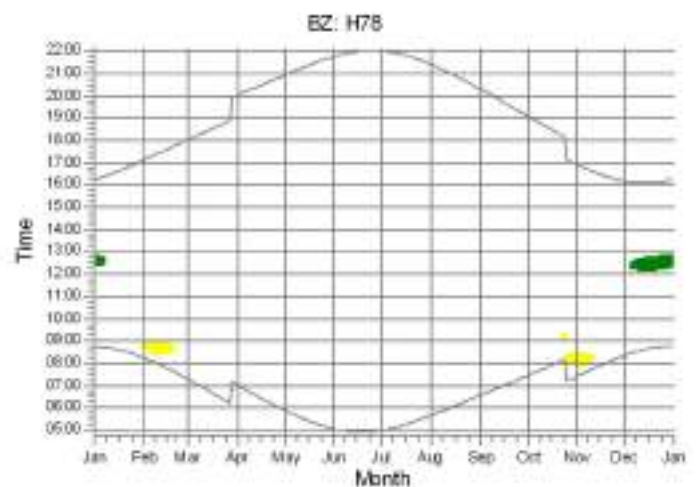
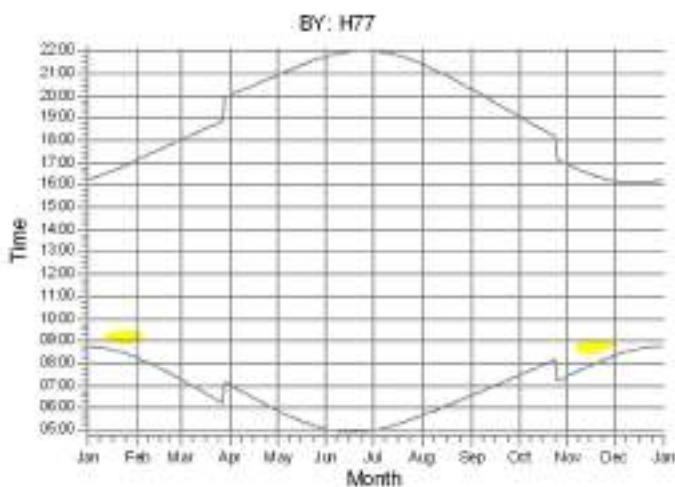
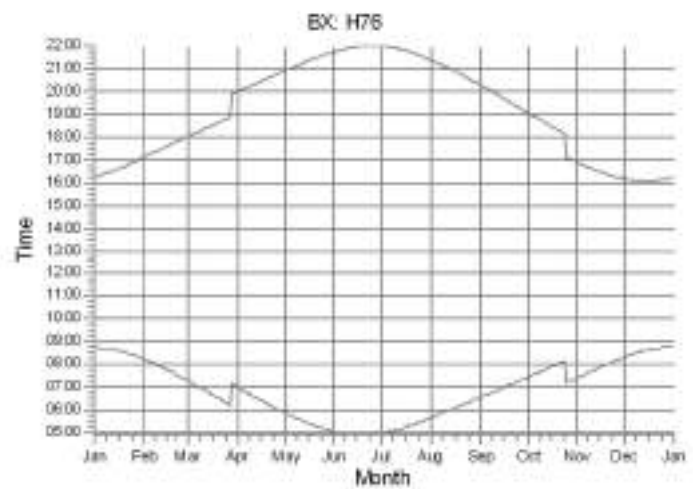
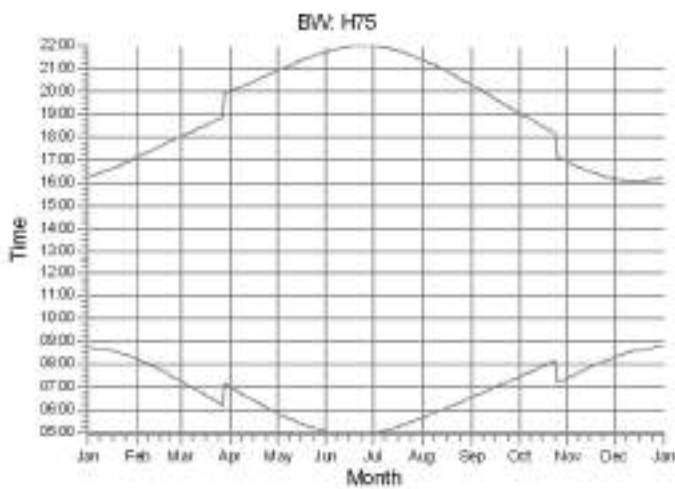
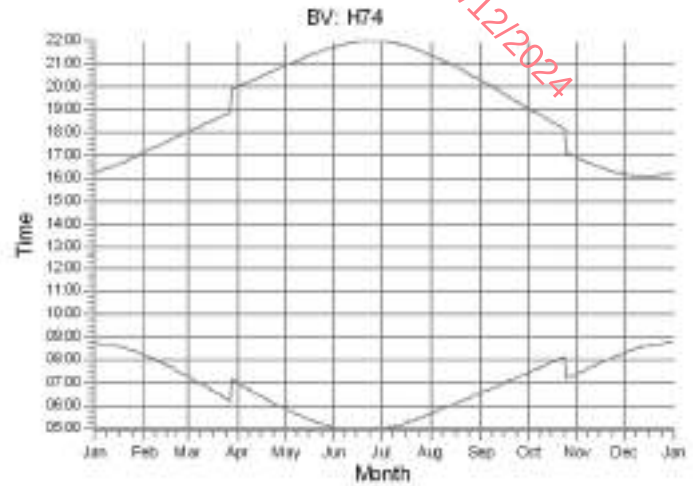
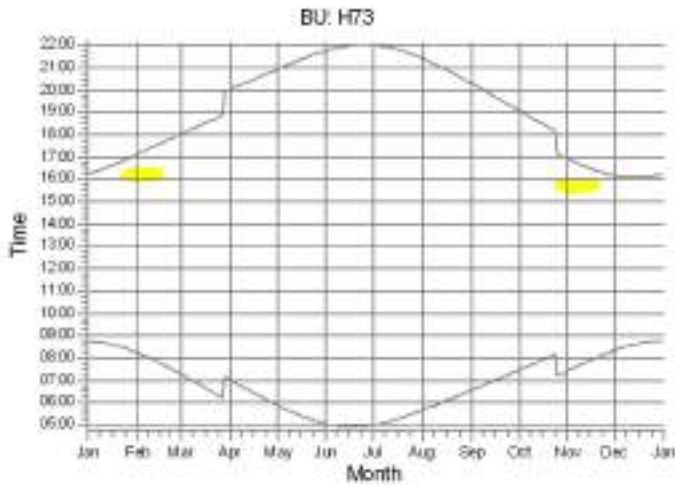


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

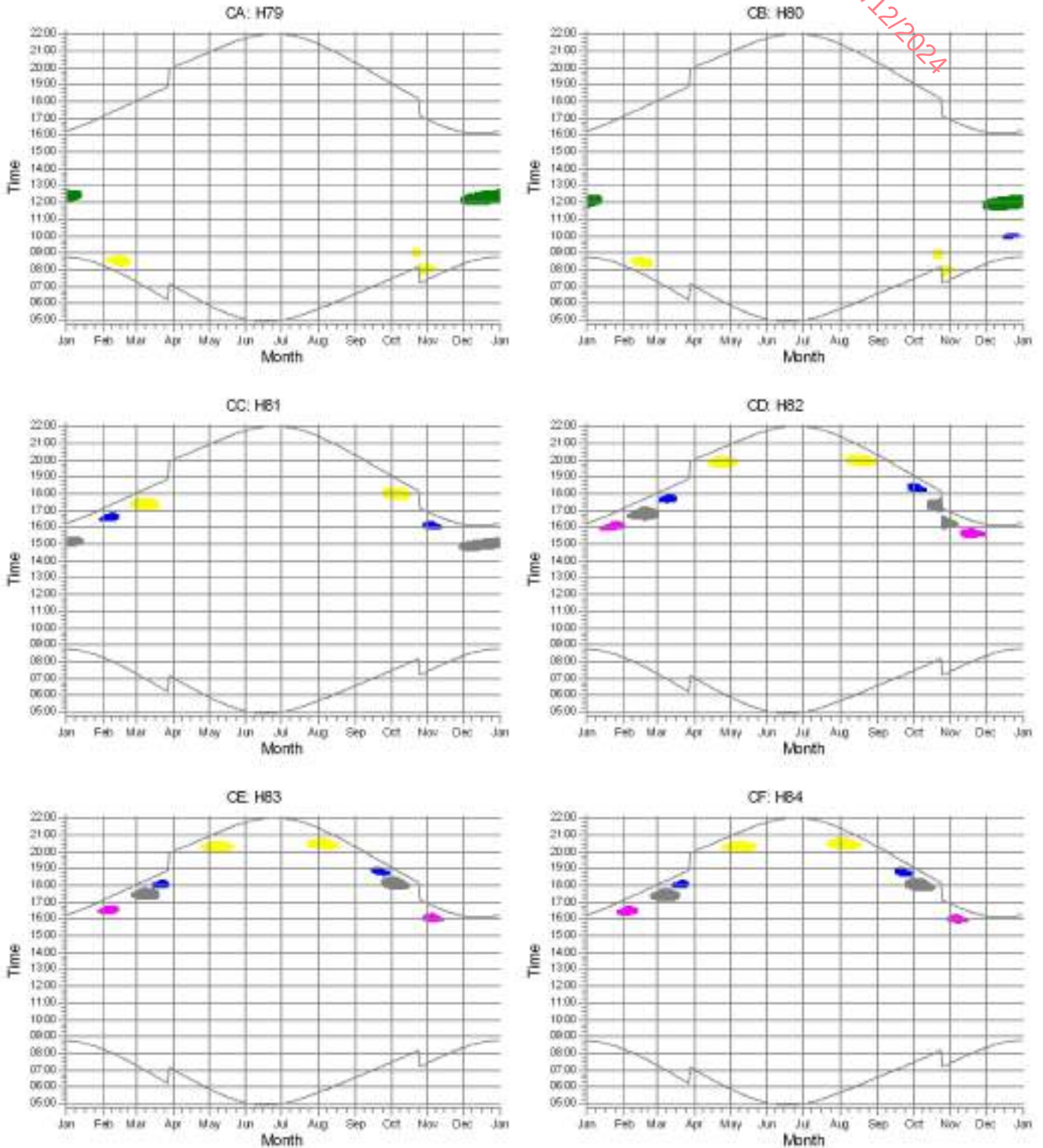


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

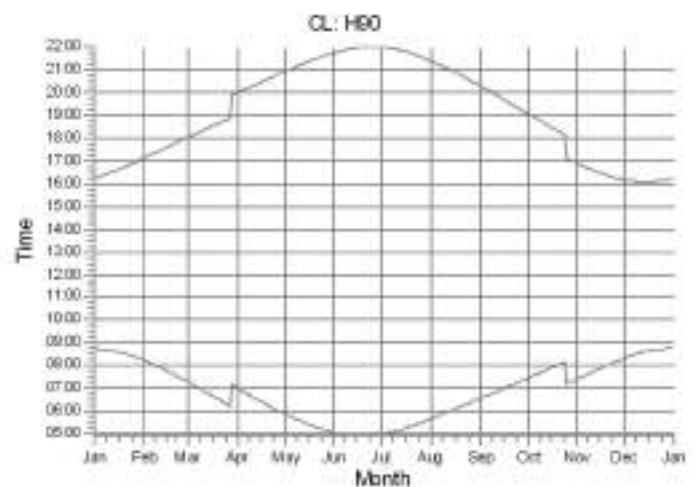
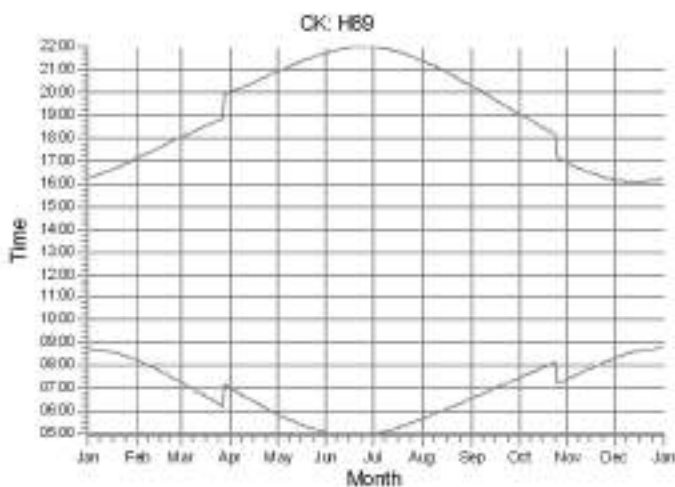
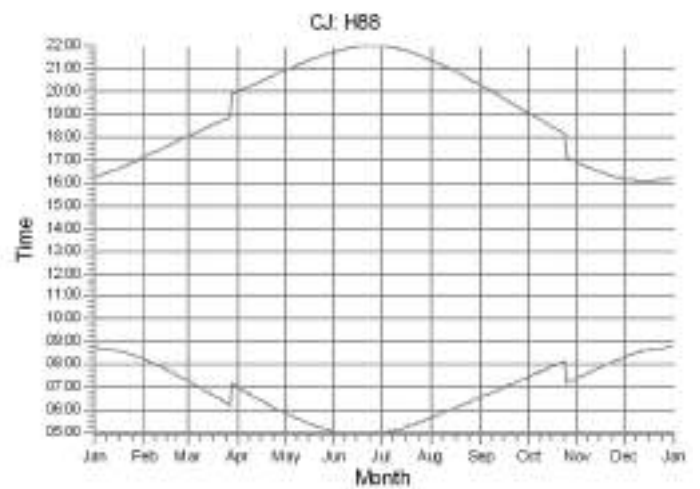
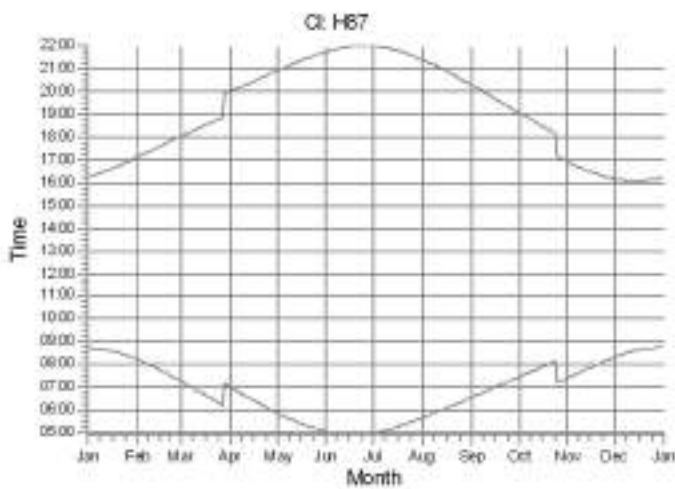
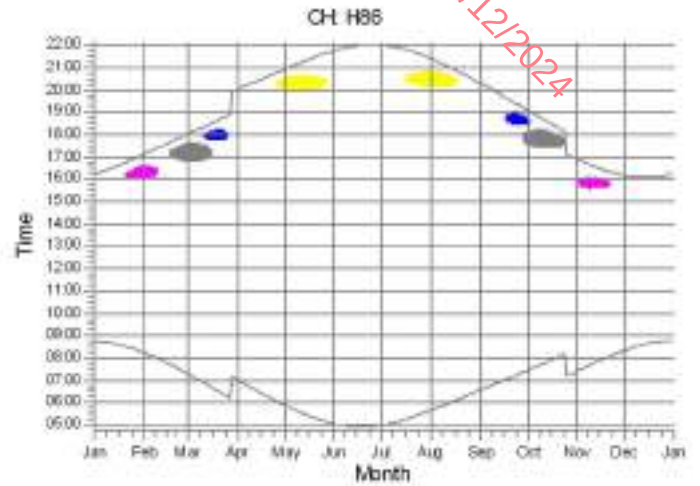
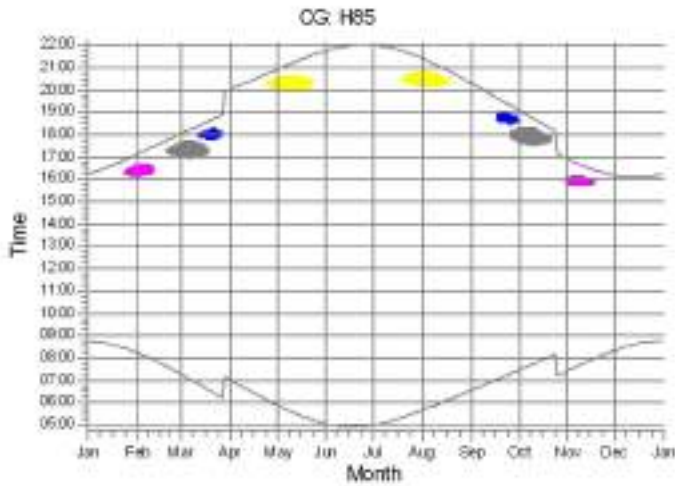


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



WTGs

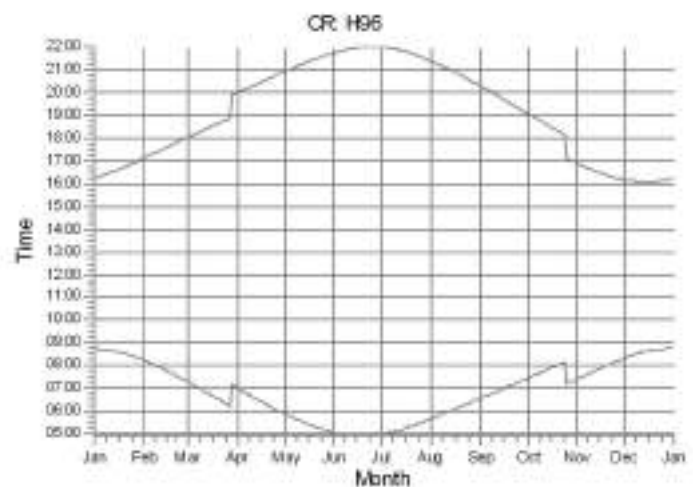
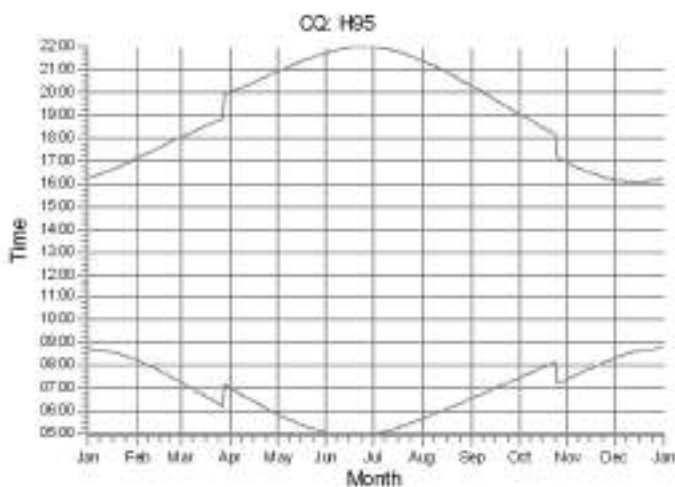
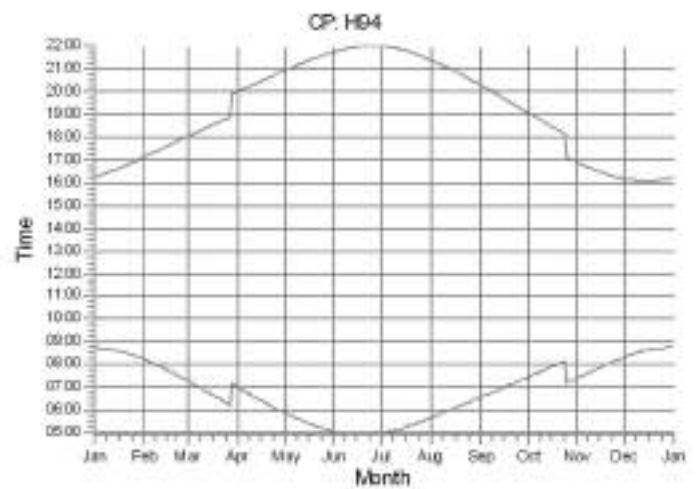
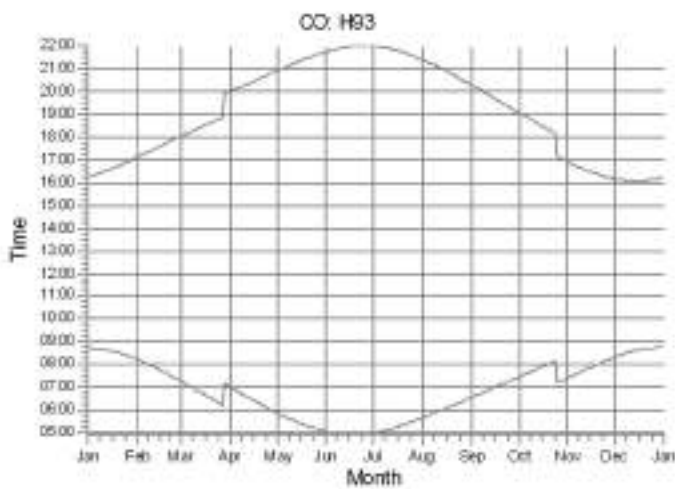
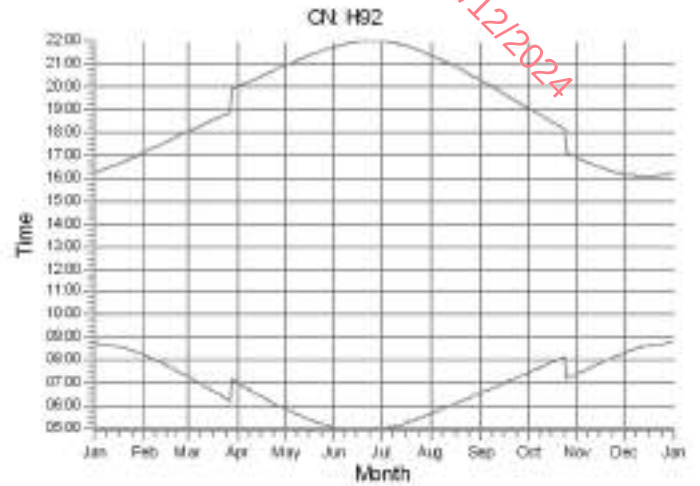
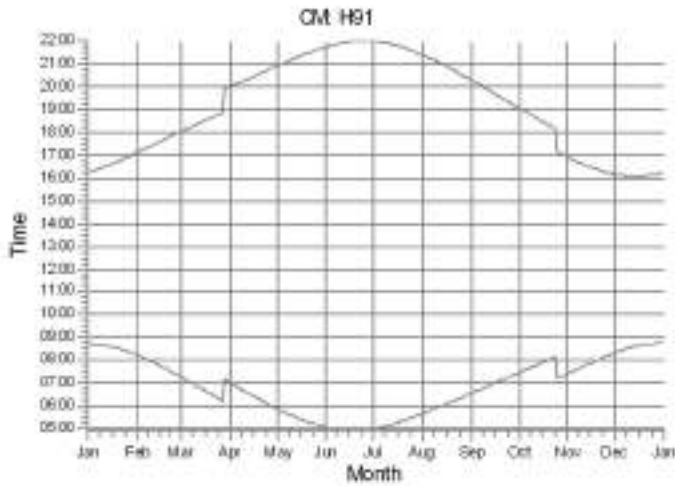
2: T02 3: T03 4: T04 5: T05

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar, graphical

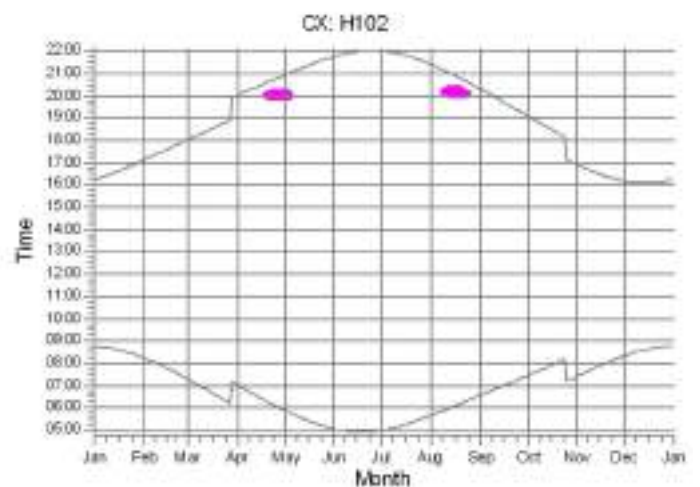
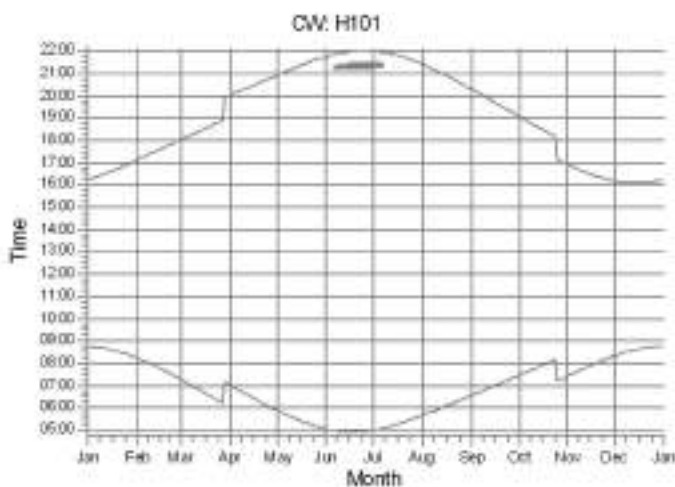
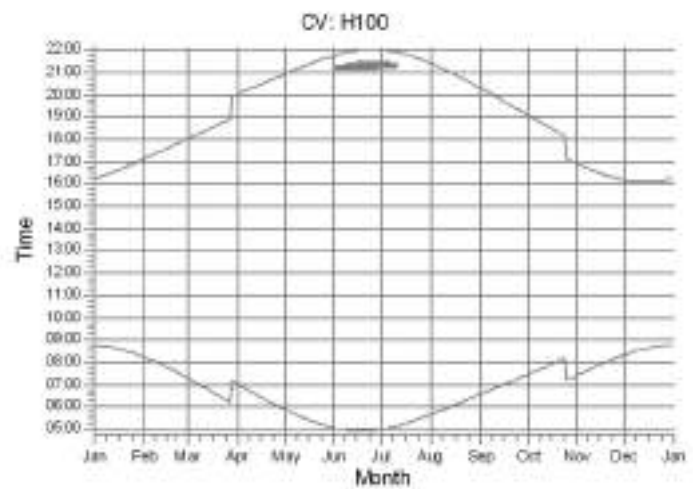
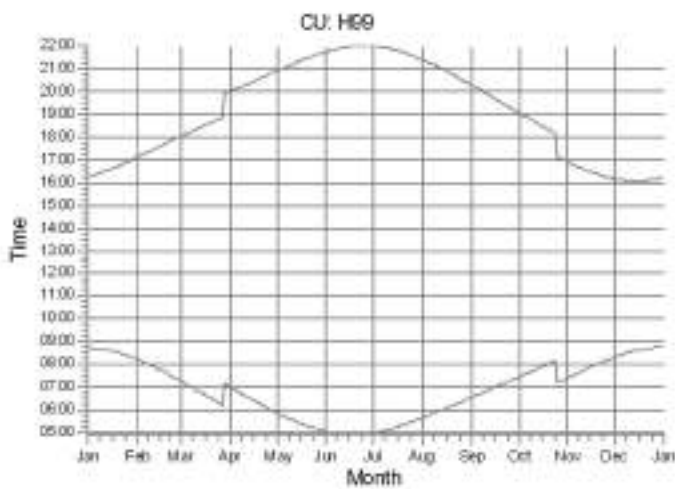
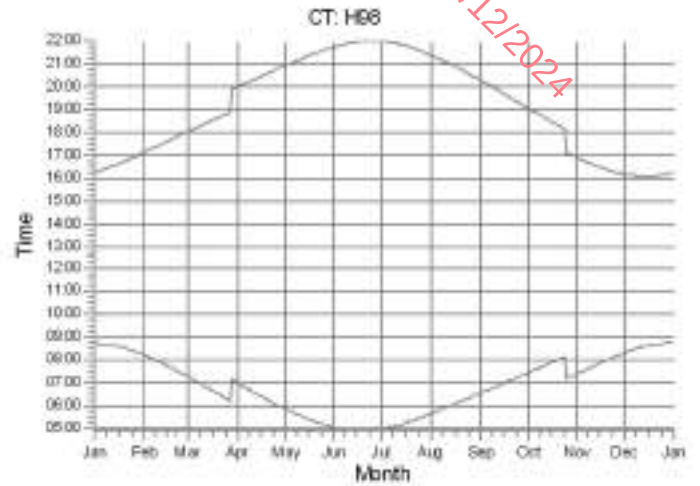
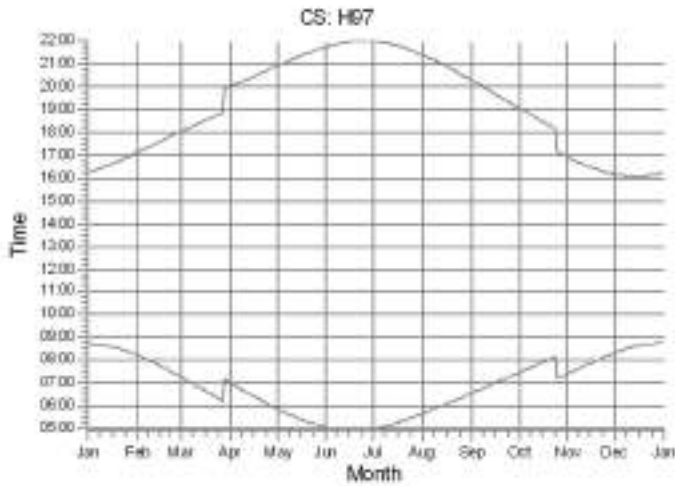
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

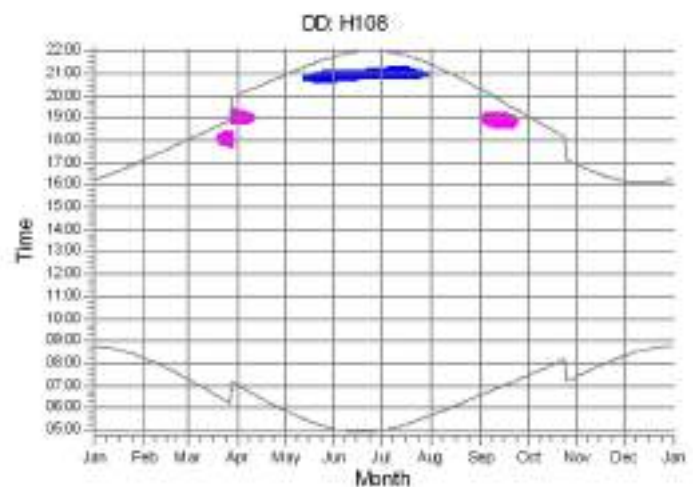
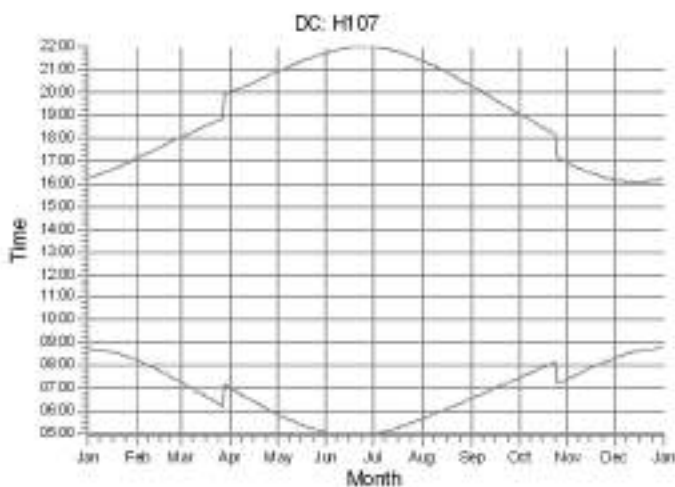
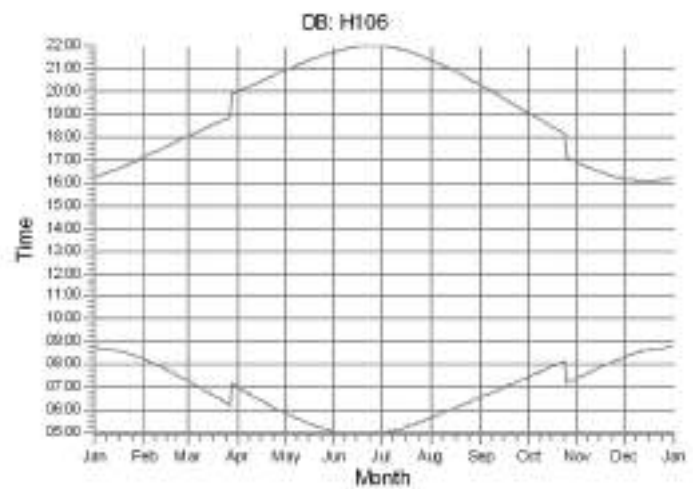
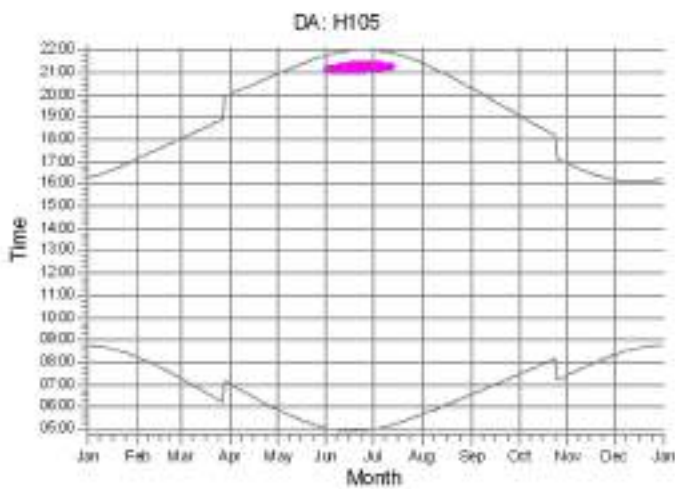
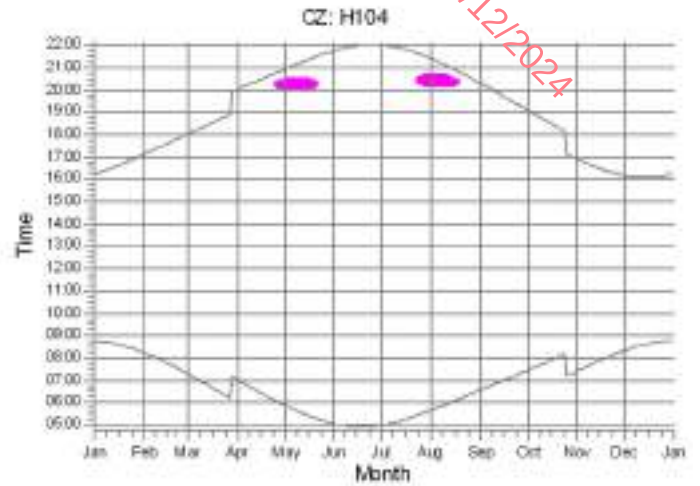
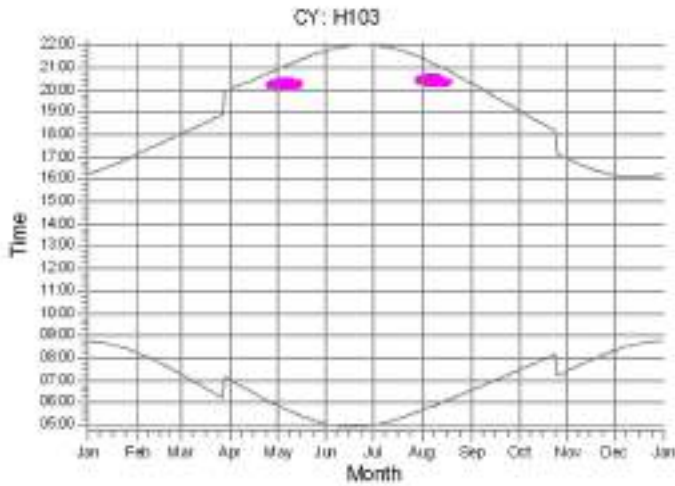


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

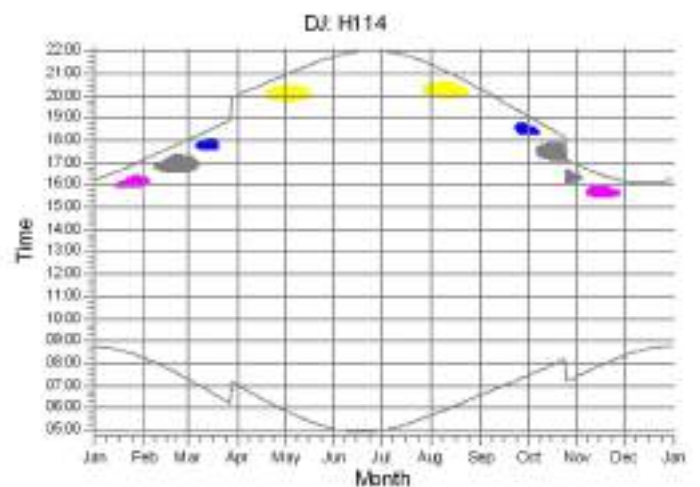
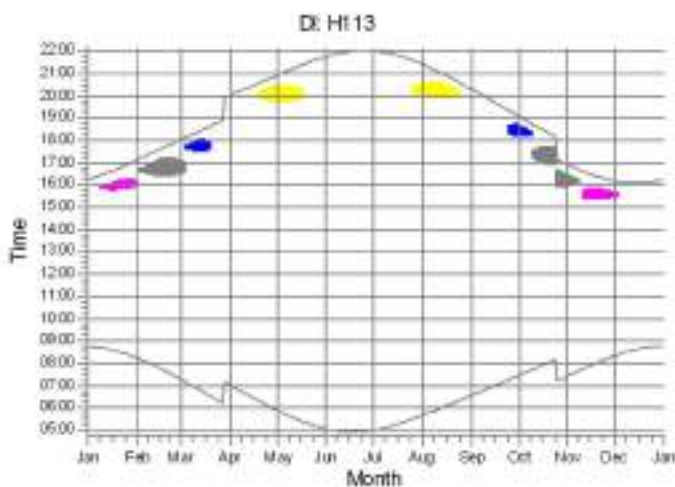
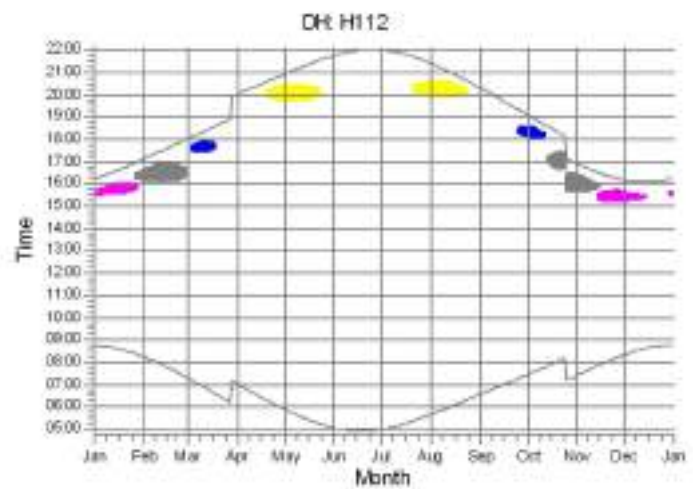
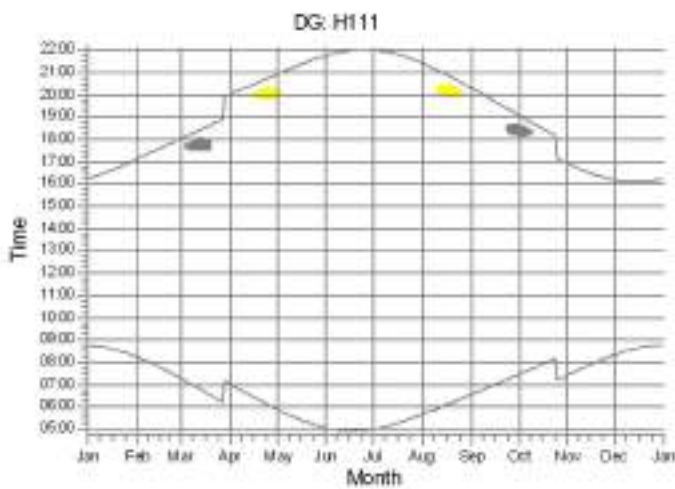
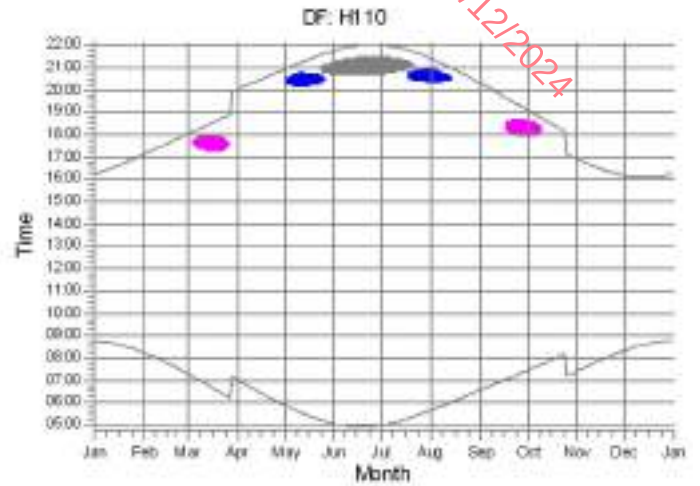
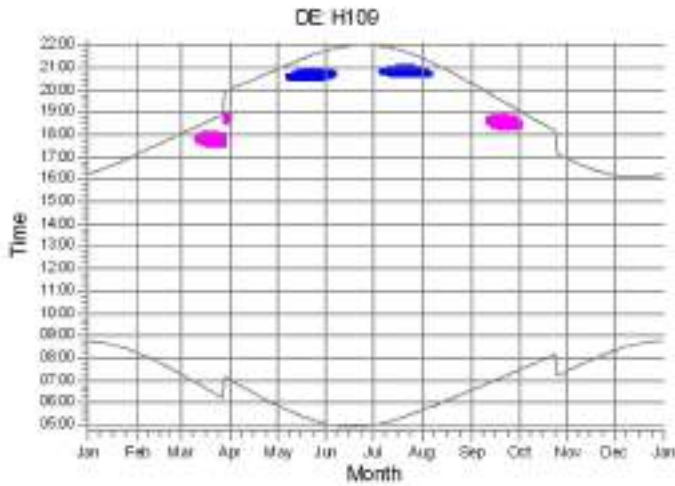


WTGs

3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

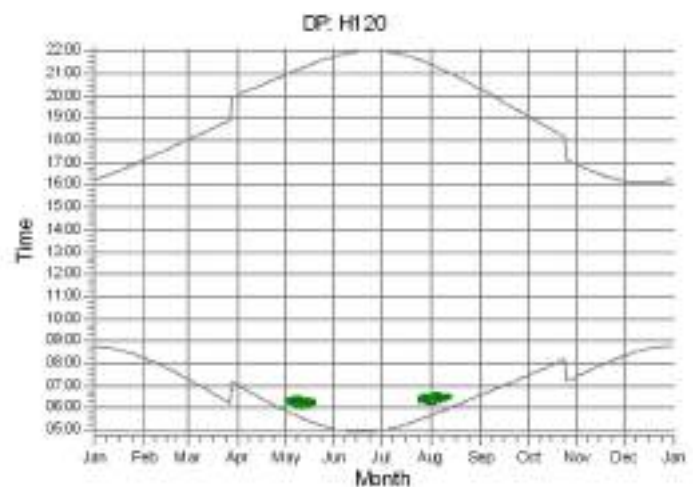
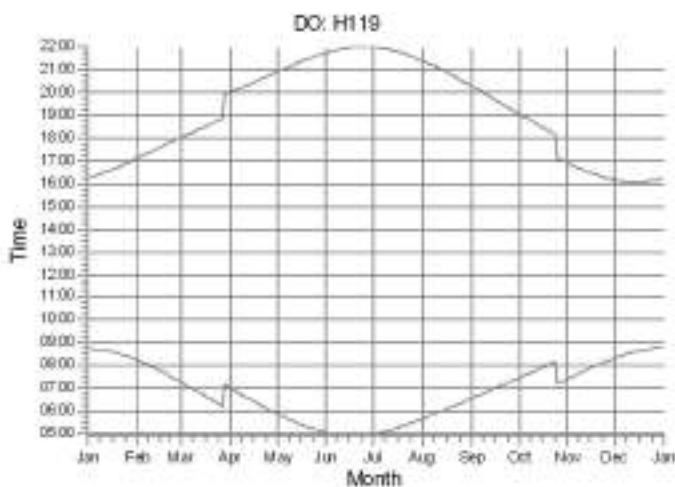
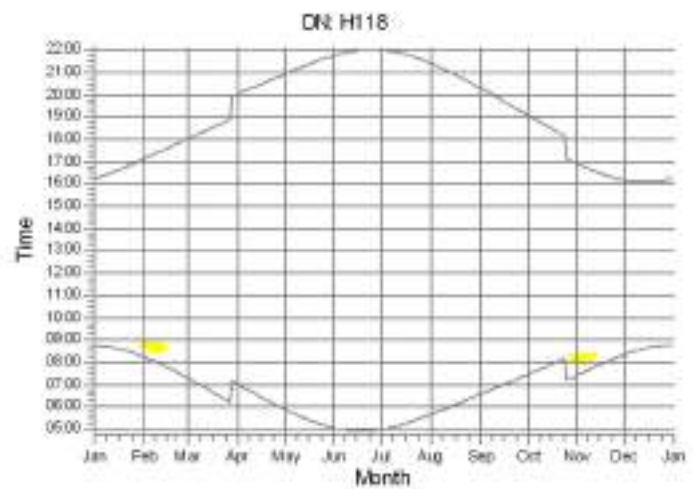
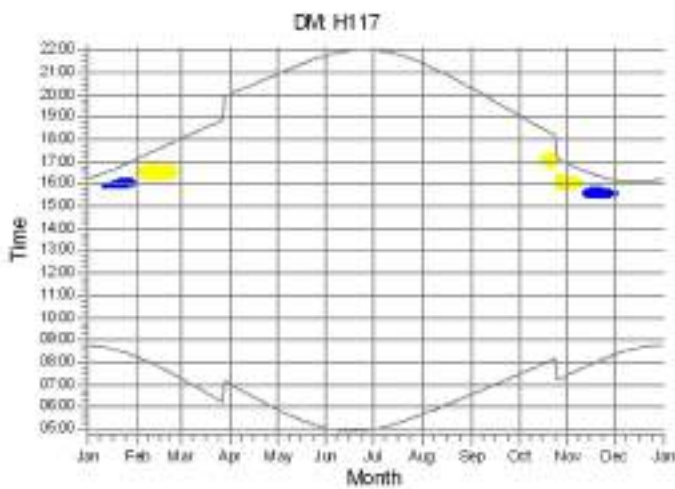
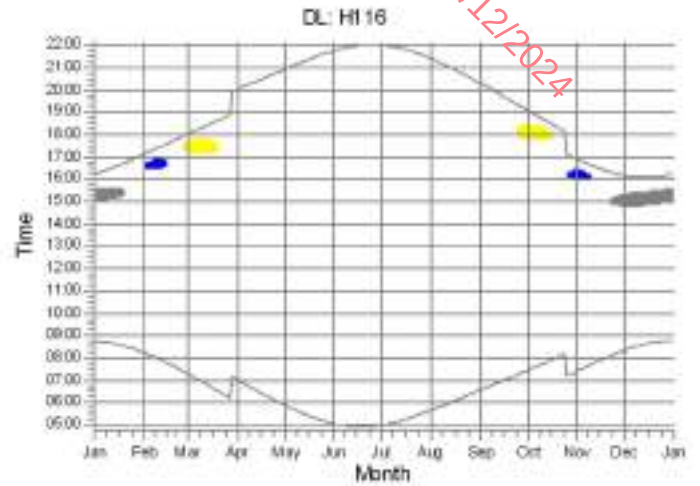
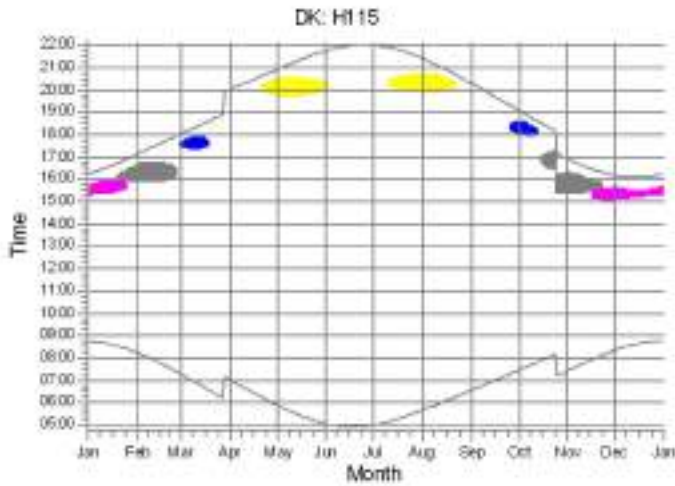


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

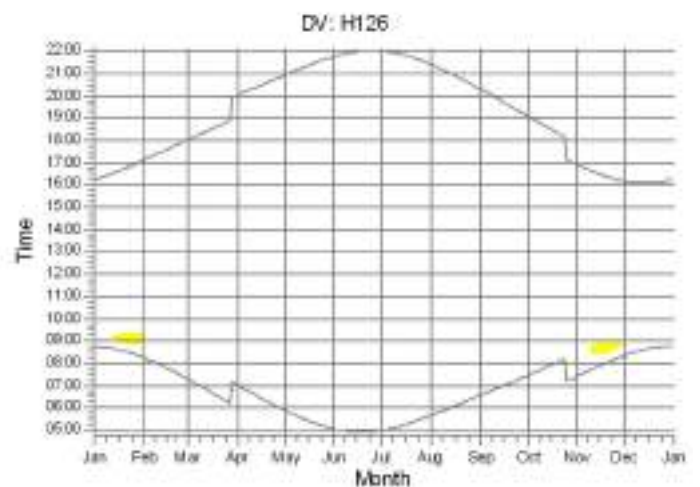
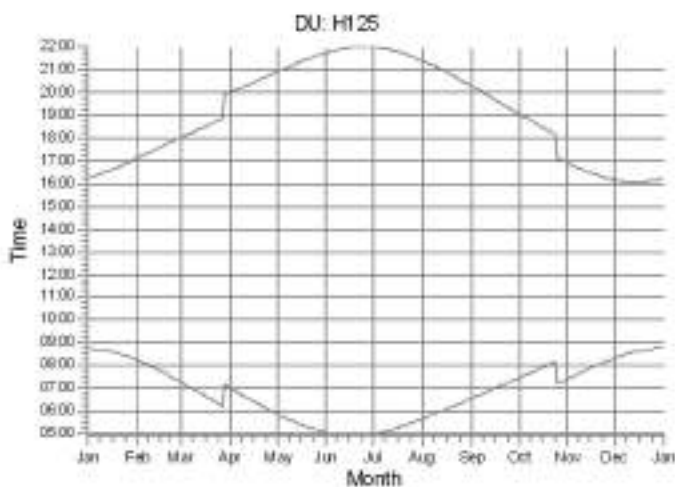
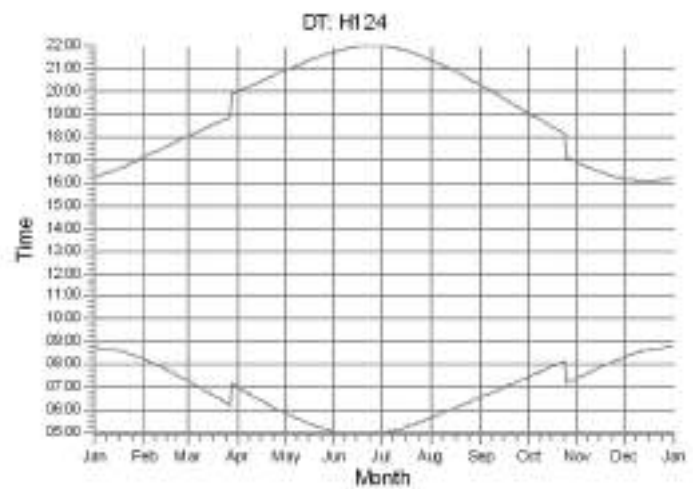
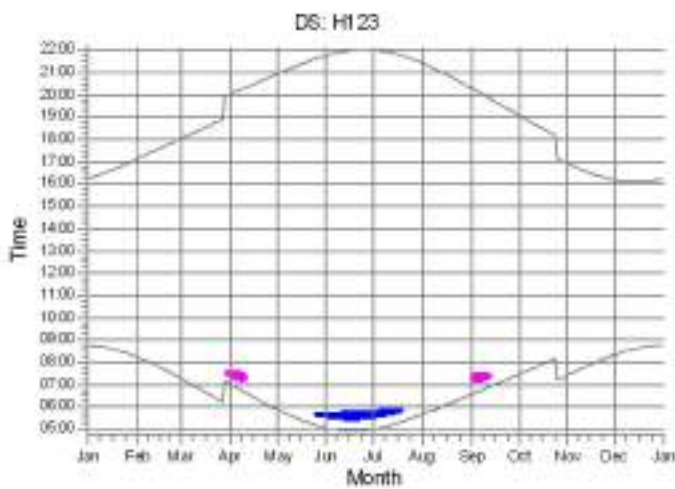
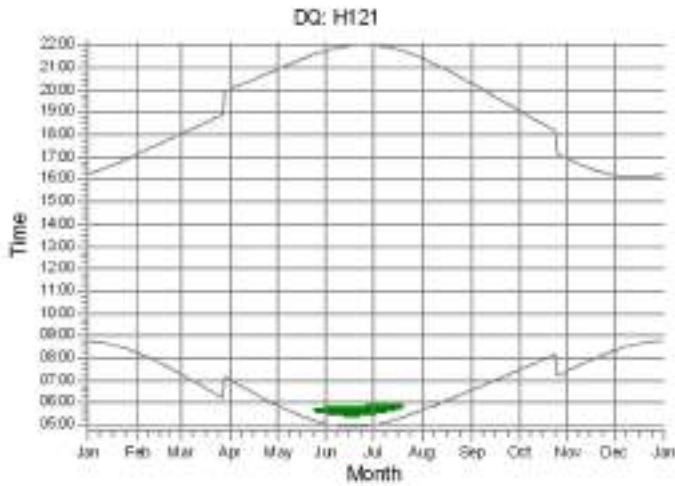


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

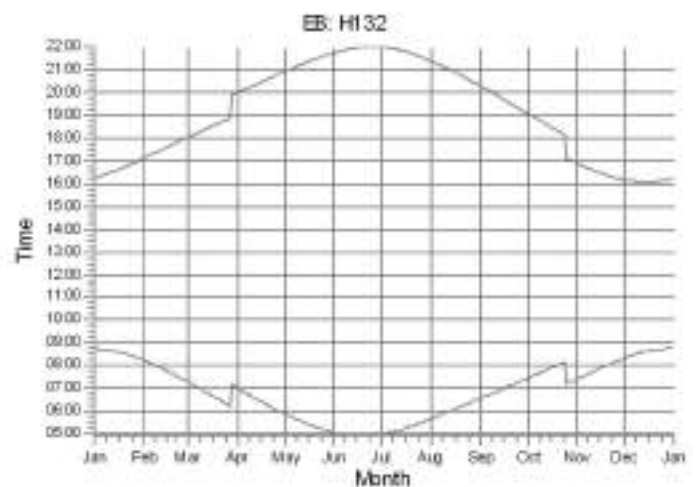
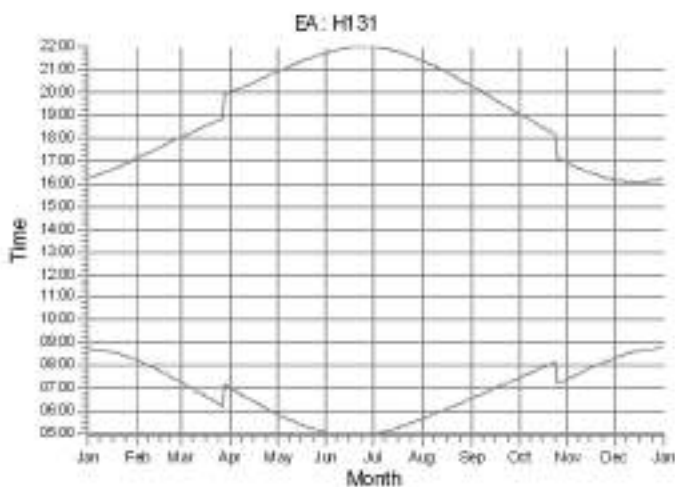
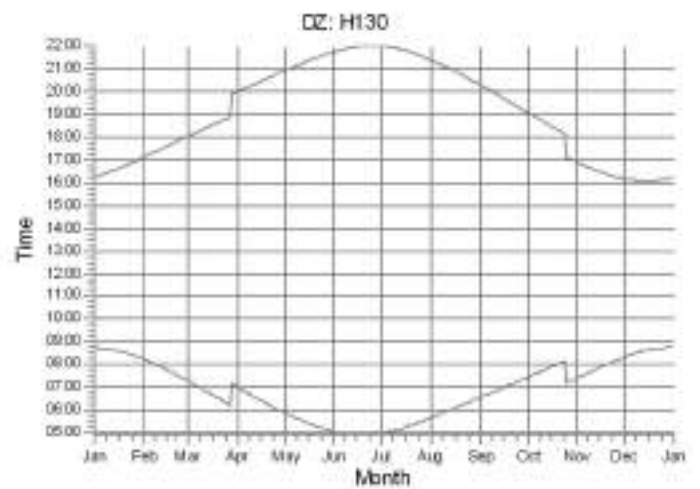
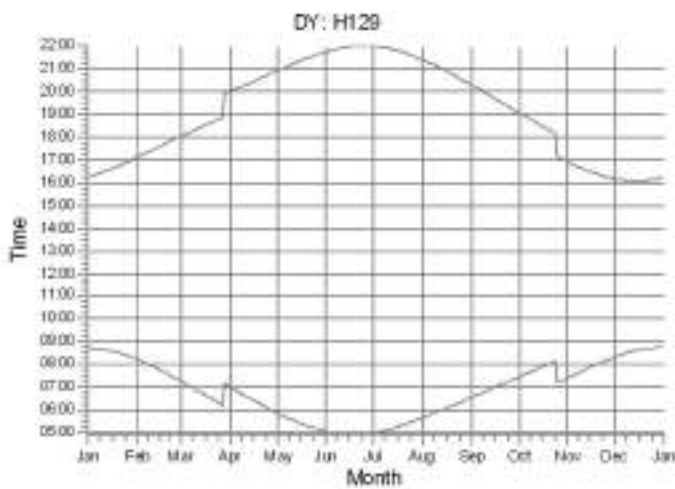
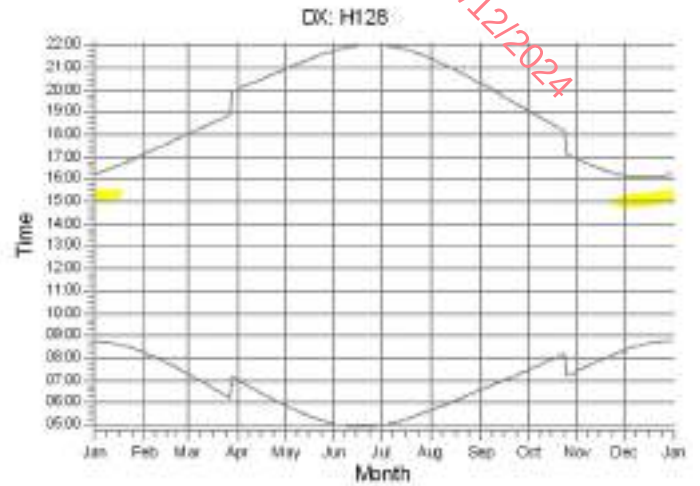
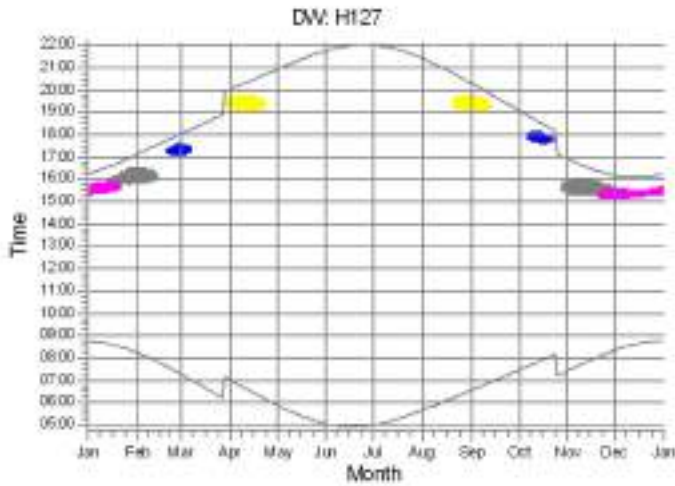


WTGs

1: T01 2: T02 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



WTGs

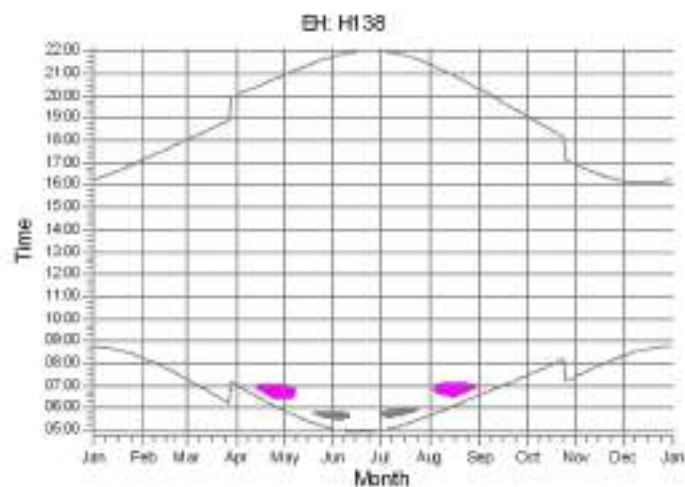
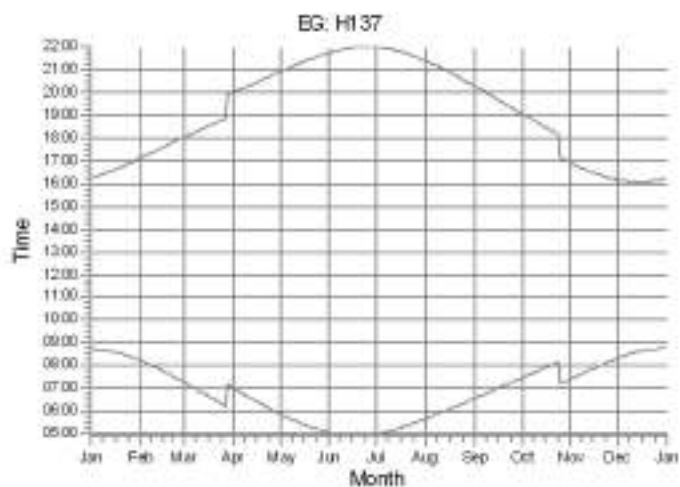
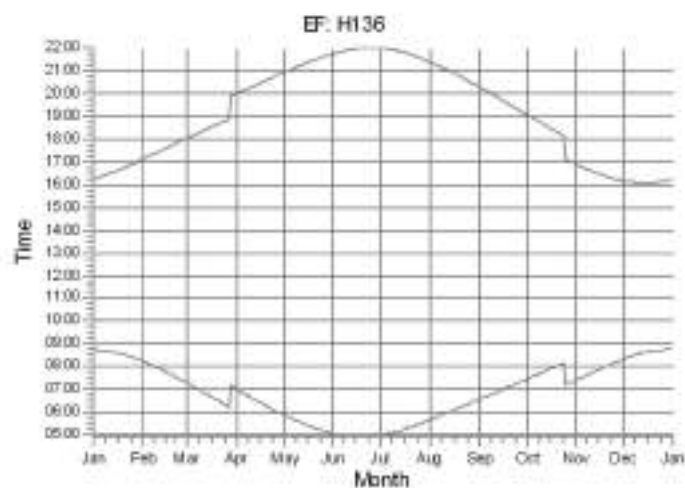
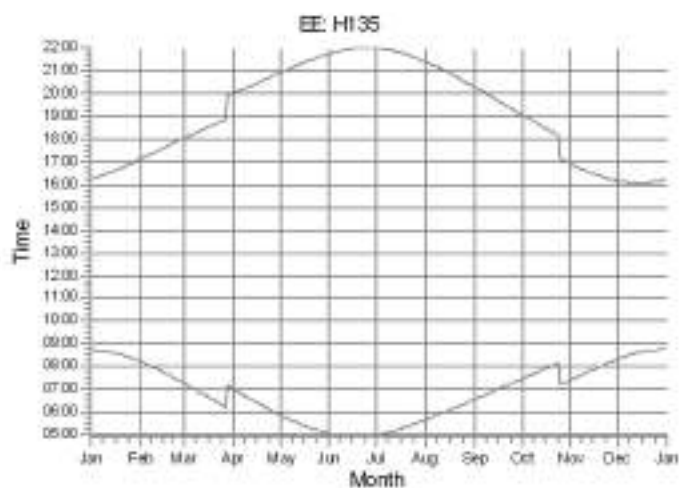
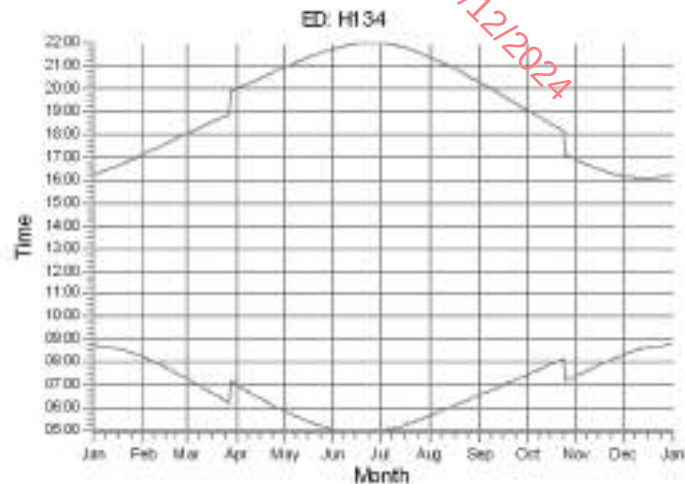
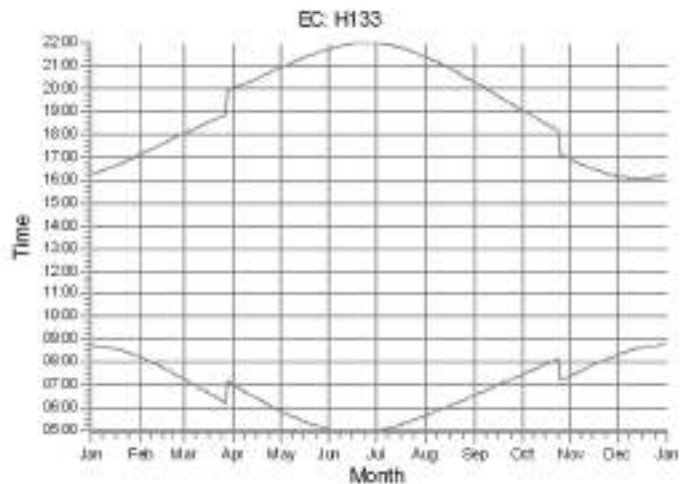
2: T02 3: T03 4: T04 5: T05

Project: 6918 Kellystown
 Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
 Jennings O'Donovan
 Finisklin Business Park
 IE-F91 RHH9 Sligo
 +353719161416
 abyryne / abyryne@jodireland.com
 Calculated:
 11/07/2024 10:33/4.0.547

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

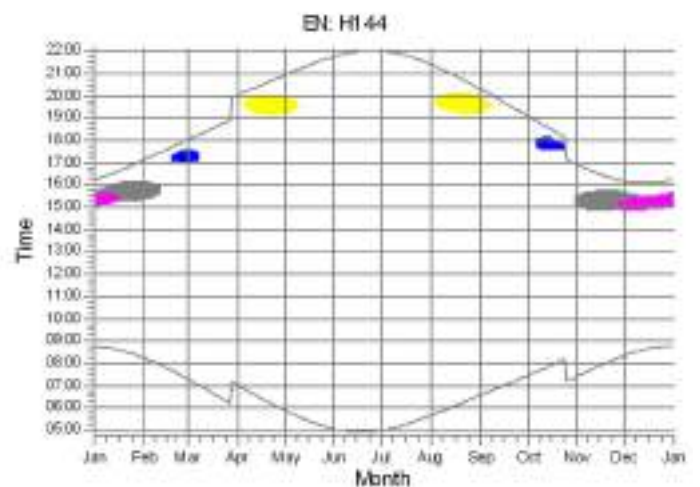
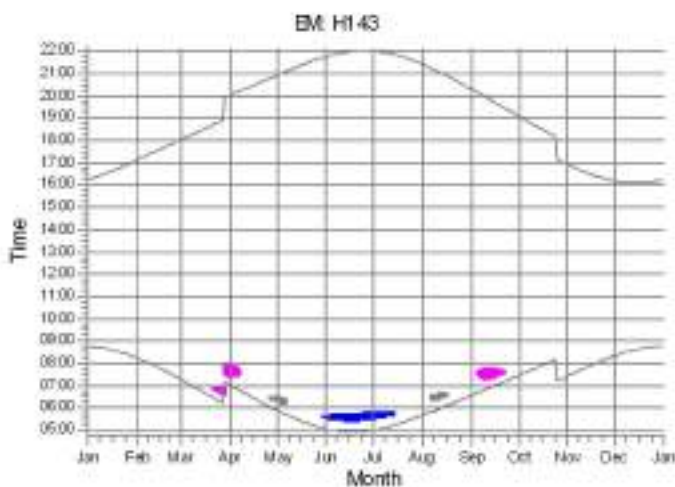
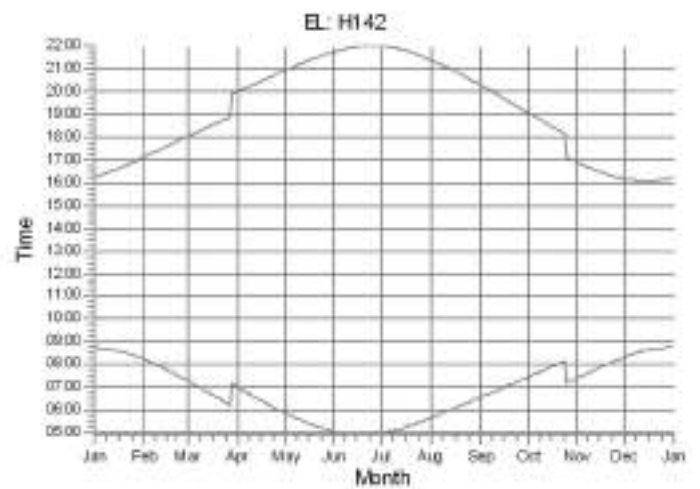
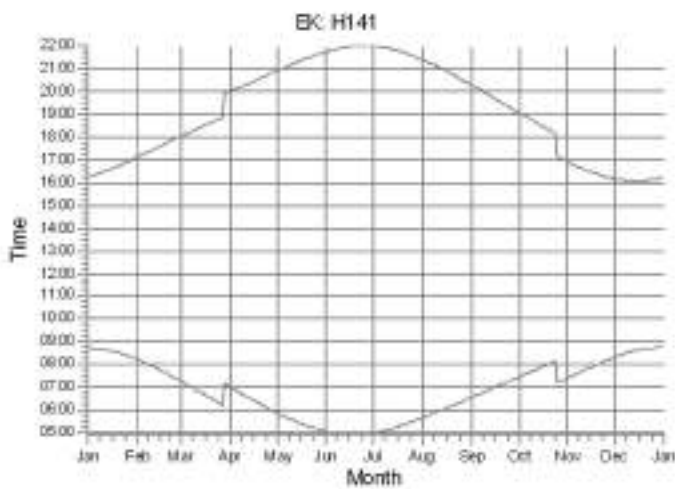
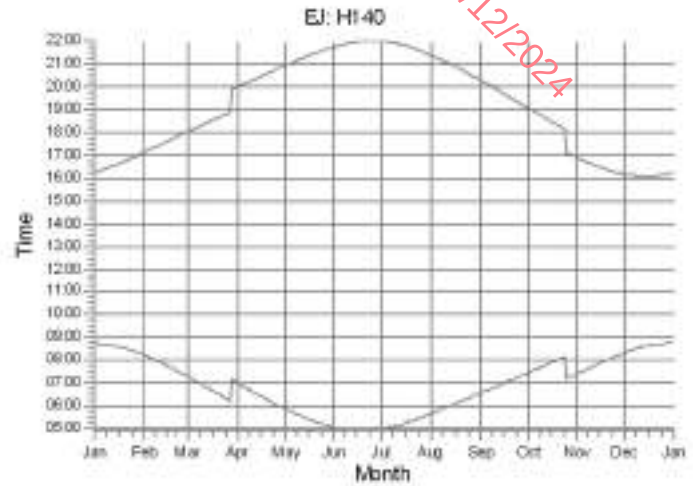
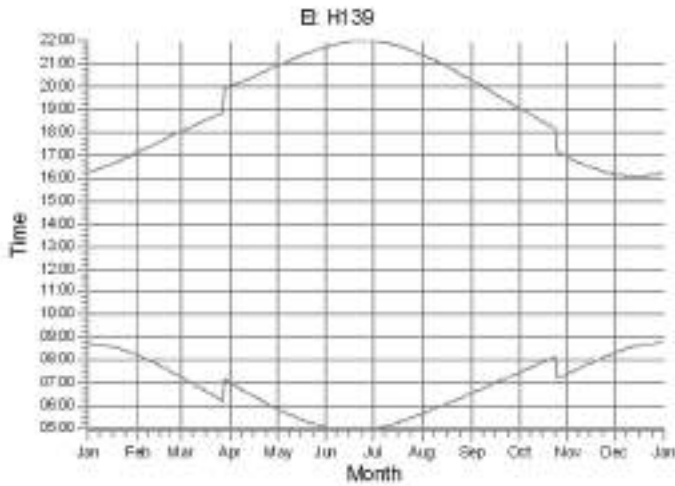


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

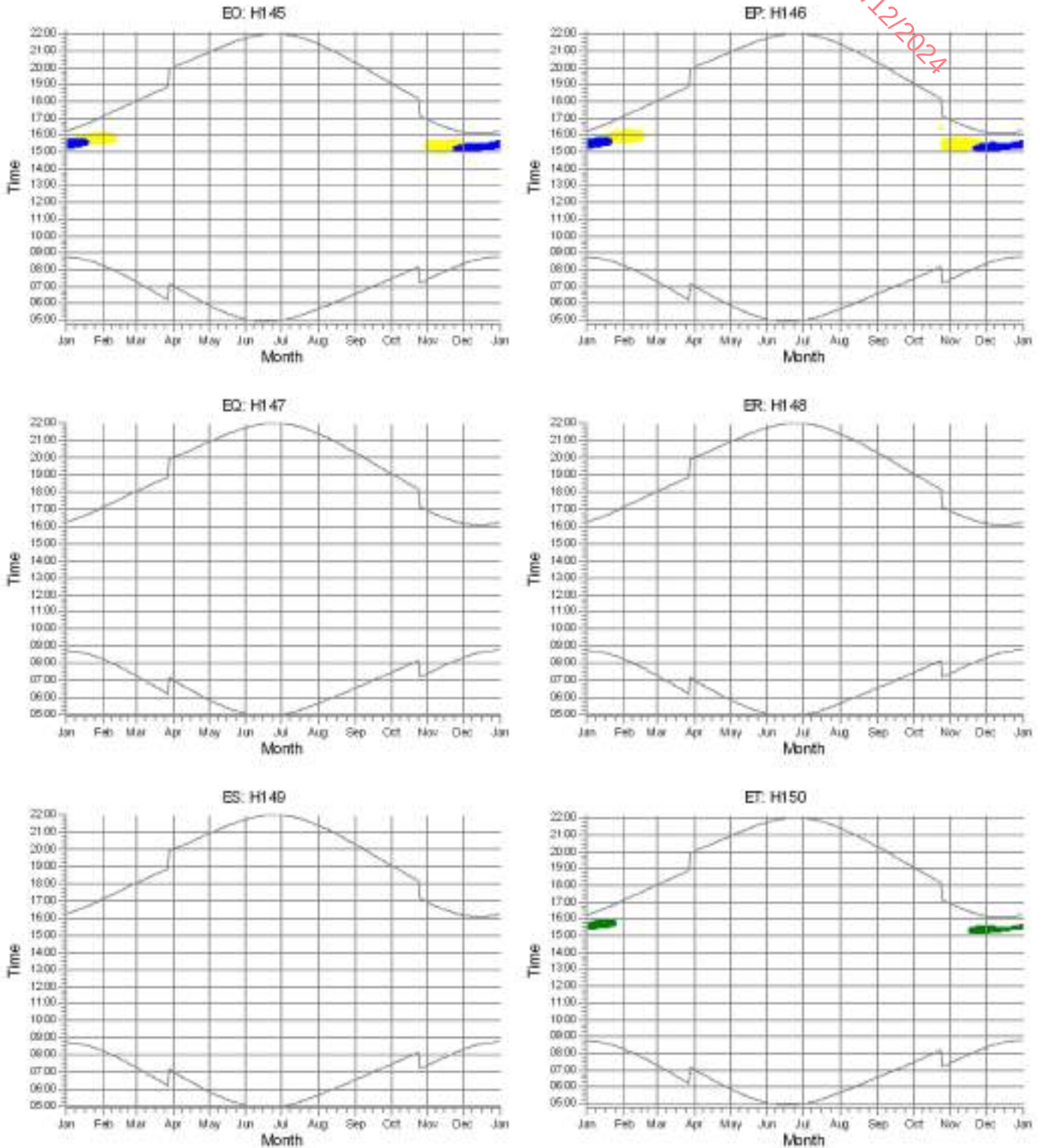


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

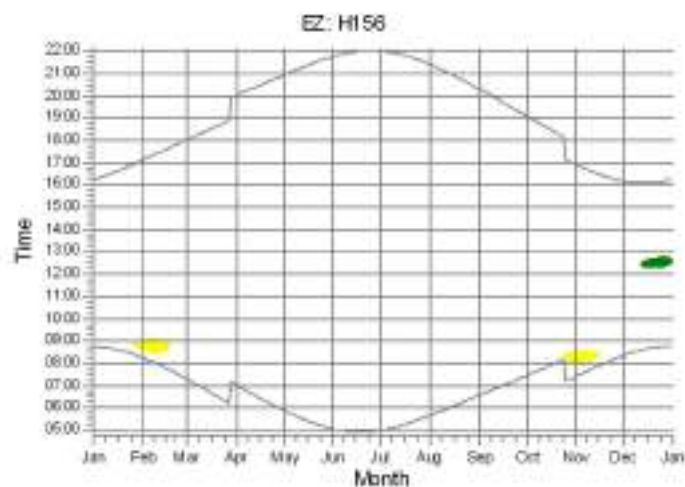
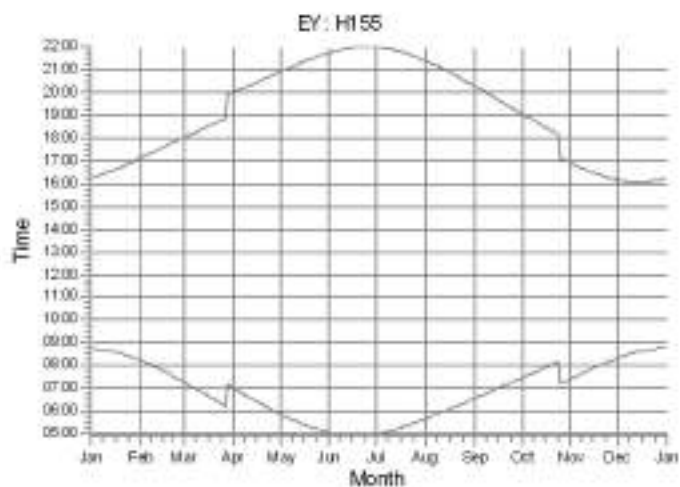
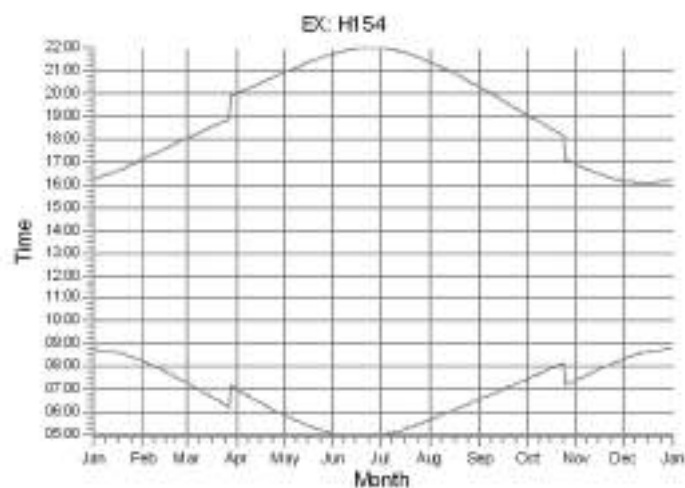
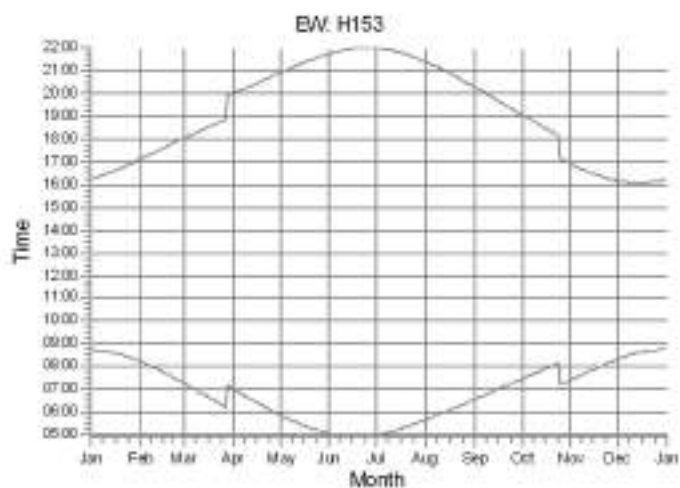
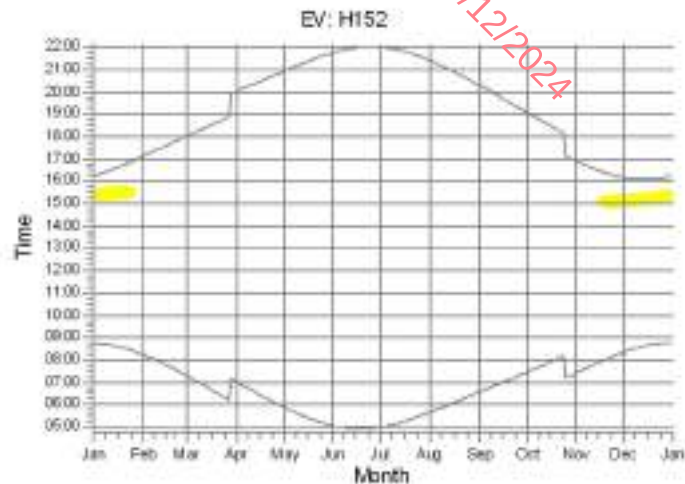
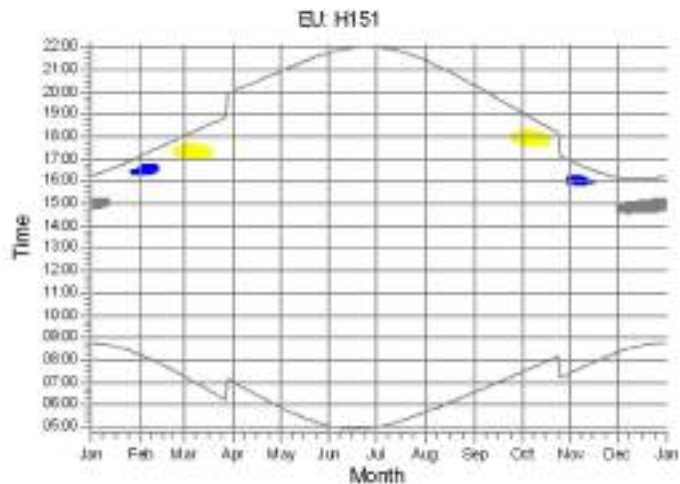


WTGs

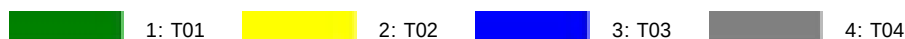
1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

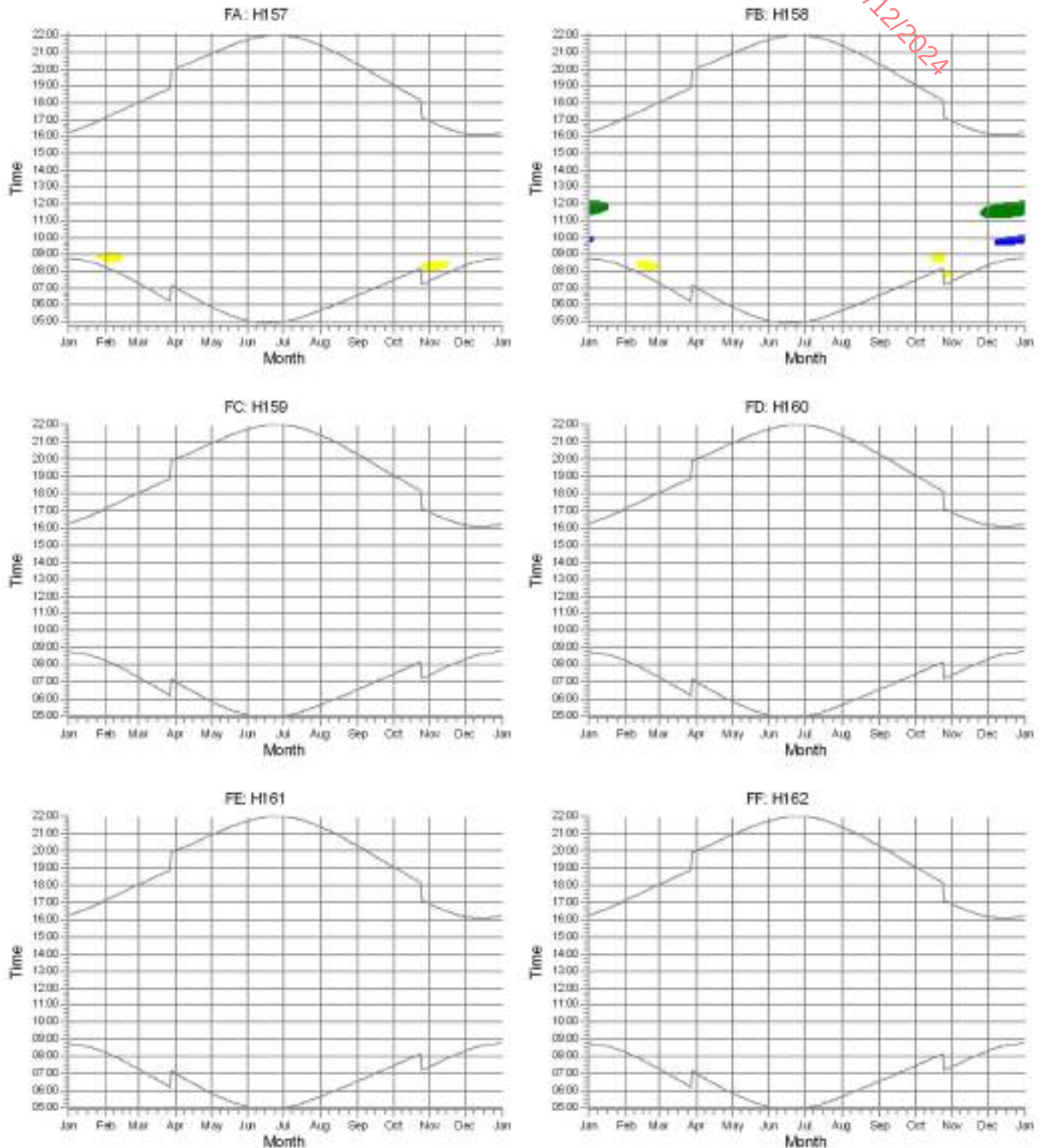


WTGs



SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

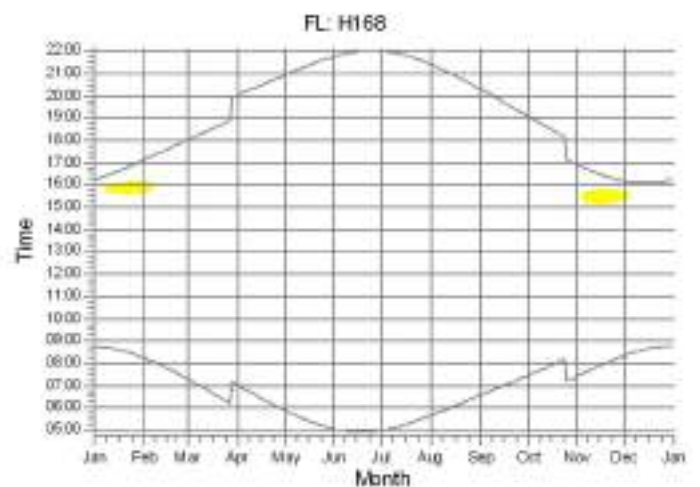
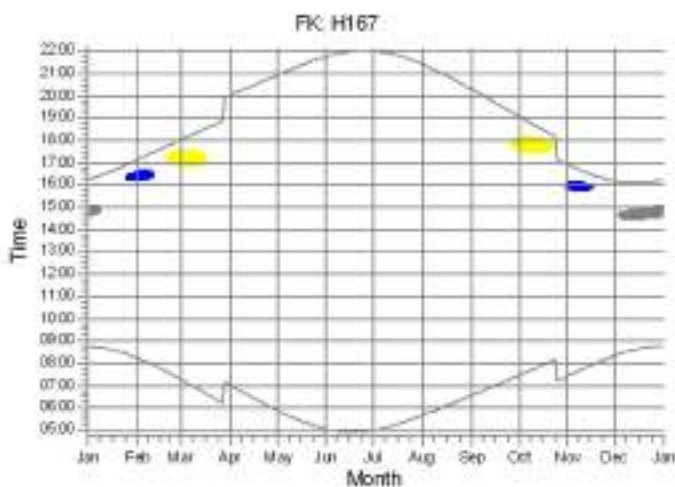
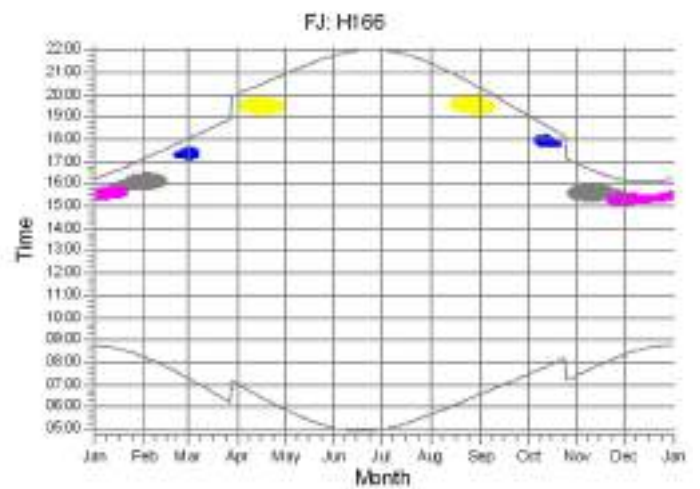
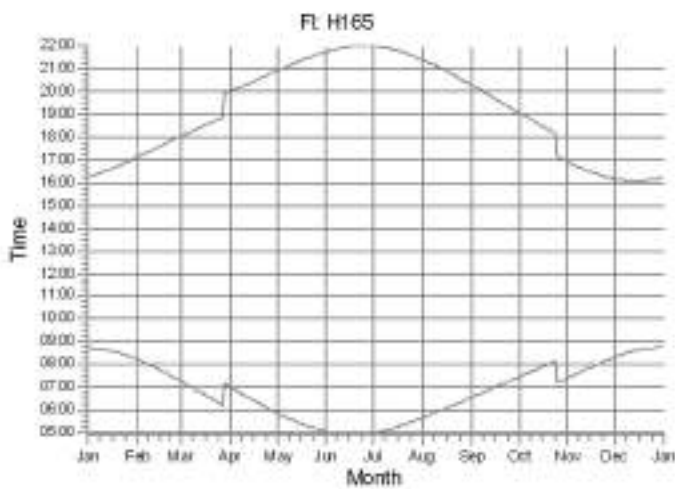
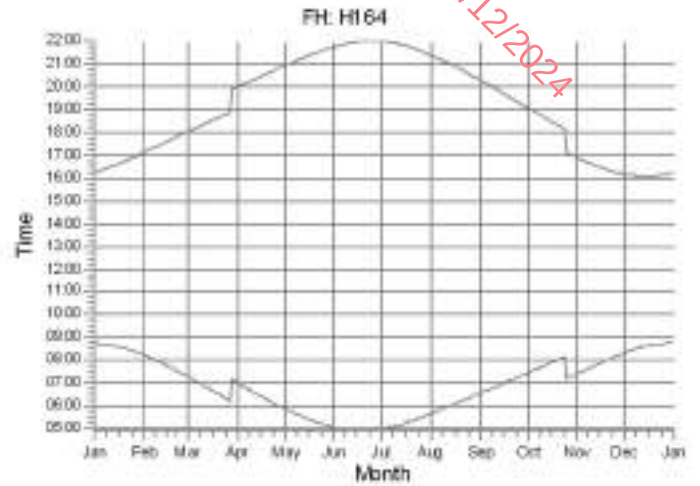
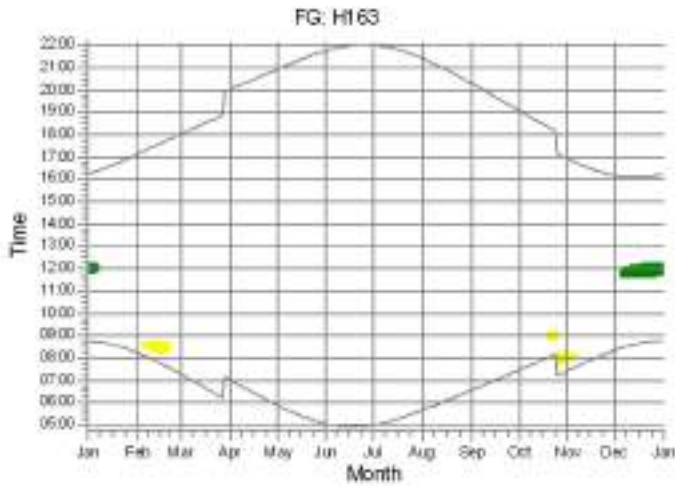


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

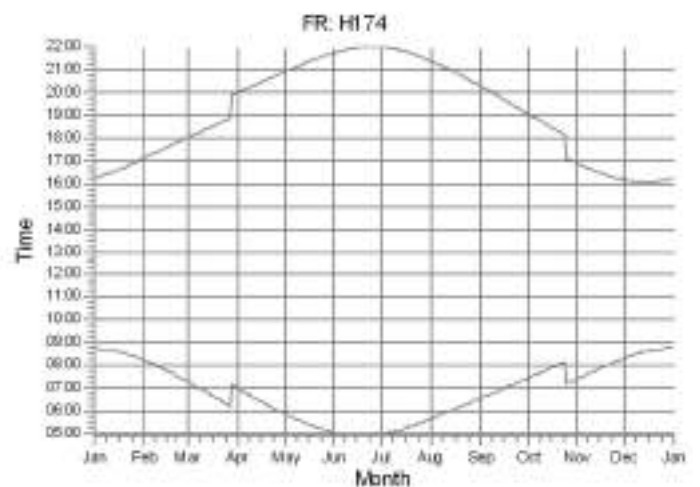
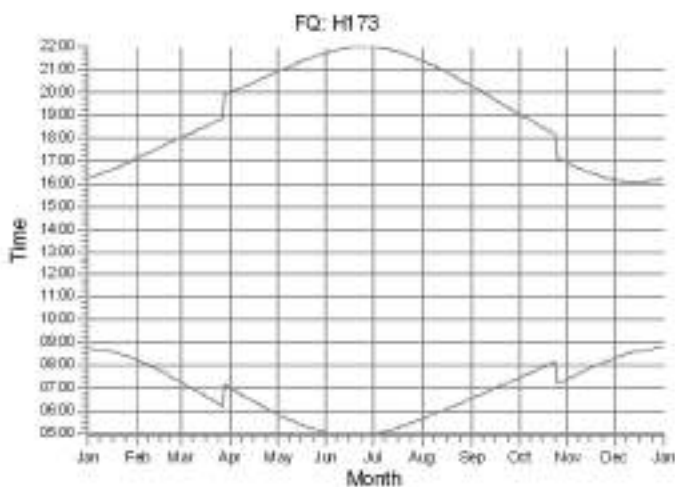
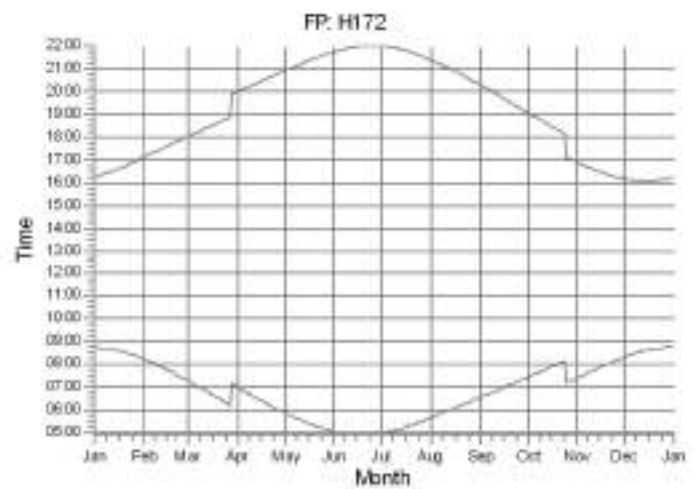
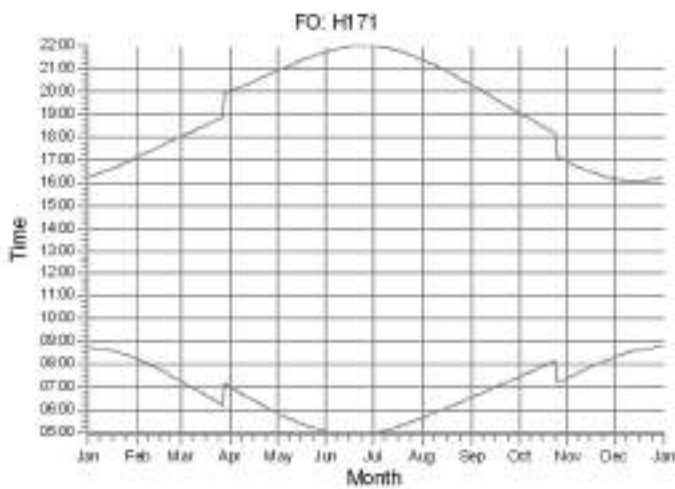
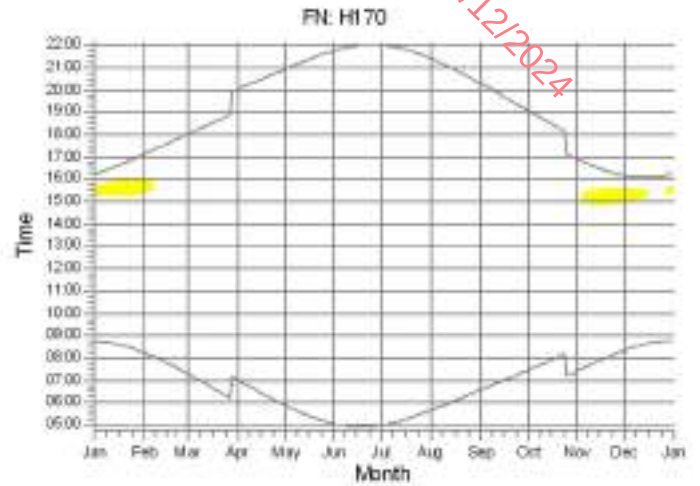
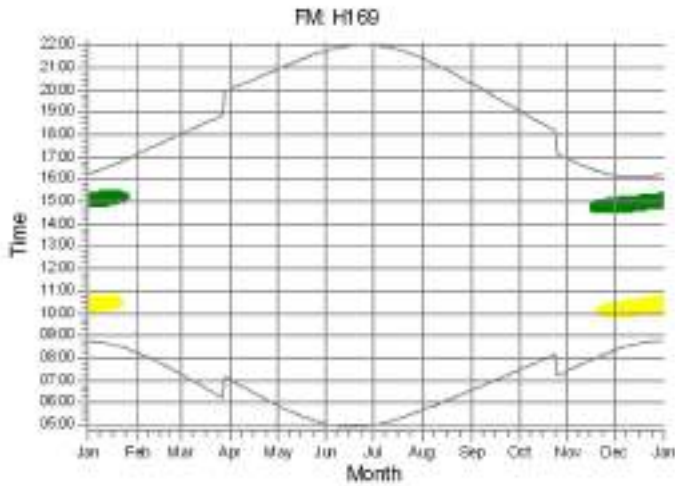


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

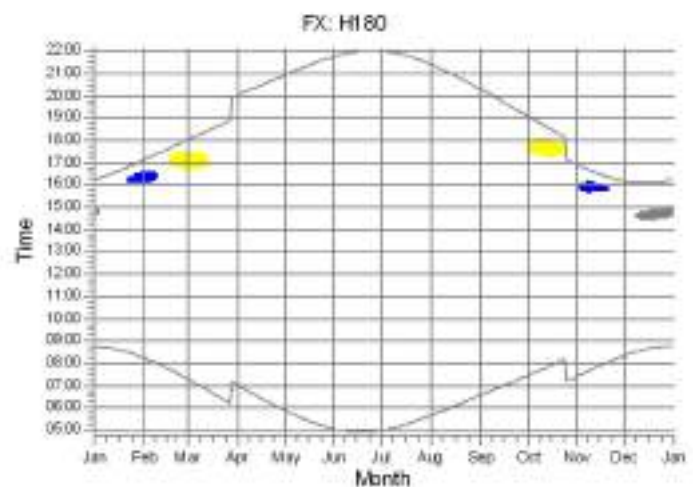
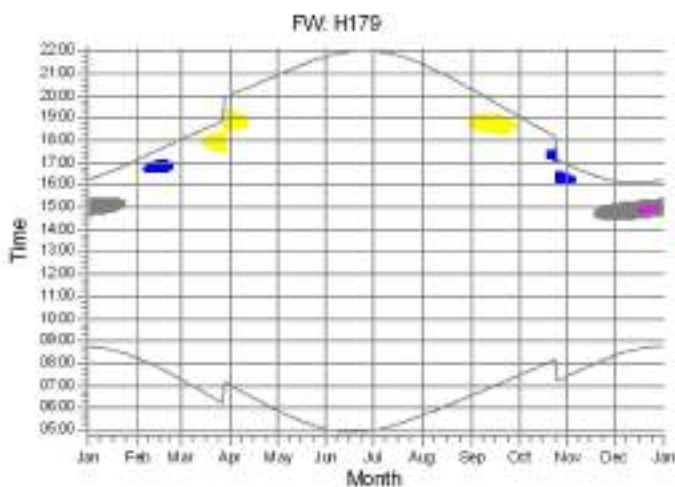
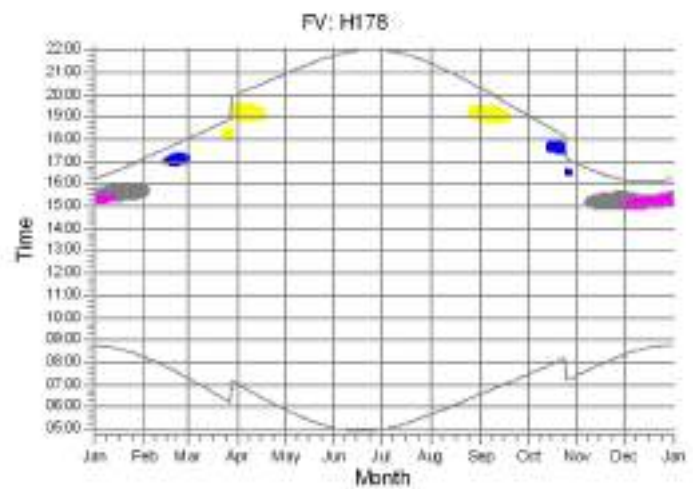
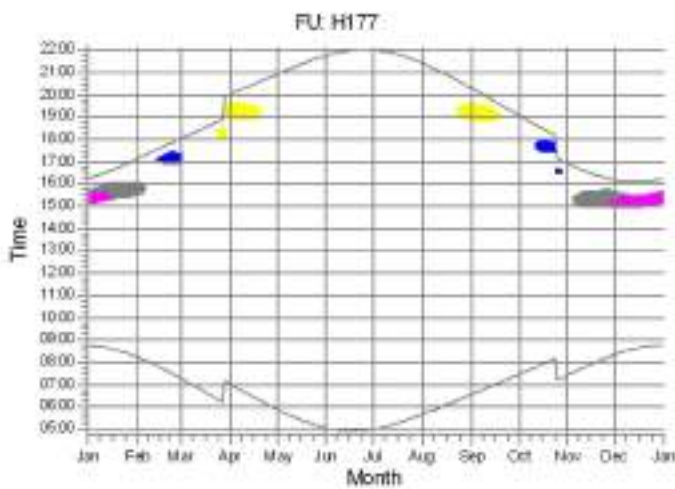
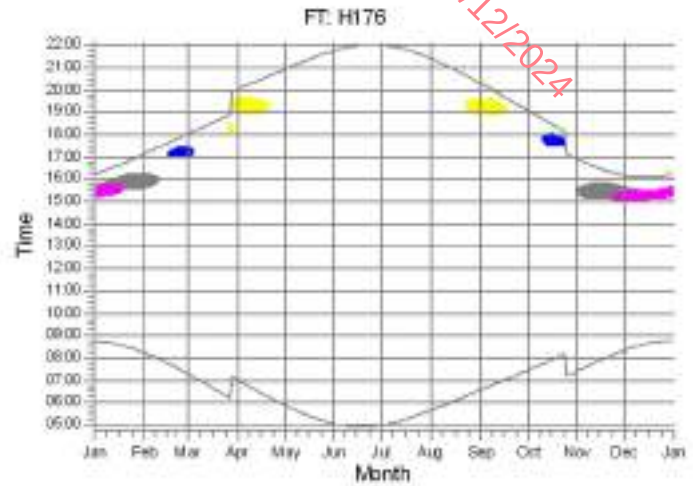
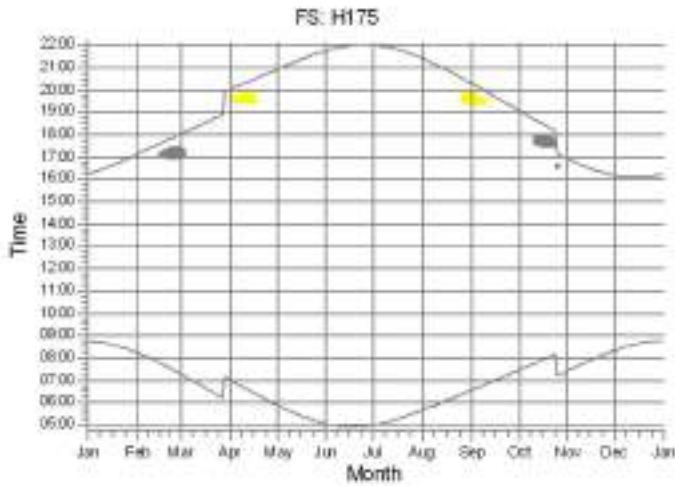


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

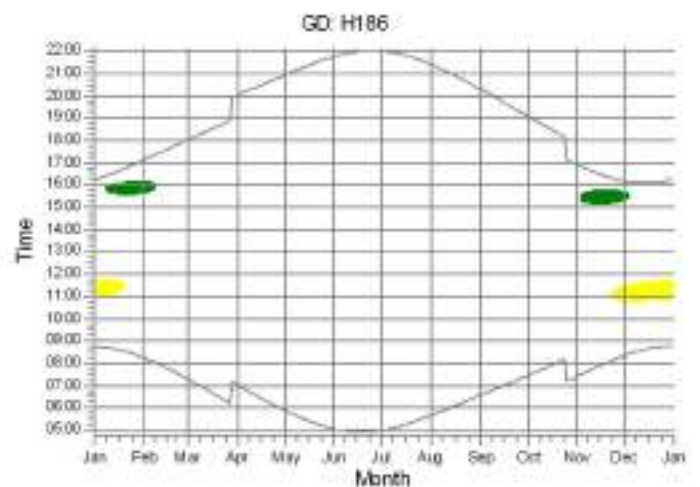
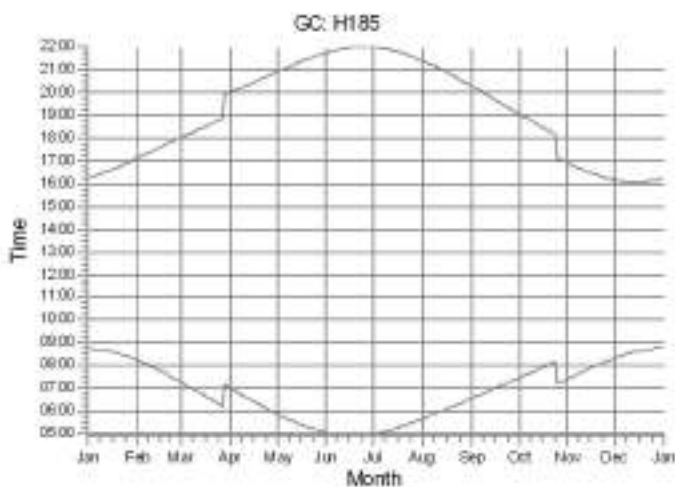
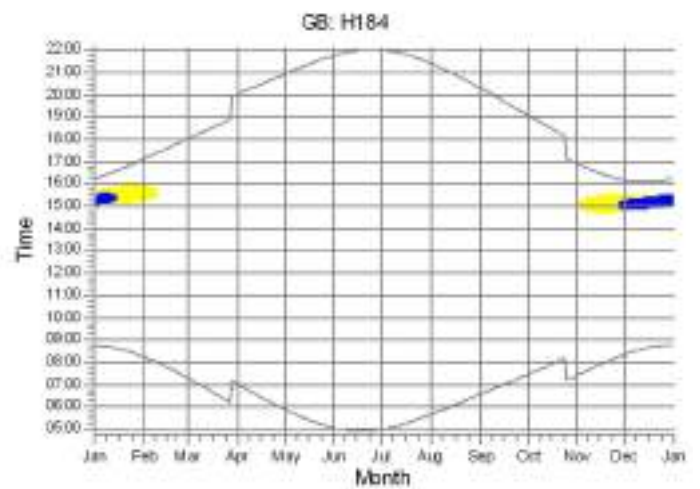
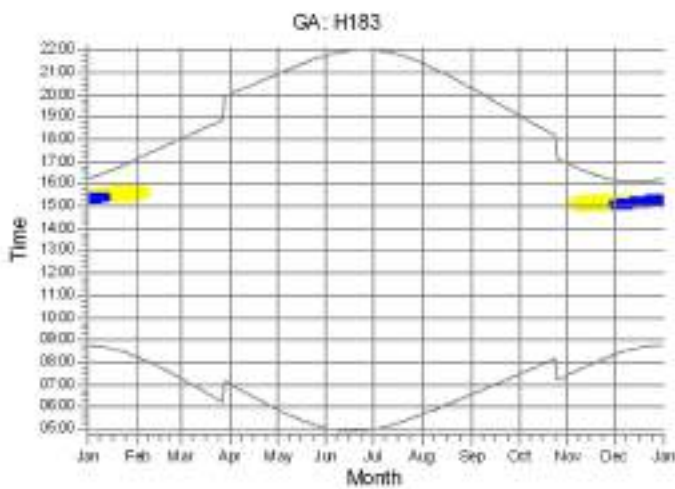
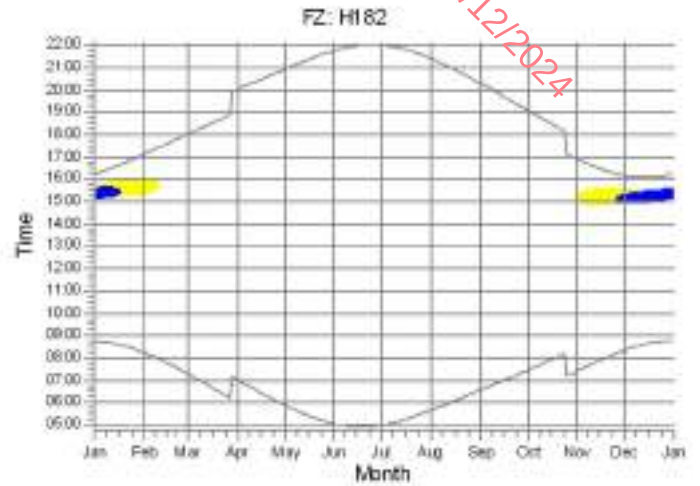
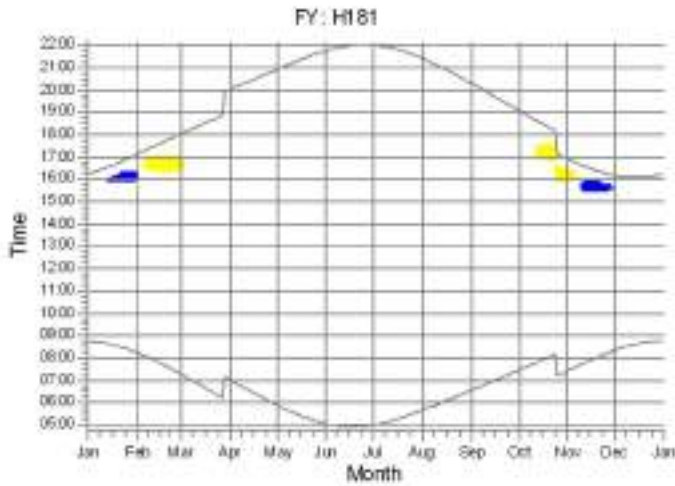


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

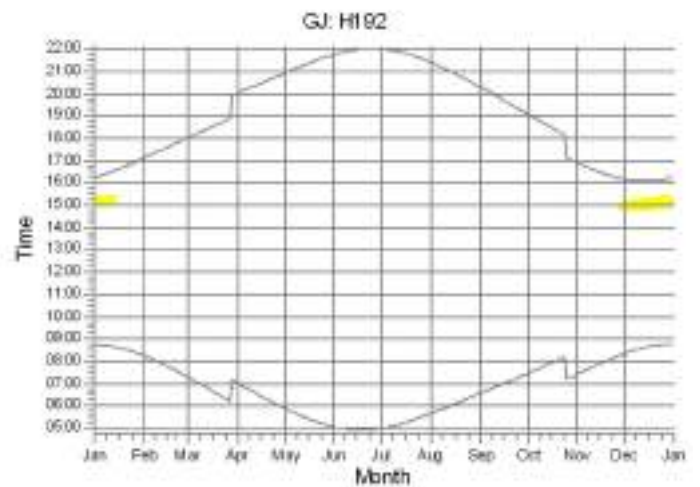
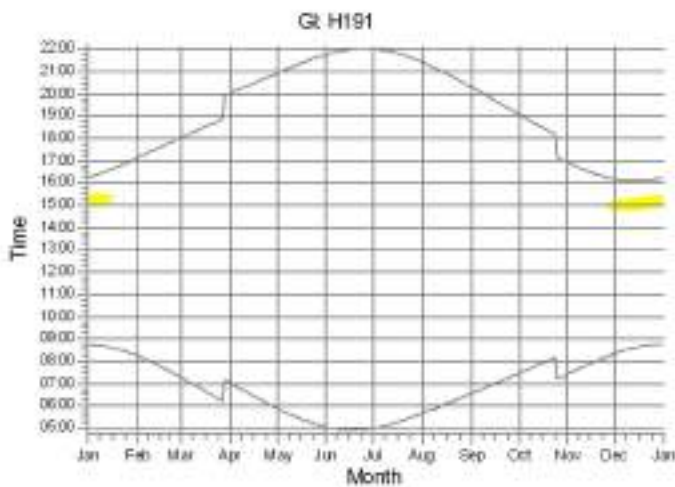
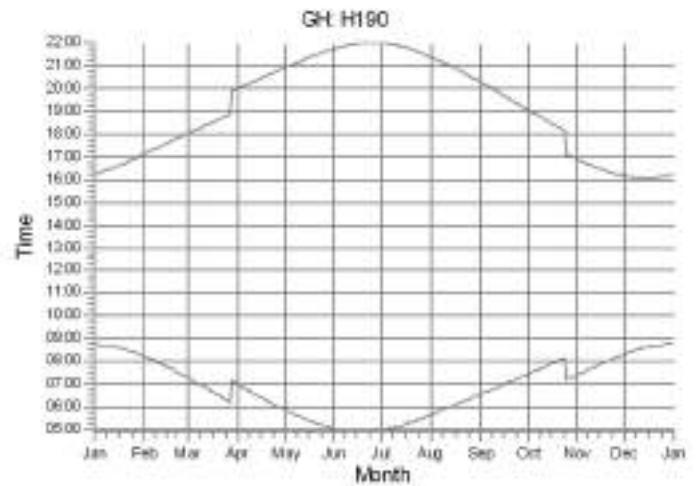
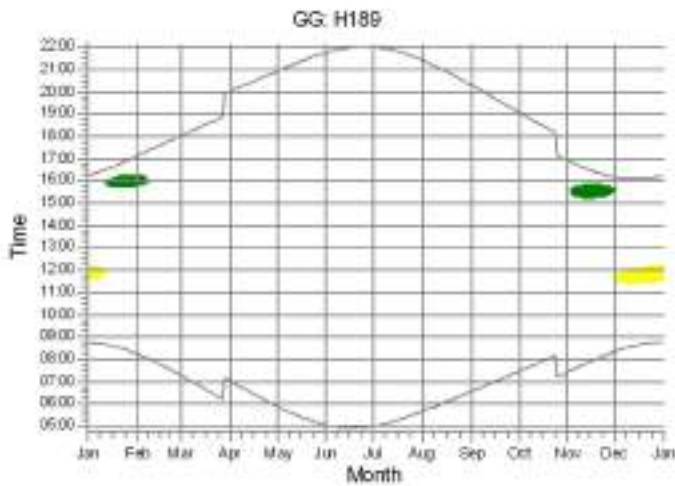
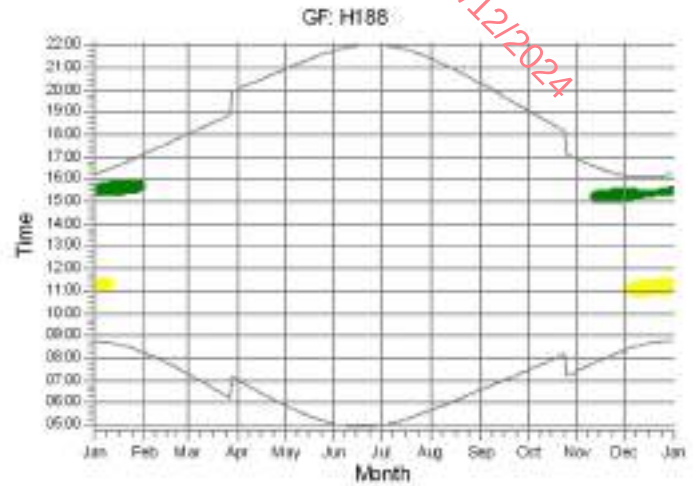
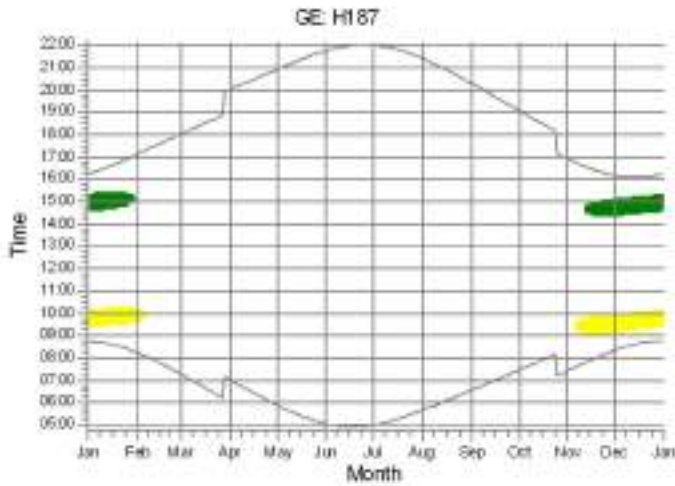


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

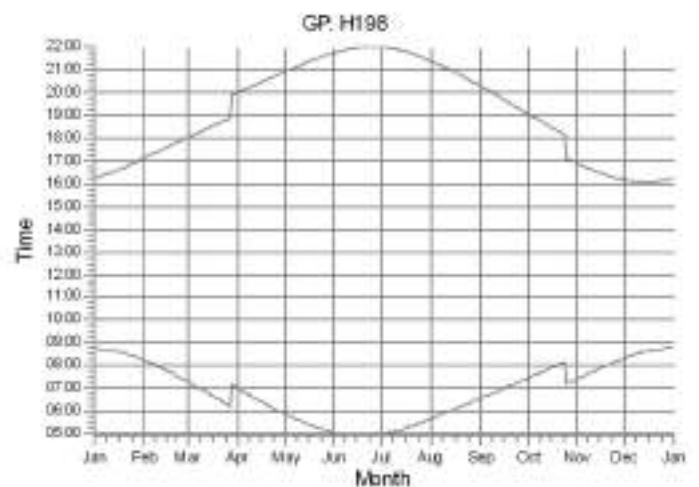
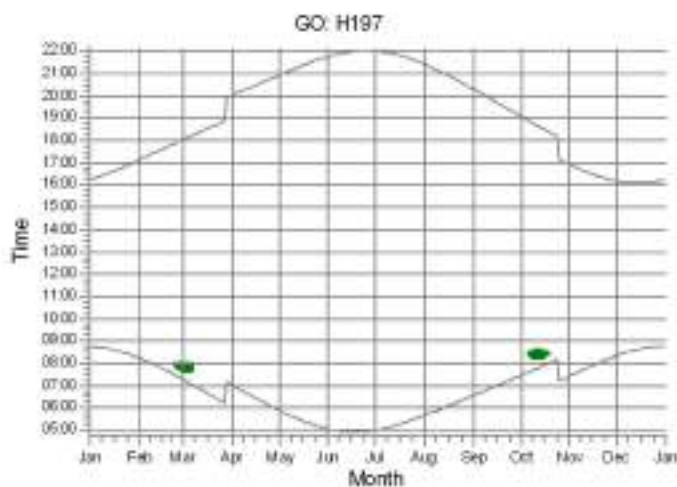
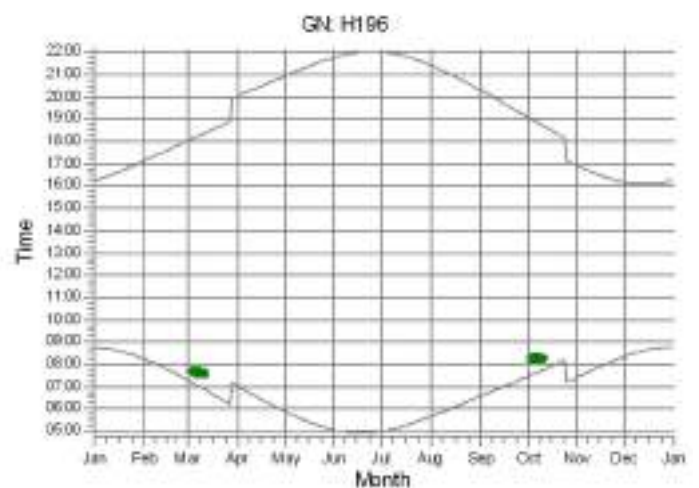
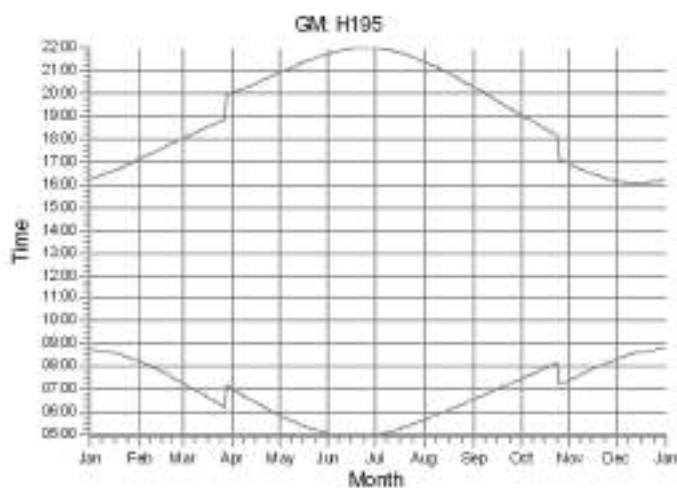
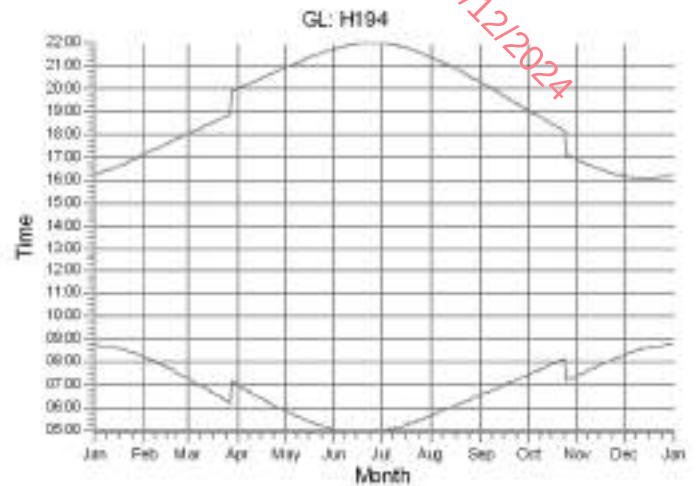
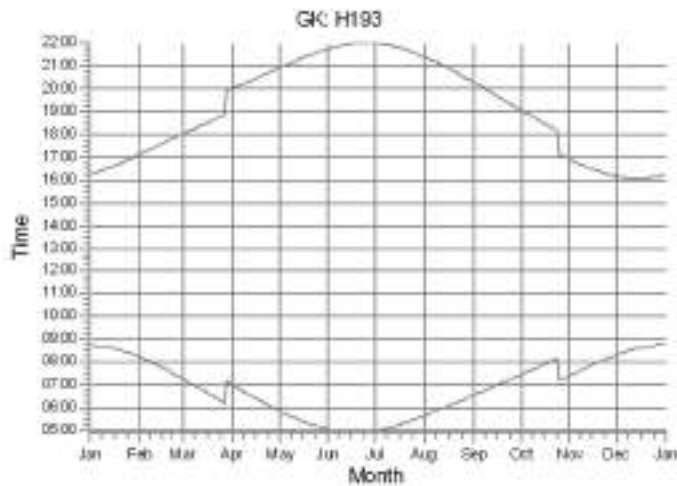


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

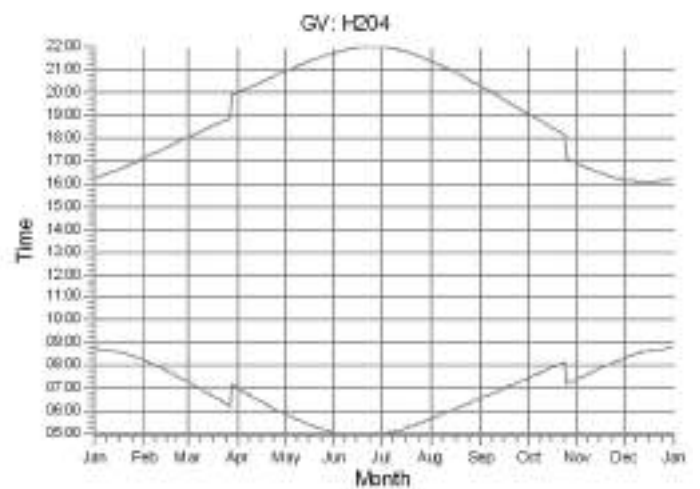
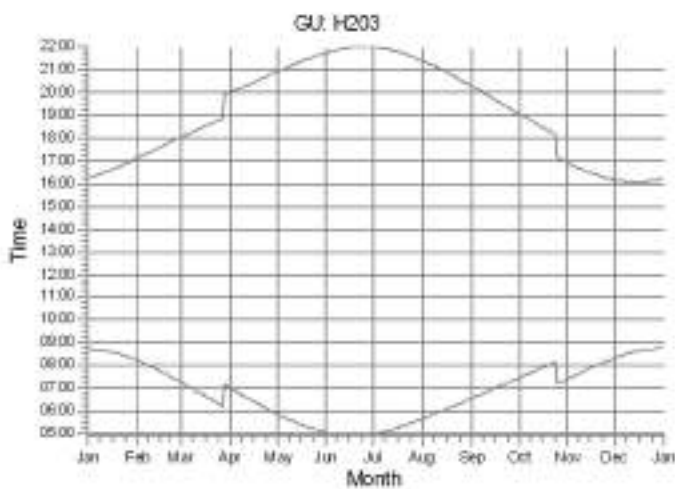
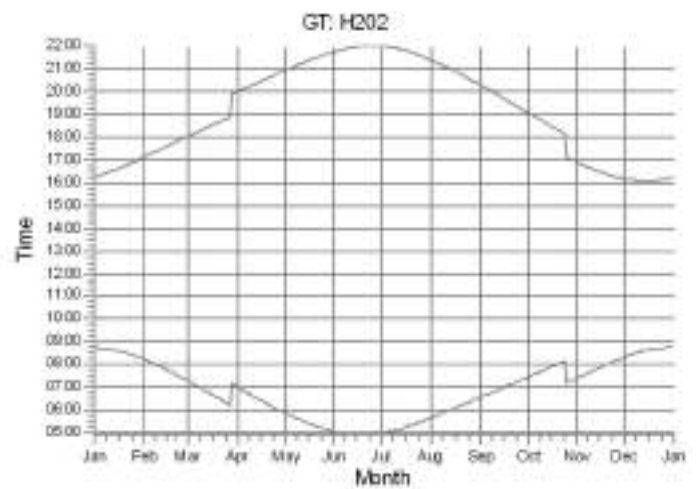
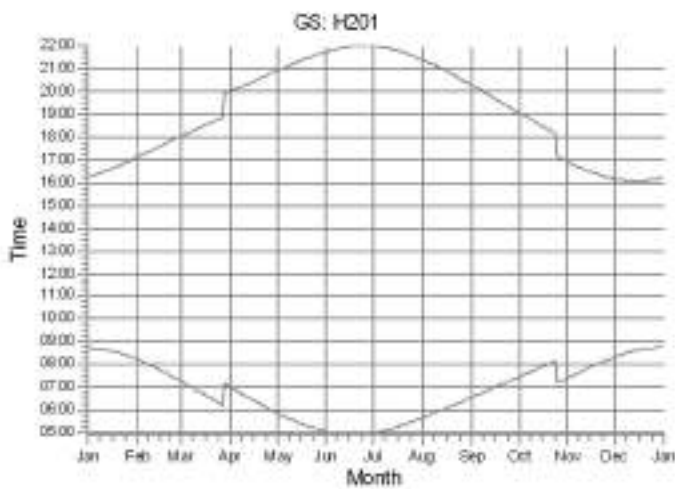
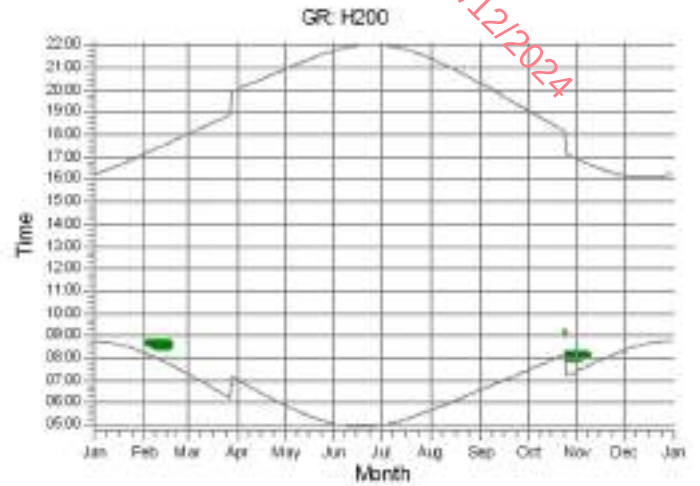
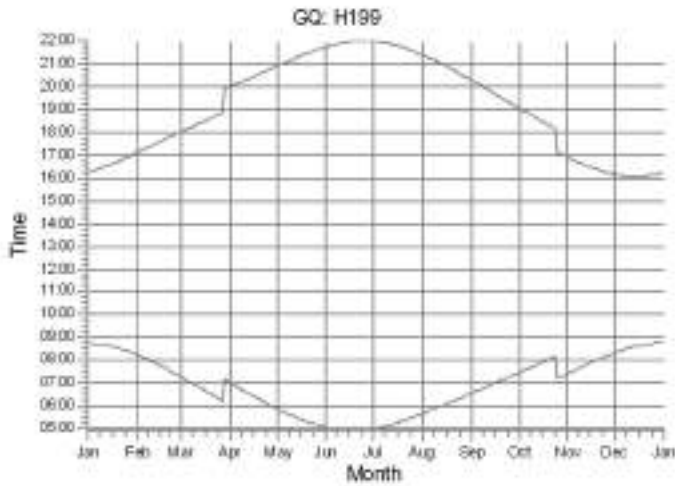


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



WTGs

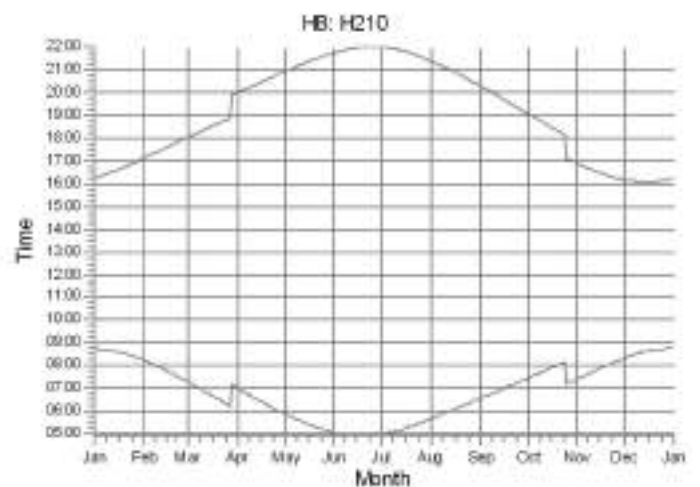
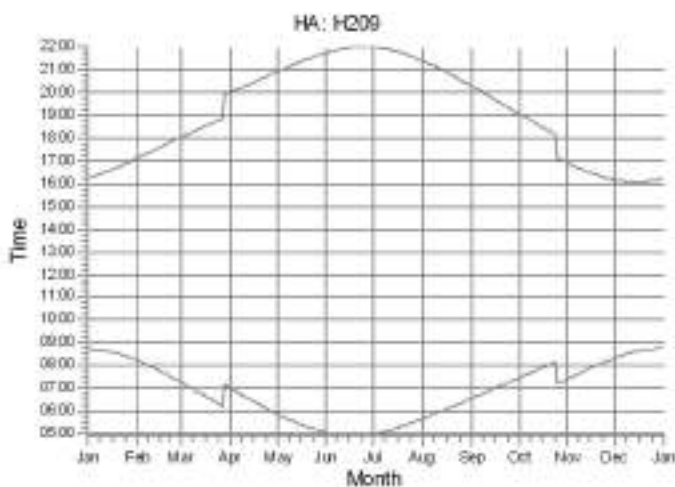
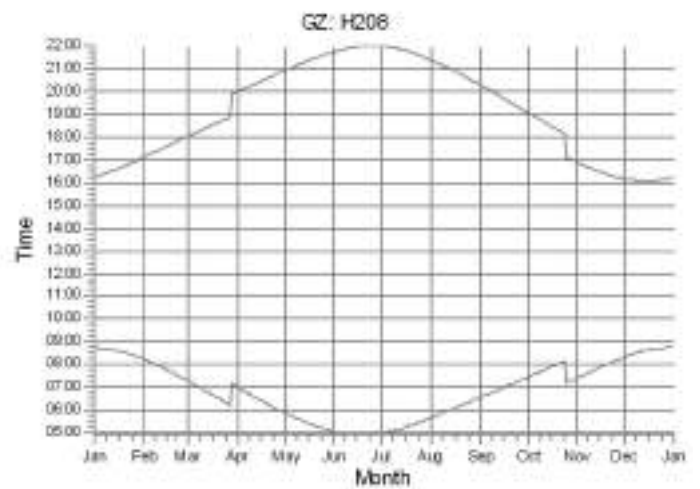
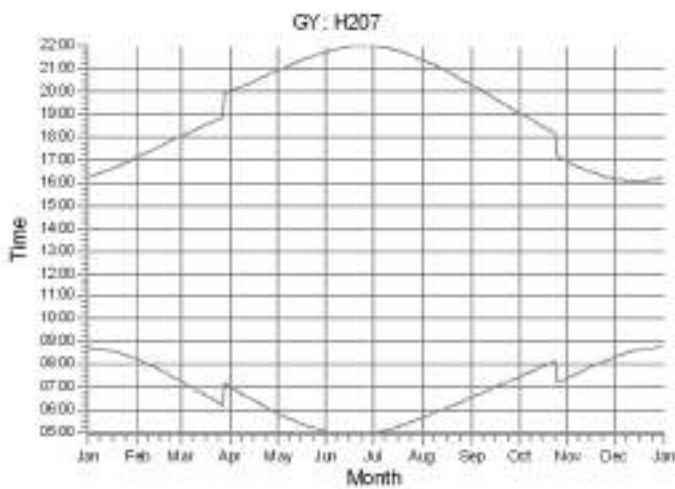
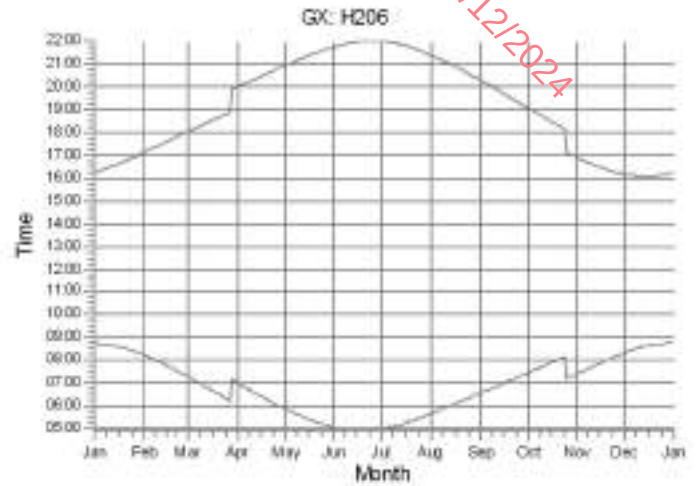
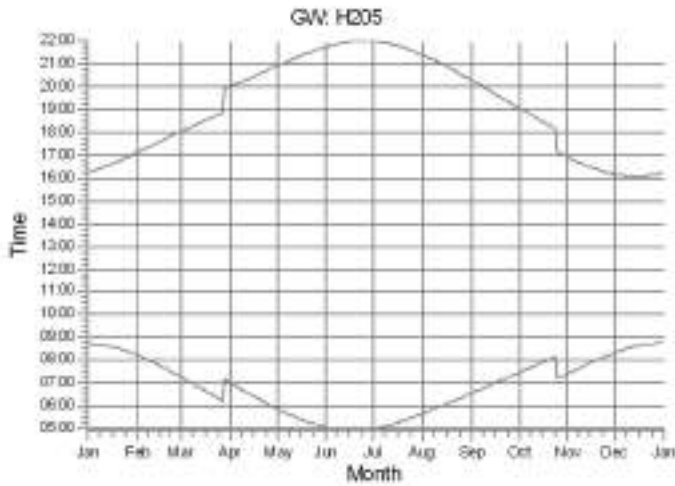
1: T01

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



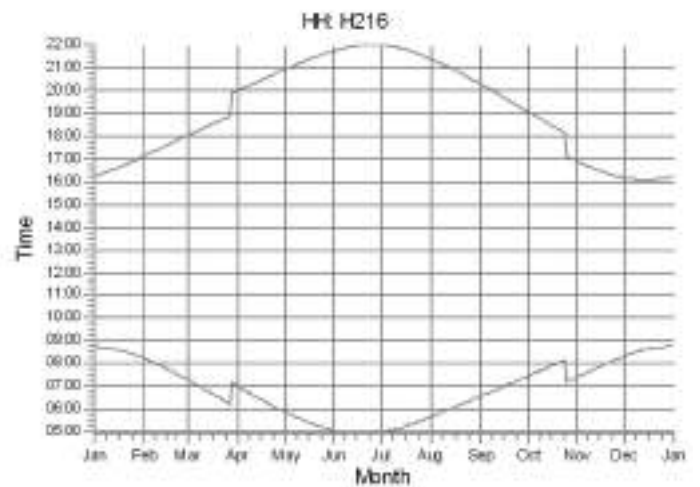
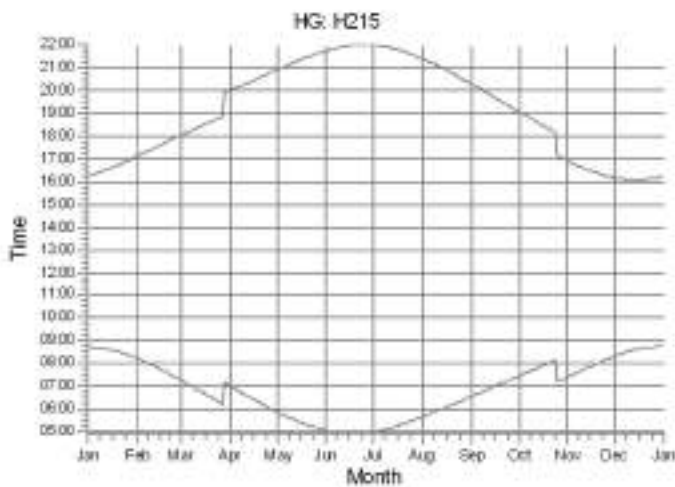
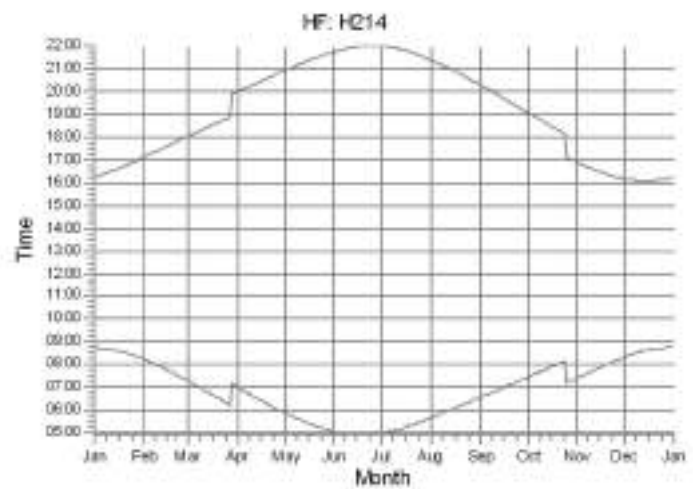
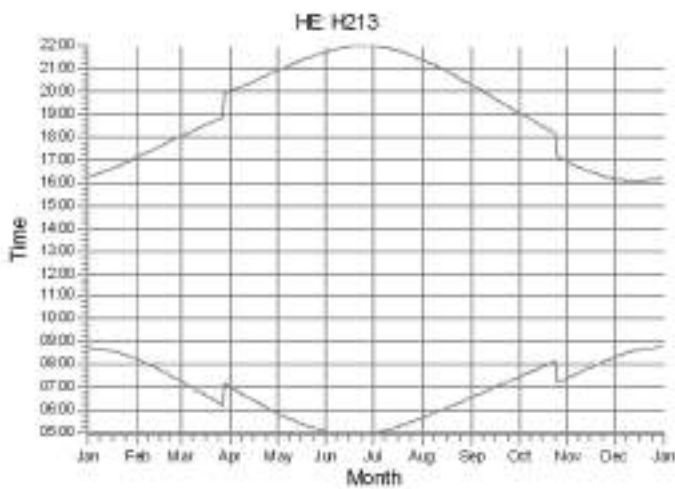
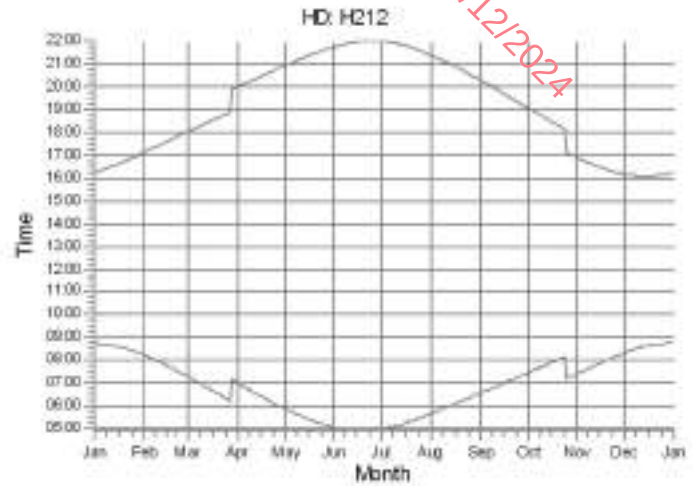
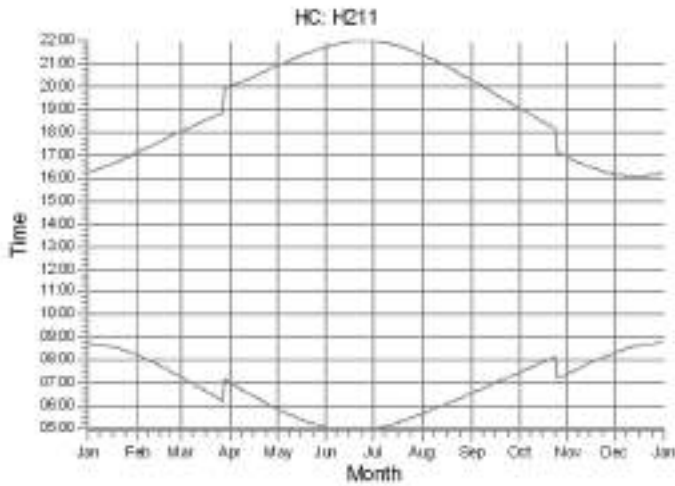
WTGs

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



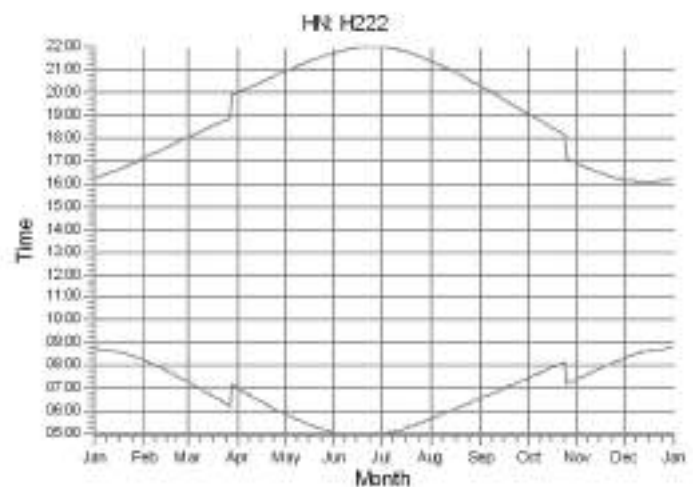
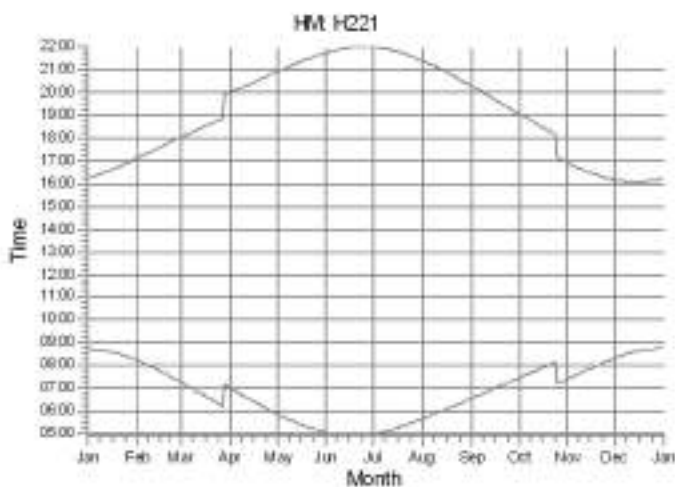
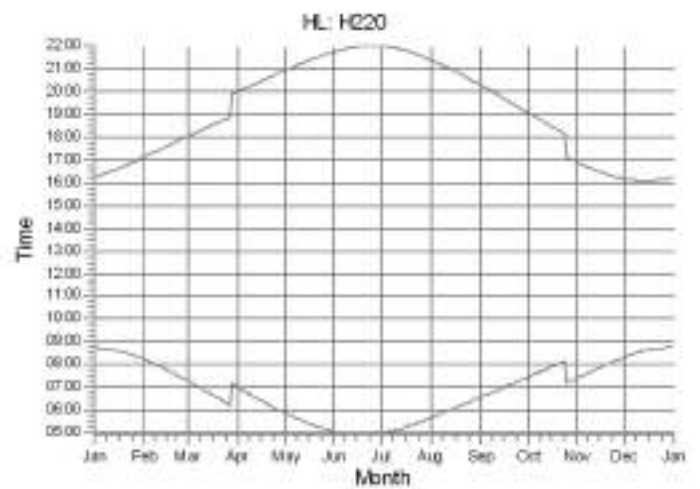
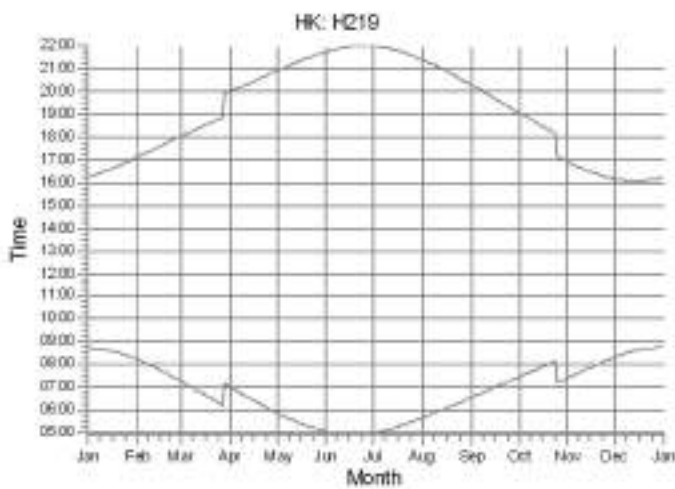
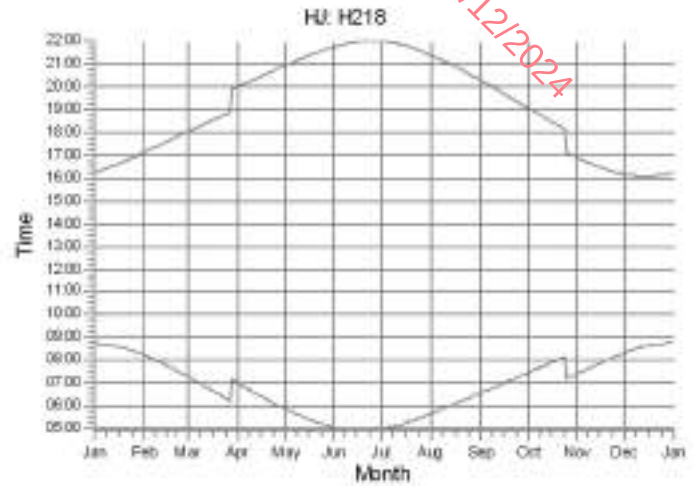
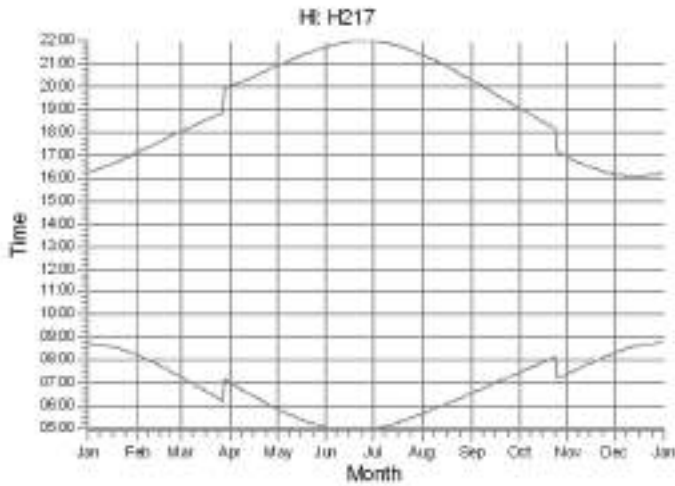
WTGs

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

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11/07/2024 10:33/4.0.547

SHADOW - Calendar, graphical

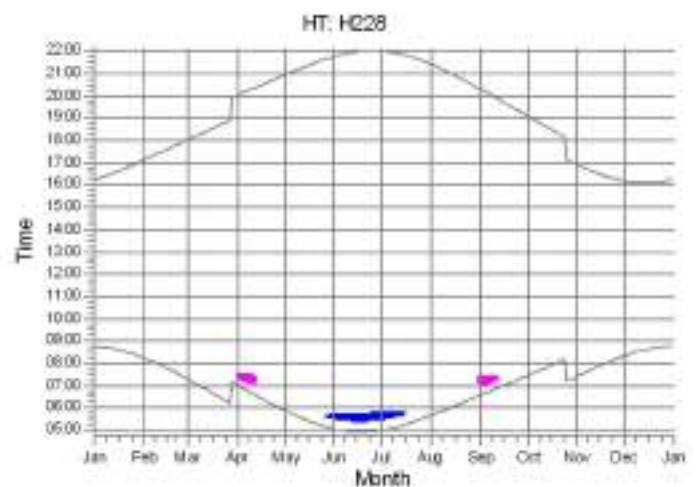
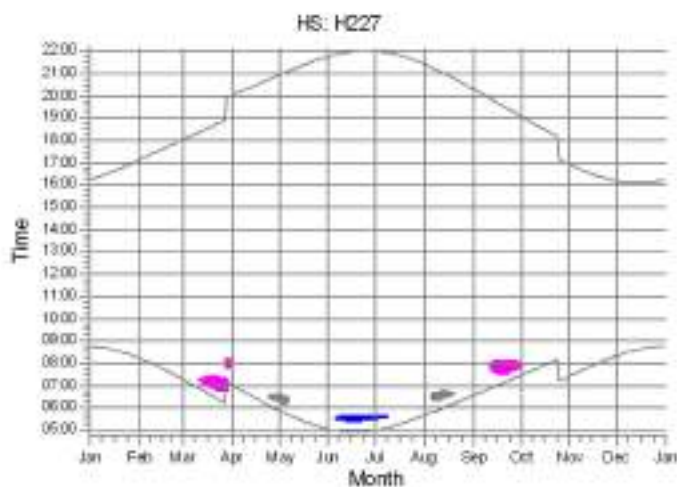
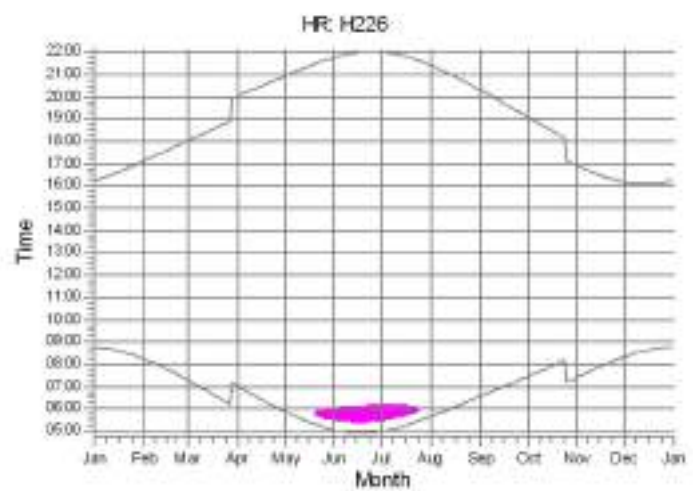
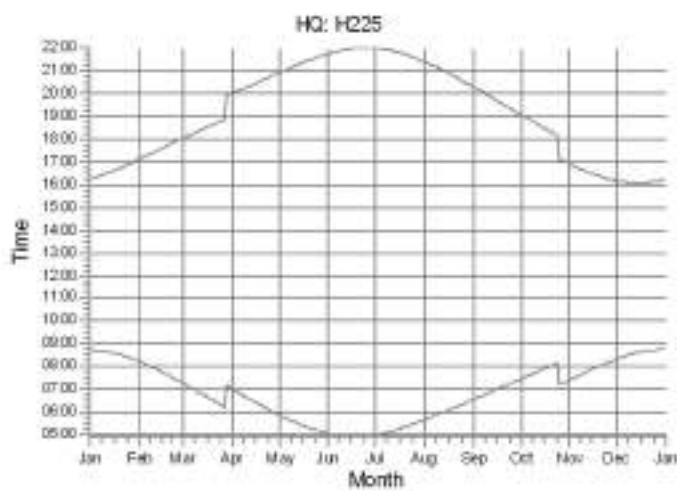
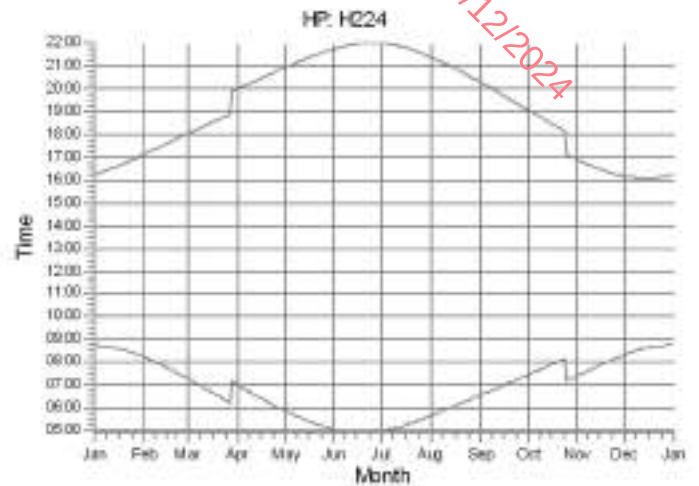
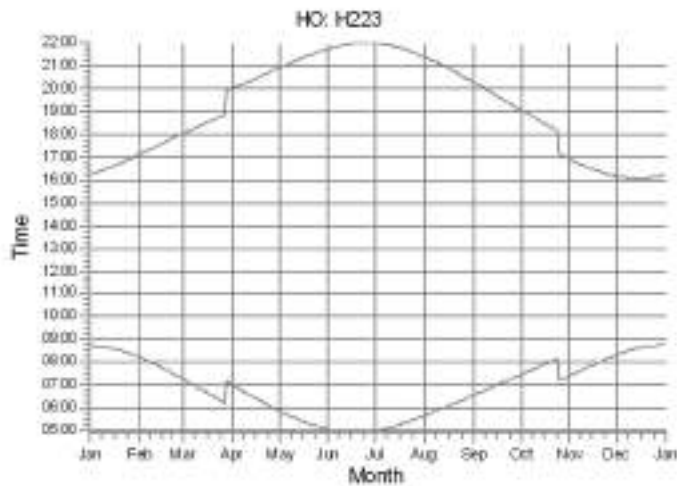
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

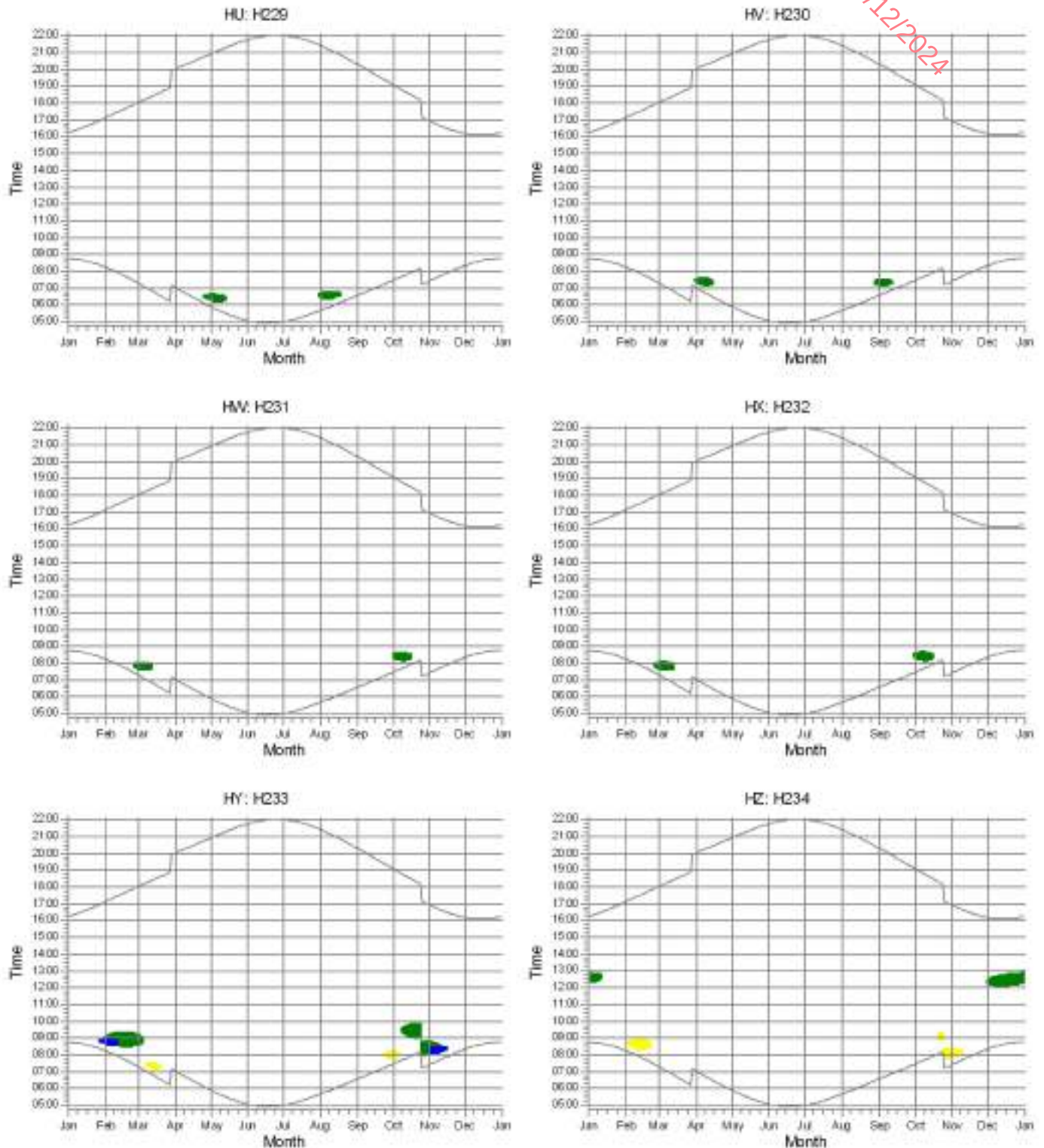


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

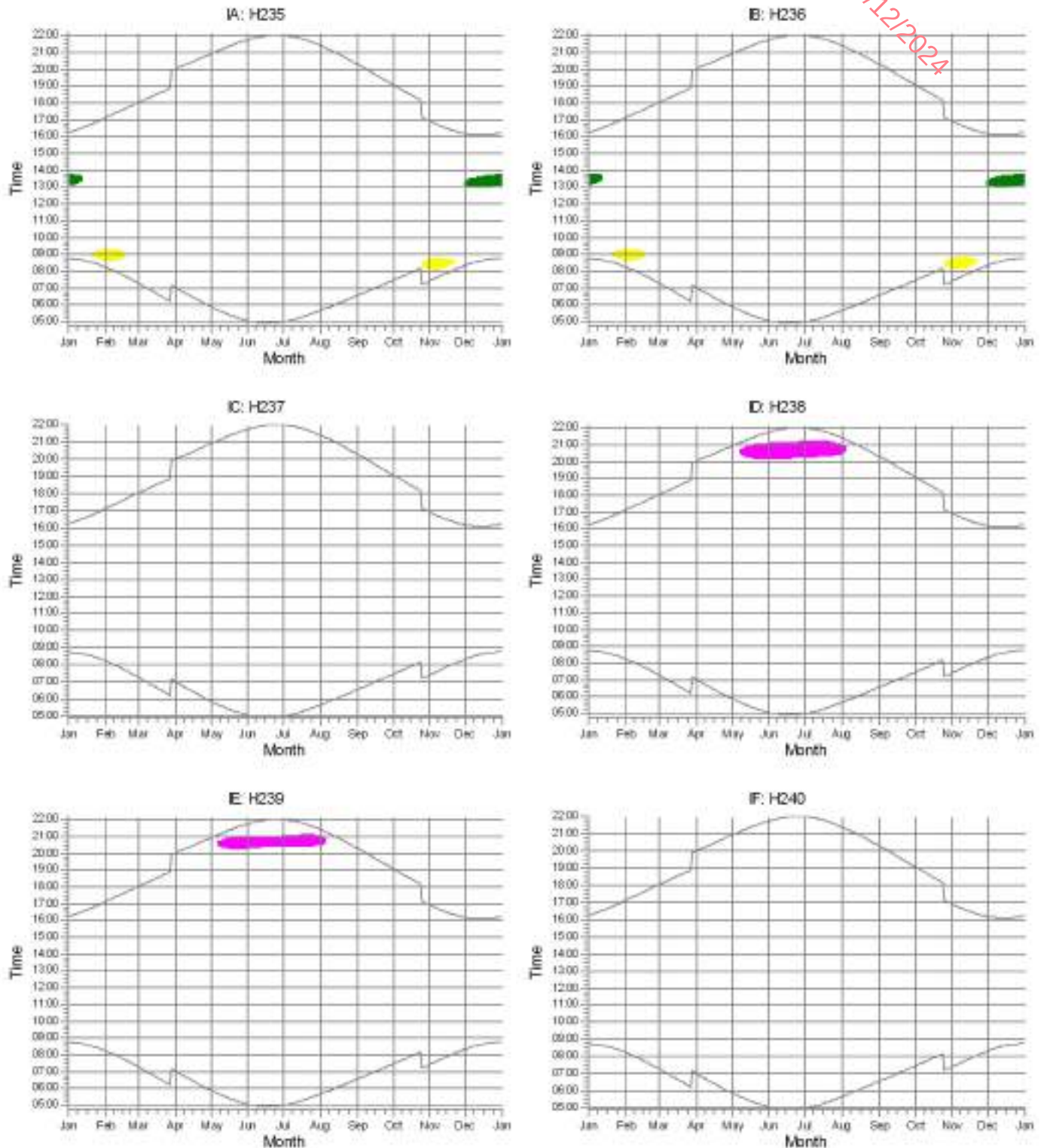


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

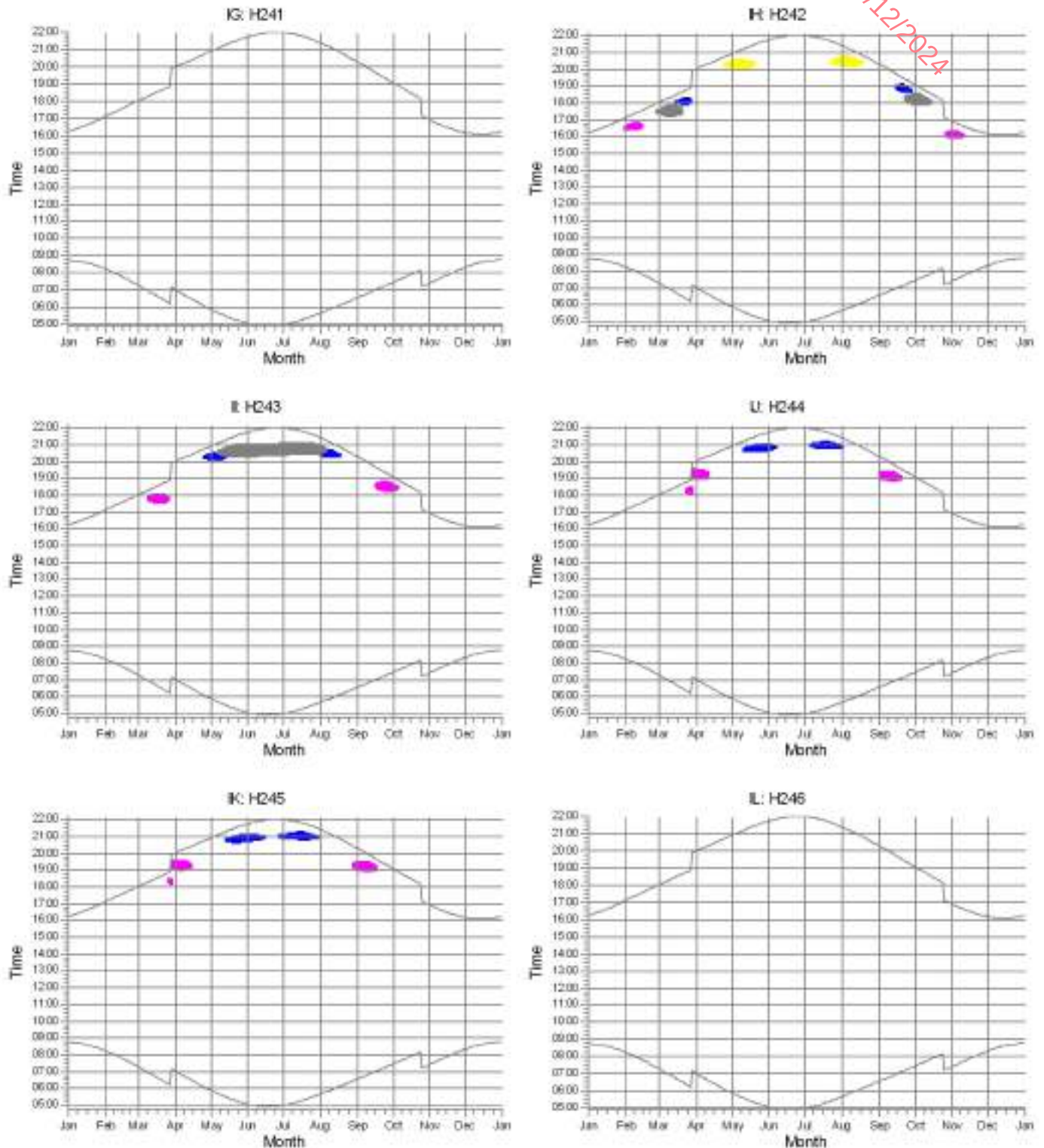


WTGs

1: T01 2: T02 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

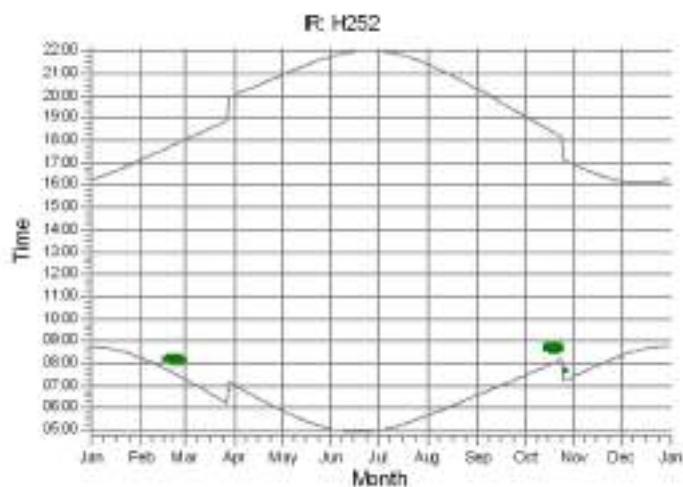
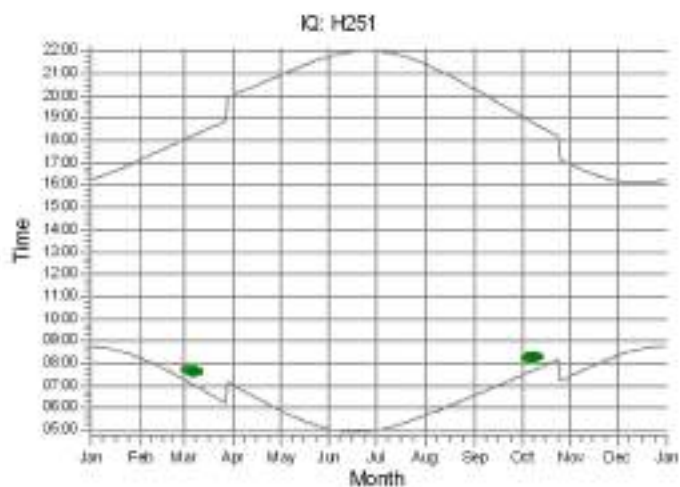
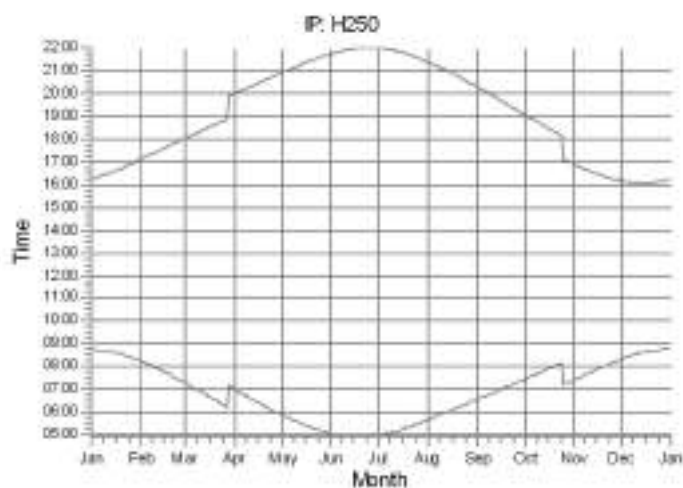
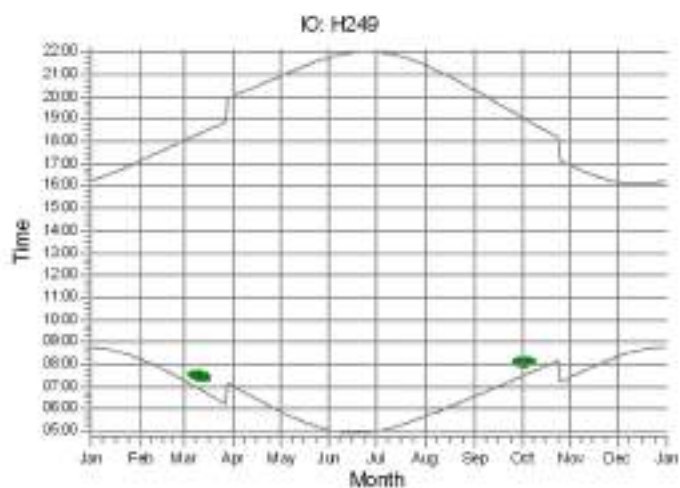
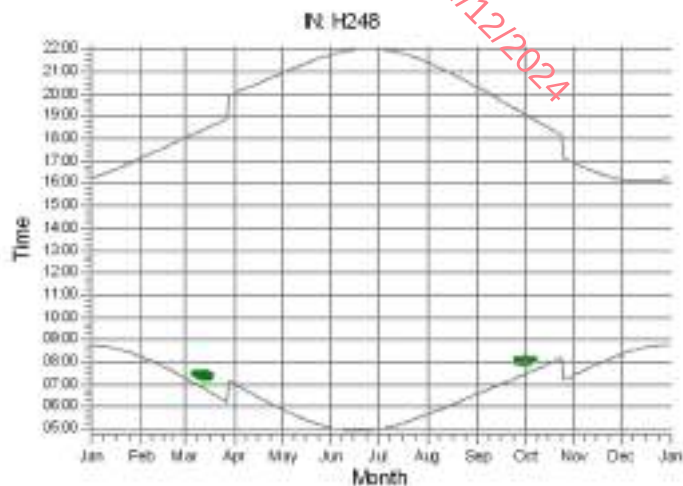
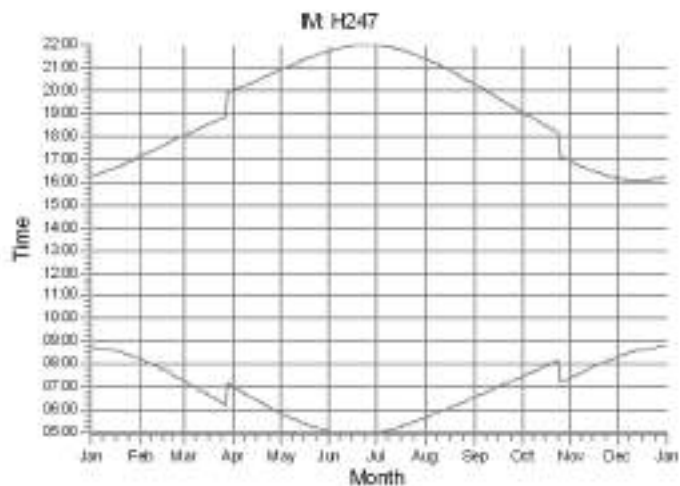


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

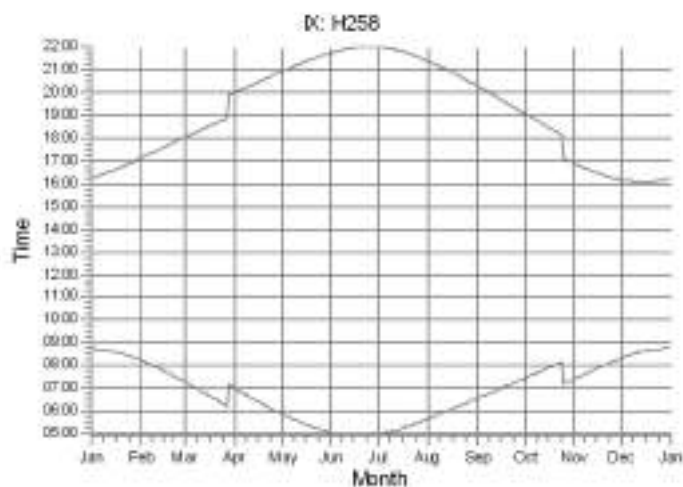
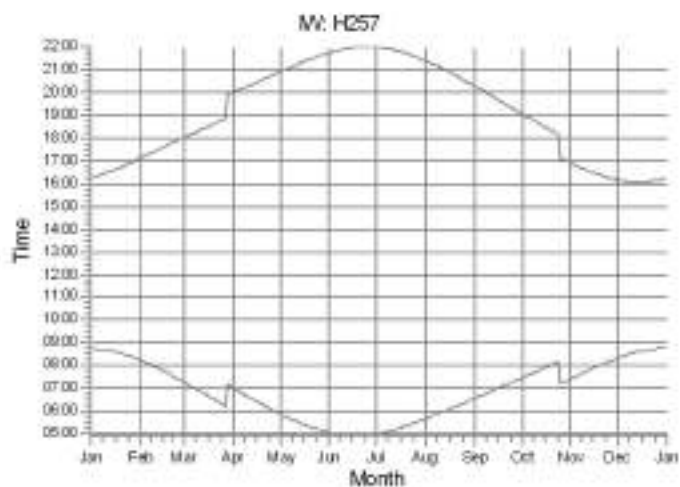
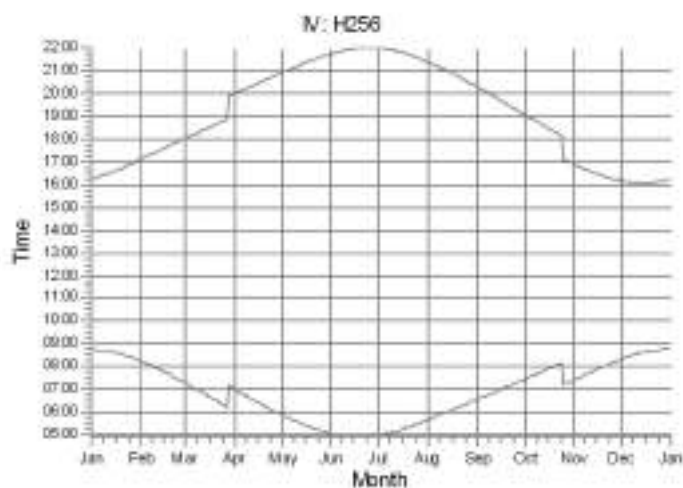
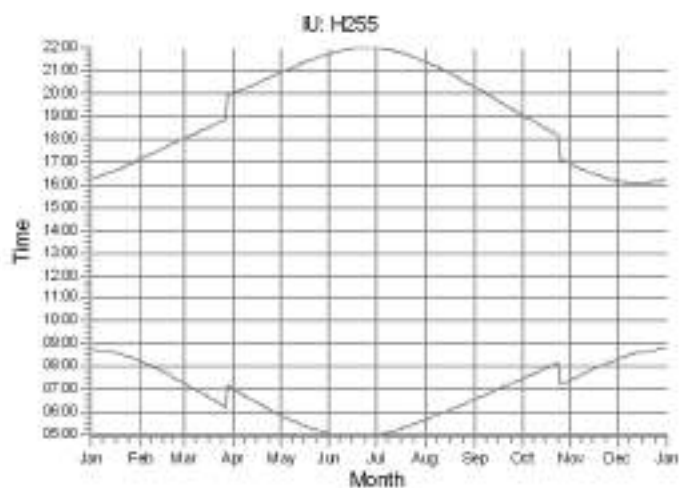
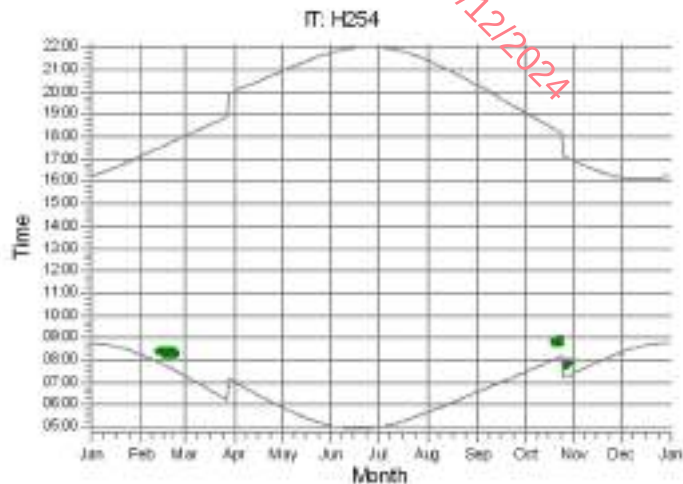
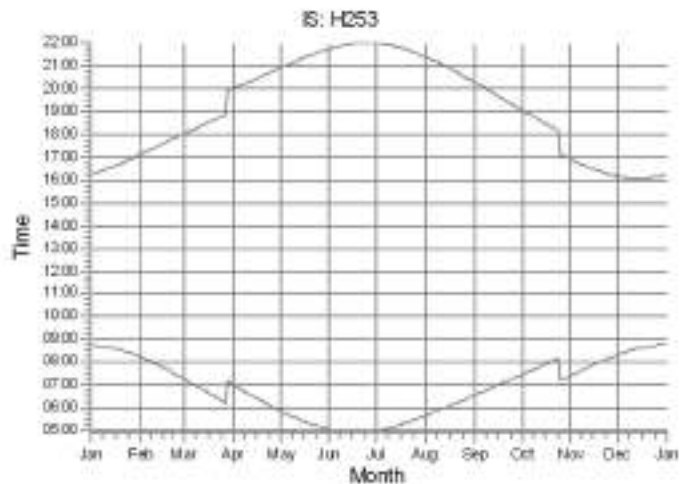


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



WTGs

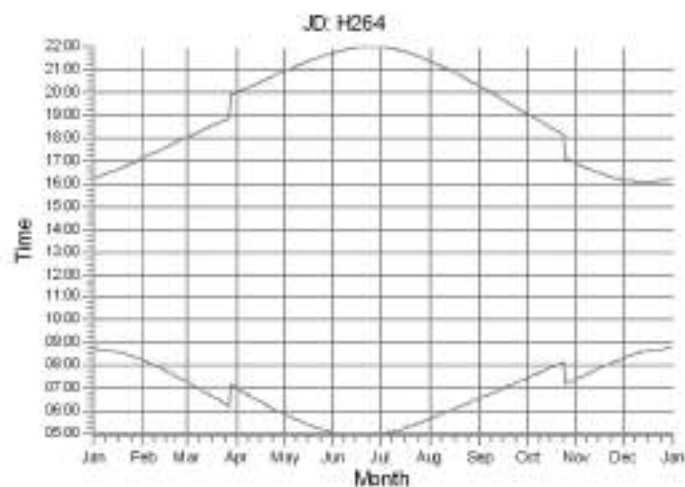
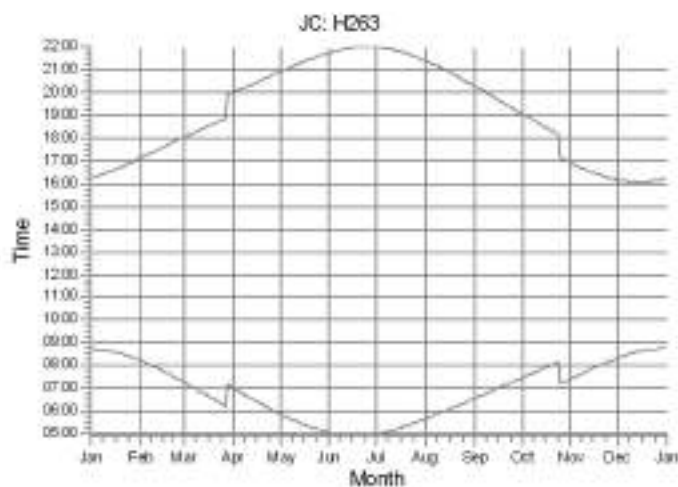
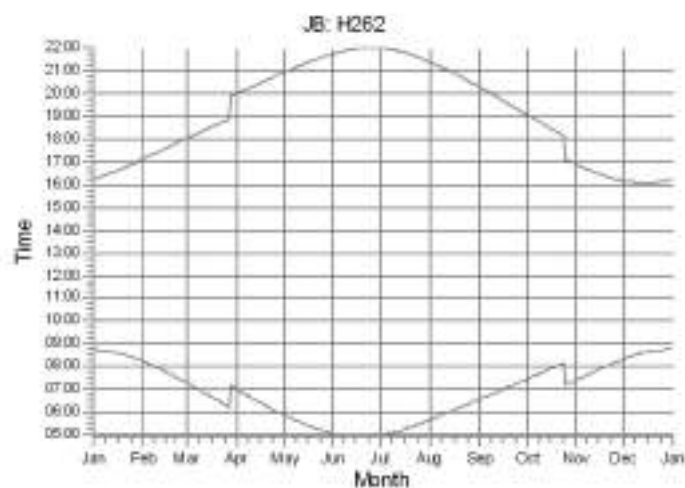
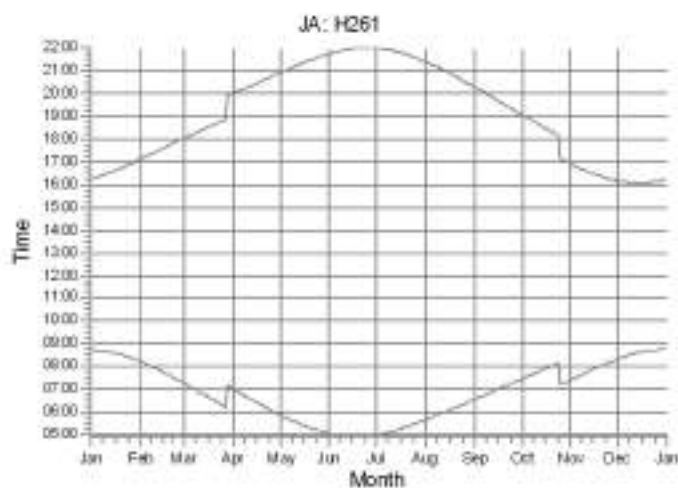
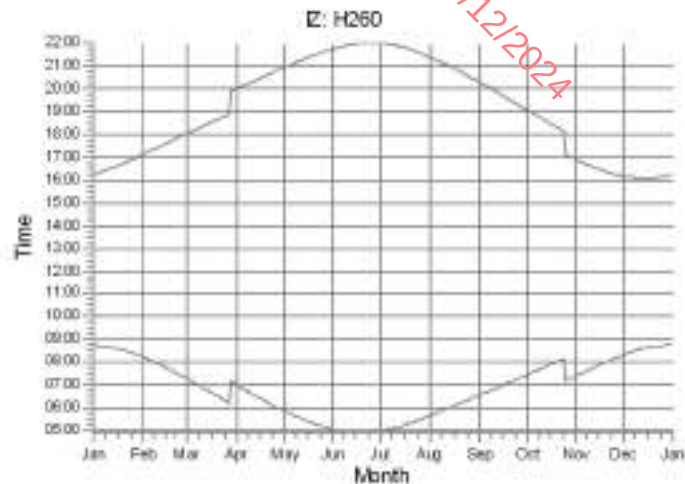
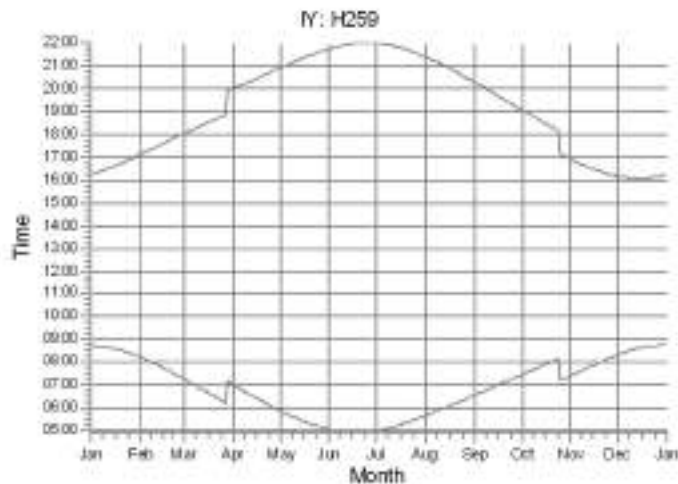
1: T01

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

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SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



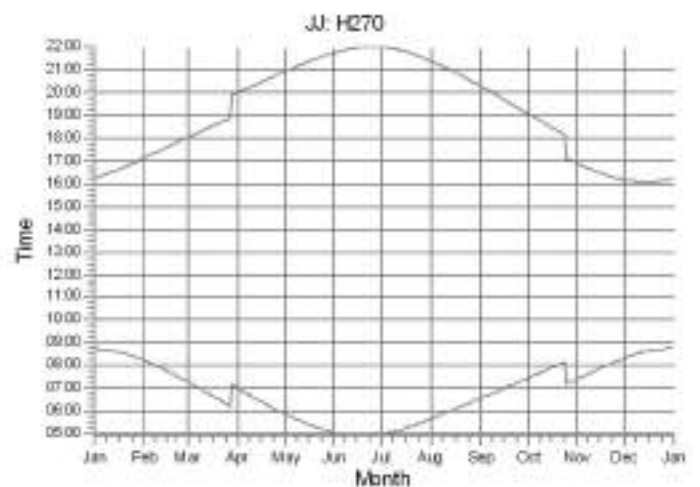
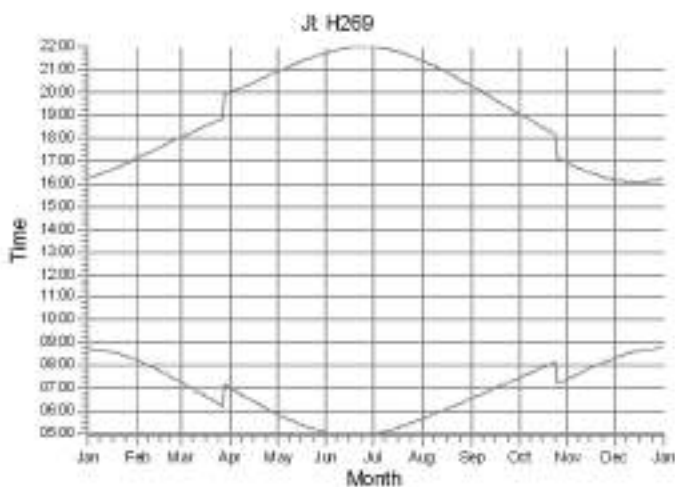
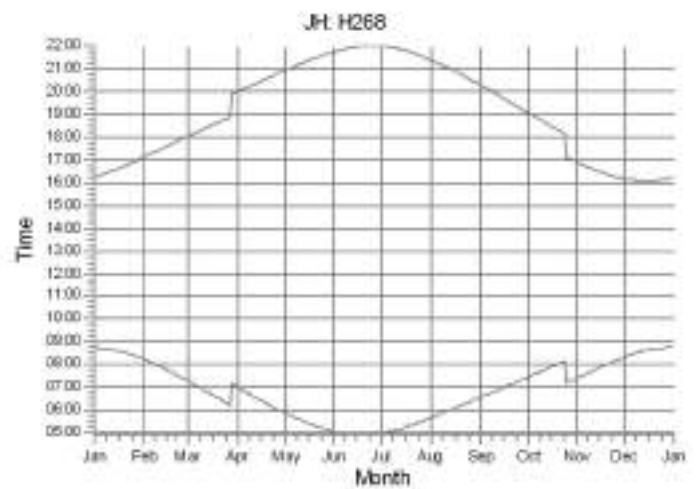
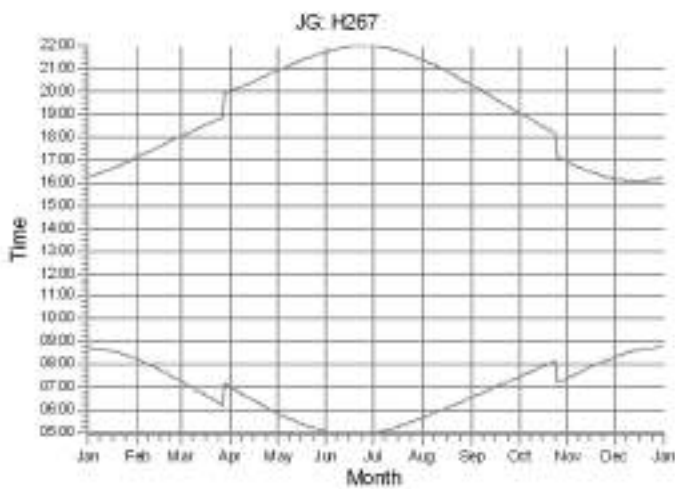
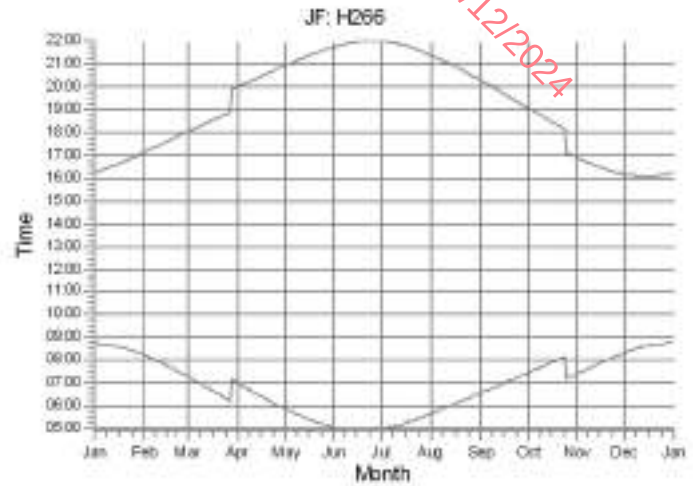
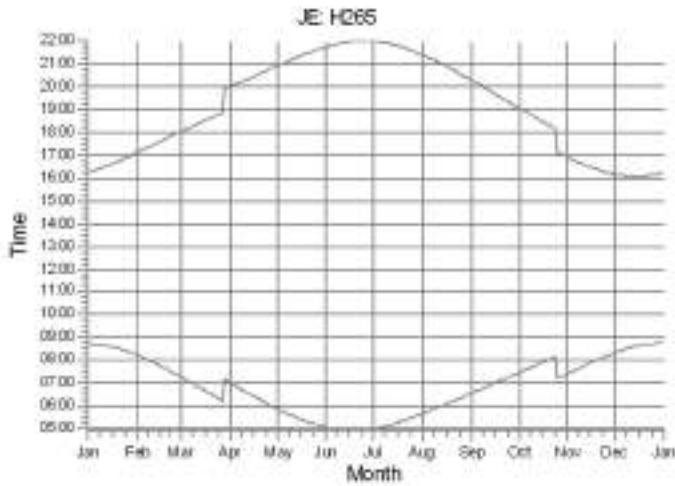
WTGs

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SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



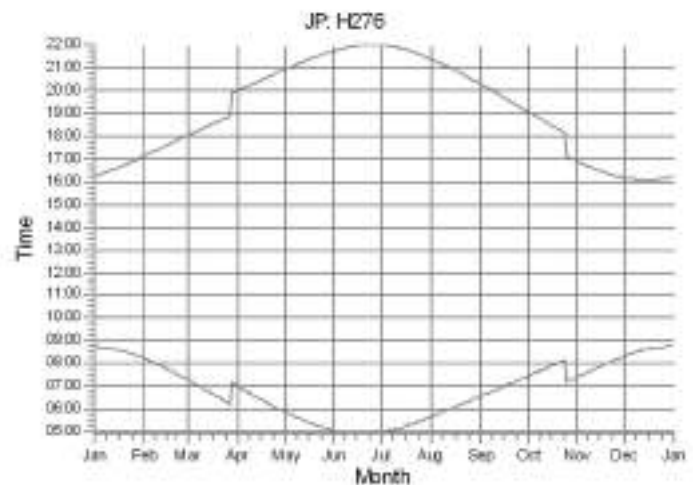
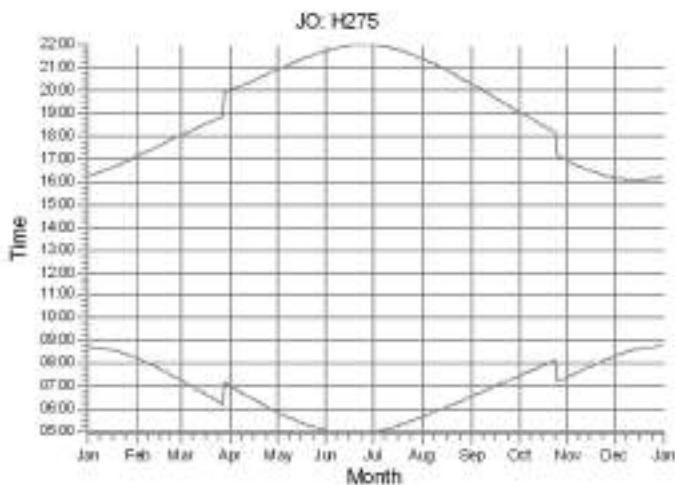
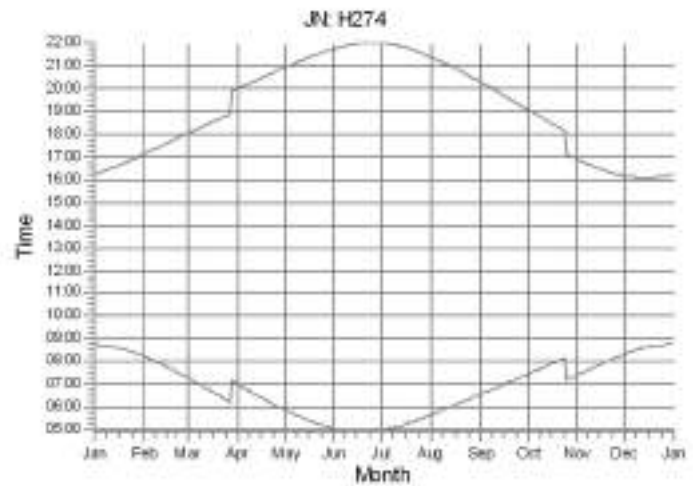
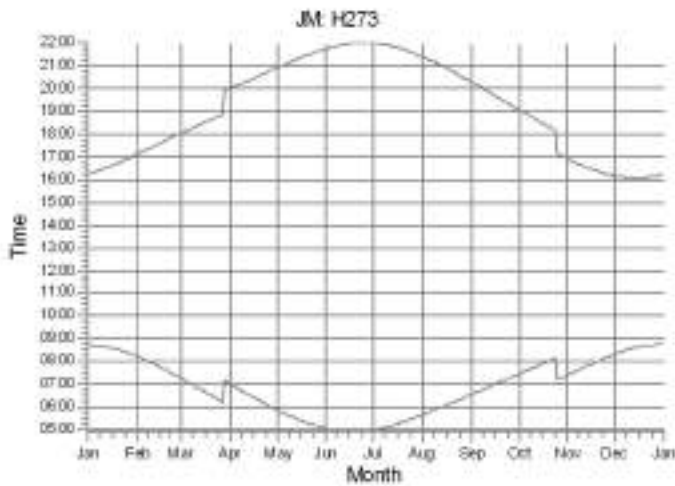
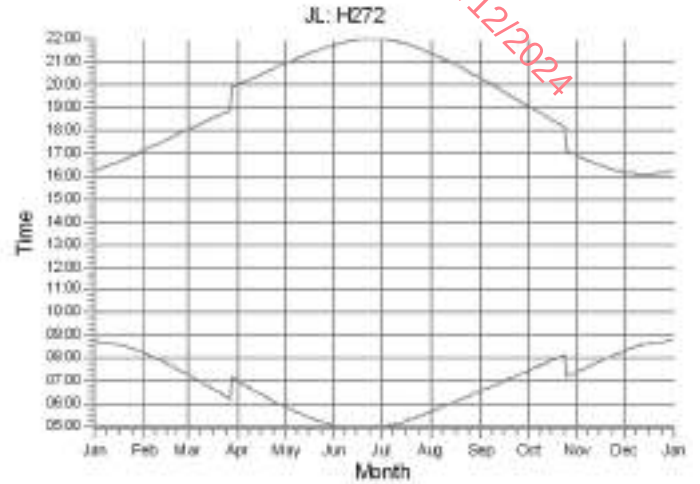
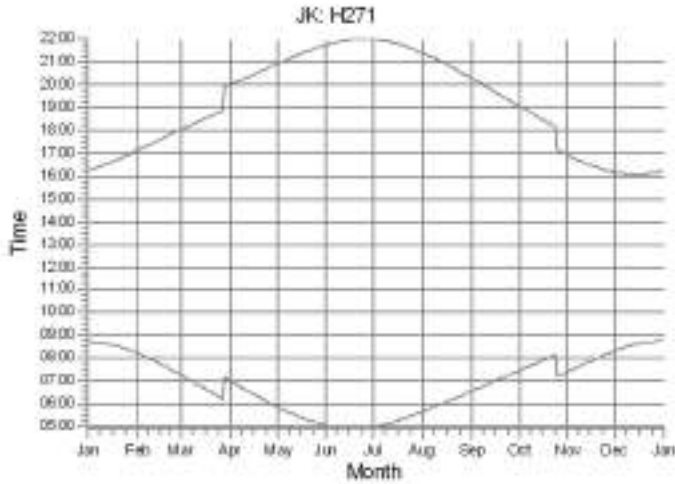
WTGs

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SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



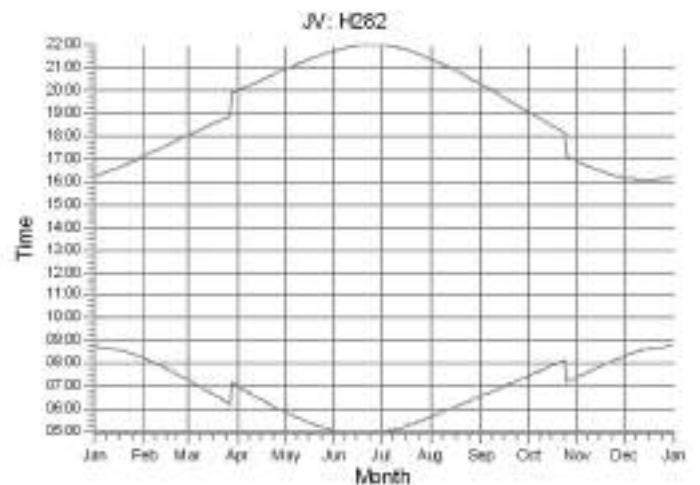
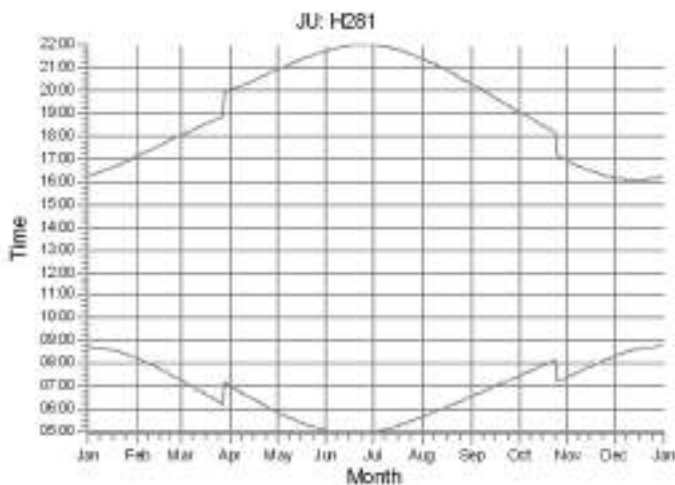
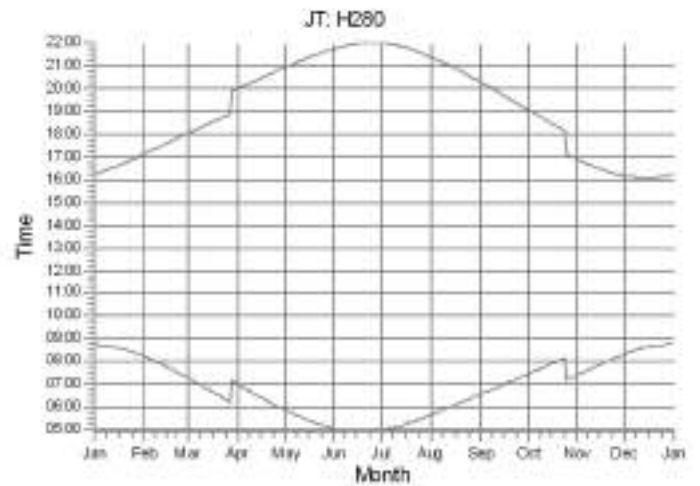
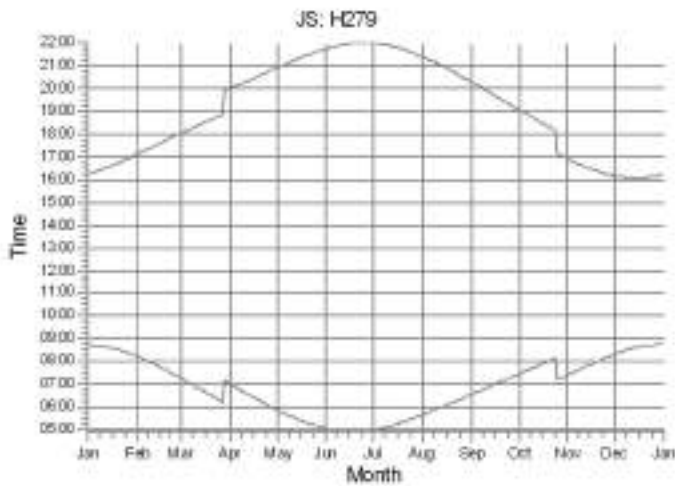
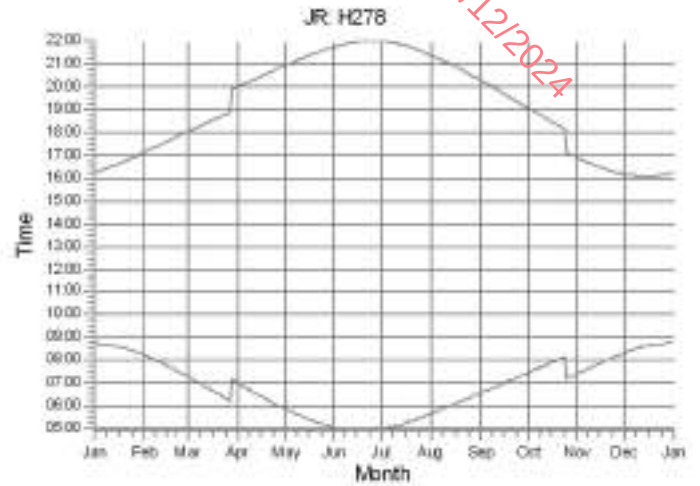
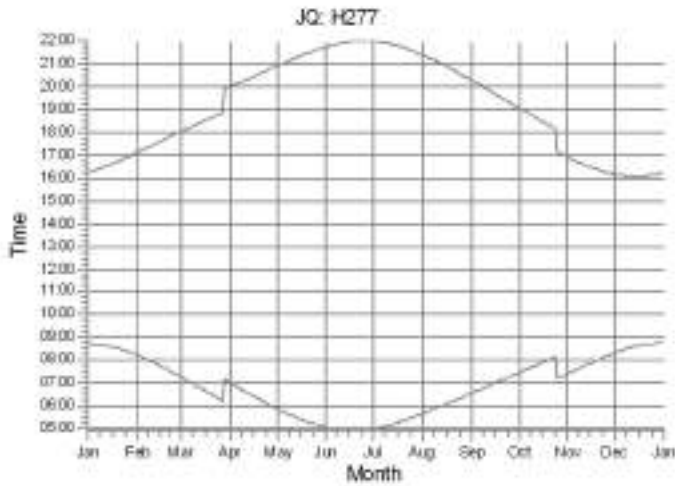
WTGs

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SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



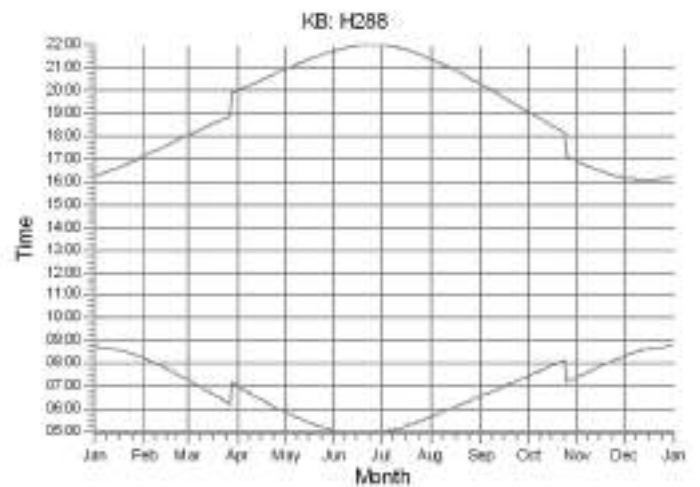
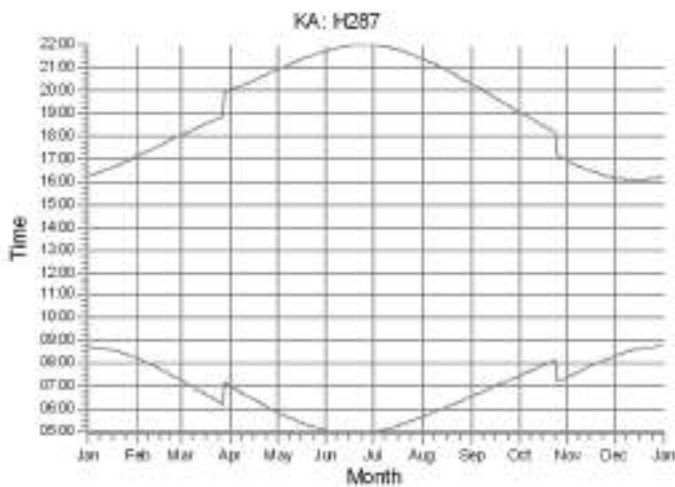
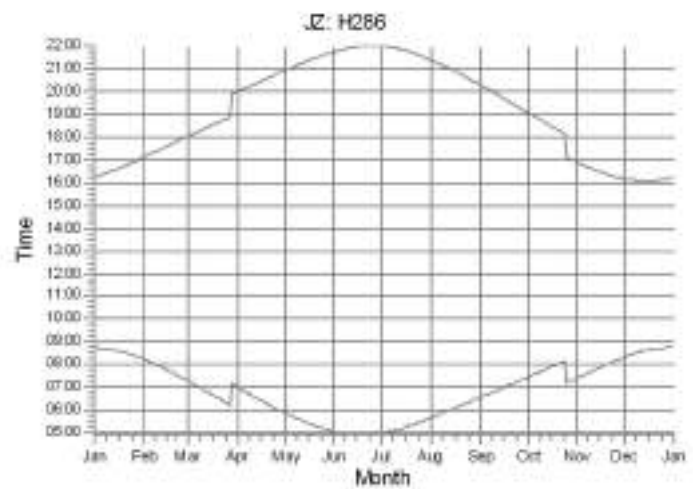
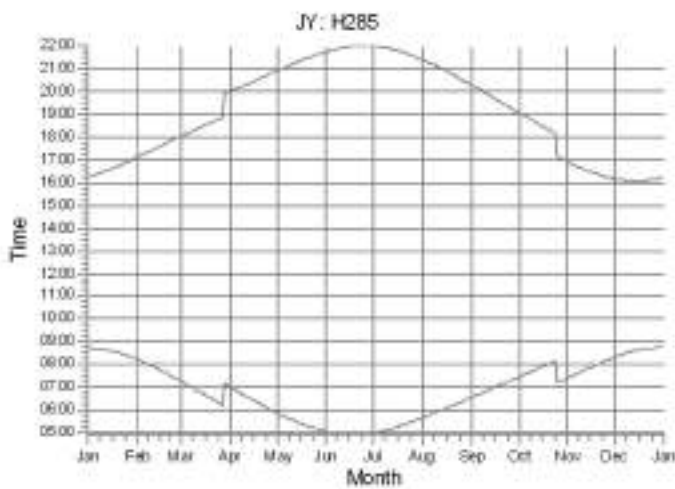
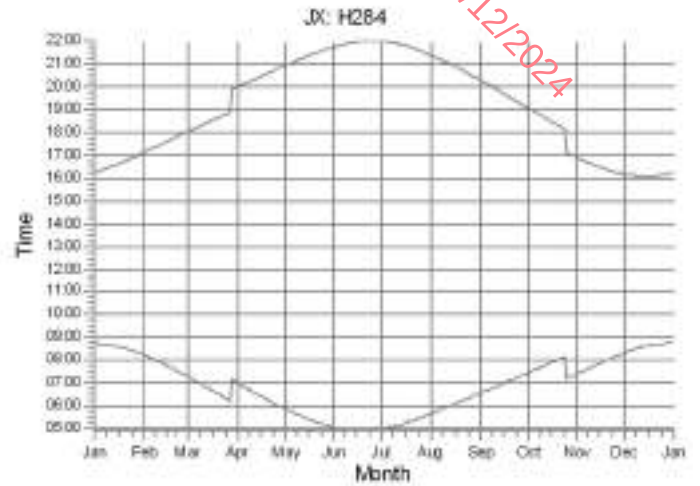
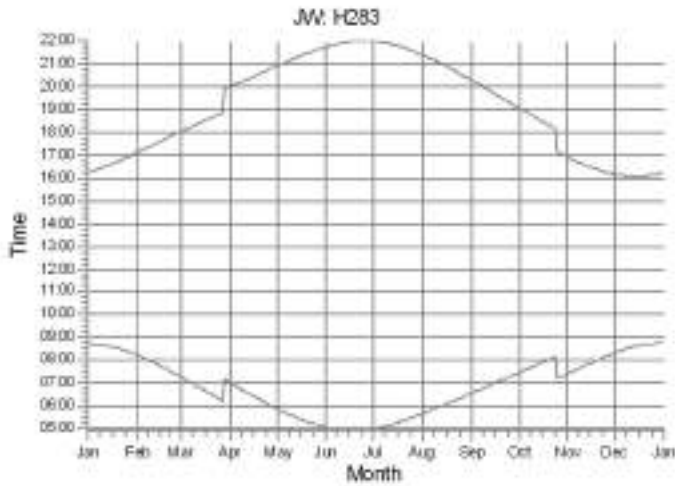
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SHADOW - Calendar, graphical

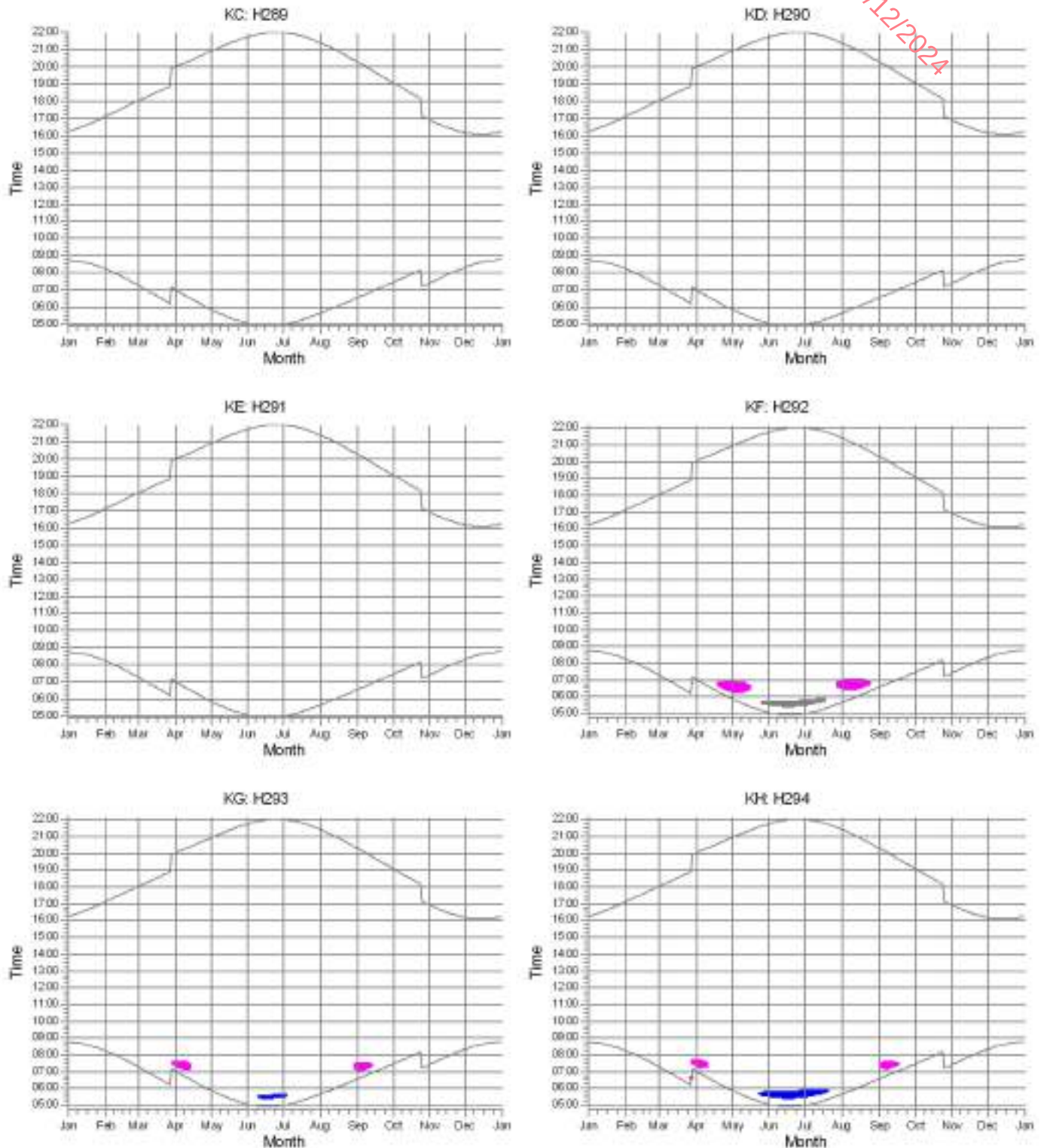
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

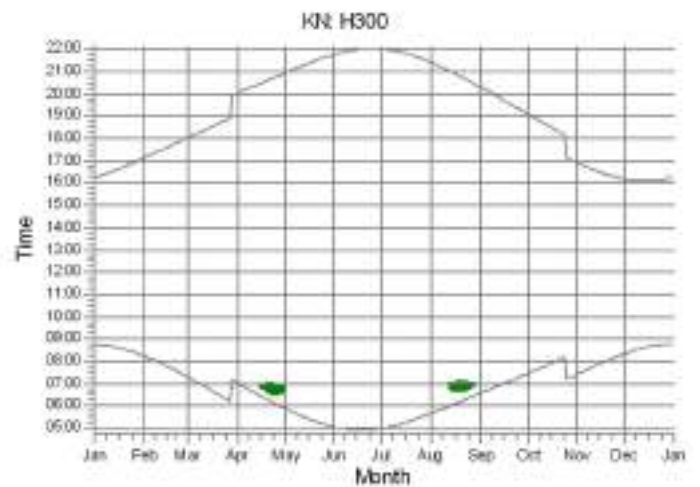
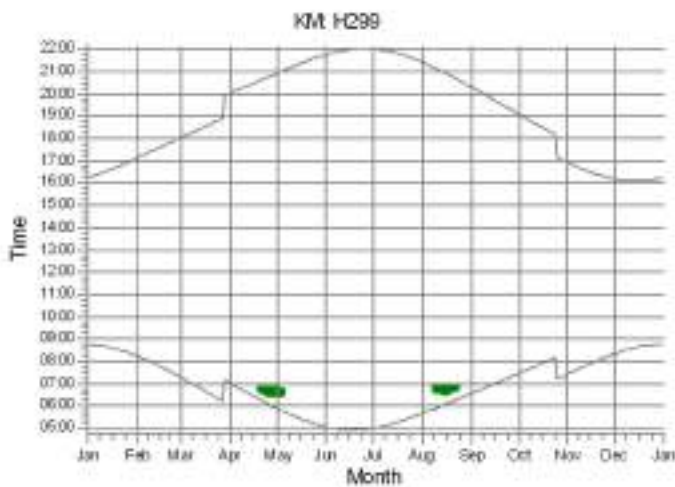
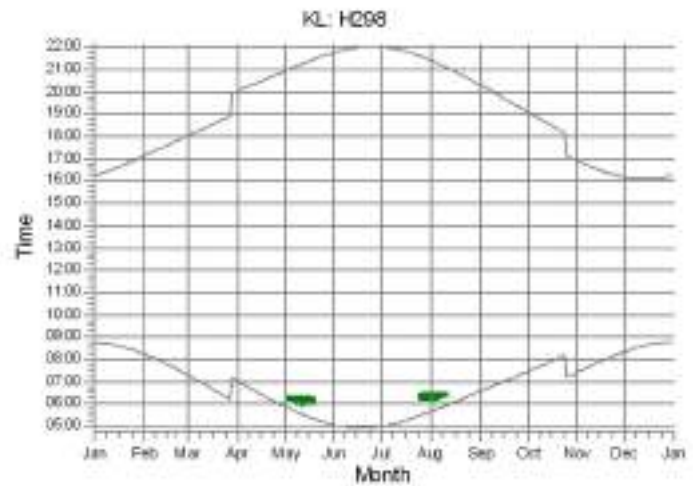
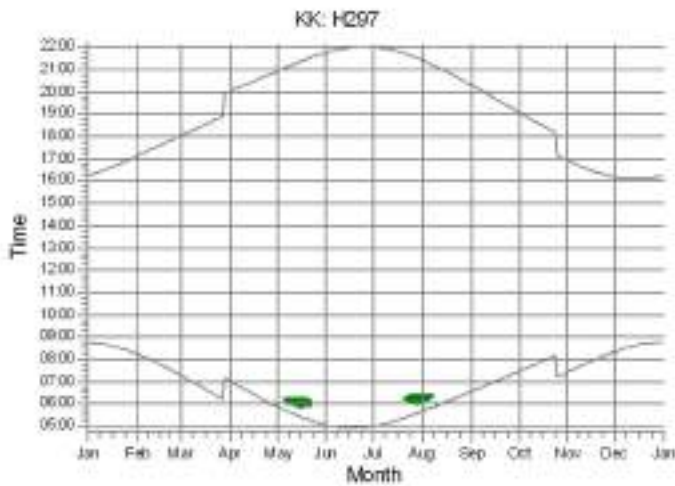
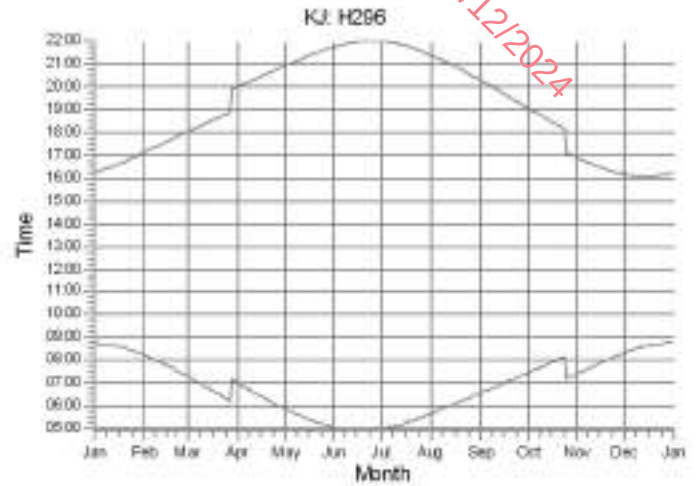
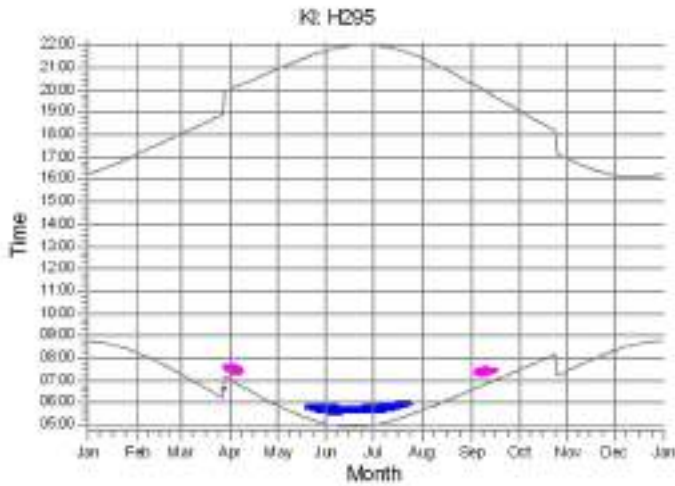


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

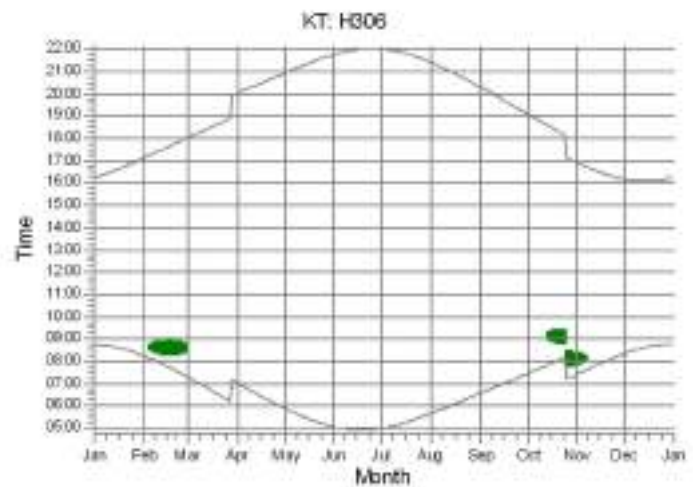
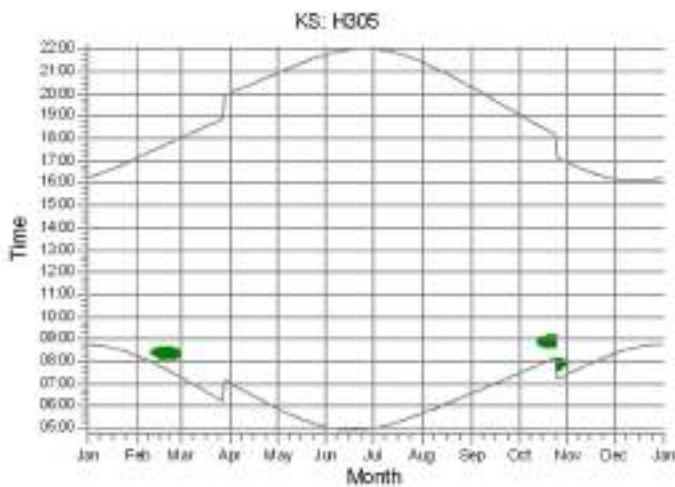
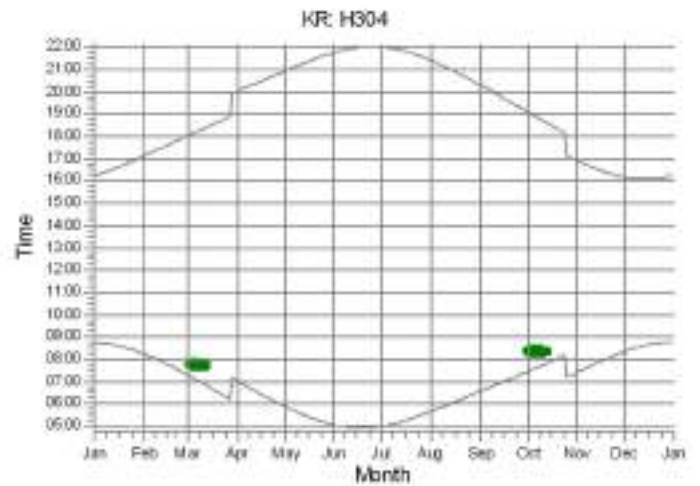
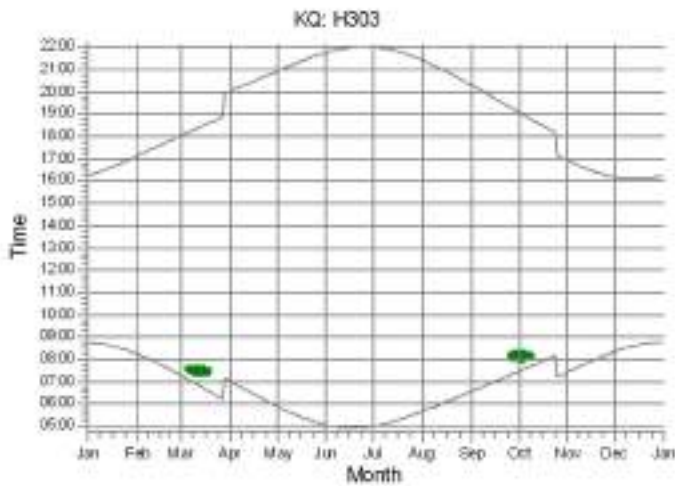
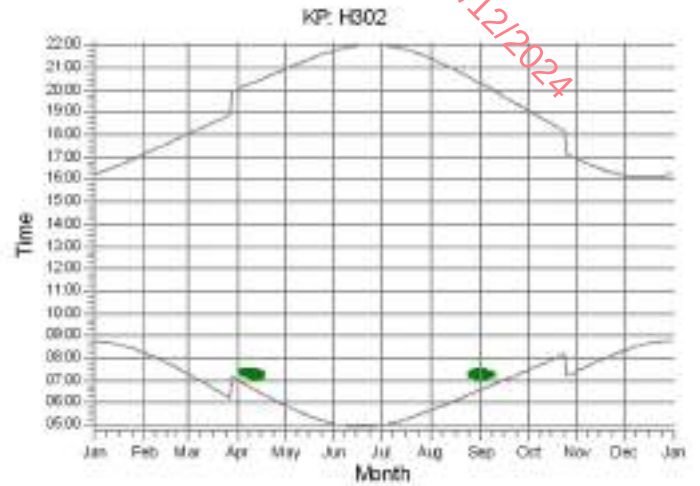
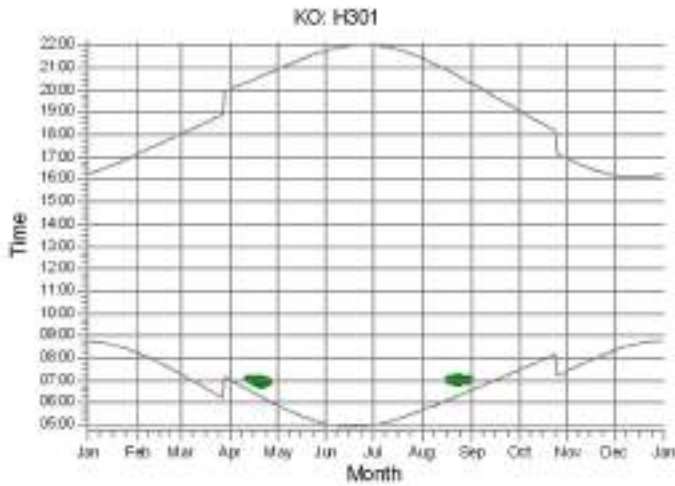


WTGs

1: T01 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

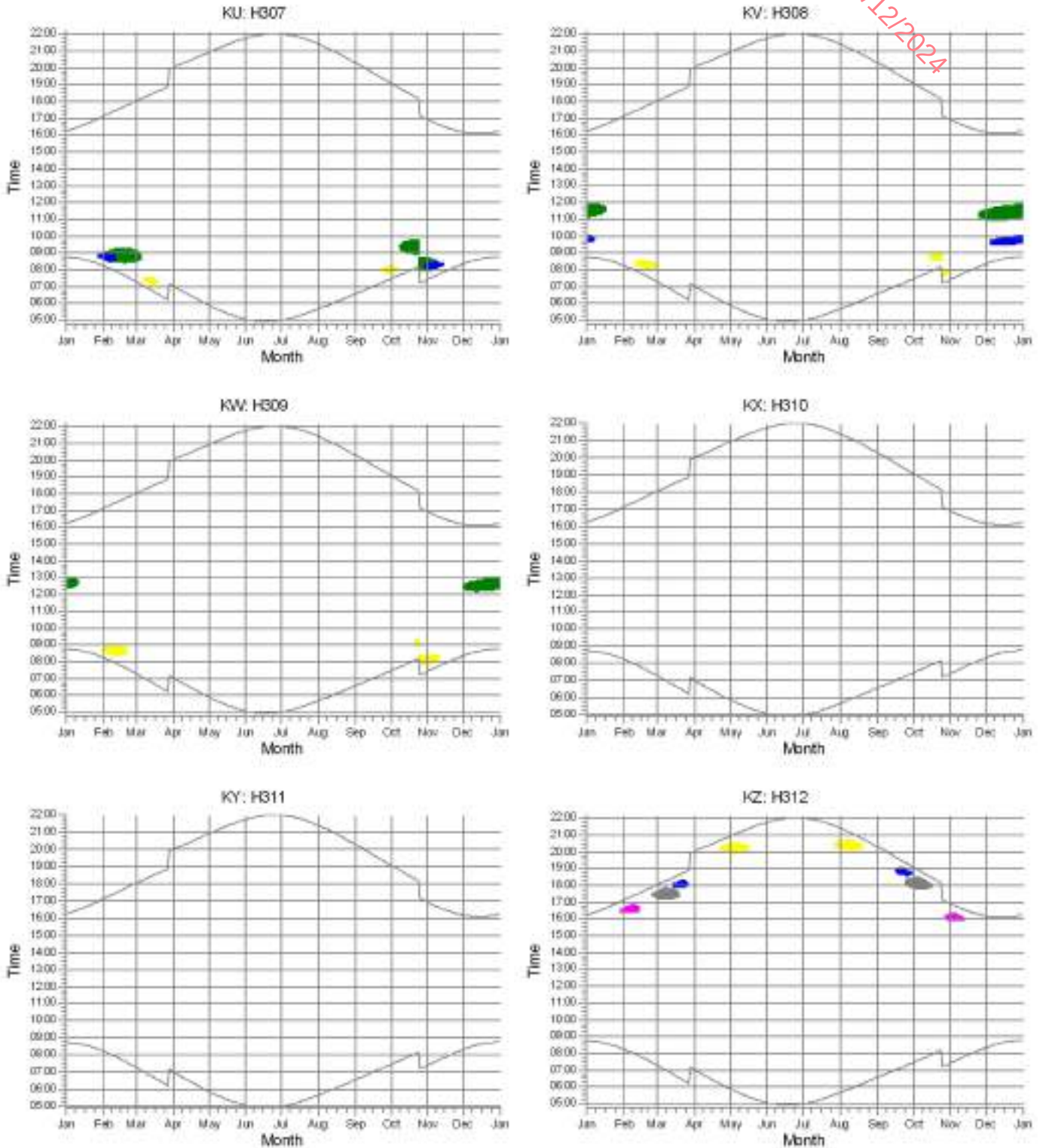


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

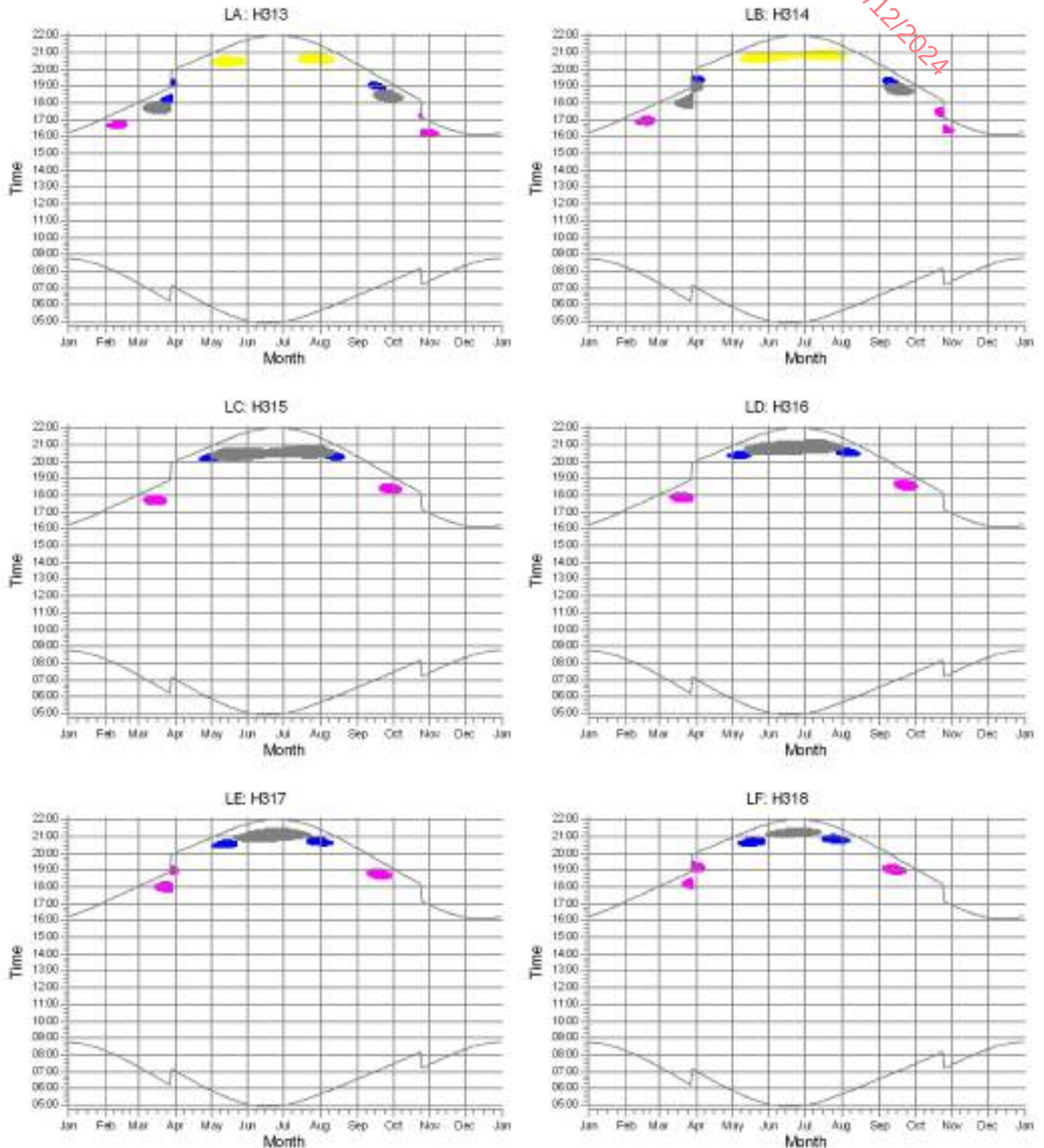


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

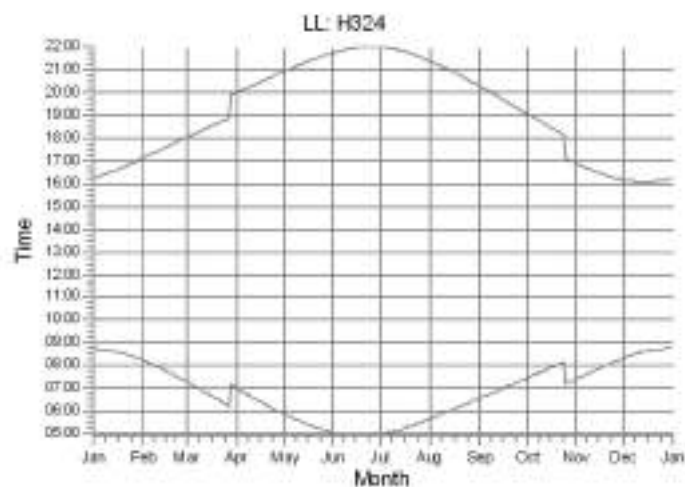
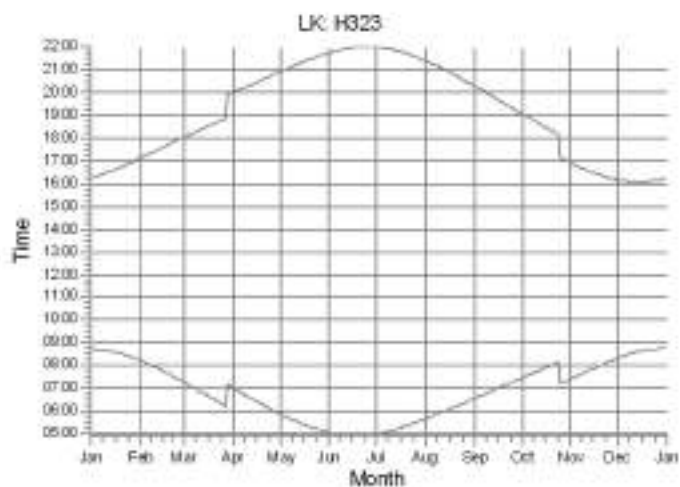
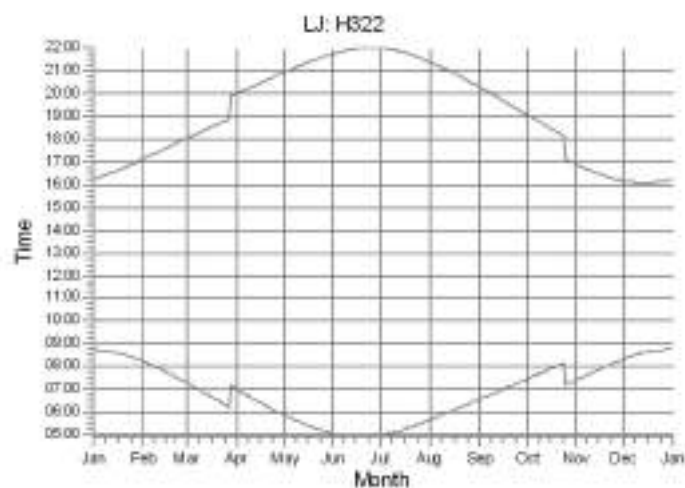
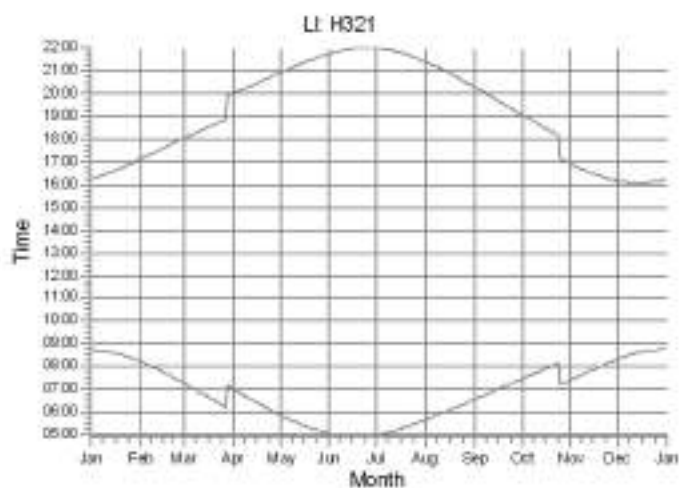
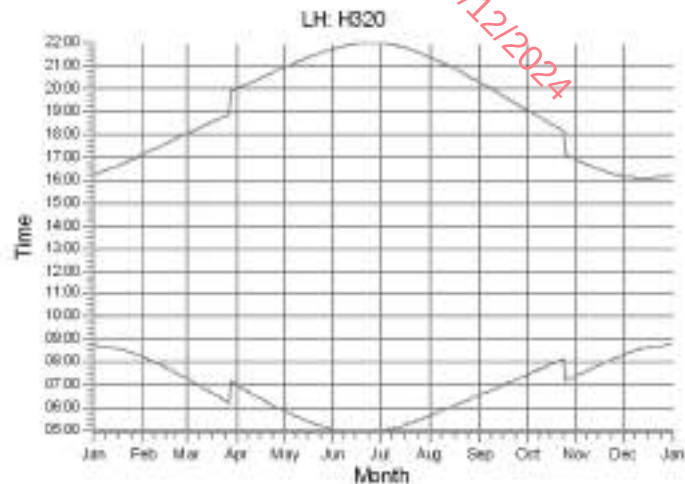
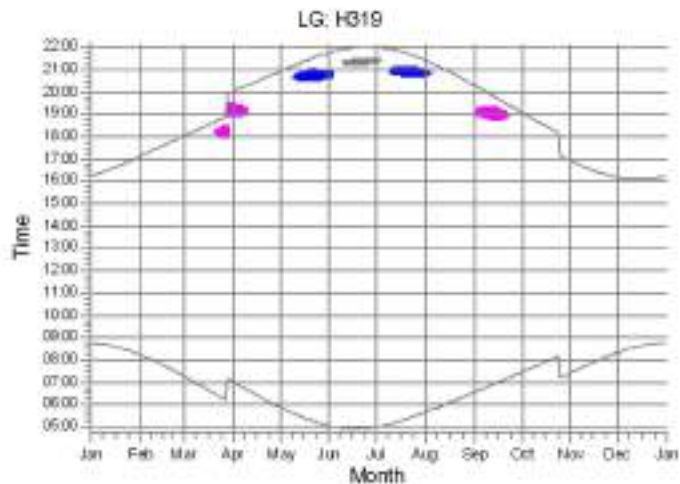


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

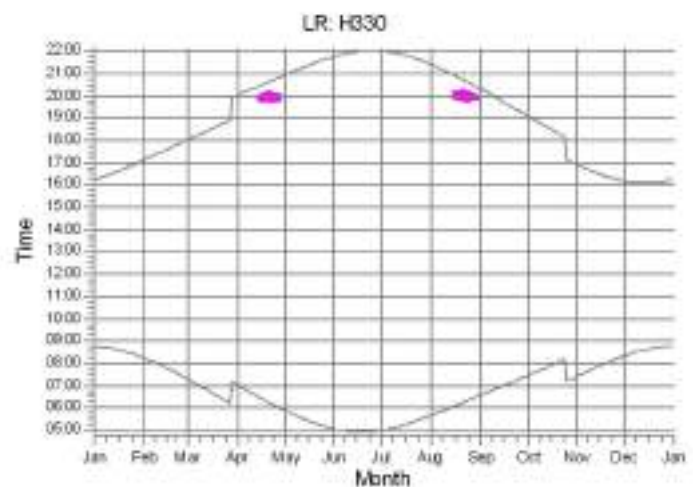
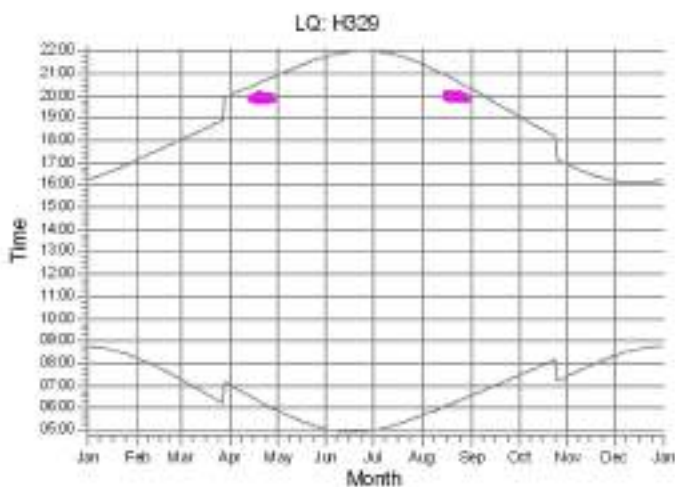
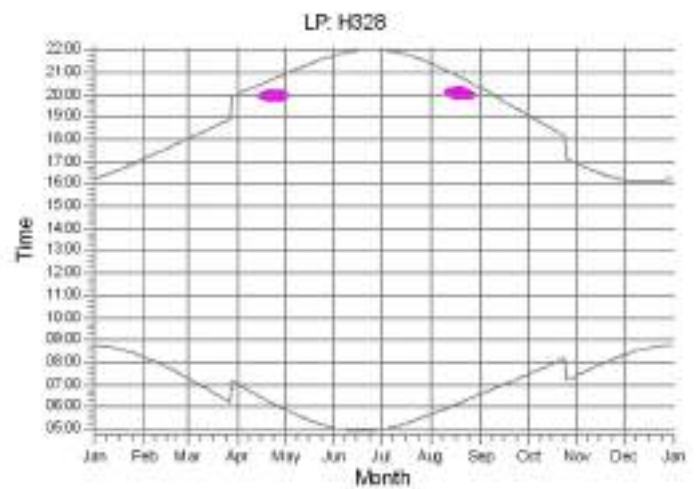
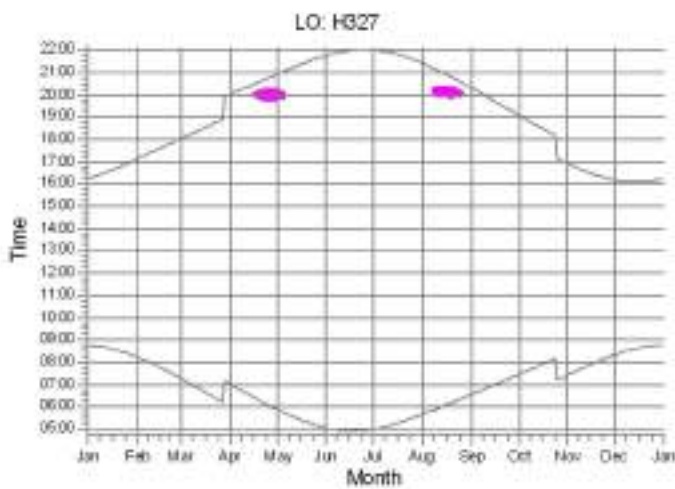
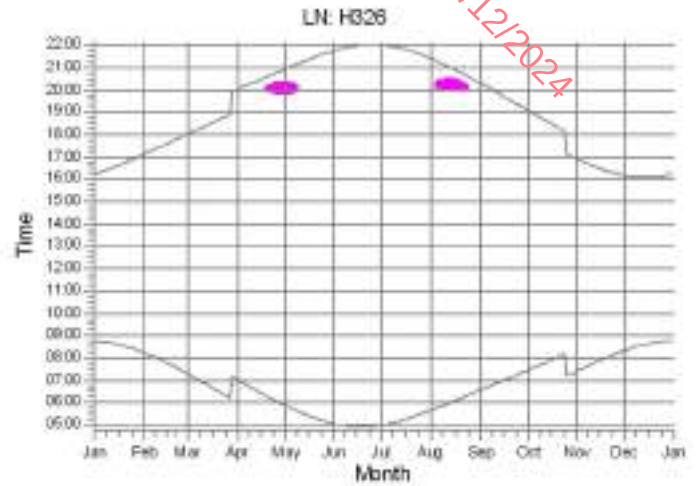
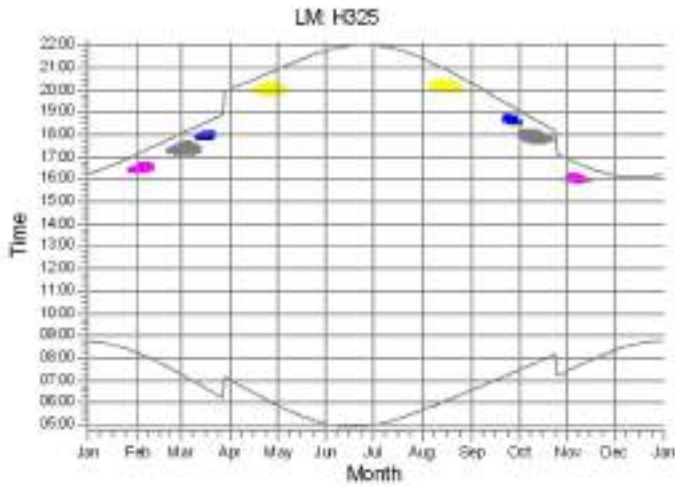


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

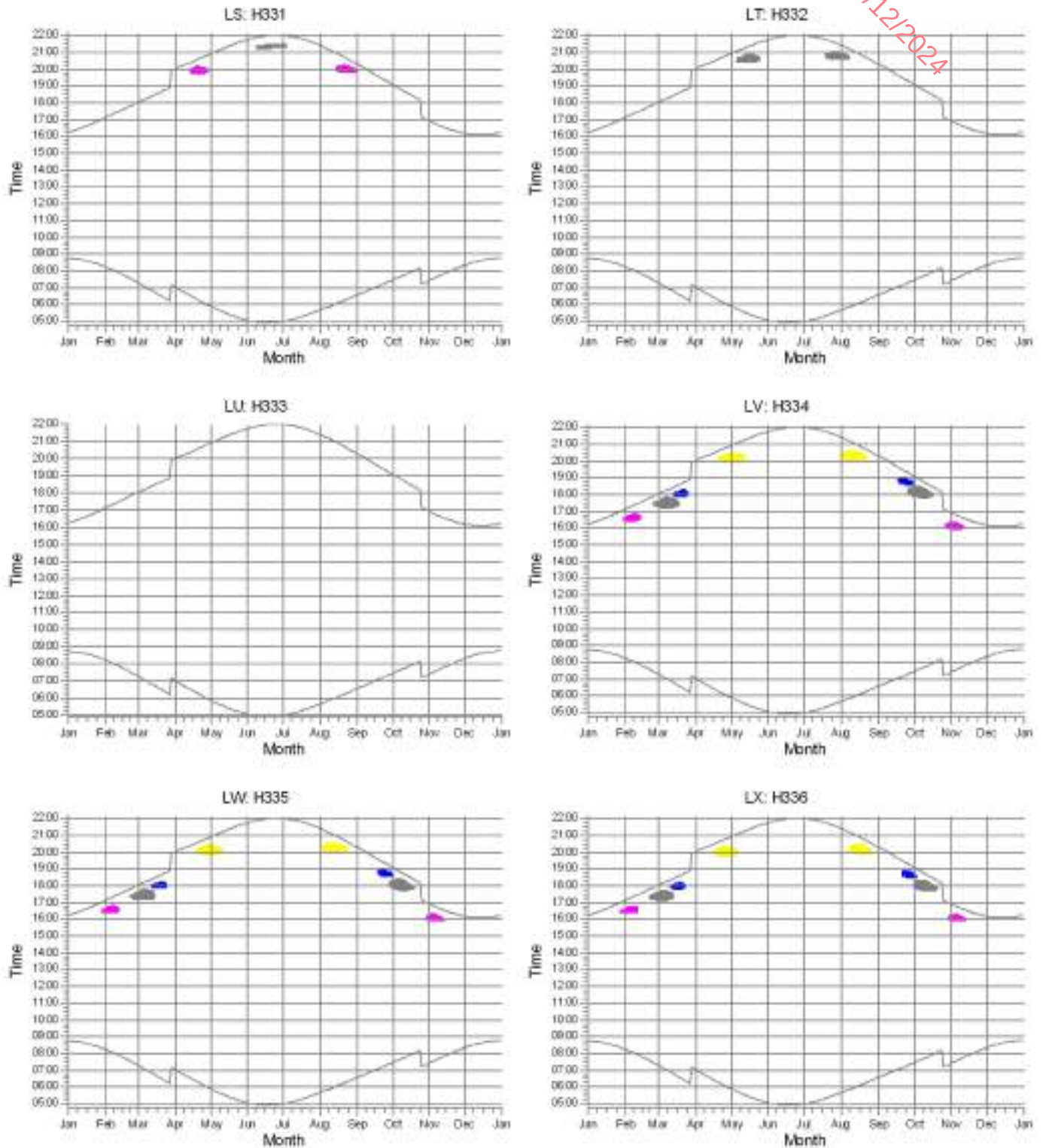


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

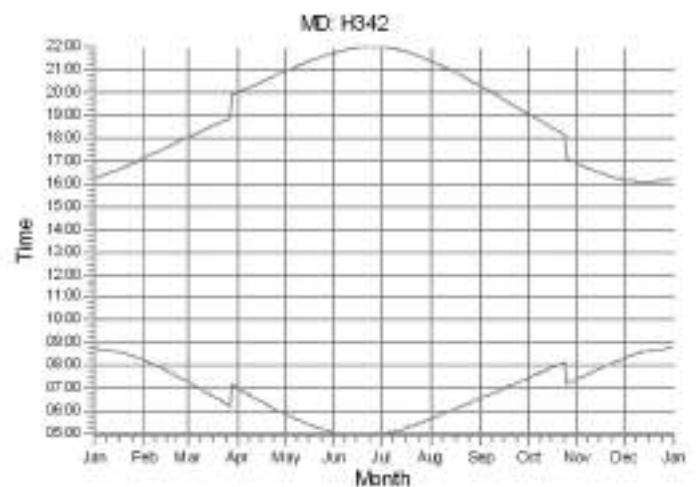
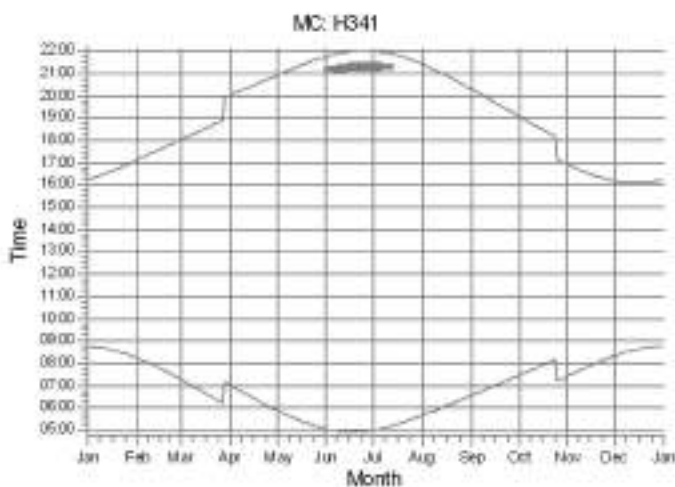
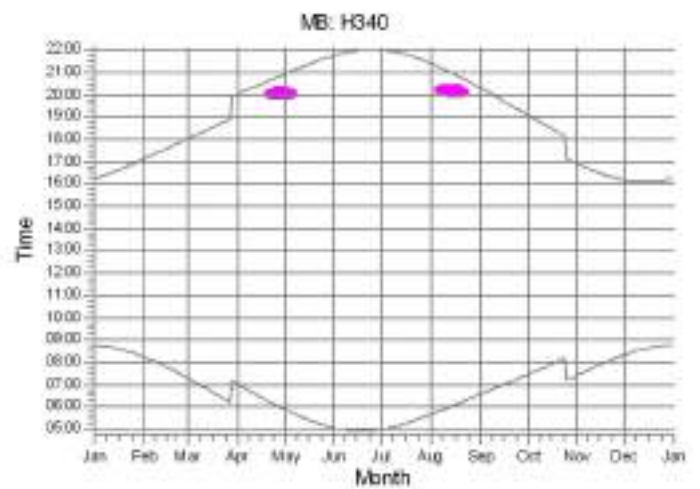
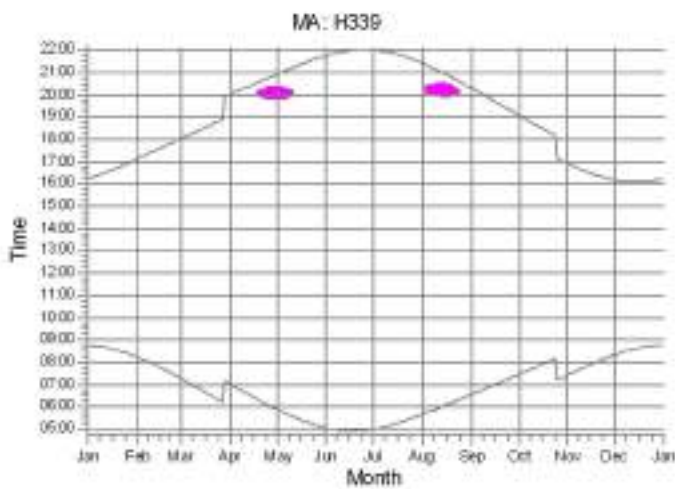
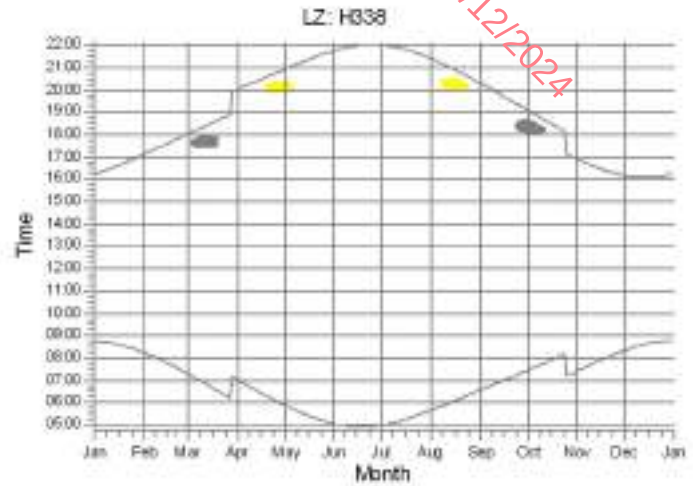
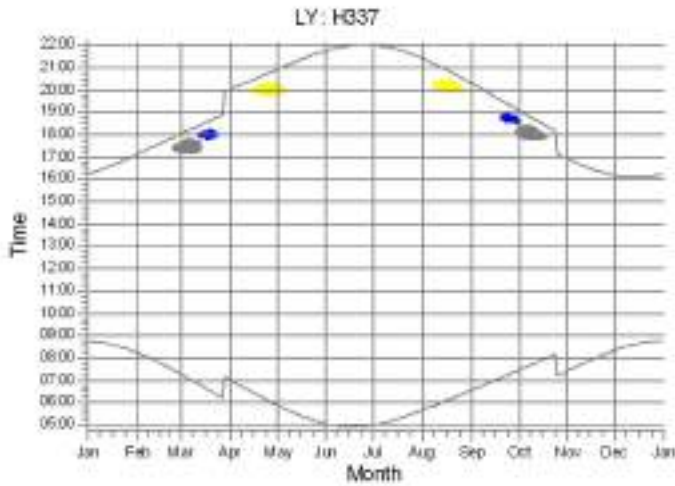
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



WTGs

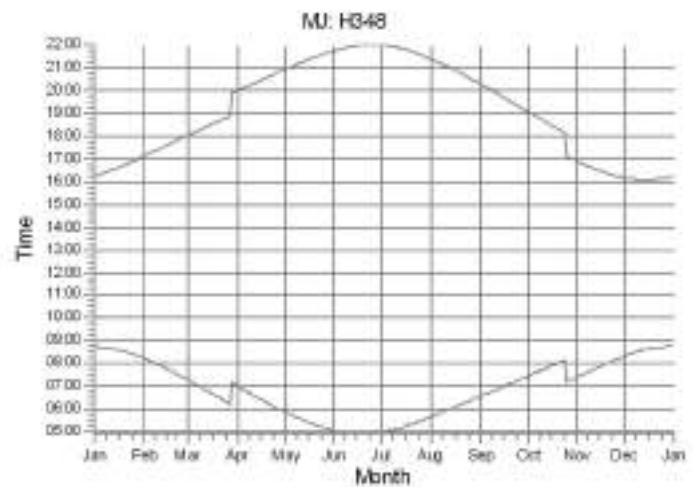
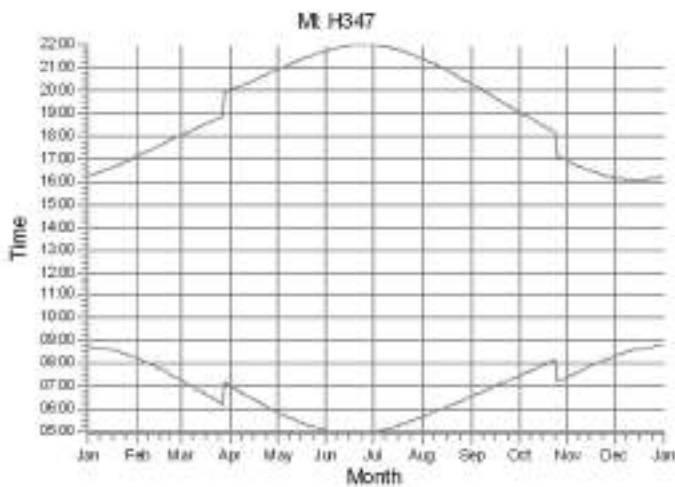
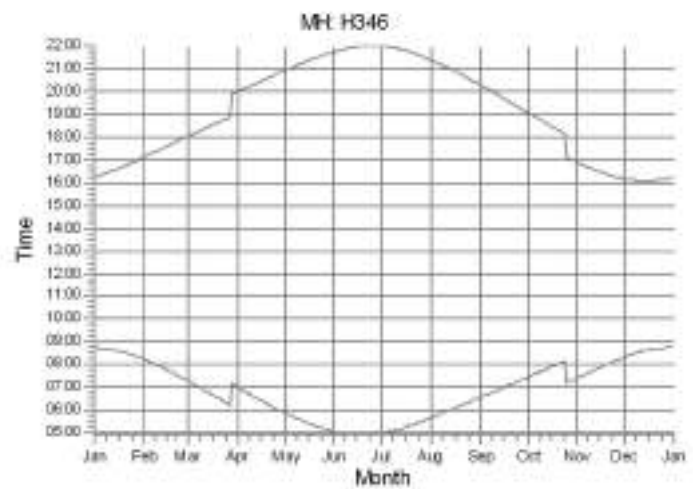
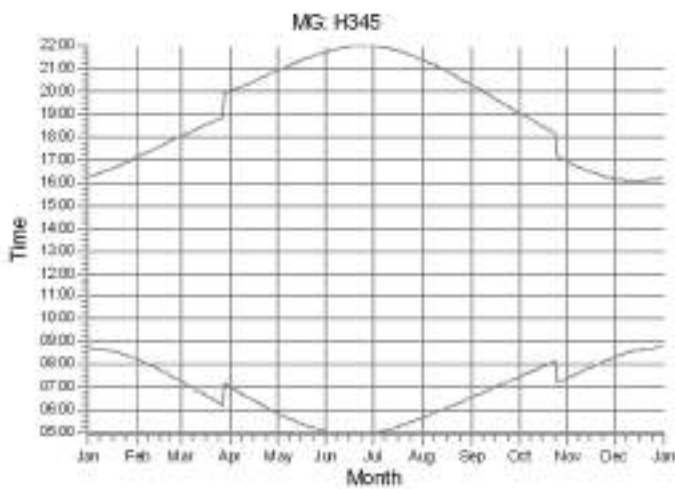
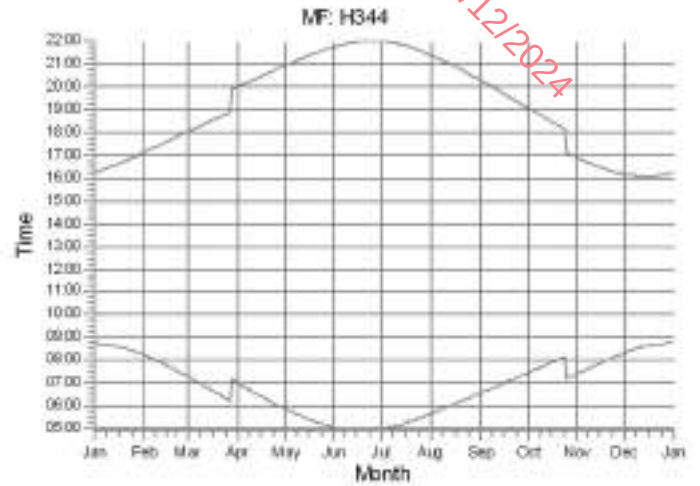
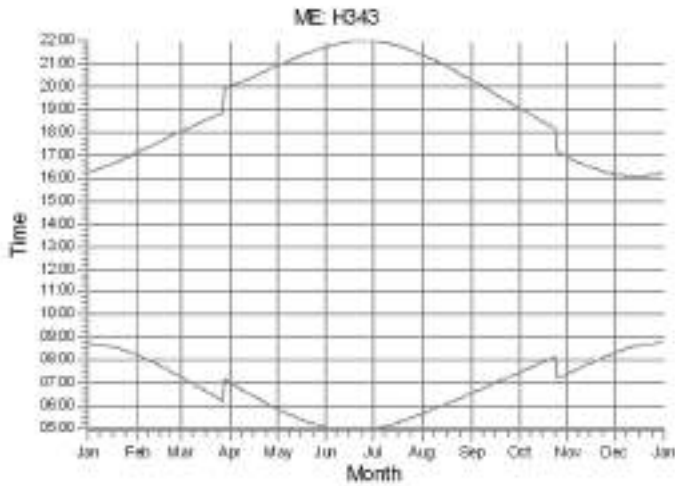
2: T02 3: T03 4: T04 5: T05

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar, graphical

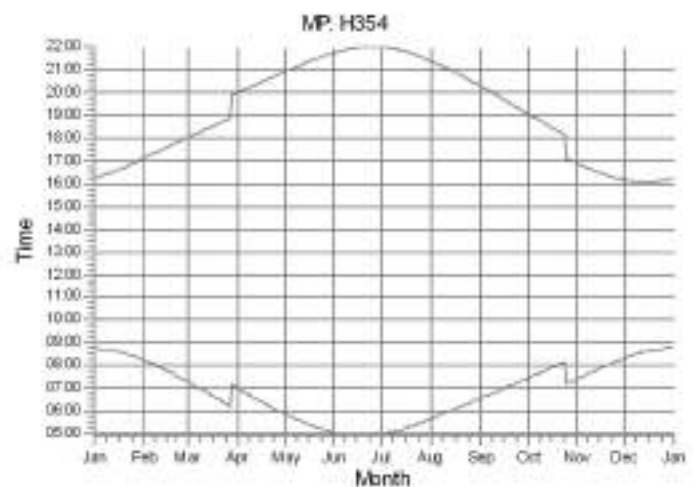
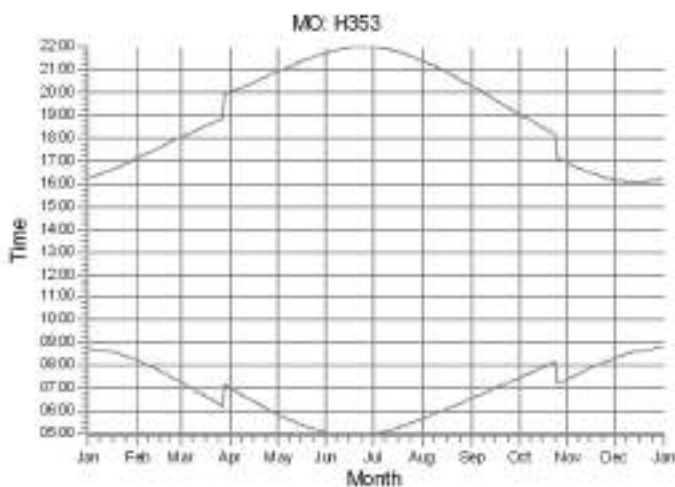
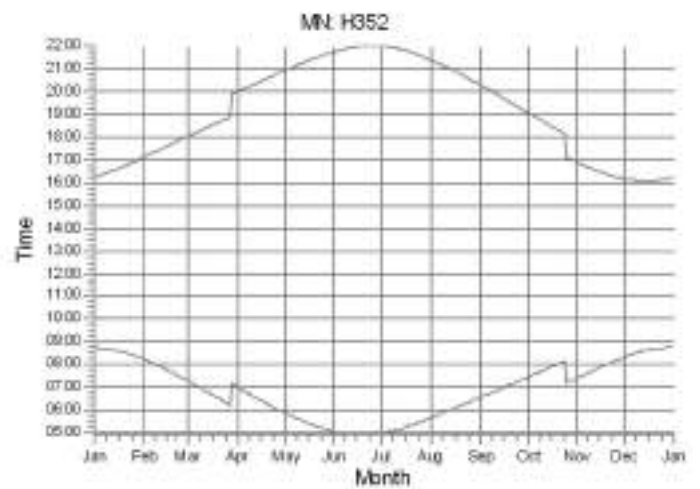
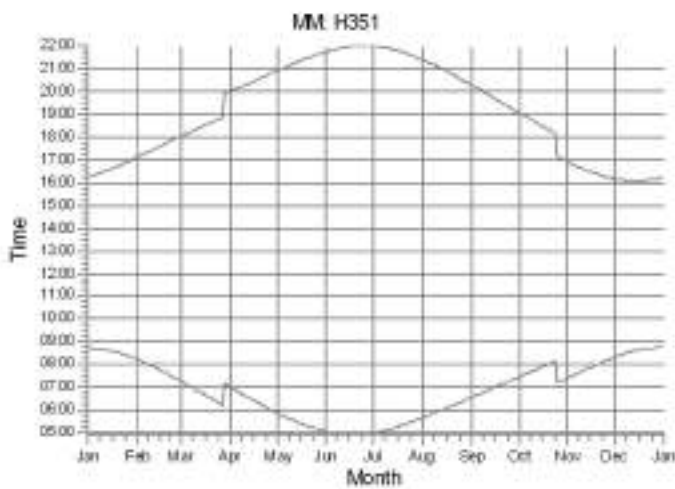
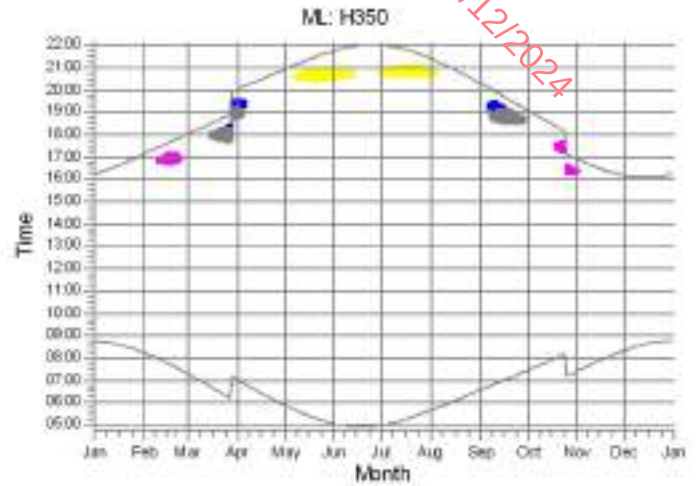
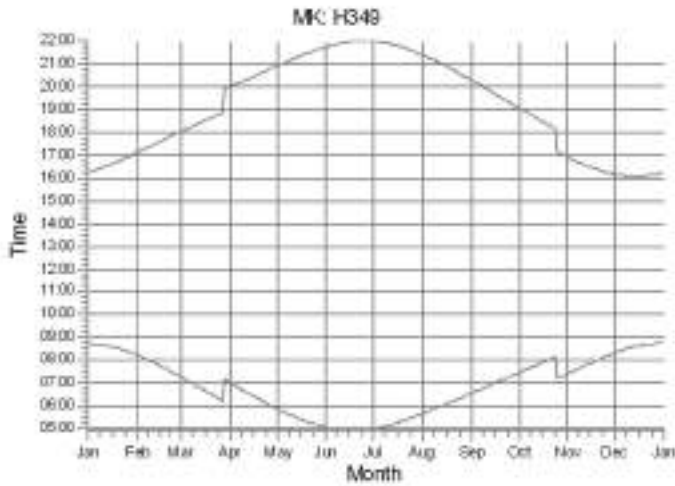
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

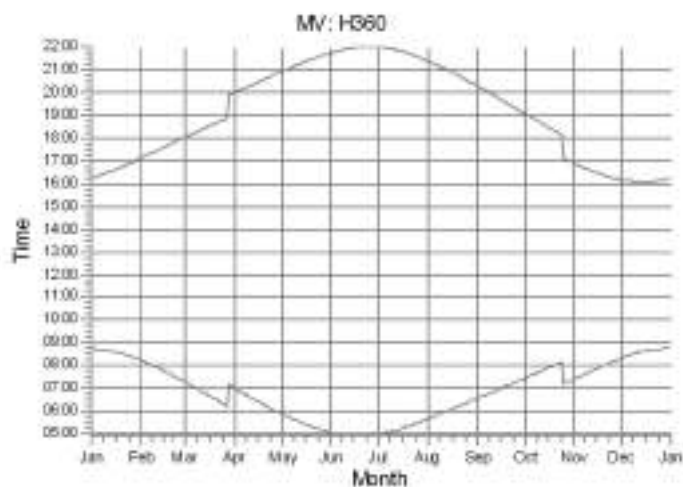
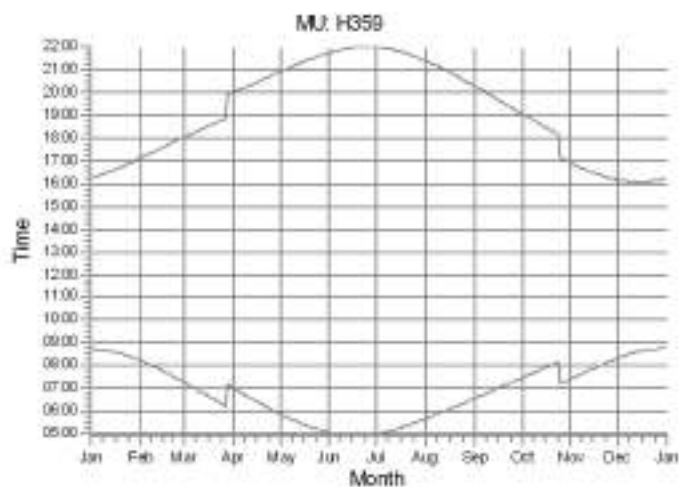
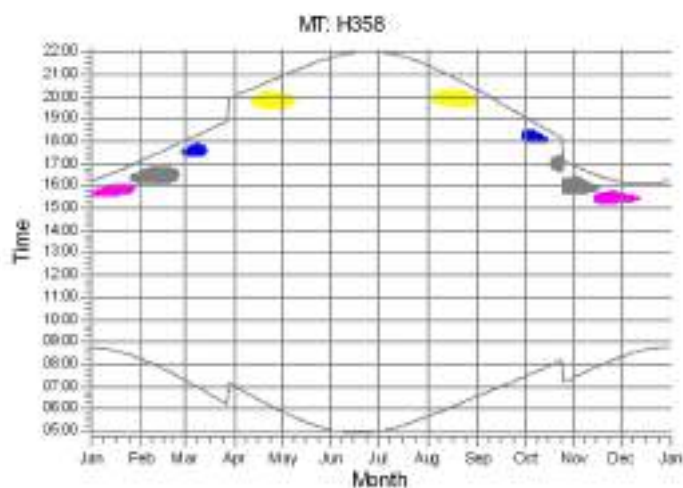
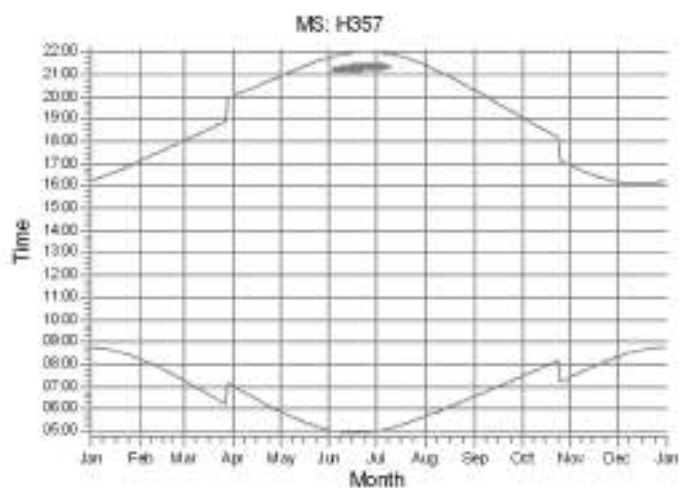
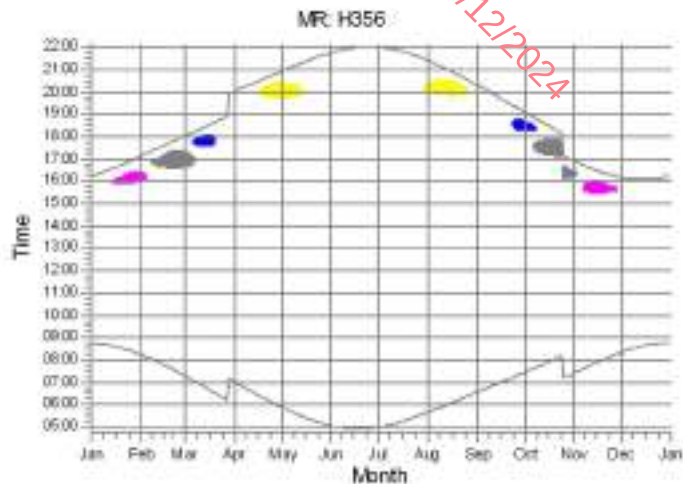
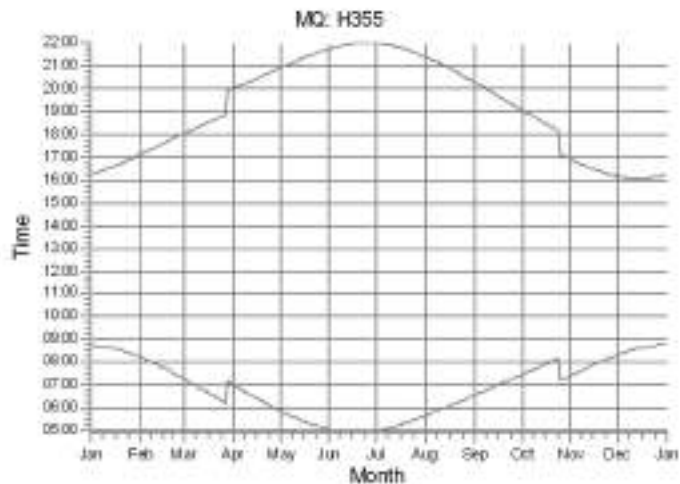


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

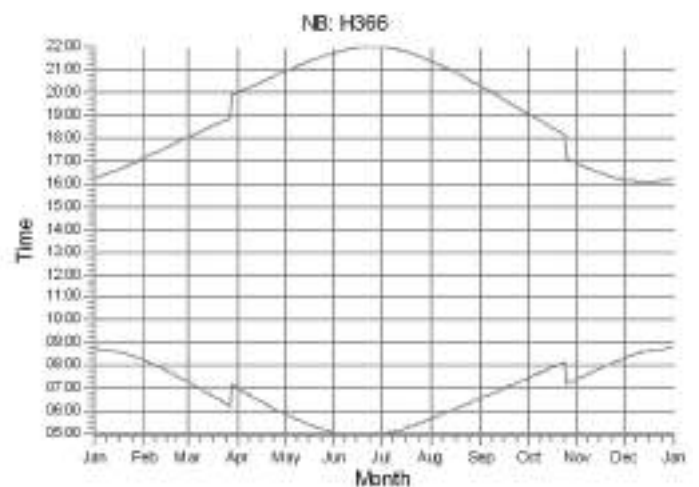
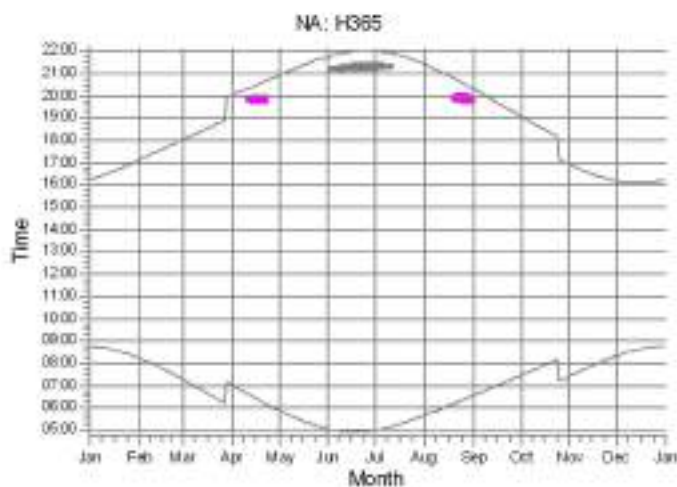
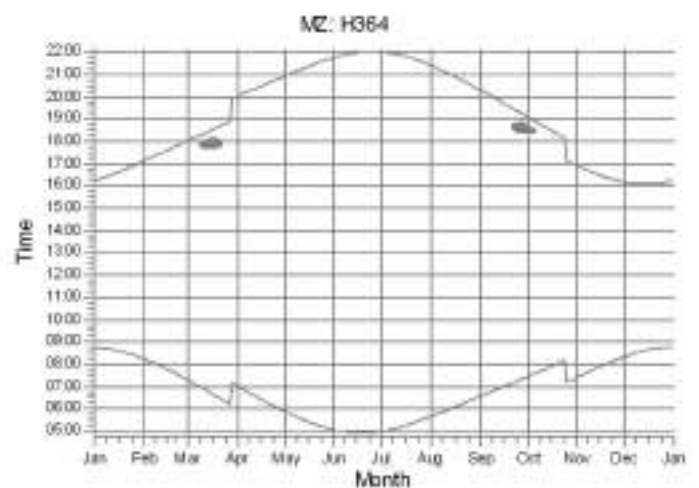
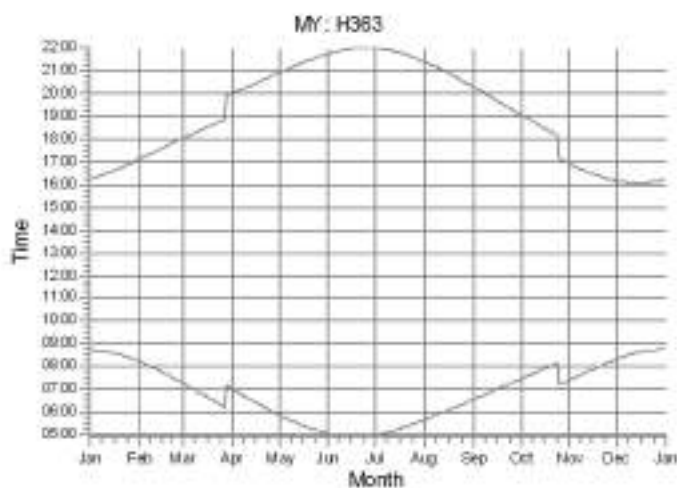
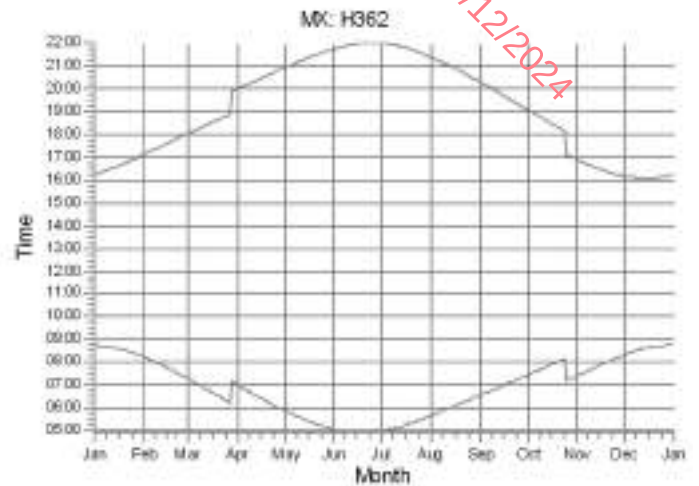
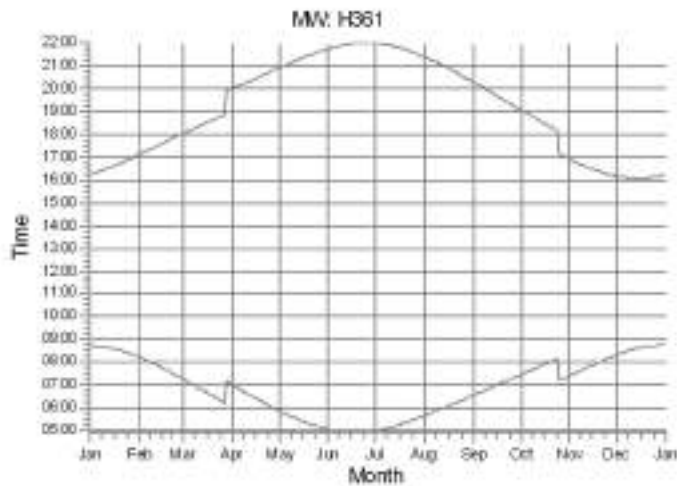


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

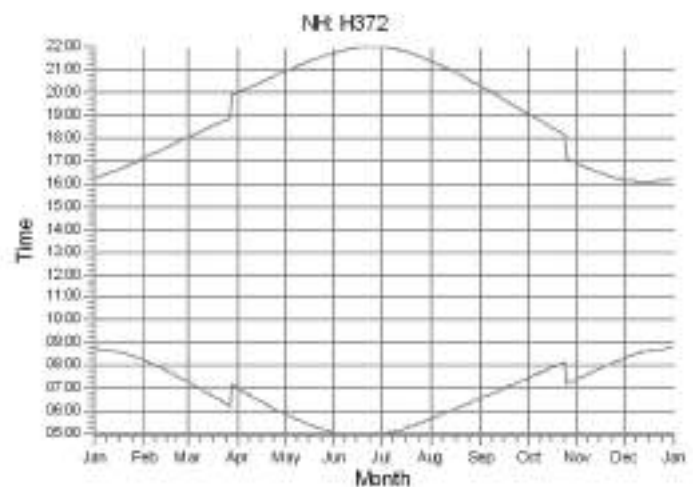
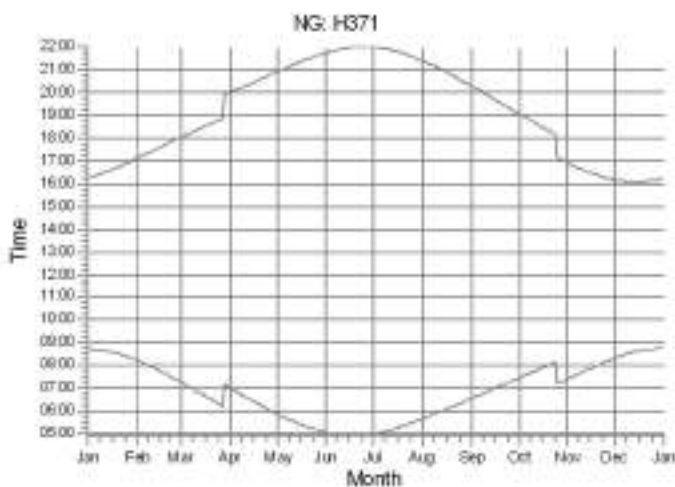
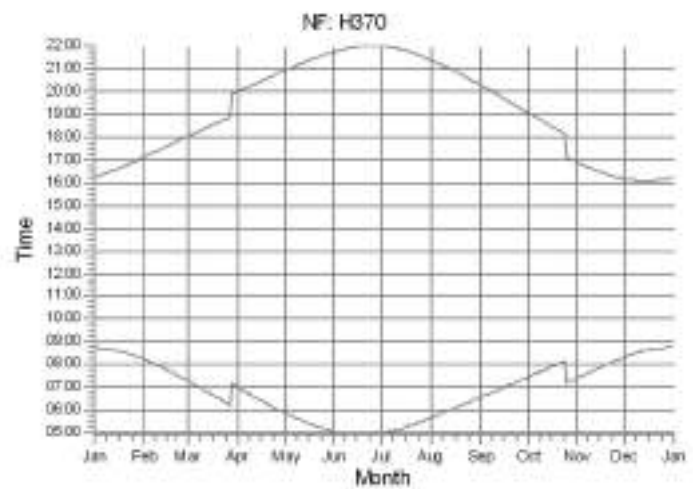
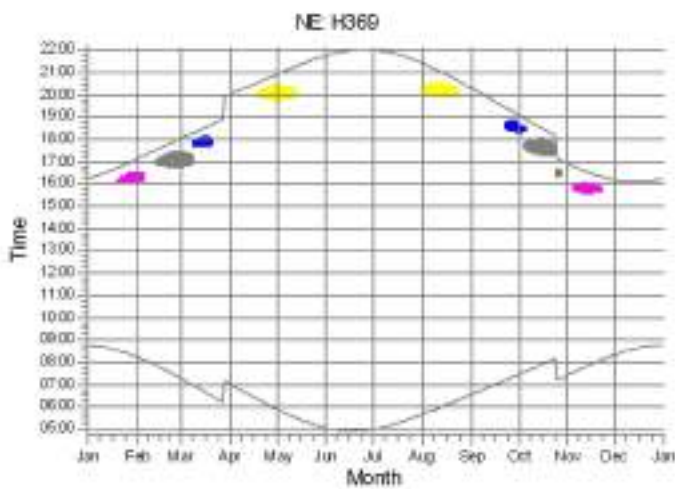
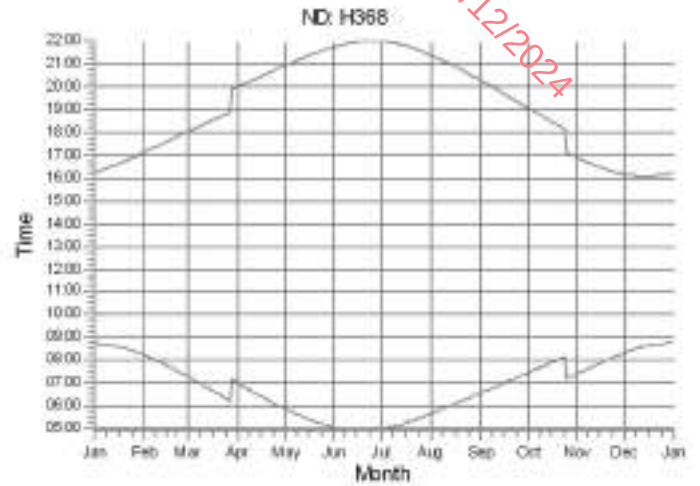
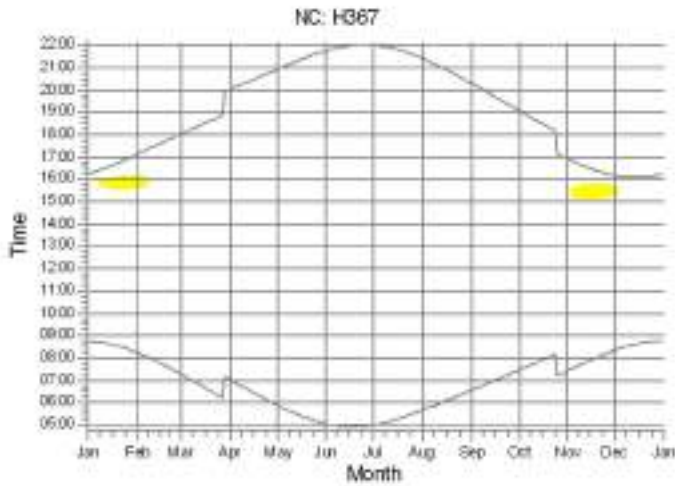


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

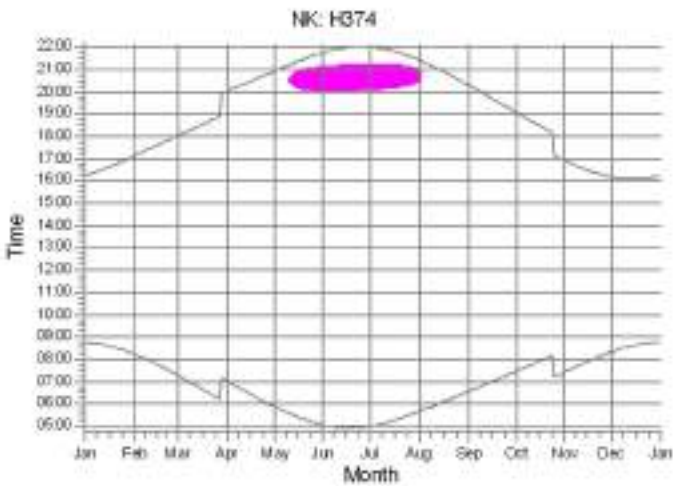
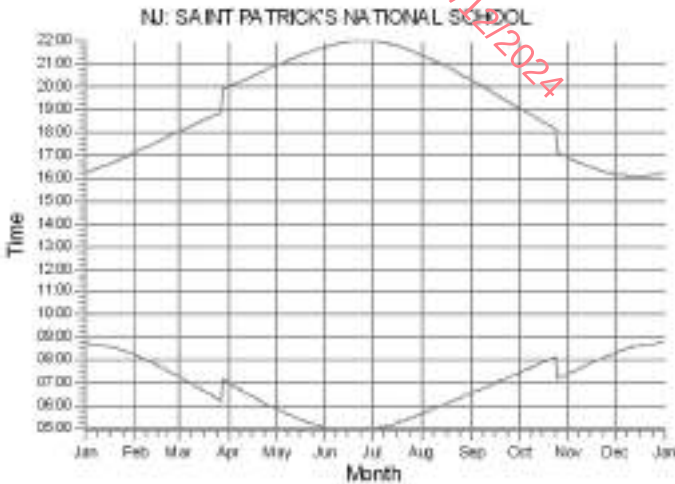
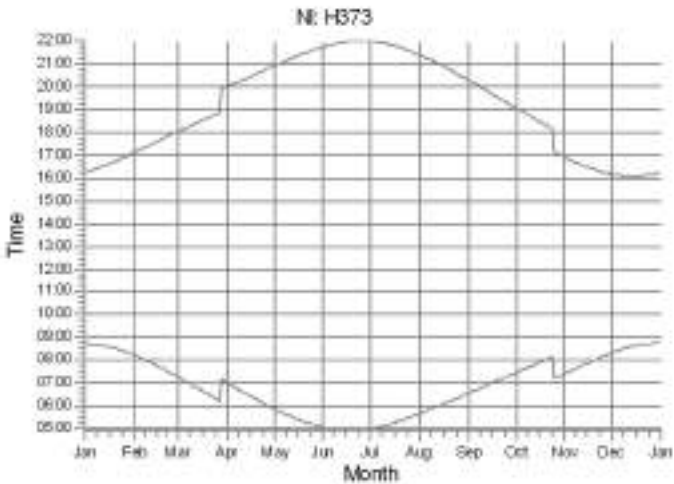
Calculation: Kellystown N149 Worst Case



WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical
Calculation: Kellystown N149 Worst Case



WTGs

5: T05

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 1 - T01
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 10:31-12:53/142 14:05-15:37/92	08:14 08:48-09:00/12 16:25-16:34/9	07:16 08:33-09:08/35 08:12-08:17/5	07:01 07:25-07:30/5	05:52 06:18-06:45/27	05:03 05:34-05:49/15
2	08:44 10:32-12:54/142 14:06-15:38/92	08:12 08:45-09:03/18 16:24-16:37/13	07:14 08:36-09:06/30	06:59 07:23-07:36/13	05:50 06:16-06:44/28	05:02 05:33-05:49/16
3	08:44 10:32-12:53/141 14:06-15:39/93	08:10 08:38-09:05/27 16:23-16:39/16	07:12 08:37-09:03/26	06:56 07:20-07:38/18	05:48 06:14-06:42/28	05:01 05:32-05:49/17
4	08:43 10:33-12:53/140 14:07-15:41/94	08:09 08:36-09:07/31 16:22-16:41/19	07:09 08:41-08:59/18	06:54 07:18-07:40/22	05:46 06:12-06:40/28	05:00 05:31-05:48/17
5	08:43 10:33-12:52/139 14:08-15:42/94	08:07 08:34-09:09/35 16:21-16:43/22	07:07 07:31-08:02/31	06:52 07:15-07:41/26	05:44 06:10-06:34/24	04:59 05:31-05:49/18
6	08:43 10:34-12:52/138 14:09-15:44/95	08:05 08:32-09:10/38 16:21-16:45/24	07:05 07:29-08:02/33	06:49 07:13-07:42/29	05:42 06:09-06:34/25	04:59 05:30-05:48/18
7	08:42 10:35-12:51/136 14:09-15:45/96	08:03 08:30-09:12/42 16:20-16:47/27	07:02 07:27-08:02/35	06:47 07:11-07:44/33	05:40 06:07-06:34/27	04:58 05:30-05:49/19
8	08:42 10:35-12:50/135 14:10-15:46/96	08:01 08:28-09:13/45	07:00 07:24-08:01/37	06:44 07:08-07:44/36	05:38 06:05-06:33/28	04:57 05:29-05:48/19
9	08:41 10:37-12:49/132 14:12-15:49/97	07:59 08:26-09:14/48	06:57 07:22-08:00/38	06:42 07:06-07:45/39	05:36 06:03-06:31/28	04:57 05:29-05:49/20
10	08:40 10:37-12:46/129 14:12-15:50/98	07:57 08:24-09:15/51	06:55 07:19-07:59/40	06:40 07:04-07:46/42	05:34 06:02-06:31/29	04:56 05:28-05:48/20
11	08:40 10:38-12:42/124 14:13-15:52/99	07:55 08:22-09:16/54	06:53 07:17-07:57/40	06:37 07:01-07:47/46	05:33 06:00-06:29/29	04:56 05:28-05:48/20
12	08:39 10:39-12:42/123 14:13-15:52/99	07:53 08:20-09:16/56 16:21-16:53/32	06:50 07:14-07:55/41	06:35 06:59-07:47/48	05:31 05:58-06:27/29	04:55 05:28-05:49/21
13	08:38 10:40-12:41/121 14:14-15:51/100	07:51 08:18-09:17/59 16:21-16:52/31	06:48 07:12-07:52/40	06:32 06:57-07:48/51	05:29 05:57-06:24/27	04:55 05:27-05:48/21
14	08:37 10:41-12:40/119 14:14-15:50/101	07:49 08:15-09:16/61	06:45 07:09-07:47/38	06:30 06:54-07:48/54	05:27 05:55-06:22/27	04:55 05:27-05:48/21
15	08:36 10:42-12:39/117 14:14-15:49/102	07:47 08:13-09:17/64	06:43 07:07-07:38/31	06:28 06:52-07:48/56	05:26 05:54-06:22/28	04:55 05:27-05:48/21
16	08:35 10:43-12:38/115 14:14-15:48/103	07:45 08:11-09:17/66	06:40 07:06-07:36/30	06:26 06:50-07:48/58	05:24 05:52-06:21/29	04:54 05:27-05:48/21
17	08:34 10:44-12:37/113 14:14-15:47/104	07:43 08:09-09:18/69	06:38 07:07-07:34/27	06:23 06:47-07:48/61	05:22 05:51-06:20/29	04:54 05:27-05:48/21
18	08:33 10:45-12:36/111 14:14-15:46/105	07:41 08:07-09:18/71	06:36 07:08-07:31/23	06:21 06:45-07:48/63	05:21 05:49-06:18/29	04:54 05:27-05:48/21
19	08:32 10:46-12:35/109 14:14-15:45/106	07:39 08:04-09:17/73	06:33 07:10-07:20/10	06:18 06:43-07:48/65	05:19 05:48-06:16/28	04:54 05:27-05:48/21
20	08:31 10:47-12:34/107 14:14-15:44/107	07:37 08:02-09:17/75 16:36-16:45/9	06:31 06:16-07:48/67	06:16 06:41-07:48/67	05:18 05:46-06:08/22	04:54 05:27-05:48/21
21	08:30 10:48-12:33/105 14:14-15:43/108	07:34 08:00-09:17/77	06:28 06:14-07:48/69	06:14 06:39-07:47/68	05:16 05:45-06:07/22	04:55 05:28-05:49/21
22	08:29 10:49-12:32/103 14:14-15:42/109	07:32 07:59-09:16/77	06:26 06:12 06:36-07:46/70	06:12 06:36-07:46/70	05:15 05:44-06:06/22	04:55 05:28-05:49/21
23	08:27 14:51-16:11/80	07:30 07:59-09:15/76	06:23 06:09 06:34-07:46/72	06:09 06:34-07:46/72	05:13 05:43-06:02/19	04:55 05:28-05:49/21
24	08:26 14:52-16:11/79	07:28 08:00-09:15/75 16:49-17:10/21	06:21 06:07 06:32-07:45/73	06:07 06:32-07:45/73	05:12 05:41-06:01/20	04:55 05:28-05:49/21
25	08:25 15:21-16:12/51	07:25 08:01-09:13/72 16:50-17:08/18	06:18 06:05 06:30-07:45/75	06:05 06:30-07:45/75	05:11 05:40-06:01/21	04:56 05:29-05:50/21
26	08:23 15:22-16:12/50	07:23 08:01-09:12/71 16:51-17:07/16	06:16 06:03 06:28-06:58/30	06:03 06:28-06:58/30	05:09 05:39-06:01/22	04:56 05:29-05:50/21
27	08:22 15:24-16:12/48	07:21 08:29-09:12/43 07:46-08:00/14	06:14 06:01 06:26-06:53/27	06:01 06:26-06:53/27	05:08 05:38-06:00/22	04:56 05:30-05:51/21
28	08:20 15:26-16:13/47	07:19 08:32-09:09/37 08:04-08:21/17	06:11 06:00 07:43-08:00/17	05:58 06:24-06:51/27	05:07 05:37-06:00/23	04:57 05:30-05:51/21
29	08:19 15:28-16:13/45		06:09 07:02-07:42/40	05:56 06:22-06:49/27	05:06 05:36-05:59/23	04:58 05:31-05:52/21
30	08:17 15:32-16:12/40		06:06 07:02-07:41/39	05:54 06:20-06:46/26	05:05 05:35-05:58/23	04:58 05:31-05:52/21
31	08:15 15:34-16:12/38		06:03 07:27-07:28/1	05:52 07:03-07:40/37	05:04 05:34-05:57/23	
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	4899	2533	706	1528	959	603

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 1 - T01
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 05:32-05:52/20 21:25	05:39 06:09-06:38/29 21:25	06:33 07:00-07:46/46 20:18	07:26 07:53-08:34/41 19:05	07:24 07:54-08:44/50 16:54 15:50-16:22/32	08:19 10:20-12:16/116 12:17-12:23/6 13:55-14:24/29 16:10 13:11-13:18/7 14:25-15:34/69
2	05:00 05:33-05:53/20 21:23	05:40 06:11-06:40/29 21:23	06:35 07:02-07:45/43 20:16	07:28 07:54-08:35/41 19:02	07:26 07:56-08:43/47 16:52 15:50-16:21/31	08:21 10:21-12:29/128 14:26-15:33/67 16:09 13:07-13:22/15 13:56-14:25/29
3	05:00 05:34-05:54/20 21:21	05:42 06:12-06:41/29 21:21	06:36 07:04-07:43/39 20:14	07:30 07:56-08:36/40 19:00	07:28 07:58-08:42/44 16:50 15:50-16:19/29	08:22 10:20-12:32/132 13:55-15:32/97 16:08 13:05-13:24/19
4	05:01 05:34-05:53/19 21:19	05:44 06:14-06:42/28 21:19	06:38 07:05-07:41/36 20:11	07:32 07:58-08:37/39 18:57	07:30 08:00-08:41/41 15:50-16:17/27 16:48 15:20-15:34/14	08:24 10:20-12:35/135 13:55-15:32/97 16:08 13:04-13:26/22
5	05:02 05:35-05:54/19 21:18	05:45 06:16-06:43/27 21:17	06:40 07:07-07:40/33 20:09	07:33 08:00-08:37/37 18:55	07:32 08:02-08:40/38 15:50-16:14/24 16:46 15:17-15:37/20	08:25 10:20-12:36/136 13:55-15:30/95 16:07 13:03-13:27/24
6	05:03 05:36-05:55/19 21:16	05:47 06:17-06:43/26 21:16	06:42 07:09-07:38/29 20:06	07:35 08:02-08:38/36 18:53	07:34 08:04-08:39/35 15:51-16:12/21 16:45 15:15-15:39/24	08:27 10:20-12:38/138 13:55-15:30/95 16:07 13:03-13:29/26
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Potential sum hours	512	460	382	328	259	233
Sum of minutes with flicker	689	1722	500	2362	2827	8197

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park IE-F91 RHH9 Sligo +353719161416 abyrne / abyrne@jodireland.com Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 2 - T02 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 15:00-15:36/36 09:18-10:42/84 16:15 10:50-12:05/75 12:24-14:33/129	08:14 15:17-16:34/77 09:34-10:08/34 17:06 08:42-09:21/39 13:54-14:37/43	07:16 16:33-17:34/61 18:02	07:01 18:32-19:33/61 20:00	05:52 19:18-20:26/68 20:55	05:03 20:29-21:10/41 21:45
2	08:44 15:01-15:38/37 09:18-10:43/85 16:16 10:51-12:06/75 12:25-14:34/129	08:12 15:18-16:37/79 09:36-10:06/30 17:08 08:40-09:17/37 13:56-14:35/39	07:14 16:36-17:36/60 18:04	06:59 18:31-19:35/64 20:02	05:50 19:19-20:27/68 20:57	05:02 20:31-21:12/41 21:47
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26	08:23 15:10-16:21/71 09:27-10:12/45 16:54 08:52-09:26/34 13:47-14:40/53	07:23 07:56-08:21/25 17:56 16:28-17:28/60	06:16 17:34-18:23/49 18:49	06:03 19:15-20:17/62 20:46	05:09 19:58-21:04/66 21:37	04:56 20:44-21:20/36 22:01
27	08:22 15:10-16:22/72 09:28-10:12/44 16:56 08:51-09:26/35 13:48-14:39/51	07:21 16:29-17:31/62 17:58 07:58-08:14/16	06:13 17:33-18:24/51 18:51	06:01 19:15-20:19/64 20:48	05:08 19:59-21:05/66 21:39	04:56 20:43-21:20/37 22:01
28	08:20 15:12-16:24/72 09:29-10:11/42 16:58 08:49-09:26/37 13:49-14:39/50	07:19 16:30-17:32/62 18:00 07:59-08:10/11	06:11 17:33-18:26/53 18:53	05:58 19:16-20:21/65 20:50	05:07 20:23-21:06/43 21:40	04:57 20:44-21:21/37 22:01
29	08:19 15:12-16:27/75 09:30-10:10/40 17:00 08:47-09:25/38 13:50-14:38/48		07:09 18:32-19:28/56 19:55	05:56 19:16-20:22/66 20:52	05:06 20:24-21:07/43 21:41	04:57 20:44-21:21/37 22:01
30	08:17 15:13-16:29/76 09:31-10:09/38 17:02 08:45-09:24/39 13:51-14:38/47		07:06 18:32-19:30/58 19:56	05:54 19:17-20:24/67 20:54	05:05 20:28-21:08/40 21:43	04:58 20:43-21:21/38 22:00
31	08:15 15:14-16:31/77 09:33-10:08/35 17:04 08:44-09:23/39 13:52-14:37/45		07:04 18:31-19:31/60 19:58		05:04 20:29-21:09/40 21:44	
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	8418	3412	1610	1908	1920	1155

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 2 - T02
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 20:43-21:21/38	05:39 19:59-20:53/54	06:33 18:40-19:50/70	07:26 07:52-08:07/15	07:24 07:54-08:41/47	07:26 07:52-08:07/15	07:24 07:54-08:41/47	07:26 07:52-08:07/15	07:24 07:54-08:41/47	07:26 07:52-08:07/15	07:24 07:54-08:41/47
2	05:00 20:43-21:22/39	05:40 19:59-20:52/53	06:35 18:37-19:48/71	07:28 07:54-08:07/13	07:26 07:56-08:42/46	07:28 07:54-08:07/13	07:26 07:56-08:42/46	07:28 07:54-08:07/13	07:26 07:56-08:42/46	07:28 07:54-08:07/13	07:26 07:56-08:42/46
3	05:00 20:42-21:21/39	05:42 19:58-20:50/52	06:36 18:35-19:46/71	07:30 07:56-08:07/11	07:28 07:58-08:42/44	07:30 07:56-08:07/11	07:28 07:58-08:42/44	07:30 07:56-08:07/11	07:28 07:58-08:42/44	07:30 07:56-08:07/11	07:28 07:58-08:42/44
4	05:01 20:42-21:22/40	05:44 19:58-20:48/50	06:38 18:33-19:43/70	07:32 07:58-08:06/8	07:30 14:52-16:12/80	07:32 07:58-08:06/8	07:30 14:52-16:12/80	07:32 07:58-08:06/8	07:30 14:52-16:12/80	07:32 07:58-08:06/8	07:30 14:52-16:12/80
5	05:02 20:42-21:22/40	05:45 19:52-20:46/54	06:40 18:31-19:41/70	07:33 08:00-08:05/5	07:32 14:54-16:15/81	07:33 08:00-08:05/5	07:32 14:54-16:15/81	07:33 08:00-08:05/5	07:32 14:54-16:15/81	07:33 08:00-08:05/5	07:32 14:54-16:15/81
6	05:03 20:41-21:22/41	05:47 19:36-20:45/69	06:42 18:30-19:39/69	07:35 08:02-08:04/2	07:34 14:52-16:12/80	07:35 08:02-08:04/2	07:34 14:52-16:12/80	07:35 08:02-08:04/2	07:34 14:52-16:12/80	07:35 08:02-08:04/2	07:34 14:52-16:12/80
7	05:04 20:41-21:22/41	05:49 19:34-20:43/69	06:43 18:28-19:35/67	07:37 17:25-18:20/55	07:36 14:51-16:10/79	07:37 17:25-18:20/55	07:36 14:51-16:10/79	07:37 17:25-18:20/55	07:36 14:51-16:10/79	07:37 17:25-18:20/55	07:36 14:51-16:10/79
8	05:05 20:41-21:21/40	05:51 19:31-20:41/70	06:45 18:27-19:33/66	07:39 17:24-18:18/54	07:38 14:50-16:08/78	07:39 17:24-18:18/54	07:38 14:50-16:08/78	07:39 17:24-18:18/54	07:38 14:50-16:08/78	07:39 17:24-18:18/54	07:38 14:50-16:08/78
9	05:06 20:40-21:21/41	05:52 19:30-20:39/69	06:47 18:26-19:31/65	07:41 17:23-18:16/53	07:40 14:49-16:07/78	07:41 17:23-18:16/53	07:40 14:49-16:07/78	07:41 17:23-18:16/53	07:40 14:49-16:07/78	07:41 17:23-18:16/53	07:40 14:49-16:07/78
10	05:07 20:39-21:20/41	05:54 19:28-20:37/69	06:49 18:25-19:28/63	07:42 17:22-18:14/52	07:42 14:47-16:05/78	07:42 17:22-18:14/52	07:42 14:47-16:05/78	07:42 17:22-18:14/52	07:42 14:47-16:05/78	07:42 17:22-18:14/52	07:42 14:47-16:05/78
11	05:08 20:38-21:19/41	05:56 19:27-20:35/68	06:51 18:24-19:26/62	07:44 17:18-18:11/53	07:47 14:44-15:59/75	07:44 17:18-18:11/53	07:47 14:44-15:59/75	07:44 17:18-18:11/53	07:47 14:44-15:59/75	07:44 17:18-18:11/53	07:47 14:44-15:59/75
12	05:09 20:37-21:18/41	05:58 19:26-20:34/68	06:52 18:24-19:24/60	07:46 17:08-18:09/61	07:46 14:45-16:01/76	07:46 17:08-18:09/61	07:46 14:45-16:01/76	07:46 17:08-18:09/61	07:46 14:45-16:01/76	07:46 17:08-18:09/61	07:46 14:45-16:01/76
13	05:10 20:36-21:17/40	05:59 19:24-20:31/67	06:54 18:23-19:22/59	07:48 17:05-18:07/62	07:47 14:44-15:59/75	07:48 17:05-18:07/62	07:47 14:44-15:59/75	07:48 17:05-18:07/62	07:47 14:44-15:59/75	07:48 17:05-18:07/62	07:47 14:44-15:59/75
14	05:11 20:35-21:16/40	06:01 19:23-20:29/66	06:56 18:22-19:18/56	07:50 17:03-18:04/61	07:49 14:43-15:56/73	07:50 17:03-18:04/61	07:49 14:43-15:56/73	07:50 17:03-18:04/61	07:49 14:43-15:56/73	07:50 17:03-18:04/61	07:49 14:43-15:56/73
15	05:12 20:34-21:15/40	06:02 19:22-20:28/65	06:58 18:22-19:16/54	07:52 17:01-18:02/61	07:51 14:43-15:55/72	07:52 17:01-18:02/61	07:51 14:43-15:55/72	07:52 17:01-18:02/61	07:51 14:43-15:55/72	07:52 17:01-18:02/61	07:51 14:43-15:55/72
16	05:13 20:33-21:14/40	06:03 19:21-20:25/64	06:59 18:22-19:14/52	07:54 16:59-17:59/60	07:53 14:43-15:54/71	07:54 16:59-17:59/60	07:53 14:43-15:54/71	07:54 16:59-17:59/60	07:53 14:43-15:54/71	07:54 16:59-17:59/60	07:53 14:43-15:54/71
17	05:14 20:32-21:13/40	06:04 19:20-20:24/63	07:01 18:21-19:11/50	07:56 16:57-17:57/61	07:55 14:42-15:52/70	07:56 16:57-17:57/61	07:55 14:42-15:52/70	07:56 16:57-17:57/61	07:55 14:42-15:52/70	07:56 16:57-17:57/61	07:55 14:42-15:52/70
18	05:15 20:31-21:12/40	06:05 19:19-20:23/62	07:02 18:20-19:10/49	07:58 16:56-17:56/62	07:57 14:42-15:51/69	07:58 16:56-17:56/62	07:57 14:42-15:51/69	07:58 16:56-17:56/62	07:57 14:42-15:51/69	07:58 16:56-17:56/62	07:57 14:42-15:51/69
19	05:16 20:30-21:11/40	06:06 19:18-20:22/61	07:03 18:19-19:08/46	07:59 16:55-17:55/63	07:58 14:41-15:50/68	07:59 16:55-17:55/63	07:58 14:41-15:50/68	07:59 16:55-17:55/63	07:58 14:41-15:50/68	07:59 16:55-17:55/63	07:58 14:41-15:50/68
20	05:17 20:29-21:10/40	06:07 19:17-20:21/60	07:04 18:18-19:07/45	08:01 16:54-17:54/64	08:00 14:40-15:49/67	08:01 16:54-17:54/64	08:00 14:40-15:49/67	08:01 16:54-17:54/64	08:00 14:40-15:49/67	08:01 16:54-17:54/64	08:00 14:40-15:49/67
21	05:18 20:28-21:09/40	06:08 19:16-20:20/59	07:05 18:17-19:06/44	08:02 16:53-17:53/65	08:01 14:39-15:48/66	08:02 16:53-17:53/65	08:01 14:39-15:48/66	08:02 16:53-17:53/65	08:01 14:39-15:48/66	08:02 16:53-17:53/65	08:01 14:39-15:48/66
22	05:19 20:27-21:08/40	06:09 19:15-20:19/58	07:06 18:16-19:05/43	08:03 16:52-17:52/66	08:02 14:38-15:47/65	08:03 16:52-17:52/66	08:02 14:38-15:47/65	08:03 16:52-17:52/66	08:02 14:38-15:47/65	08:03 16:52-17:52/66	08:02 14:38-15:47/65
23	05:20 20:26-21:07/40	06:10 19:14-20:18/57	07:07 18:15-19:04/42	08:04 16:51-17:51/67	08:03 14:37-15:46/64	08:04 16:51-17:51/67	08:03 14:37-15:46/64	08:04 16:51-17:51/67	08:03 14:37-15:46/64	08:04 16:51-17:51/67	08:03 14:37-15:46/64
24	05:21 20:25-21:06/40	06:11 19:13-20:17/56	07:08 18:14-19:03/41	08:05 16:50-17:50/68	08:04 14:36-15:45/63	08:05 16:50-17:50/68	08:04 14:36-15:45/63	08:05 16:50-17:50/68	08:04 14:36-15:45/63	08:05 16:50-17:50/68	08:04 14:36-15:45/63
25	05:22 20:24-21:05/40	06:12 19:12-20:16/55	07:09 18:13-19:02/40	08:06 16:49-17:49/69	08:05 14:35-15:44/62	08:06 16:49-17:49/69	08:05 14:35-15:44/62	08:06 16:49-17:49/69	08:05 14:35-15:44/62	08:06 16:49-17:49/69	08:05 14:35-15:44/62
26	05:23 20:23-21:04/40	06:13 19:11-20:15/54	07:10 18:12-19:01/39	08:07 16:48-17:48/70	08:06 14:34-15:43/61	08:07 16:48-17:48/70	08:06 14:34-15:43/61	08:07 16:48-17:48/70	08:06 14:34-15:43/61	08:07 16:48-17:48/70	08:06 14:34-15:43/61
27	05:24 20:22-21:03/40	06:14 19:10-20:14/53	07:11 18:11-19:00/38	08:08 16:47-17:47/71	08:07 14:33-15:42/60	08:08 16:47-17:47/71	08:07 14:33-15:42/60	08:08 16:47-17:47/71	08:07 14:33-15:42/60	08:08 16:47-17:47/71	08:07 14:33-15:42/60
28	05:25 20:21-21:02/40	06:15 19:09-20:13/52	07:12 18:10-18:59/37	08:09 16:46-17:46/72	08:08 14:32-15:41/59	08:09 16:46-17:46/72	08:08 14:32-15:41/59	08:09 16:46-17:46/72	08:08 14:32-15:41/59	08:09 16:46-17:46/72	08:08 14:32-15:41/59
29	05:26 20:20-21:01/40	06:16 19:08-20:12/51	07:13 18:09-18:58/36	08:10 16:45-17:45/73	08:09 14:31-15:40/58	08:10 16:45-17:45/73	08:09 14:31-15:40/58	08:10 16:45-17:45/73	08:09 14:31-15:40/58	08:10 16:45-17:45/73	08:09 14:31-15:40/58
30	05:27 20:19-21:00/40	06:17 19:07-20:11/50	07:14 18:08-18:57/35	08:11 16:44-17:44/74	08:10 14:30-15:39/57	08:11 16:44-17:44/74	08:10 14:30-15:39/57	08:11 16:44-17:44/74	08:10 14:30-15:39/57	08:11 16:44-17:44/74	08:10 14:30-15:39/57
31	05:28 20:18-20:59/58	06:18 19:06-20:10/49	07:15 18:07-18:56/34	08:12 16:43-17:43/75	08:11 14:29-15:38/56	08:12 16:43-17:43/75	08:11 14:29-15:38/56	08:12 16:43-17:43/75	08:11 14:29-15:38/56	08:12 16:43-17:43/75	08:11 14:29-15:38/56
Potential sun hours	512	460	382	264	6405	259	984				
Sum of minutes with flicker	1663	1919	1662	2674	6405	259	984				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 3 - T03
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 09:21-09:59/38	08:14 08:42-08:54/12	07:16 17:04-17:34/30	07:01 19:09-19:33/24	05:52 20:02-20:26/24	05:03 20:33-21:06/33
	16:15 15:04-15:37/33	17:06 16:04-16:34/30	18:02 07:41-07:49/8	20:00	20:55	21:45 05:33-05:51/18
2	08:44 09:22-09:59/37	08:12 08:40-08:55/15	07:14 17:05-17:36/31	06:59 19:10-19:35/25	05:50 20:02-20:27/25	05:02 20:34-21:07/33
	16:16 15:05-15:39/34	17:08 16:10-16:37/27	18:04 07:39-07:50/11	20:02	20:57	21:47 05:33-05:50/17
3	08:44 09:22-09:58/36	08:10 08:38-08:55/17	07:12 17:06-17:38/32	06:56 19:12-19:37/25	05:48 20:02-20:29/27	05:01 20:35-21:07/32
	16:17 15:05-15:39/34	17:10 16:12-16:39/27	18:06 07:36-07:49/13	20:04	20:59	21:48 05:32-05:49/17
4	08:43 09:23-09:58/35	08:08 08:36-08:55/19	07:09 17:07-17:41/34	06:54 19:14-19:39/25	05:46 20:03-20:30/27	05:00 05:31-05:49/18
	16:18 15:06-15:41/35	17:12 16:14-16:41/27	18:08 07:34-07:50/16	20:06	21:01	21:49 20:36-21:07/31
5	08:43 09:24-09:54/30	08:07 08:34-08:55/21	07:07 17:08-17:42/34	06:52 19:15-19:40/25	05:44 20:03-20:32/29	04:59 05:31-05:49/18
	16:20 15:06-15:42/36	17:14 16:15-16:43/28	18:09 07:31-07:49/18	20:08	21:03	21:50 20:38-21:07/29
6	08:43 09:25-09:54/29	08:05 08:32-08:54/22	07:05 17:10-17:45/35	06:49 19:17-19:42/25	05:42 20:04-20:33/29	04:59 05:30-05:48/18
	16:21 15:08-15:43/35	17:16 16:16-16:45/29	18:11 07:29-07:49/20	20:09	21:04	21:51 20:39-21:07/28
7	08:42 09:50-09:51/1 09:25-09:49/24	08:03 08:32-08:54/22	07:02 17:14-17:46/32	06:47 19:18-19:43/25	05:40 20:06-20:36/30	04:58 05:30-05:49/19
	16:22 15:09-15:45/36	17:18 16:18-16:47/29	18:13 07:26-07:48/22	20:11	21:06	21:52 20:43-21:06/23
8	08:42 15:09-15:46/37	08:01 08:33-08:53/20	07:00 17:24-17:48/24	06:44 19:20-19:46/26	05:38 20:08-20:37/29	04:57 05:29-05:48/19
	16:24 09:26-09:48/22	17:20 16:20-16:50/30	18:15 07:24-07:47/23	20:13	21:08	21:53 20:44-21:07/23
9	08:41 15:11-15:49/38	07:59 08:34-08:52/18	06:57 17:24-17:50/26	06:42 19:22-19:47/25	05:36 20:10-20:39/29	04:57 05:29-05:48/19
	16:25 09:28-09:48/20	17:22 16:22-16:52/30	18:17 07:22-07:47/25	20:15	21:10	21:54 20:44-21:07/23
10	08:40 15:13-15:50/37	07:57 08:35-08:51/16	06:55 17:25-17:52/27	06:39 19:23-19:46/23	05:34 20:11-20:40/29	04:56 05:28-05:48/20
	16:27 09:29-09:47/18	17:24 16:24-16:54/30	18:19 07:19-07:44/25	20:17	21:12	21:55 20:44-21:06/22
11	08:40 15:14-15:52/38	07:55 08:37-08:48/11	06:53 17:26-17:55/29	06:37 19:25-19:45/20	05:33 20:13-20:42/29	04:56 05:28-05:48/20
	16:28 09:30-09:46/16	17:26 16:28-16:56/28	18:21 07:19-07:42/23	20:19 19:48-19:51/3	21:13	21:55 20:45-21:07/22
12	08:39 15:16-15:54/38	07:53 16:32-16:59/27	06:50 17:26-17:56/30	06:35 19:26-19:44/18	05:31 20:14-20:43/29	04:55 05:28-05:48/20
	16:30 09:31-09:44/13	17:28	18:23 07:19-07:34/15	20:20 19:46-19:53/7	21:15	21:56 20:46-21:07/21
13	08:38 15:17-15:55/38	07:51 16:34-17:00/26	06:48 17:27-17:58/31	06:32 19:27-19:42/15	05:29 20:14-20:44/30	04:55 05:27-05:47/20
	16:31 09:33-09:43/10	17:30	18:25 07:21-07:33/12	20:22 19:44-19:54/10	21:17	21:57 20:45-21:06/21
14	08:37 15:20-15:57/37	07:49 16:37-17:02/25	06:45 17:27-18:00/33	06:30 19:29-19:40/11	05:27 20:15-20:47/32	04:55 05:27-05:47/20
	16:33 09:35-09:41/6	17:32	18:27 07:24-07:28/4	20:24 19:43-19:56/13	21:18	21:58 20:46-21:06/20
15	08:36 15:23-15:59/36	07:47 16:38-17:05/27	06:43 17:29-18:02/33	06:28 19:32-19:37/5	05:26 20:15-20:48/33	04:55 05:27-05:47/20
	16:35	17:34	18:29	20:26 19:43-19:58/15	21:20 05:54-05:55/1	21:58 20:46-21:07/21
16	08:35 15:25-16:00/35	07:45 16:38-17:07/29	06:40 17:31-18:04/33	06:25 19:42-20:00/18	05:24 20:16-20:50/34	04:54 05:27-05:47/20
	16:36	17:36	18:30	20:28	21:22 05:52-05:54/2	21:59 20:47-21:07/20
17	08:34 15:26-16:02/36	07:43 16:39-17:09/30	06:38 17:36-18:06/30	06:23 19:41-20:01/20	05:22 20:16-20:51/35	04:54 05:27-05:47/20
	16:38	17:38	18:32	20:30	21:23 05:51-05:55/4	21:59 20:47-21:07/20
18	08:33 15:45-16:05/20	07:41 16:39-17:11/32	06:36 17:40-18:07/27	06:21 19:41-20:03/22	05:21 20:17-20:53/36	04:54 05:27-05:47/20
	16:40 15:27-15:44/17	17:40	18:34	20:32	21:25 05:49-05:55/6	22:00 20:48-21:07/19
19	08:32 15:45-16:07/22	07:39 16:40-17:13/33	06:33 17:43-18:10/27	06:18 19:42-20:04/22	05:19 20:18-20:54/36	04:54 05:27-05:47/20
	16:41 15:29-15:43/14	17:42	18:36	20:33	21:27 05:48-05:55/7	22:00 20:48-21:07/19
20	08:31 15:45-16:08/23	07:37 16:42-17:16/34	06:31 17:47-18:11/24	06:16 19:42-20:03/21	05:18 20:18-20:55/37	04:54 05:27-05:47/20
	16:43 15:30-15:42/12	17:44	18:38	20:35	21:28 05:46-05:55/9	22:00 20:48-21:07/19
21	08:30 15:46-16:11/25	07:34 16:44-17:18/34	06:28 17:48-18:13/25	06:14 19:42-20:01/19	05:16 20:20-20:57/37	04:55 05:27-05:48/21
	16:45 15:33-15:41/8	17:46	18:40	20:37	21:30 05:45-05:55/10	22:01 20:48-21:07/19
22	08:29 15:46-16:12/26	07:32 16:46-17:19/33	06:26 17:48-18:15/27	06:12 20:09-20:10/1	05:15 20:21-20:59/38	04:55 05:28-05:48/20
	16:47	17:48	18:42	20:39 19:43-20:00/17	21:31 05:44-05:55/11	22:01 20:49-21:08/19
23	08:27 15:47-16:15/28	07:30 16:55-17:22/27	06:23 17:50-18:17/27	06:09 20:07-20:12/5	05:13 20:22-20:59/37	04:55 05:28-05:48/20
	16:49	17:50	18:43	20:41 19:44-19:59/15	21:33 05:43-05:55/12	22:01 20:49-21:08/19
24	08:26 15:48-16:17/29	07:28 16:56-17:24/28	06:21 17:51-18:18/27	06:07 20:05-20:14/9	05:12 20:24-21:01/37	04:55 05:28-05:48/20
	16:51	17:52	18:45	20:43 19:46-19:57/11	21:34 05:41-05:54/13	22:01 20:49-21:08/19
25	08:25 15:50-16:19/29	07:25 16:56-17:26/30	06:18 17:54-18:21/27	06:05 20:04-20:15/11	05:11 20:27-21:02/35	04:56 05:29-05:49/20
	16:52	17:54	18:47	20:44 19:49-19:54/5	21:36 05:40-05:54/14	22:01 20:49-21:09/20
26	08:23 15:51-16:21/30	07:23 16:57-17:28/31	06:16 17:57-18:22/25	06:03 20:03-20:17/14	05:09 20:29-21:04/35	04:56 05:29-05:49/20
	16:54	17:56	18:49	20:46	21:37 05:39-05:54/15	22:01 20:49-21:09/20
27	08:22 15:52-16:23/31	07:21 16:59-17:31/32	06:13 18:00-18:24/24	06:01 20:03-20:19/16	05:08 20:29-21:05/36	04:56 05:30-05:50/20
	16:56	17:58 07:46-07:47/1	18:51	20:48	21:39 05:38-05:53/15	22:01 20:49-21:09/20
28	08:20 08:49-08:51/2	07:19 17:01-17:32/31	06:11 18:03-18:26/23	05:58 20:02-20:21/19	05:07 20:30-21:06/36	04:57 05:30-05:50/20
	16:58 15:56-16:26/30	18:00 07:43-07:48/5	18:53	20:50	21:40 05:37-05:53/16	22:01 20:49-21:09/20
29	08:19 08:47-08:52/5		07:09 19:03-19:28/25	05:56 20:02-20:22/20	05:06 20:31-21:07/36	04:58 05:31-05:51/20
	17:00 15:58-16:28/30		19:55	20:52	21:41 05:36-05:52/16	22:01 20:50-21:10/20
30	08:17 08:45-08:52/7		07:06 19:04-19:30/26	05:54 20:02-20:24/22	05:05 20:31-21:07/36	04:58 05:31-05:51/20
	17:02 16:00-16:29/29		19:56	20:54	21:43 05:35-05:51/16	22:00 20:49-21:10/21
31	08:15 08:44-08:54/10		07:04 19:05-19:31/26		05:04 20:32-21:07/35	
	17:04 16:01-16:31/30		19:58		21:44 05:34-05:51/17	
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	1405	1023	1119	652	1191	1260

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 3 - T03
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 05:32-05:52/20 22:00 20:49-21:11/22	05:39 20:24-20:53/29 21:25	06:33 19:24-19:44/20 20:18 19:47-19:50/3	07:26 18:05-18:36/31 19:05 07:59-08:13/14	07:24 08:04-08:21/17 16:54 15:53-16:23/30	08:19 14:56-15:34/38 16:10 09:12-09:28/16
2	05:00 05:33-05:53/20 22:00 20:50-21:12/22	05:40 20:23-20:52/29 21:23	06:35 19:22-19:45/23 20:16	07:28 18:04-18:33/29 19:02 07:57-08:19/22	07:26 08:03-08:22/19 16:52 15:51-16:21/30	08:21 14:55-15:32/37 16:09 09:12-09:30/18
3	05:00 05:33-05:52/19 21:59 20:49-21:11/22	05:42 20:21-20:50/29 21:21	06:36 19:19-19:44/25 20:13	07:30 18:03-18:31/28 19:00 07:56-08:21/25	07:28 08:02-08:23/21 16:50 15:49-16:19/30	08:22 14:55-15:32/37 16:08 09:11-09:31/20
4	05:01 05:34-05:53/19 21:59 20:49-21:12/23	05:44 20:19-20:48/29 21:19	06:38 19:17-19:43/26 20:11	07:32 18:02-18:29/27 18:57 07:58-08:23/25	07:30 08:01-08:24/23 16:48 15:47-16:17/30	08:24 14:55-15:32/37 16:08 09:11-09:33/22
5	05:02 05:35-05:54/19 21:58 20:49-21:12/23	05:45 20:16-20:46/30 21:17	06:40 19:15-19:41/26 20:09	07:33 18:01-18:26/25 18:55 08:00-08:24/24	07:32 08:02-08:24/22 16:46 15:46-16:15/29	08:25 14:54-15:30/36 16:07 09:11-09:34/23
6	05:03 05:36-05:55/19 21:58 20:47-21:13/26	05:47 20:15-20:45/30 21:16	06:42 19:13-19:39/26 20:06	07:35 17:54-18:24/30 18:52 08:02-08:25/23	07:34 08:04-08:24/20 16:44 15:45-16:12/27	08:26 09:11-09:40/29 16:07 14:54-15:29/35
7	05:04 05:37-05:55/18 21:57 20:45-21:13/28	05:49 20:14-20:43/29 21:14	06:44 19:10-19:35/25 20:04	07:37 17:47-18:21/34 18:50 08:04-08:25/21	07:36 08:06-08:24/18 16:43 15:44-16:10/26	08:28 09:11-09:41/30 16:06 14:54-15:29/35
8	05:05 05:38-05:56/18 21:56 20:44-21:14/30	05:51 20:12-20:41/29 21:12	06:45 19:09-19:33/24 20:01	07:39 17:44-18:18/34 18:48 08:05-08:24/19	07:38 08:09-08:25/16 16:41 15:41-16:08/27	08:29 09:12-09:46/34 16:06 14:53-15:28/35
9	05:06 05:39-05:57/18 21:55 20:43-21:14/31	05:52 20:12-20:39/27 21:10	06:47 19:06-19:31/25 19:59	07:41 17:42-18:16/34 18:45 08:07-08:24/17	07:40 08:11-08:25/14 16:39 15:41-16:07/26	08:30 09:11-09:47/36 16:05 14:54-15:28/34
10	05:07 20:42-21:15/33 21:55 20:43-21:15/17	05:54 20:11-20:37/26 21:08	06:49 19:04-19:28/24 19:56	07:43 17:40-18:14/34 18:43 08:09-08:24/15	07:42 08:13-08:25/12 16:37 15:35-16:05/30	08:32 09:11-09:48/37 16:05 14:54-15:28/34
11	05:08 20:42-21:15/33 21:54 05:41-05:58/17	05:56 20:10-20:35/25 21:06	06:51 19:02-19:26/24 19:54	07:44 17:39-18:11/32 18:41 08:11-08:23/12	07:44 08:15-08:25/10 16:36 15:33-16:03/30	08:33 09:12-09:49/37 16:05 14:54-15:27/33
12	05:09 20:41-21:15/34 21:53 05:42-05:59/17	05:58 20:10-20:34/24 21:03	06:52 18:58-19:24/26 19:52	07:46 17:38-18:09/31 18:38 08:13-08:23/10	07:46 08:17-08:24/7 16:34 15:32-16:01/29	08:34 09:13-09:51/38 14:26-14:28/2 16:05 14:54-15:27/33
13	05:11 20:40-21:15/35 21:52 05:43-06:00/17	05:59 20:10-20:31/21 21:01	06:54 18:56-19:22/26 19:49	07:48 17:36-18:07/31 18:36 08:15-08:22/7	07:47 08:19-08:24/5 16:32 15:29-15:59/30	08:35 09:13-09:52/39 14:24-14:31/7 16:05 14:54-15:26/32
14	05:12 20:39-21:15/36 21:51 05:44-06:00/16	06:01 20:10-20:29/19 20:59	06:56 18:53-19:18/25 19:47	07:50 17:33-18:04/31 18:33 08:17-08:20/3	07:49 08:21-08:23/2 16:31 15:28-15:57/29	08:36 09:13-09:53/40 14:25-14:33/8 16:05 14:55-15:26/31
15	05:13 20:39-21:15/36 21:50 05:45-06:01/16	06:03 20:10-20:28/18 20:57	06:58 18:52-19:16/24 19:44	07:52 17:30-18:02/32 18:31	07:51 15:25-15:56/31 16:29	08:37 09:14-09:54/40 14:24-14:33/9 16:05 14:55-15:26/31
16	05:14 20:39-21:15/36 21:49 05:47-06:02/15	06:05 20:10-20:25/15 20:55	06:59 18:50-19:14/24 19:42	07:54 17:29-17:59/30 18:29	07:53 15:24-15:54/30 16:28	08:38 09:13-09:56/43 14:24-14:35/11 16:05 14:55-15:26/31
17	05:16 20:39-21:14/35 21:47 05:48-06:03/15	06:06 20:10-20:23/13 20:53	07:01 18:46-19:11/25 19:39	07:56 17:28-17:57/29 18:27	07:55 15:23-15:52/29 16:26	08:38 09:14-09:58/44 14:24-14:36/12 16:05 14:56-15:27/31
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21	05:21 20:31-21:09/38 21:42 05:53-06:05/12	06:13 19:48-20:06/18 20:44	07:08 18:34-19:01/27 19:29	08:03 17:14-17:48/34 18:17	08:02 15:21-15:46/25 16:20	08:41 09:17-10:02/45 14:25-14:39/14 16:06 14:58-15:28/30
22	05:23 20:30-21:07/37 21:41 05:55-06:05/10	06:15 19:46-20:06/20 20:42	07:10 18:33-18:58/25 19:27	08:05 17:12-17:45/33 18:15	08:04 15:21-15:44/23 16:19	08:42 09:17-10:02/45 14:25-14:39/14 16:07 14:58-15:28/30
23	05:24 20:30-21:07/37 21:39 05:56-06:05/9	06:17 19:46-20:07/21 20:39	07:12 18:32-18:56/24 19:24	08:07 17:10-17:43/33 18:13	08:06 15:21-15:43/22 16:18	08:42 09:18-10:03/45 14:26-14:40/14 16:07 14:59-15:29/30
24	05:26 20:28-21:05/37 21:38 05:57-06:05/8	06:19 19:45-20:07/22 20:37	07:14 18:28-18:54/26 19:22	08:09 17:09-17:41/32 18:11	08:08 15:22-15:42/20 16:17	08:43 09:18-10:03/45 14:26-14:40/14 16:08 14:59-15:29/30
25	05:27 20:28-21:04/36 21:36 05:59-06:07/7	06:20 19:44-20:06/22 20:35	07:15 18:23-18:51/28 19:19	07:11 16:08-16:38/30 17:09	08:09 15:04-15:41/37 16:16	08:43 09:18-10:03/45 14:27-14:40/13 16:08 14:59-15:30/31
26	05:29 20:27-21:02/35 21:35 06:00-06:05/5	06:22 19:44-20:04/20 20:32	07:17 18:21-18:48/27 19:17	07:13 16:08-16:36/28 17:07	08:11 15:04-15:39/35 16:15	08:43 09:19-10:03/44 14:27-14:40/13 16:09 15:00-15:30/30
27	05:31 20:27-21:01/34 21:33 06:02-06:05/3	06:24 19:44-20:02/18 20:30	07:19 18:14-18:46/32 19:14	07:15 16:07-16:34/27 17:04	08:13 15:02-15:38/36 16:14	08:44 09:19-10:03/44 14:29-14:41/12 16:10 15:01-15:32/31
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29	05:34 20:26-20:58/32 21:30	06:28 19:29-19:41/12 20:25	07:22 18:09-18:41/32 19:10	07:18 16:02-16:29/27 17:00	08:16 14:57-15:36/39 16:12	08:44 09:20-10:00/40 14:31-14:40/9 16:12 15:02-15:34/32
30	05:35 20:25-20:56/31 21:28	06:29 19:28-19:43/15 20:23	07:24 18:06-18:38/32 19:07	07:20 08:09-08:14/5 16:58	08:18 14:57-15:35/38 16:11	08:44 09:21-10:00/39 14:33-14:40/7 16:12 15:03-15:35/32
31	05:37 20:26-20:55/29 21:27	06:31 19:25-19:43/18 20:21	07:22 08:06-08:19/13 16:56	07:22 08:06-08:19/13 16:56	09:12-09:25/13 16:11	08:44 09:20-09:59/39 14:34-14:38/4 16:13 15:03-15:35/32
Potential sun hours	512	460	382	328	259	233
Sum of minutes with flicker	1387	716	797	1189	1172	2376

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 4 - T04
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	
1	08:44 14:39-15:37/58 16:15	08:14 15:26-16:35/69 17:06	07:16 16:35-17:34/59 18:02	07:01 18:44-19:33/49 20:00	05:52 20:22-20:26/4 19:30-20:03/33 20:55 06:18-06:31/13	05:03 20:08-21:10/62 21:45 05:33-05:46/13	
2	08:44 14:41-15:39/58 16:16	08:12 15:26-16:37/71 17:08	07:14 16:36-17:36/60 18:04	06:59 18:44-19:35/51 20:02	05:50 20:18-20:27/9 19:30-20:02/32 20:57 06:16-06:30/14	05:02 20:10-21:12/62 21:46 05:33-05:46/13	
3	08:44 14:41-15:39/58 16:17	08:10 15:27-16:39/72 17:10	07:12 16:40-17:38/58 18:06	06:56 18:46-19:37/51 20:04	05:48 20:15-20:29/14 19:31-20:01/30 20:59 06:14-06:29/15	05:01 20:10-21:13/63 21:48 05:32-05:45/13	
4	08:43 14:43-15:41/58 16:18	08:08 15:28-16:41/73 17:12	07:09 16:45-17:41/56 18:08	06:54 18:48-19:38/50 20:06	05:46 20:13-20:30/17 19:32-19:59/27 21:01 06:12-06:28/16	05:00 20:10-21:14/64 21:49 05:31-05:44/13	
5	08:43 14:43-15:42/59 16:20	08:07 15:29-16:43/74 17:14	07:07 16:47-17:42/55 18:09	06:51 18:50-19:38/48 20:07	05:44 20:11-20:32/21 19:33-19:58/25 21:03 06:10-06:27/17	04:59 20:11-21:15/64 21:50 05:31-05:44/13	
6	08:43 14:44-15:44/60 16:21	08:05 15:31-16:45/74 17:16	07:04 16:52-17:45/53 18:11	06:49 18:51-19:38/47 20:09	05:42 20:10-20:33/23 19:34-19:56/22 21:04 06:09-06:27/18	04:59 20:11-21:16/65 21:51 05:30-05:44/14	
7	08:42 14:44-15:45/61 16:22	08:03 15:32-16:47/75 17:18	07:02 16:53-17:46/53 18:13	06:47 18:52-19:37/45 20:11	05:40 20:10-20:36/26 19:37-19:55/18 21:06 06:07-06:25/18	04:58 20:12-21:16/64 21:52 05:30-05:44/14	
8	08:42 14:45-15:46/61 16:24	08:01 15:34-16:50/76 17:20	07:00 16:54-17:48/54 18:15	06:44 18:54-19:37/43 20:13	05:38 20:08-20:37/29 19:39-19:53/14 21:08 06:05-06:22/17	04:57 20:13-21:18/65 21:53 05:29-05:42/13	
9	08:41 14:46-15:49/63 16:25	07:59 15:37-16:52/75 17:22	06:57 16:54-17:50/56 18:17	06:42 18:56-19:37/41 20:15	05:36 20:07-20:39/32 19:43-19:48/5 21:10 06:03-06:11/8 06:13-06:19/6	04:57 20:13-21:19/66 21:54 05:29-05:42/13	
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12	08:39 14:48-15:54/66 16:30	07:53 15:55-16:58/63 17:28	06:50 16:58-17:56/58 18:23	06:35 19:00-19:35/35 20:20	05:31 20:06-20:43/37 21:15 05:58-06:09/11	04:55 20:15-21:21/66 21:56 05:28-05:41/13	
13	08:38 14:49-15:55/66 16:31	07:51 15:56-17:00/64 17:30	06:48 17:00-17:58/58 18:25	06:32 19:01-19:34/33 20:22	05:29 20:05-20:44/39 21:17 05:57-06:09/12	04:55 20:15-21:21/66 21:57 05:27-05:40/13	
14	08:37 14:50-15:57/67 16:33	07:49 15:56-17:02/66 17:32	06:45 17:02-18:00/58 18:27	06:30 19:02-19:33/31 20:24	05:27 20:05-20:47/42 21:18 05:55-06:07/12	04:55 20:16-21:22/66 21:58 05:27-05:40/13	
15	08:36 14:51-15:59/68 16:34	07:47 15:57-17:05/68 17:34	06:43 17:07-18:02/55 18:28	06:28 19:03-19:32/29 20:26	05:26 20:04-20:48/44 21:20 05:58-06:06/8	04:55 20:16-21:22/66 21:58 05:27-05:41/14	
16	08:35 14:51-16:00/69 16:36	07:45 15:58-17:07/69 17:36	06:40 17:10-18:04/54 18:30	06:25 19:04-19:31/27 20:28	05:24 20:05-20:50/45 21:22	04:54 20:17-21:23/66 21:59 05:27-05:41/14	
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18	08:33 14:54-16:05/71 16:40	07:41 15:59-17:11/72 17:40	06:36 17:17-18:07/50 18:34	06:21 19:07-19:26/19 20:31	05:21 20:05-20:53/48 21:25	04:54 20:17-21:24/67 22:00 05:27-05:41/14	
19	08:32 14:56-16:07/71 16:41	07:39 16:00-17:13/73 17:42	06:33 17:21-18:10/49 18:36	06:18 19:09-19:24/15 20:33	05:19 20:05-20:54/49 21:27	04:54 20:18-21:24/66 22:00 05:27-05:41/14	
20	08:31 14:57-16:08/71 16:43	07:36 16:01-17:16/75 17:44	06:31 17:24-18:11/47 18:38	06:16 19:14-19:19/5 20:35	05:18 20:04-20:55/51 21:28	04:54 20:18-21:24/66 22:00 05:27-05:41/14	
21	08:30 14:59-15:18/19 16:45	07:34 16:03-17:18/75 17:46	06:28 17:25-18:13/48 18:40	06:14 19:28-20:06/38 20:37	05:16 20:05-20:57/52 21:30	04:54 20:18-21:24/66 22:01 05:27-05:41/14	
22	08:29 15:01-15:16/15 16:47	07:32 16:04-17:19/75 17:48	06:26 17:25-18:15/50 18:42	06:12 19:28-20:06/38 20:39	05:15 20:05-20:59/54 21:31	04:55 20:19-21:25/66 22:01 05:28-05:42/14	
23	08:27 15:05-15:13/8 16:49	07:30 16:06-17:22/76 17:50	06:23 17:26-18:17/51 18:43	06:09 19:28-20:06/38 20:41	05:13 20:05-20:59/54 21:33	04:55 20:19-21:25/66 22:01 05:28-05:42/14	
24	08:26 15:20-16:17/57 16:51	07:28 16:09-17:24/75 17:52	06:21 17:27-18:18/51 18:45	06:07 19:28-20:06/38 20:43	05:12 20:05-21:01/56 21:34	04:55 20:19-21:25/66 22:01 05:28-05:42/14	
25	08:24 15:22-16:19/57 16:52	07:25 16:12-17:26/74 17:54	06:18 17:29-18:21/52 18:47	06:05 06:30-06:34/4 20:44	05:11 20:06-21:02/56 21:36	04:56 20:19-21:25/66 22:01 05:29-05:43/14	
26	08:23 15:22-16:21/59 16:54	07:23 16:21-17:28/67 17:56	06:16 17:30-18:22/52 18:49	06:03 06:28-06:34/6 20:46	05:09 20:06-21:04/58 21:37	04:56 20:19-21:25/66 22:01 05:29-05:43/14	
27	08:22 15:22-16:23/61 16:56	07:21 16:25-17:31/66 17:58	06:13 17:34-18:24/50 18:51	06:01 06:26-06:34/8 20:48	05:08 20:07-21:05/58 21:39	04:56 20:18-21:24/66 22:01 05:30-05:44/14	
28	08:20 15:23-16:26/63 16:58	07:19 16:33-17:32/59 18:00	06:11 17:39-18:26/47 18:53	05:58 06:24-06:33/9 20:50	05:07 20:07-21:06/59 21:40	04:57 20:19-21:25/66 22:01 05:30-05:43/13	
29	08:19 15:23-16:28/65 17:00		07:09 18:39-19:28/49 19:55	05:56 06:22-06:33/11 20:52	05:06 20:07-21:07/60 21:41	04:58 20:19-21:25/66 22:01 05:31-05:44/13	
30	08:17 15:24-16:30/66 17:02		07:06 18:41-19:30/49 19:56	05:54 06:20-06:32/12 20:54	05:05 20:08-21:08/60 21:43	04:58 20:19-21:24/65 22:00 05:31-05:44/13	
31	08:15 15:24-16:32/68 17:04		07:04 18:42-19:31/49 19:58		05:04 20:08-21:09/61 21:44		
Potential sun hours	250	273	367	420	494	510	
Sum of minutes with flicker	1980	1982	1647	1381	1762	2364	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 4 - T04
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 20:19-21:24/65 22:00 05:32-05:45/13	05:39 20:16-20:53/37 21:25 06:09-06:20/11	06:33 18:57-19:35/38 20:18 19:43-19:50/7	07:26 17:38-18:36/58 19:05 16:54	07:24 15:09-16:23/74 16:52	08:19 14:30-15:34/64 16:10
2	05:00 20:19-21:24/65 22:00 05:33-05:45/12	05:40 20:17-20:52/35 21:23 06:11-06:21/10	06:35 18:55-19:35/40 20:16	07:28 17:36-18:33/57 19:02	07:26 15:06-16:21/75 16:52	08:21 14:29-15:33/64 16:09
3	05:00 20:18-21:23/65 21:59 05:33-05:46/13	05:42 20:17-20:50/33 21:21 06:12-06:21/9	06:36 18:53-19:34/41 20:13	07:30 17:34-18:31/57 19:00	07:28 15:04-16:19/75 16:50	08:22 14:29-15:32/63 16:08
4	05:01 20:18-21:23/65 21:59 05:34-05:47/13	05:44 20:18-20:48/30 06:14-06:21/7 21:19 06:22-06:30/8 19:51-20:00/9	06:38 18:51-19:34/43 20:11	07:31 17:33-18:29/56 18:57	07:30 15:02-16:17/75 16:48	08:24 14:30-15:32/62 16:08
5	05:02 20:18-21:23/65 21:58 05:35-05:48/13	05:45 20:18-20:46/28 19:47-20:03/16 21:17 06:16-06:34/18	06:40 18:49-19:34/45 20:09	07:33 17:32-18:26/54 18:55	07:32 15:00-16:15/75 16:46	08:25 14:30-15:30/60 16:07
6	05:03 20:18-21:22/64 21:58 05:36-05:50/14	05:47 20:19-20:45/26 19:45-20:05/20 21:15 06:17-06:35/18	06:42 18:47-19:34/47 20:06	07:35 17:31-18:24/53 18:52	07:34 14:59-16:12/73 16:44	08:26 14:30-15:30/60 16:07
7	05:04 20:18-21:22/64 21:57 05:37-05:50/13	05:49 20:21-20:43/22 19:44-20:07/23 21:14 06:19-06:37/18	06:43 18:45-19:33/48 20:04	07:37 17:29-18:21/52 18:50	07:36 14:58-16:10/72 16:43	08:28 14:30-15:29/59 16:06
8	05:05 20:18-21:21/63 21:56 05:38-05:51/13	05:51 20:21-20:41/20 19:42-20:08/26 21:12 06:20-06:37/17	06:45 18:42-19:33/51 20:01	07:39 17:24-18:18/54 18:48	07:38 14:57-16:08/71 16:41	08:29 14:30-15:28/58 16:06
9	05:06 20:17-21:21/64 21:55 05:39-05:52/13	05:52 20:23-20:39/16 19:41-20:09/28 21:10 06:22-06:38/16	06:47 18:40-19:31/51 19:59	07:41 17:21-18:16/55 18:45	07:40 14:56-16:06/70 16:39	08:30 14:30-15:28/58 16:05
10	05:07 20:17-21:20/63 21:55 05:40-05:53/13	05:54 20:24-20:37/13 19:39-20:09/30 21:08 06:24-06:39/15	06:49 18:38-19:28/50 19:56	07:42 17:17-18:14/57 18:43	07:42 14:56-16:05/69 16:37	08:31 14:30-15:28/58 16:05
11	05:08 20:17-21:19/62 21:54 05:41-05:53/12	05:56 20:27-20:35/8 19:38-20:11/33 21:05 06:25-06:39/14	06:51 18:36-19:26/50 19:54	07:44 17:12-18:11/59 18:40	07:44 14:56-16:03/67 16:36	08:33 14:30-15:27/57 16:05
12	05:09 20:17-21:18/61 21:53 05:42-05:54/12	05:58 20:33-20:34/1 19:38-20:11/33 21:03 06:27-06:40/13	06:52 18:34-19:24/50 19:52	07:46 17:09-18:09/60 18:38	07:45 14:55-16:01/66 16:34	08:34 14:29-15:27/58 16:05
13	05:11 20:16-21:17/61 21:52 05:43-05:54/11	05:59 06:28-06:41/13 21:01 19:36-20:11/35	06:54 18:32-19:22/50 19:49	07:48 17:07-18:07/60 18:36	07:47 14:55-15:59/64 16:32	08:35 14:29-15:27/58 16:05
14	05:12 20:16-21:16/60 21:51 05:44-05:55/11	06:01 06:30-06:41/11 20:59 19:36-20:12/36	06:56 18:30-19:18/48 19:47	07:50 17:01-18:04/63 18:33	07:49 14:55-15:58/63 16:31	08:36 14:29-15:26/57 16:05
15	05:13 20:16-21:15/59 21:50 05:45-05:55/10	06:03 06:32-06:41/9 20:57 19:36-20:13/37	06:58 18:28-19:16/48 19:44	07:52 16:56-18:02/66 18:31	07:51 14:55-15:56/61 16:29	08:37 14:30-15:26/56 16:05
16	05:14 20:16-21:15/59 21:49 05:47-05:56/9	06:05 06:33-06:40/7 20:55 19:35-20:12/37	06:59 18:24-19:14/50 19:42	07:54 16:48-17:59/71 18:29	07:53 14:55-15:54/59 16:27	08:38 14:30-15:26/56 16:05
17	05:16 20:16-21:14/58 21:47 05:48-05:56/8	06:06 06:35-06:41/6 20:53 19:34-20:12/38	07:01 18:19-19:11/52 19:39	07:55 16:42-17:57/75 18:26	07:55 14:55-15:52/57 16:26	08:38 14:31-15:27/56 16:05
18	05:17 20:15-21:12/57 21:46 05:49-05:56/7	06:08 06:37-06:41/4 20:51 19:34-20:13/39	07:03 18:16-19:08/52 19:37	07:57 16:39-17:55/76 18:24	07:57 14:54-15:51/57 16:25	08:39 14:31-15:27/56 16:05
19	05:18 20:15-21:11/56 21:45 05:50-05:56/6	06:10 19:33-20:12/39 20:48 06:38-06:39/1	07:05 18:14-19:06/52 19:34	07:59 16:37-17:52/75 18:22	07:59 14:39-14:47/8 16:23	08:40 14:32-15:28/56 16:05
20	05:20 20:16-21:10/54 21:44 05:52-05:57/5	06:12 19:34-20:12/38 20:46	07:06 18:13-19:04/51 19:32	08:01 16:35-17:50/75 18:20	08:00 14:36-14:51/15 16:22	08:41 14:31-15:27/56 16:06
21	05:21 20:15-21:09/54 21:42 05:53-05:56/3	06:13 19:34-20:12/38 20:44	07:08 18:11-19:01/50 19:29	08:03 16:33-17:48/75 18:17	08:02 14:34-14:53/19 16:20	08:41 14:32-15:28/56 16:06
22	05:23 20:15-21:07/52 21:41 05:55-05:57/2	06:15 19:33-20:11/38 20:42	07:10 18:10-18:58/48 19:27	08:05 16:31-17:45/74 18:15	08:04 14:33-15:44/71 16:19	08:42 14:32-15:28/56 16:07
23	05:24 20:15-21:07/52 21:39 05:56-05:57/1	06:17 19:17-19:24/7 20:39 19:34-20:10/36	07:12 18:09-18:56/47 19:24	08:07 16:30-17:43/73 18:13	08:06 14:32-15:43/71 16:18	08:42 14:33-15:29/56 16:07
24	05:26 20:15-21:05/50 21:38	06:19 19:13-19:28/15 20:37 19:34-20:09/35	07:14 18:06-18:54/48 19:22	08:09 16:29-17:41/72 18:11	08:08 14:31-15:42/71 16:17	08:43 14:34-15:30/56 16:08
25	05:27 20:15-21:04/49 21:36	06:20 19:09-19:29/20 20:35 19:34-20:06/32	07:15 18:01-18:51/50 19:19	07:11 15:28-16:38/70 17:09	08:09 14:31-15:41/70 16:16	08:43 14:34-15:30/56 16:08
26	05:29 20:15-21:02/47 21:35	06:22 19:07-19:31/24 20:32 19:35-20:04/29	07:17 17:57-18:48/51 19:17	07:13 15:27-16:36/69 17:07	08:11 14:30-15:39/69 16:15	08:43 14:34-15:30/56 16:09
27	05:31 20:16-21:01/45 21:33	06:24 19:06-19:33/27 20:30 19:35-20:02/27	07:19 17:53-18:46/53 19:14	07:15 15:26-16:34/68 17:04	08:13 14:30-15:38/68 16:14	08:44 14:36-15:32/56 16:10
28	05:32 20:15-20:59/44 21:32 06:09-06:14/5	06:26 19:04-19:33/29 20:28 19:36-19:59/23	07:21 17:49-18:44/55 19:12	07:16 15:26-16:31/65 17:02	08:14 14:30-15:37/67 16:13	08:44 14:36-15:33/57 16:11
29	05:34 20:16-20:58/42 21:30 06:07-06:17/10	06:28 19:03-19:34/31 20:25 19:37-19:57/20	07:22 17:44-18:41/57 19:10	07:18 15:25-16:29/64 17:00	08:16 14:29-15:36/67 16:12	08:44 14:37-15:34/57 16:11
30	05:35 20:16-20:56/40 21:28 06:06-06:18/12	06:29 19:02-19:35/33 20:23 19:39-19:55/16	07:24 17:40-18:38/58 19:07	07:20 15:23-16:27/64 16:58	08:18 14:29-15:35/66 16:11	08:44 14:37-15:34/57 16:12
31	05:37 20:16-20:55/39 21:27 06:08-06:19/11	06:31 18:59-19:34/35 20:21 19:40-19:52/12	 	07:22 15:22-16:25/63 16:56	 	08:44 14:38-15:35/57 16:13
Potential sun hours	512	460	382	328	259	233
Sum of minutes with flicker	2009	1538	1481	1990	2045	1792

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 5 - T05
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 15:07-15:37/30 16:15	08:14 16:03-16:35/32 17:06	07:16 16:59-17:34/35 18:02	07:01 18:39-19:33/54 20:00	05:52 19:48-20:26/38 20:55	05:03 20:03-21:03/60 21:45
2	08:44 15:07-15:39/32 16:16	08:12 16:05-16:37/32 17:08	07:14 17:00-17:36/36 18:04	06:59 18:44-19:33/49 20:02	05:50 19:49-20:27/38 20:57	05:02 20:04-21:12/68 21:46
3	08:44 15:07-15:39/32 16:17	08:10 16:08-16:39/31 17:10	07:12 17:03-17:10/7 18:06	06:56 18:45-19:34/49 20:04	05:48 19:49-20:29/40 20:59	05:01 20:04-21:13/69 21:48
4	08:43 15:09-15:41/32 16:18	08:08 16:10-16:41/31 17:12	07:09 17:11-17:36/25 18:08	06:54 18:45-19:34/49 20:06	05:46 19:50-20:30/40 21:01	05:00 20:03-21:14/71 21:49
5	08:43 15:09-15:42/33 16:20	08:07 16:11-16:43/32 17:14	07:07 17:37-17:41/4 18:09	06:52 18:45-19:33/48 20:07	05:44 19:50-20:32/42 21:03	04:59 20:04-21:15/71 21:50
6	08:43 15:10-15:44/34 16:21	08:05 16:12-16:45/33 17:16	07:05 17:11-17:45/34 18:11	06:49 18:47-19:33/46 20:09	05:42 19:51-20:32/41 21:04	04:59 20:03-21:16/73 21:51
7	08:42 15:10-15:45/35 16:22	08:03 16:13-16:47/34 17:18	07:02 17:11-17:46/35 18:13	06:47 18:47-19:32/45 20:11	05:40 19:52-20:33/41 21:06	04:58 20:03-21:16/73 21:52
8	08:42 15:11-15:46/35 16:24	08:01 16:16-16:50/34 17:20	07:00 17:12-17:48/36 18:15	06:44 18:49-19:31/42 20:13	05:38 19:53-20:37/44 21:08	04:57 20:03-21:17/74 21:53
9	08:41 15:12-15:49/37 16:25	07:59 16:19-16:52/33 17:22	06:57 17:12-17:50/38 18:17	06:42 18:51-19:31/40 20:15	05:36 19:54-20:38/44 21:10	04:57 20:04-21:19/75 21:54
10	08:40 15:13-15:50/37 16:27	07:57 16:22-16:54/32 17:24	06:55 17:14-17:52/38 18:19	06:39 07:04-07:32/28 20:17	05:34 06:20-06:45/25 21:11	04:56 20:03-21:19/76 21:55
11	08:40 15:14-15:52/38 16:28	07:55 16:25-16:56/31 17:26	06:53 17:17-17:55/38 18:21	06:37 19:48-19:51/3 19:06-19:28/22 20:17	05:33 19:58-20:42/44 21:13	04:56 20:04-21:20/76 21:55
12	08:39 15:15-15:54/39 16:30	07:53 16:27-16:58/31 17:28	06:50 17:22-17:56/34 18:23	06:35 19:46-19:53/7 19:07-19:26/19 20:20	05:31 20:02-20:43/41 21:15	04:55 20:04-21:21/77 21:56
13	08:38 15:17-15:55/38 16:31	07:51 16:30-17:00/30 17:30	06:48 17:21-17:58/37 18:25	06:32 19:44-19:54/10 19:09-19:23/14 20:22	05:29 20:02-20:45/43 21:17	04:55 20:03-21:21/78 21:57
14	08:37 15:18-15:57/39 16:33	07:49 16:32-17:02/30 17:32	06:45 17:20-18:00/40 18:27	06:30 19:43-19:56/13 07:07-07:27/20 20:24	05:27 20:04-20:47/43 21:18	04:55 20:04-21:21/77 21:58
15	08:36 15:21-15:59/38 16:35	07:47 16:34-17:05/31 17:34	06:43 17:20-18:02/42 18:28	06:28 19:42-19:58/16 07:09-07:25/16 20:26	05:26 20:04-20:48/44 21:20	04:55 20:04-21:22/78 21:58
16	08:35 15:27-16:00/33 16:36	07:45 16:35-17:07/32 17:36	06:40 17:19-18:04/45 18:30	06:25 19:41-20:00/19 07:11-07:23/12 20:28	05:24 20:05-20:50/45 21:22	04:54 20:04-21:23/79 21:59
17	08:34 15:28-16:03/35 16:38	07:43 16:37-17:09/32 17:38	06:38 17:20-18:06/46 18:32	06:23 19:41-20:01/20 20:30	05:22 20:06-20:51/45 21:23	04:54 20:04-21:23/79 21:59
18	08:33 15:30-16:05/35 16:40	07:41 16:38-17:11/33 17:40	06:36 17:19-18:07/48 18:34	06:21 19:41-20:03/22 20:31	05:21 20:08-20:52/44 21:25	04:54 20:05-21:24/79 22:00
19	08:32 15:31-16:07/36 16:41	07:39 16:44-17:13/29 17:42	06:33 17:20-18:10/50 18:36	06:18 19:41-20:05/24 20:33	05:19 20:10-20:54/44 21:27	04:54 20:05-21:24/79 22:00
20	08:31 15:32-16:08/36 16:43	07:36 16:45-17:16/31 17:44	06:31 17:20-18:11/51 18:38	06:16 19:42-20:07/25 20:35	05:18 20:09-20:55/46 21:28	04:54 20:05-21:24/79 22:00
21	08:30 15:33-16:11/38 16:45	07:34 16:46-17:18/32 17:46	06:28 17:21-18:13/52 18:40	06:14 19:42-20:08/26 20:37	05:16 20:09-20:57/48 21:30	04:55 20:05-21:24/79 22:01
22	08:29 15:34-16:12/38 16:47	07:32 16:48-17:19/31 17:48	06:26 17:21-18:15/54 18:42	06:12 19:42-20:10/28 20:39	05:15 20:08-20:58/50 21:31	04:55 20:06-21:25/79 22:01
23	08:27 15:36-16:15/39 16:49	07:30 16:49-17:20/31 17:50	06:23 17:23-18:17/54 18:43	06:09 19:43-20:12/29 20:41	05:13 20:07-20:58/51 21:33	04:55 20:06-21:25/79 22:01
24	08:26 15:38-16:17/39 16:51	07:28 16:52-17:20/28 17:52	06:21 17:24-18:18/54 18:45	06:07 19:43-20:13/30 20:43	05:12 20:06-20:59/53 21:34	04:55 20:06-21:25/79 22:01
25	08:24 15:42-16:19/37 16:52	07:25 16:53-17:26/33 17:54	06:18 17:27-18:21/54 18:47	06:05 19:44-20:15/31 20:44	05:11 20:06-20:59/53 21:36	04:56 20:06-21:25/79 22:01
26	08:23 15:45-16:21/36 16:54	07:23 16:55-17:28/33 17:56	06:16 17:30-18:23/53 18:49	06:03 19:45-20:17/32 20:46	05:09 20:06-21:00/54 21:37	04:56 20:06-21:25/79 22:01
27	08:22 15:47-16:23/36 16:56	07:21 16:56-17:31/35 17:58	06:13 17:30-18:24/54 18:51	06:01 19:46-20:19/33 20:48	05:08 20:05-21:01/56 21:39	04:56 20:07-21:25/78 22:01
28	08:20 15:53-16:26/33 16:58	07:19 16:57-17:32/35 18:00	06:11 17:31-18:26/55 18:53	05:58 19:48-20:21/33 20:50	05:07 20:05-21:01/56 21:40	04:57 20:07-21:25/78 22:01
29	08:19 15:55-16:28/33 17:00	07:09 18:32-19:28/56 19:55	07:09 18:32-19:28/56 19:55	05:56 19:48-20:22/34 20:52	05:06 20:04-21:02/58 21:41	04:58 20:07-21:25/78 22:01
30	08:17 15:56-16:30/34 17:02	07:06 18:34-19:30/56 19:56	07:06 18:34-19:30/56 19:56	05:54 19:48-20:24/36 20:54	05:05 20:04-21:02/58 21:43	04:58 20:07-21:24/77 22:00
31	08:15 15:58-16:32/34 17:04	07:04 18:35-19:31/56 19:58	07:04 18:35-19:31/56 19:58	06:20-06:56/36 20:54	05:04 20:04-21:03/59 21:06-21:09/3 21:44	04:58 20:07-21:24/77 22:00
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	1101	895	2028	1775	2011	3271

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park IE-F91 RHH9 Sligo +353719161416 abyrrne / abyrrne@jodireland.com Calculated: 11/07/2024 10:33/4.0.547

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 5 - T05 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59 20:08-21:24/76	05:39 20:10-20:53/43	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38				
2	05:00 20:08-21:24/76	05:40 20:10-20:53/43	06:34 19:48-19:51/4	19:06-19:27/22	07:27 18:01-18:37/37	07:25 15:52-16:24/33	08:20 14:57-15:35/39				
3	05:01 20:09-21:25/77	05:41 20:11-20:54/44	06:35 19:49-19:52/5	19:07-19:28/23	07:28 18:02-18:38/38	07:26 15:53-16:25/34	08:21 14:58-15:36/40				
4	05:02 20:09-21:25/77	05:42 20:11-20:54/44	06:36 19:50-19:53/6	19:08-19:29/24	07:29 18:03-18:39/39	07:27 15:54-16:26/35	08:22 14:59-15:37/41				
5	05:03 20:10-21:26/78	05:43 20:12-20:55/45	06:37 19:51-19:54/7	19:09-19:30/25	07:30 18:04-18:40/40	07:28 15:55-16:27/36	08:23 15:00-15:38/42				
6	05:04 20:10-21:26/78	05:44 20:12-20:55/45	06:38 19:52-19:55/8	19:10-19:31/26	07:31 18:05-18:41/41	07:29 15:56-16:28/37	08:24 15:01-15:39/43				
7	05:05 20:11-21:27/79	05:45 20:13-20:56/46	06:39 19:53-19:56/9	19:11-19:32/27	07:32 18:06-18:42/42	07:30 15:57-16:29/38	08:25 15:02-15:40/44				
8	05:06 20:11-21:27/79	05:46 20:13-20:56/46	06:40 19:54-19:57/10	19:12-19:33/28	07:33 18:07-18:43/43	07:31 15:58-16:30/39	08:26 15:03-15:41/45				
9	05:07 20:12-21:28/80	05:47 20:14-20:57/47	06:41 19:55-19:58/11	19:13-19:34/29	07:34 18:08-18:44/44	07:32 15:59-16:31/40	08:27 15:04-15:42/46				
10	05:08 20:12-21:28/80	05:48 20:14-20:57/47	06:42 19:56-19:59/12	19:14-19:35/30	07:35 18:09-18:45/45	07:33 15:59-16:32/41	08:28 15:05-15:43/47				
11	05:09 20:13-21:29/81	05:49 20:15-20:58/48	06:43 19:57-19:59/13	19:15-19:36/31	07:36 18:10-18:46/46	07:34 15:59-16:33/42	08:29 15:06-15:44/48				
12	05:10 20:13-21:29/81	05:50 20:15-20:58/48	06:44 19:58-19:59/14	19:16-19:37/32	07:37 18:11-18:47/47	07:35 15:59-16:34/43	08:30 15:07-15:45/49				
13	05:11 20:14-21:30/82	05:51 20:16-20:59/49	06:45 19:59-19:59/15	19:17-19:38/33	07:38 18:12-18:48/48	07:36 15:59-16:35/44	08:31 15:08-15:46/50				
14	05:12 20:14-21:30/82	05:52 20:16-20:59/49	06:46 19:59-19:59/16	19:18-19:39/34	07:39 18:13-18:49/49	07:37 15:59-16:36/45	08:32 15:09-15:47/51				
15	05:13 20:15-21:31/83	05:53 20:17-21:00/50	06:47 19:59-19:59/17	19:19-19:40/35	07:40 18:14-18:50/50	07:38 15:59-16:37/46	08:33 15:10-15:48/52				
16	05:14 20:15-21:31/83	05:54 20:17-21:00/50	06:48 19:59-19:59/18	19:20-19:41/36	07:41 18:15-18:51/51	07:39 15:59-16:38/47	08:34 15:11-15:49/53				
17	05:15 20:16-21:32/84	05:55 20:18-21:01/51	06:49 19:59-19:59/19	19:21-19:42/37	07:42 18:16-18:52/52	07:40 15:59-16:39/48	08:35 15:12-15:50/54				
18	05:16 20:16-21:32/84	05:56 20:18-21:01/51	06:50 19:59-19:59/20	19:22-19:43/38	07:43 18:17-18:53/53	07:41 15:59-16:40/49	08:36 15:13-15:51/55				
19	05:17 20:17-21:33/85	05:57 20:19-21:02/52	06:51 19:59-19:59/21	19:23-19:44/39	07:44 18:18-18:54/54	07:42 15:59-16:41/50	08:37 15:14-15:52/56				
20	05:18 20:17-21:33/85	05:58 20:19-21:02/52	06:52 19:59-19:59/22	19:24-19:45/40	07:45 18:19-18:55/55	07:43 15:59-16:42/51	08:38 15:15-15:53/57				
21	05:19 20:18-21:34/86	05:59 20:20-21:03/53	06:53 19:59-19:59/23	19:25-19:46/41	07:46 18:20-18:56/56	07:44 15:59-16:43/52	08:39 15:16-15:54/58				
22	05:20 20:18-21:34/86	06:00 20:20-21:03/53	06:54 19:59-19:59/24	19:26-19:47/42	07:47 18:21-18:57/57	07:45 15:59-16:44/53	08:40 15:17-15:55/59				
23	05:21 20:19-21:35/87	06:01 20:21-21:04/54	06:55 19:59-19:59/25	19:27-19:48/43	07:48 18:22-18:58/58	07:46 15:59-16:45/54	08:41 15:18-15:56/60				
24	05:22 20:19-21:35/87	06:02 20:21-21:04/54	06:56 19:59-19:59/26	19:28-19:49/44	07:49 18:23-18:59/59	07:47 15:59-16:46/55	08:42 15:19-15:57/61				
25	05:23 20:20-21:36/88	06:03 20:22-21:05/55	06:57 19:59-19:59/27	19:29-19:50/45	07:50 18:24-19:00/60	07:48 15:59-16:47/56	08:43 15:20-15:58/62				
26	05:24 20:20-21:36/88	06:04 20:22-21:05/55	06:58 19:59-19:59/28	19:30-19:51/46	07:51 18:25-19:01/61	07:49 15:59-16:48/57	08:44 15:21-15:59/63				
27	05:25 20:21-21:37/89	06:05 20:23-21:06/56	06:59 19:59-19:59/29	19:31-19:52/47	07:52 18:26-19:02/62	07:50 15:59-16:49/58	08:45 15:22-16:00/64				
28	05:26 20:21-21:37/89	06:06 20:23-21:06/56	07:00 19:59-19:59/30	19:32-19:53/48	07:53 18:27-19:03/63	07:51 15:59-16:50/59	08:46 15:23-16:01/65				
29	05:27 20:22-21:38/90	06:07 20:24-21:07/57	07:01 19:59-19:59/31	19:33-19:54/49	07:54 18:28-19:04/64	07:52 15:59-16:51/60	08:47 15:24-16:02/66				
30	05:28 20:22-21:38/90	06:08 20:24-21:07/57	07:02 19:59-19:59/32	19:34-19:55/50	07:55 18:29-19:05/65	07:53 15:59-16:52/61	08:48 15:25-16:03/67				
31	05:29 20:23-21:39/91	06:09 20:25-21:08/58	07:03 19:59-19:59/33	19:35-19:56/51	07:56 18:30-19:06/66	07:54 15:59-16:53/62	08:49 15:26-16:04/68				
Potential sun hours	512	460	382	328	259	1048	1016				
Sum of minutes with flicker	2336	1820	2428	1040	1048						

Table layout: For each day in each month the following matrix apply

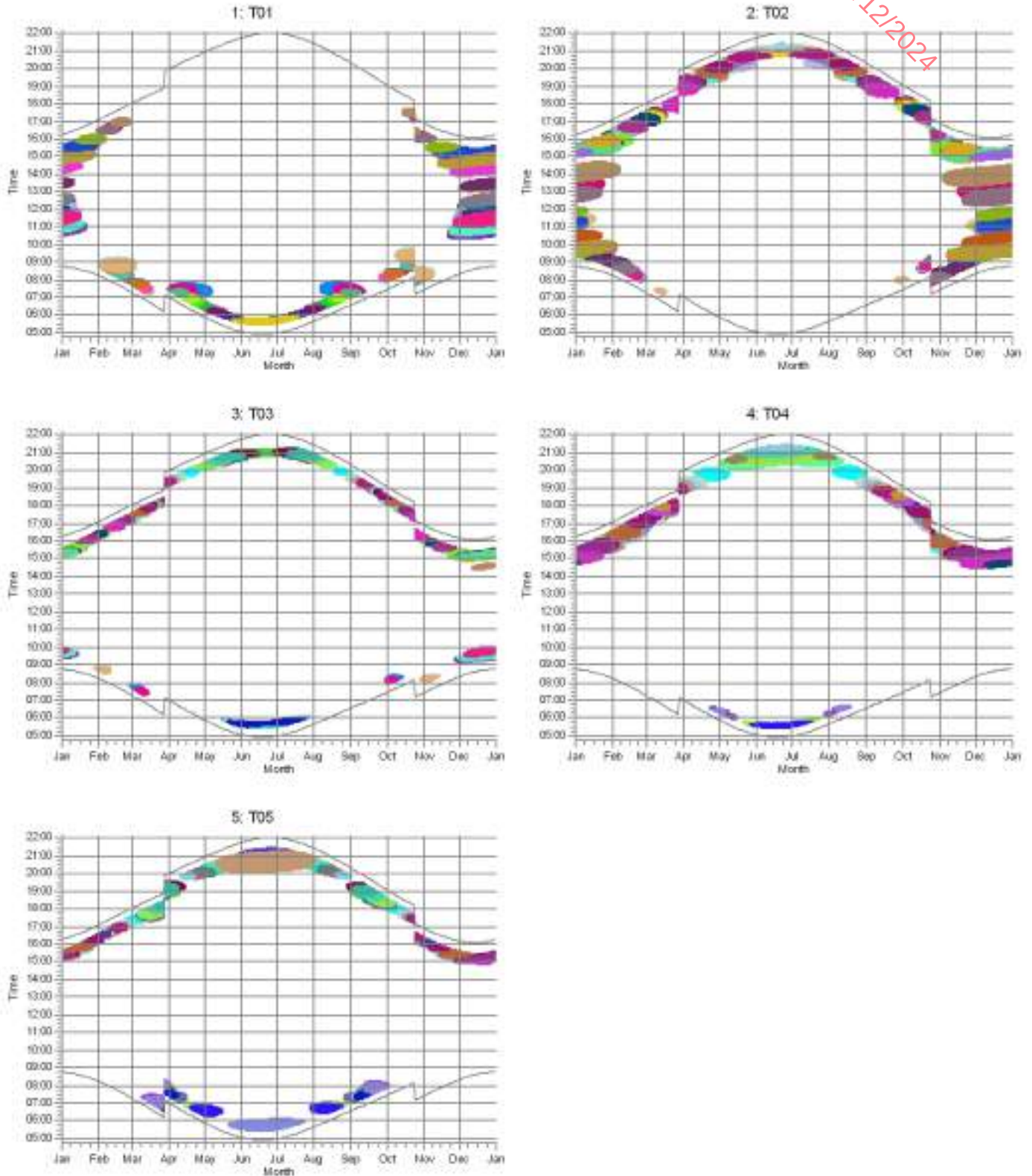
Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
IE-F91 RHH9 Sligo
+353719161416
abyrne / abyrne@jodireland.com
Calculated:
11/07/2024 10:33/4.0.547

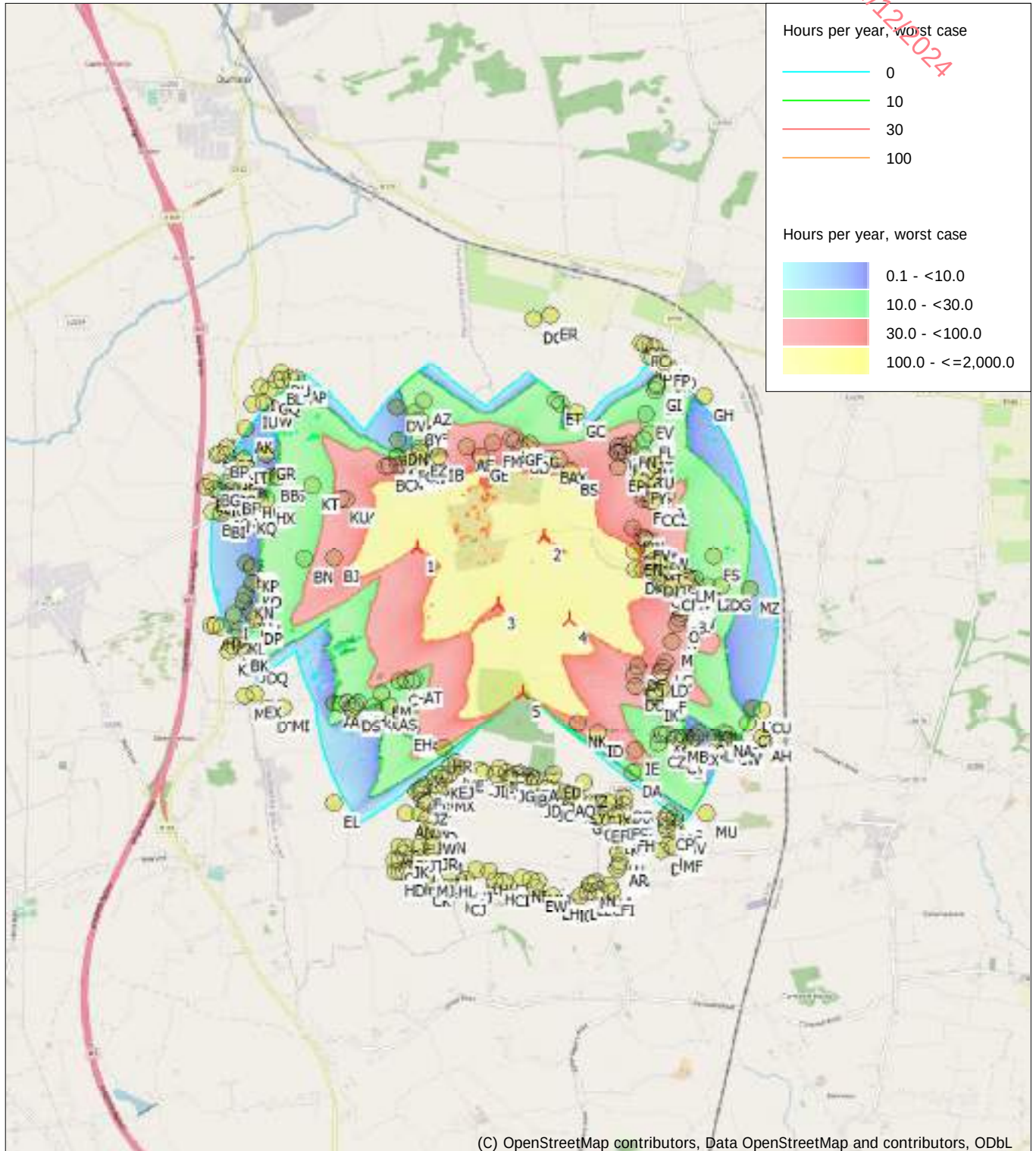
SHADOW - Calendar per WTG, graphical

Calculation: Kellystown N149 Worst Case



SHADOW - Map

Calculation: Kellystown N149 Worst Case



0 500 1000 1500 2000 m

Map: EMD OpenStreetMap , Print scale 1:50,000, Map center Irish ITM-IRENET95 (IE), geocentric, GRS80 East: 708,030 North: 783,620
 New WTG Shadow receptor
 Flicker map level: Height Contours: CONTOURLINE_6918 Kellystown_3.wpo (3)
 Time step: 2 minutes, Day step: 3 days, Map resolution: 10 m, Visibility resolution: 5 m, Eye height: 1.5 m