

Appendix 12.3 – Noise Modelling Assumptions and Inputs

Prediction calculations for turbine noise have been conducted in accordance with ISO 9613-2:2024: *Acoustics – Attenuation of sound during propagation outdoors Part 2: Engineering method for the prediction of sound pressure levels outdoors*. Guidance in terms of the calculation settings has been obtained from the Institute of Acoustics (IOA) Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (IOA GPG) and its associated supplementary guidance notes. The following are the main aspects that have been considered in terms of the noise predictions presented in this instance.

Ground Effect:

Ground effect is the result of sound reflected by the ground interfering with the sound propagating directly from source to receiver. The prediction of ground effects is inherently complex and depend on source height receiver height propagation height between the source and receiver and the ground conditions.

The ground conditions are described according to a variable defined as G, which varies between 0.0 for hard ground (including paving, ice concrete) and 1.0 for soft ground (includes ground covered by grass trees or other vegetation)

Noise Calculations have been conducted using a source height corresponding to the hub height of the turbines, a receiver height of 4m and an assumed ground factor of G=0.5.

Geometrical Divergence

This term relates to the spherical spreading in the free-field from a point sound source resulting in an attenuation depending on distance according to the following equation:

$$A_{\text{geo}} = 20 \times \log(d) + 11$$

where d = distance from the source

A wind turbine may be considered as a point source beyond a distance corresponding to one rotor diameter.

Atmospheric Adsorption

Sound propagation through the atmosphere is attenuated by the conversion of the sound energy into heat. This attenuation is dependent on the temperature and relative humidity of the air through which the sound is travelling and is frequency dependent with increasing attenuation towards higher frequencies.

In accordance with the guidance set out in the IOA GPG for calculations, a temperature of 10°C and a relative humidity of 70% have been used, which give relatively low levels of atmosphere attenuation and corresponding worst case noise predictions.

Barrier Attenuation

The effect of any barrier between the noise source and the receiver position is that noise will be reduced according to the relative heights of the source, receiver and barrier and the frequency spectrum of the noise. For calculation of wind turbine noise, barrier and ground corrections have been applied in accordance with of ISO 9613-2 *Annex D Calculation of sound pressure levels caused by wind turbines*, sections D.3 and D.4

The atmospheric attenuation outlined in Table A12-1 were used for all calculations in accordance with the guidance outlined in the IOA GPG. No meteorological corrections were applied to all calculations.

Table A12-1 Atmospheric Attenuation Assumed for Noise Calculations (dB per km)

Temp (°C)	% Humidity	Octave Band Centre Frequencies (Hz)							
		63	125	250	500	1k	2k	4k	8k
10	70	0.12	0.41	1.04	1.92	3.66	9.70	33.06	118.4

Table A12-2 Coordinates (ITM) for Noise Sensitive Locations (NSLs)

Building ID	Receptor	X_ITM	Y_ITM	Assigned Limit Based on Location	Building ID	Receptor	X_ITM	Y_ITM	Assigned Limit Based on Location
101	Sensitive	660,001	621,710	A	354	Sensitive	663,219	626,174	D
102	Sensitive	660,095	621,720	A	355	Sensitive	663,292	626,165	D
103	Sensitive	660,234	621,858	A	356	Sensitive	663,233	626,146	D
104	Sensitive	659,946	622,098	A	357	Sensitive	663,210	626,093	D
105	Sensitive	660,501	622,050	E	358	Sensitive	663,210	626,093	D
106	Sensitive	660,053	622,325	A	359	Sensitive	663,036	625,996	D
107	Sensitive	660,136	622,626	A	360	Sensitive	663,139	625,858	D
108	Sensitive	659,972	622,692	A	361	Sensitive	663,233	625,700	D
109	Sensitive	660,137	622,762	A	362	Sensitive	663,164	625,625	D
110	Non-Sensitive	660,145	622,845	Ignore	363	Sensitive	663,240	625,622	D
111	Sensitive	660,147	622,875	A	364	Sensitive	663,174	625,449	D
112	Sensitive	660,167	622,892	A	365	Sensitive	663,259	625,319	D
113	Sensitive	659,929	622,686	A	366	Sensitive	663,592	625,561	D
114	Sensitive	659,549	622,823	A	367	Sensitive	663,729	625,590	D
115	Sensitive	659,420	622,795	A	368	Sensitive	663,768	625,625	D
116	Sensitive	659,246	622,820	A	369	Sensitive	663,836	625,635	D
117	Sensitive	659,108	622,802	A	370	Sensitive	663,886	625,666	D
118	Sensitive	659,053	622,805	A	371	Sensitive	664,030	625,756	D
119	Sensitive	658,995	622,888	A	372	Sensitive	664,060	625,777	D
120	Sensitive	658,956	622,997	A	373	Sensitive	664,143	625,852	D
121	Sensitive	658,847	623,014	A	374	Sensitive	664,272	625,986	D
122	Sensitive	658,721	622,969	A	375	Sensitive	664,169	626,041	D
123	Sensitive	658,691	622,859	A	376	Sensitive	664,232	626,083	D
124	Sensitive	658,577	622,907	A	377	Sensitive	664,359	626,259	D
125	Sensitive	658,414	623,071	A	378	Sensitive	664,510	626,249	D
126	Sensitive	658,371	623,185	A	379	Sensitive	664,651	626,349	D
127	Sensitive	658,333	623,240	A	380	Sensitive	664,589	626,441	D
128	Sensitive	658,194	623,349	A	381	Sensitive	664,529	626,494	D

Building ID	Receptor	X_ITM	Y_ITM	Assigned Limit Based on Location	Building ID	Receptor	X_ITM	Y_ITM	Assigned Limit Based on Location
129	Sensitive	658,291	623,573	A	382	Sensitive	664,459	626,467	D
130	Sensitive	658,300	623,602	A	383	Sensitive	664,497	626,530	D
131	Sensitive	658,388	623,666	A	384	Sensitive	664,414	626,557	D
132	Sensitive	658,377	623,533	A	385	Sensitive	664,623	626,503	D
133	Sensitive	658,056	623,547	A	386	Sensitive	664,688	626,489	D
134	Sensitive	657,952	623,773	A	387	Sensitive	664,713	626,533	D
135	Sensitive	657,926	623,852	A	388	Sensitive	664,679	626,597	D
136	Sensitive	657,887	623,867	A	389	Sensitive	664,750	626,583	D
137	Sensitive	657,777	623,806	A	390	Sensitive	664,441	626,938	D
138	Sensitive	657,747	623,926	A	391	Sensitive	664,290	626,962	D
140	Sensitive	657,702	623,978	A	392	Sensitive	664,360	627,041	D
142	Sensitive	657,891	624,112	A	393	Sensitive	664,237	627,041	D
143	Sensitive	657,958	624,264	F	394	Sensitive	664,307	627,150	D
144	Sensitive	657,899	624,407	F	395	Sensitive	664,907	627,011	D
145	Sensitive	657,879	624,444	F	396	Sensitive	665,133	626,980	D
146	Sensitive	657,848	624,491	F	397	Sensitive	664,912	627,108	D
152	Sensitive	657,952	624,537	F	398	Sensitive	664,963	627,216	D
153	Sensitive	657,910	624,757	F	399	Sensitive	664,946	627,270	D
154	Sensitive	657,892	624,911	F	400	Sensitive	664,960	627,307	D
155	Sensitive	658,079	624,688	F	401	Sensitive	664,757	627,427	D
156	Sensitive	658,104	624,609	F	402	Sensitive	663,841	627,951	D
157	Sensitive	658,149	624,727	F	403	Sensitive	663,850	628,005	D
158	Sensitive	658,211	624,700	F	404	Sensitive	663,795	627,977	D
159	Sensitive	658,194	624,750	F	405	Sensitive	663,841	628,099	D
160	Sensitive	658,248	624,749	F	406	Sensitive	663,672	628,113	D
161	Sensitive	658,302	624,722	F	407	Sensitive	663,665	628,308	D
162	Sensitive	658,595	624,313	A	408	Sensitive	663,803	628,349	D
163	Sensitive	658,351	624,754	F	409	Sensitive	663,747	628,490	D
164	Sensitive	658,384	624,785	F	410	Sensitive	663,802	628,543	D
165	Sensitive	658,370	624,883	F	411	Sensitive	664,013	628,887	D
166	Sensitive	658,439	624,995	F	412	Sensitive	663,981	628,972	D
167	Sensitive	658,580	625,003	F	413	Sensitive	664,039	628,968	D
168	Sensitive	659,261	625,018	A	414	Sensitive	664,173	628,860	D
169	Sensitive	659,354	624,921	A	415	Sensitive	664,305	628,773	D
170	Sensitive	659,420	624,964	A	501	Sensitive	665,229	625,447	D
171	Sensitive	659,621	625,096	A	502	Sensitive	665,139	625,449	D
172	Sensitive	659,750	625,075	A	503	Sensitive	665,048	625,432	D
173	Sensitive	659,569	624,788	A	504	Sensitive	664,652	625,754	D
174	Sensitive	659,732	624,499	A	505	Sensitive	664,589	625,665	D
175	Sensitive	659,752	624,465	A	506	Sensitive	664,446	625,725	D
176	Sensitive	659,813	624,393	A	507	Sensitive	664,436	625,527	D
177	Sensitive	660,021	624,361	A	508	Sensitive	664,917	624,709	D
178	Sensitive	660,128	624,313	A	509	Sensitive	664,797	624,767	D
179	Sensitive	660,167	624,211	A	510	Sensitive	664,697	624,777	D
180	Sensitive	660,308	624,248	A	511	Sensitive	664,686	624,697	D
181	Sensitive	659,950	623,892	A	512	Sensitive	664,676	624,764	D
182	Sensitive	660,052	623,832	A	513	Sensitive	664,594	624,711	D
183	Sensitive	661,129	623,603	A	514	Sensitive	664,598	624,760	D
230	Sensitive	657,778	626,603	F	515	Sensitive	664,560	624,780	D

Building ID	Receptor	X_ITM	Y_ITM	Assigned Limit Based on Location	Building ID	Receptor	X_ITM	Y_ITM	Assigned Limit Based on Location
231	Sensitive	657,761	626,516	F	516	Sensitive	664,474	624,711	D
232	Sensitive	657,859	626,907	F	517	Sensitive	664,413	624,731	D
234	Sensitive	657,961	627,102	F	518	Sensitive	664,365	624,811	D
235	Sensitive	658,001	627,099	F	519	Sensitive	664,312	624,819	D
236	Sensitive	658,120	627,198	F	520	Sensitive	664,262	624,816	D
237	Sensitive	658,041	627,245	F	521	Sensitive	664,225	624,809	D
240	Sensitive	658,605	627,296	F	522	Sensitive	664,217	624,655	D
241	Sensitive	658,487	627,592	F	523	Sensitive	664,679	624,409	D
242	Sensitive	659,504	627,704	F	524	Sensitive	664,233	624,529	D
243	Sensitive	659,568	628,212	F	525	Sensitive	664,308	624,386	D
245	Sensitive	659,592	628,238	F	526	Sensitive	664,164	624,565	D
249	Sensitive	659,343	627,037	F	527	Sensitive	664,131	624,566	D
250	Sensitive	659,315	626,986	F	528	Sensitive	664,107	624,588	D
251	Sensitive	659,304	626,947	F	529	Sensitive	664,148	624,646	D
253	Sensitive	659,029	626,838	F	530	Sensitive	664,090	624,732	D
254	Sensitive	659,083	626,724	F	531	Sensitive	664,053	624,744	D
255	Sensitive	659,119	626,631	F	532	Sensitive	664,035	624,748	D
256	Sensitive	659,059	626,457	F	533	Sensitive	663,978	624,751	D
257	Sensitive	659,057	626,404	F	534	Sensitive	663,895	624,794	D
258	Sensitive	659,033	626,347	F	535	Sensitive	663,802	624,810	D
259	Sensitive	659,036	626,291	F	536	Sensitive	663,584	624,740	Minimum
260	Sensitive	658,952	626,297	F	537	Sensitive	663,395	624,733	Minimum
261	Sensitive	658,993	626,165	F	538	Sensitive	663,368	624,631	Minimum
262	Sensitive	658,967	626,068	F	539	Sensitive	663,503	624,939	Minimum
263	Sensitive	658,934	626,044	F	540	Non-Sensitive	663,341	624,794	Ignore
264	Sensitive	658,955	625,989	F	541	Sensitive	662,989	624,855	Minimum
265	Sensitive	658,869	625,829	F	542	Sensitive	662,816	625,007	Minimum
266	Sensitive	658,911	625,724	F	543	Sensitive	662,861	625,013	Minimum
267	Sensitive	658,859	625,672	F	544	Sensitive	662,933	625,071	Minimum
268	Sensitive	660,509	625,929	F	545	Sensitive	662,963	625,105	Minimum
269	Sensitive	660,537	625,958	F	546	Sensitive	662,953	625,236	Minimum
270	Sensitive	661,371	626,945	D	547	Sensitive	662,889	625,211	Minimum
271	Sensitive	661,453	627,086	D	548	Sensitive	662,714	625,129	C
272	Sensitive	661,510	627,266	D	549	Sensitive	662,666	625,146	C
273	Sensitive	661,772	627,278	D	550	Sensitive	662,697	625,190	C
274	Sensitive	661,789	627,313	D	551	Sensitive	662,598	625,225	C
275	Sensitive	662,007	627,693	D	552	Sensitive	662,514	625,133	C
276	Sensitive	662,037	627,760	D	553	Sensitive	662,522	625,239	C
277	Sensitive	662,115	628,109	D	554	Sensitive	662,449	625,242	C
278	Sensitive	662,103	628,166	D	555	Sensitive	662,429	625,115	C
279	Sensitive	662,164	628,202	D	556	Sensitive	662,290	625,096	C
280	Sensitive	662,181	628,279	D	557	Sensitive	662,008	625,057	Minimum
281	Sensitive	661,384	628,039	D	601	Sensitive	661,515	621,498	E
282	Sensitive	661,181	628,198	D	602	Sensitive	661,509	621,527	E
283	Sensitive	660,910	628,173	F	603	Sensitive	661,494	621,574	E
284	Sensitive	660,844	628,076	F	604	Sensitive	661,478	621,603	E
285	Sensitive	660,449	627,833	F	605	Sensitive	661,435	621,617	E
286	Sensitive	661,208	628,316	D	606	Sensitive	660,921	621,473	E

Building ID	Receptor	X_ITM	Y_ITM	Assigned Limit Based on Location	Building ID	Receptor	X_ITM	Y_ITM	Assigned Limit Based on Location
287	Sensitive	661,249	628,354	D	607	Sensitive	660,890	621,492	E
288	Sensitive	661,399	628,416	D	608	Sensitive	660,976	621,693	E
289	Sensitive	661,553	628,516	D	609	Sensitive	661,227	621,933	E
290	Sensitive	661,596	628,543	D	610	Sensitive	661,285	622,503	E
291	Sensitive	661,640	628,565	D	611	Sensitive	661,198	622,542	E
292	Sensitive	661,835	628,713	D	612	Sensitive	661,826	622,059	E
293	Sensitive	661,790	628,993	D	613	Sensitive	661,844	622,110	E
300	Sensitive	662,487	629,443	D	614	Sensitive	662,132	622,577	E
301	Sensitive	662,768	629,374	D	615	Sensitive	662,136	622,619	E
302	Sensitive	662,781	629,309	D	616	Sensitive	662,188	622,729	E
303	Sensitive	662,796	629,267	D	617	Sensitive	662,184	622,787	E
304	Non-Sensitive	662,820	629,235	Ignore	618	Sensitive	662,414	623,069	E
305	Sensitive	662,847	629,204	D	619	Sensitive	662,421	622,907	E
306	Sensitive	662,873	629,163	D	620	Sensitive	662,460	622,906	E
307	Sensitive	662,898	629,120	D	621	Non-Sensitive	662,496	622,731	Ignore
308	Sensitive	662,917	629,082	D	622	Sensitive	662,549	622,834	E
309	Non-Sensitive	662,853	629,033	Ignore	623	Sensitive	662,556	622,760	E
311	Sensitive	662,868	629,018	D	624	Sensitive	662,574	622,760	E
312	Sensitive	662,796	628,989	D	625	Sensitive	662,513	622,487	E
313	Sensitive	662,670	628,977	D	626	Sensitive	662,600	622,491	E
314	Sensitive	662,702	628,894	D	627	Sensitive	662,702	622,241	E
315	Sensitive	662,898	629,033	D	628	Sensitive	662,704	622,207	E
316	Sensitive	662,921	629,046	D	629	Sensitive	662,579	622,023	E
318	Sensitive	662,977	628,972	D	630	Sensitive	662,805	621,975	E
319	Non-Sensitive	662,999	628,903	Ignore	631	Sensitive	662,813	622,818	E
320	Non-Sensitive	663,040	629,058	Ignore	632	Sensitive	663,078	622,861	E
321	Sensitive	663,059	629,119	D	633	Sensitive	663,145	622,829	E
322	Sensitive	663,248	629,248	D	634	Sensitive	663,219	622,922	E
323	Sensitive	663,303	629,297	D	635	Sensitive	663,384	622,710	E
324	Sensitive	663,055	628,721	D	636	Sensitive	663,284	622,530	E
325	Sensitive	663,027	628,678	D	637	Sensitive	663,423	622,566	E
326	Sensitive	663,043	628,414	D	638	Sensitive	663,548	622,684	E
327	Sensitive	663,050	628,370	D	639	Sensitive	663,877	622,910	E
328	Sensitive	663,035	628,082	D	640	Sensitive	663,538	623,076	E
329	Sensitive	663,152	628,105	D	641	Sensitive	662,347	623,289	E
330	Sensitive	663,158	628,070	D	642	Sensitive	662,420	623,642	E
331	Sensitive	663,199	628,010	D	643	Sensitive	662,008	623,651	E
332	Sensitive	663,256	628,037	D	644	Sensitive	662,420	623,706	E
333	Sensitive	663,304	628,055	D	645	Sensitive	662,517	623,769	E
334	Sensitive	663,367	628,066	D	646	Sensitive	662,442	623,838	E
335	Sensitive	663,422	628,076	D	647	Sensitive	662,949	623,771	E
336	Sensitive	663,172	627,614	D	648	Sensitive	662,490	624,431	Minimum
337	Sensitive	663,189	627,569	D	649	Sensitive	662,350	624,619	Minimum
338	Sensitive	663,225	627,566	D	650	Sensitive	662,586	624,603	Minimum
339	Sensitive	663,005	627,537	D	651	Sensitive	662,708	624,616	Minimum
340	Sensitive	663,004	627,502	D	652	Sensitive	662,691	624,664	Minimum

Building ID	Receptor	X_ITM	Y_ITM	Assigned Limit Based on Location	Building ID	Receptor	X_ITM	Y_ITM	Assigned Limit Based on Location
341	Sensitive	663,084	627,441	D	653	Sensitive	662,685	624,763	Minimum
342	Sensitive	663,186	627,297	D	654	Sensitive	662,945	629,056	D
343	Sensitive	663,237	627,101	D	700	Non-Sensitive	659,872	626,516	Ignore
344	Sensitive	663,312	627,036	D	701	Sensitive	659,295	627,087	F
345	Sensitive	663,544	626,937	D	702	Sensitive	658,898	625,763	F
346	Sensitive	663,846	627,150	B	703	Sensitive	662,426	624,114	Minimum
347	Sensitive	663,906	627,077	B	704	Non-Sensitive	662,756	624,914	Ignore
348	Sensitive	663,299	626,889	D	705	Sensitive	663,036	628,457	D
349	Sensitive	663,813	626,501	D	706	Sensitive	663,338	626,783	D
350	Sensitive	663,207	626,312	D	707	TBC	663,325	626,966	Ignore
351	Sensitive	663,171	626,297	D	708	TBC	663,302	626,245	Ignore
352	Sensitive	663,155	626,236	D	709	Sensitive	663,367	628,005	D
353	Sensitive	663,235	626,219	D	710	Sensitive	663,179	625,496	D

Table A12-3 to A12- present the turbine sound power noise emission values used for the various wind farms development in the noise prediction model.

Table A12-3 L_{WA} Levels Used for Prediction Model – Vestas V150 at 105 m HH

Wind Speed (m/s at 10m Standardised Height)	Octave Bank Centre Frequency (Hz)								dB L_{WA}
	63	125	250	500	1000	2000	4000	8000	
3	73.7	81.4	86.2	88.0	86.8	82.6	75.4	65.2	92.8
4	76.9	84.8	89.6	91.5	90.3	86.2	79.0	68.8	96.3
5	81.2	89.0	93.8	95.7	94.6	90.4	83.3	73.1	100.5
6	84.5	92.4	97.3	99.2	98.1	94.0	86.9	76.7	104.0
7	85.1	93.1	98.0	100.0	98.9	94.8	87.7	77.5	104.8
8	85.5	93.3	98.2	100.1	99.0	94.8	87.7	77.6	104.9
9	86.3	93.7	98.2	100.0	98.9	94.8	88.0	78.2	104.9

Table A12-4 L_{WA} Levels Used for Prediction Model – Vestas V150 at 95 m HH

Wind Speed (m/s at 10m Standardised Height)	Octave Bank Centre Frequency (Hz)								dB L_{WA}
	63	125	250	500	1000	2000	4000	8000	
3	73.6	81.3	86.1	87.9	86.7	82.5	75.3	65.1	92.7
4	76.6	84.5	89.3	91.2	90.0	85.9	78.7	68.5	96.0
5	80.9	88.7	93.5	95.4	94.3	90.1	83.0	72.8	100.2
6	84.2	92.1	97.0	98.9	97.8	93.7	86.6	76.4	103.7
7	85.1	93.1	98.0	100.0	98.9	94.8	87.7	77.5	104.8
8	85.5	93.3	98.2	100.1	99.0	94.8	87.7	77.6	104.9
9	86.3	93.7	98.2	100.0	98.9	94.8	88.0	78.2	104.9

Table A12-5 L_{WA} Levels Used for Prediction Model – SG6.6 at 102 m HH

Wind Speed (m/s at 10m Standardised Height)	Octave Bank Centre Frequency (Hz)								dB L_{WA}
	63	125	250	500	1000	2000	4000	8000	
3	72.5	79.9	84.5	86.8	86.6	86.9	80.3	65.3	92.9
4	77.4	84.8	89.4	91.7	91.5	91.8	85.2	70.2	97.8
5	82.3	89.7	94.3	96.6	96.4	96.7	90.1	75.1	102.7
6	83.6	91.1	97.0	98.5	99.6	98.4	92.7	76.9	105.0
7	83.6	91.1	97.0	98.5	99.6	98.4	92.7	76.9	105.0
8	86.1	92.3	97.3	97.6	99.3	98.9	93.0	76.1	105.0
9	86.1	92.3	97.3	97.6	99.3	98.9	93.0	76.1	105.0

Table A12-6 L_{WA} Levels Used for Prediction Model – Vestas V162 at 99 m HH

Wind Speed (m/s at 10m Standardised Height)	Octave Bank Centre Frequency (Hz)								dB L_{WA}
	63	125	250	500	1000	2000	4000	8000	
3	75.2	82.9	87.6	89.4	88.1	84.0	76.8	66.7	94.2
4	76.7	84.4	89.1	90.8	89.7	85.5	78.4	68.3	95.7
5	80.6	88.3	93.0	94.7	93.6	89.4	82.4	72.3	99.6
6	83.8	91.7	96.6	98.5	97.4	93.2	86.2	76.0	103.3
7	84.8	92.7	97.6	99.5	98.4	94.2	87.2	77.0	104.3
8	85.0	92.8	97.6	99.5	98.3	94.2	87.1	77.0	104.3
9	85.7	93.1	97.6	99.4	98.3	94.3	87.5	77.8	104.3

Table A12-7 L_{WA} Levels Used for Prediction Model – Nordex N149 at 105.5 m HH

Wind Speed (m/s at 10m Standardised Height)	Octave Bank Centre Frequency (Hz)								dB L_{WA}
	63	125	250	500	1000	2000	4000	8000	
3	77.1	83.7	86.6	87.6	88.0	86.2	80.5	71.3	94.0
4	76.5	83.1	86.8	88.9	90.2	88.3	78.7	70.8	95.2
5	81.1	87.7	91.4	93.5	94.8	92.9	83.3	75.4	99.8
6	85.9	92.1	95.8	98.4	99.1	96.6	89.0	80.7	104.2
7	87.3	93.5	97.2	99.8	100.5	98.0	90.4	82.1	105.6
8	87.3	93.5	97.2	99.8	100.5	98.0	90.4	82.1	105.6
9	87.3	93.5	97.2	99.8	100.5	98.0	90.4	82.1	105.6

Table A12-8 L_{WA} Levels Used for Prediction Model – Nordex N149 at 95.5 m HH

Wind Speed (m/s at 10m Standardised Height)	Octave Bank Centre Frequency (Hz)								dB L_{WA}
	63	125	250	500	1000	2000	4000	8000	
3	76.4	83.0	86.7	88.8	90.1	88.2	78.6	70.7	95.1
4	80.8	87.4	91.1	93.2	94.5	92.6	83.0	75.1	99.5
5	85.6	91.8	95.5	98.1	98.8	96.3	88.7	80.4	103.9
6	87.2	93.4	97.1	99.7	100.4	97.9	90.3	82.0	105.5
7	87.3	93.5	97.2	99.8	100.5	98.0	90.4	82.1	105.6
8	87.3	93.5	97.2	99.8	100.5	98.0	90.4	82.1	105.6
9	87.3	93.5	97.2	99.8	100.5	98.0	90.4	82.1	105.6

Table A12-9 L_{WA} Levels Used for Prediction Model – Nordex N163 at 98.5 m HH

Wind Speed (m/s at 10m Standardised Height)	Octave Bank Centre Frequency (Hz)								dB L_{WA}
	63	125	250	500	1000	2000	4000	8000	
3	78.6	85.2	88.1	89.1	89.5	87.7	82.0	72.8	95.5
4	79.1	85.7	89.4	91.5	92.8	90.9	81.3	73.4	97.8
5	83.7	90.2	93.9	96.0	97.3	95.5	85.9	78.0	102.3
6	88.3	94.5	98.2	100.8	101.5	99.0	91.4	83.4	106.6
7	88.9	95.1	98.8	101.4	102.1	99.6	92.0	84.0	107.2
8	88.9	95.1	98.8	101.4	102.1	99.6	92.0	84.0	107.2
9	88.9	95.1	98.8	101.4	102.1	99.6	92.0	84.0	107.2

Table A12-10 L_{WA} Levels Used for Prediction Model – Nordex N163 at 98.5 m HH

Wind Speed (m/s at 10m Standardised Height)	Octave Bank Centre Frequency (Hz)								dB L_{WA}
	63	125	250	500	1000	2000	4000	8000	
3	76.5	83.2	87.0	87.4	87.8	86.6	81.1	65.4	94.0
4	78.4	86.4	91.0	90.9	89.8	87.8	83.2	68.8	96.8
5	82.5	89.6	94.7	96.1	95.6	92.9	87.1	72.9	101.5
6	86.4	92.1	96.8	99.1	100.3	97.9	90.6	75.4	105.2
7	87.2	92.9	97.6	99.9	101.1	98.7	91.4	76.2	106.0
8	87.2	92.9	97.6	99.9	101.1	98.7	91.4	76.2	106.0
9	87.2	92.9	97.6	99.9	101.1	98.7	91.4	76.2	106.0

Table A12-11 L_{WA} Levels Used for Ballymartin WF – Enercon E82 at 78 m HH

Wind Speed (m/s at 10m Standardised Height)	Octave Bank Centre Frequency (Hz)								dB L_{WA}
	63	125	250	500	1000	2000	4000	8000	
5	79.8	87.8	87.5	90.1	91.9	87	74.7	66.6	96.5
6	84	92	91.7	94.3	96.1	91.2	78.9	70.8	100.7
7	85.9	93.9	93.6	96.2	98	93.1	80.8	72.7	102.6
8	86.6	94.6	94.3	96.9	98.7	93.8	81.5	73.4	103.3
9	86.7	94.7	94.4	97	98.8	93.9	81.6	73.5	103.4
10	86.3	94.3	94	96.6	98.4	93.5	81.2	73.1	103

Table A12-12 L_{WA} Levels Used for Castlebanny WF – Vestas V150-5.6 at 110 m HH

Wind Speed (m/s at 10m Standardised Height)	Octave Bank Centre Frequency (Hz)								dB L_{WA}
	63	125	250	500	1000	2000	4000	8000	
3	73.6	81.3	86	87.8	86.5	82.4	75.2	65.1	92.6
4	77.4	85.1	89.8	91.5	90.4	86.2	79.1	69	96.4
5	81.7	89.4	94.1	95.8	94.7	90.5	83.5	73.4	100.7
6	84.1	92	96.9	98.8	97.7	93.5	86.5	76.3	103.6
7	84.7	92.6	97.5	99.4	98.3	94.1	87.1	76.9	104.2
8	85.6	93.4	98.2	100.1	98.9	94.8	87.7	77.6	104.9
9	86.3	93.7	98.2	100	98.9	94.9	88.1	78.4	104.9

Table A12-13 L_{WA} Levels Used for Rahora WF – Enercon E48-800 at 56 m HH

Wind Speed (m/s at 10m Standardised Height)	Octave Bank Centre Frequency (Hz)								dB L_{WA}
	63	125	250	500	1000	2000	4000	8000	
4	72.5	80.5	80.2	82.8	84.6	79.7	67.4	59.3	89.1
5	77	85	84.7	87.3	89.1	84.2	71.9	63.8	93.6
6	81.2	89.2	88.9	91.5	93.3	88.4	76.1	68	97.8
7	84	92	91.7	94.3	96.1	91.2	78.9	70.8	100.6
8	85	93	92.7	95.3	97.1	92.2	79.9	71.8	101.6
9	85.8	93.8	93.5	96.1	97.9	93	80.7	72.6	102.4
10	85.8	93.8	93.5	96.1	97.9	93	80.7	72.6	102.4

Table A12-14 Turbine Location Coordinates for Rahora Wind Farm

Turbine Ref	Coordinates (ITM)	
	X	Y
R1	664,354	627,596
R2	664,531	627,826
R3	664,807	627,924
R4	664,681	628,103
R5	664,949	628,138

Table A12-15 Turbine Location Coordinates for Ballymartin Wind Farm

Turbine Ref	Coordinates (ITM)	
	X	Y
B1	660,861	626,337
B2	660,516	626,665
B3	660,897	626,707
B4	660,529	627,010
B5	660,871	627,171
B6	660,624	627,361
B7	661,028	627,486

Table A12-16 Turbine Location Coordinates for Castlebanny Wind Farm

Turbine Ref	Coordinates (ITM)	
	X	Y
C01	658,464	628,904
C02	659,458	629,770
C03	658,678	629,701
C04	659,349	630,345
C05	658,475	630,328
C06	659,292	630,971
C07	658,460	630,876
C08	658,948	631,462
C09	658,120	631,359
C10	658,620	631,958
C11	657,754	631,828
C12	658,380	632,457
C13	657,625	632,441
C14	658,512	633,132
C15	657,687	633,081
C16	658,418	633,693
C17	657,571	633,655
C18	658,105	634,316
C19	657,303	634,069
C20	657,800	634,781
C21	657,025	634,541