

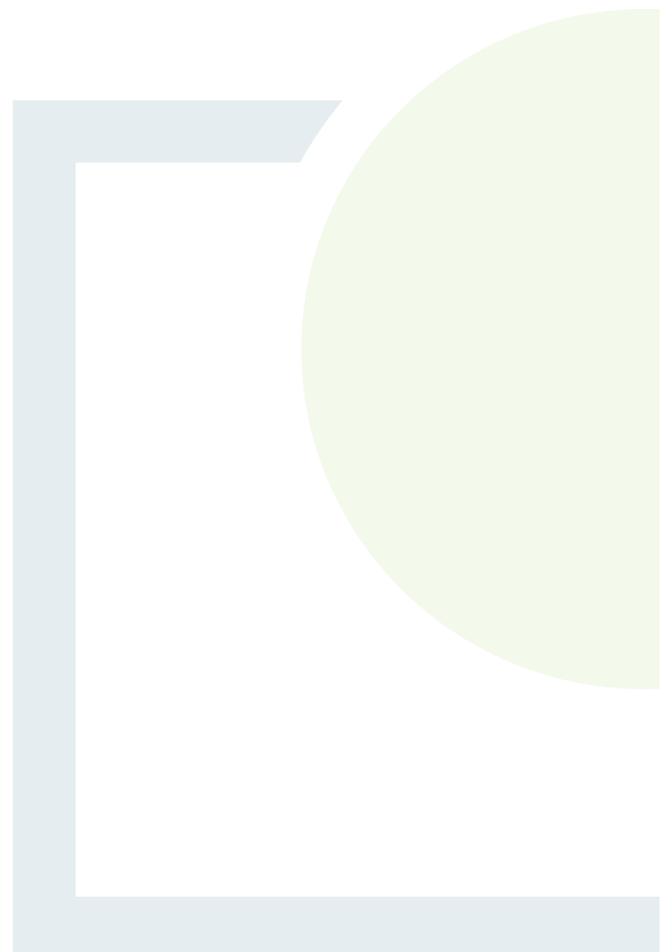


**FEHILY
TIMONEY**

**CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING**

APPENDIX 14.1

Carbon Calculator Inputs



Carbon Calculator Inputs	Value	Explanation
Windfarm characteristics:		
No. of Turbines	6	
Duration of consent	25	
Power rating of 1 turbine (MW)	4.167	Client has advised 25 MW wind farm. 25MW/6 turbines = 4.167 MW per turbine
Capacity factor	35%	
Backup - fraction of output to back up (%)	5%	
Backup - Additional emissions due to reduced thermal efficiency of the reserve generation (%)	10 (fixed)	Provided by model
CO2 emissions from turbine life (tCO2/MW)	Calculate wrt installed capacity	
Characteristics of peatland before windfarm development:		
Type of peatland	Acid Bog	
Average annual air temp	10.25	Taken from Air and Climate chapter
Average depth of peat at site (m)	0	No peat shall be removed from site
C Content of dry peat (% by weight)	49%	Lower end of range as soils at the site are going to be more mineralic and of lower C content
Average extent of drainage around drainage features at site (m)	0.50	Don't have info. Worst case taken
Average water table depth at site (m)	0.5	Calculator values range between 0 and 1. Actual depth unknown and likely to be far greater than 1 m. Perched water in small lenses of peat could potentially exist, 0.5 m taken as middle value
Dry soil bulk density (g cm-3)	0.3 g cm-3	the calculator only goes as high as 0.3m.
Characteristics of bog plants:		
Time required for regeneration of bog plants after restoration (years)	2	Not applicable. 2 years was minimum calculator would accept
Carbon accumulation due to C fixation by bog plants in undrained peats (tC ha-1 yr-1)	0.1	While no restoration/regeneration is envisaged, the lowest figure the carbon calculator accepts is 0.1 tC ha-1 yr-1.
Forestry Plantation Characteristics:		

Carbon Calculator Inputs	Value	Explanation
Area of forestry to be felled (ha)	0	No felling of forestry is scheduled as part of the proposed development
Average rate of carbon sequestration in timber (tC ha-1 yr-1)	3.6	This is dependent on the yield class of the forestry. Carbon sequestered for yield class 16 m3 ha-1 y-1 = 3.6 tC ha-1 yr-1
Counterfactual emission factors:		
Fossil fuel-mix emission factor (t CO2 MWh-1)	0.366	Not used in calculator but supplied by SEAI (2020). 25MW x 365days x 24hrs x 0.35 x 0.366tCO ₂ /MWhr = avoided losses = 28,054 tonnes CO ₂ per annum
Borrow pits (if any):		
No. of borrow pits	1	
Average length of borrow pits (m)	60m	Sq. route of 3,600 m ² which is footprint of borrow pit
Average width of borrow pits (m)	60m	
Average depth of peat removed from pit (m)	0	No peat being removed from site
Foundations and hard-standing area associated with each turbine:		
Method used to calculate CO2 loss from foundations and hard-standing	Rectangular with vertical walls	
Average length of turbine foundations (m)	19.5	19.5m x 19.5m square is same area as 22m diameter circle
Average width of turbine foundations (m)	19.5	
Average depth of peat excavated when constructing foundations (m)	0	No peat being removed from site
Approximate geometric shape	Circular	
Average length of hard-standing (m)	45	
Average width of hard-standing (m)	35	
Average depth of peat excavated when constructing hardstandings (m)	0	No peat being removed from site
Volume of concrete used in construction of the ENTIRE windfarm		
Volume of concrete used (m ³)	7,000	As per table in Chapter 2: 3888 m ³ for turbine foundations, 3,000m ³ for other uses. Rounded up to 7,000 for conservative approach
Access tracks:		
Existing track length (m)	1381	From the "access track breakdown"
Length of access track that is floating road (m)	0	No floating roads
Floating road width (m)	5	Tool requires a value to be entered >/=5

Carbon Calculator Inputs	Value	Explanation
Floating road depth (m)	0	
Length of floating road that is drained (m)	0	
Average depth of drains associated with floating roads (m)	0	
Length of access track that is excavated road (m)	0	
Excavated road width (m)	0	
Average depth of peat excavated for road (m)	0	
Length of access track that is rock filled road (m)	2346	From the "access track breakdown"
Rock filled road width (m)	5	
Rock filled road depth (m)	0.5	
Length of rock filled road that is drained (m)	2346	= same as length of road
Average depth of drains associated with rock filled roads (m)	0.75	Assumption based on previous similar project
Total length of access track (m)	3727	Sum of 1381 and 2346
Cable Trenches:		
Length of any cable trench on peat that does not follow access tracks and is lined with a permeable medium eg. sand (m)	0	Cable will follow internal access tracks unless GCR option pursued. Assumed a maximum of 1000m for potential peat removal along GCR
Average depth of peat cut for cable trenches (m)	0	No peat cutting anticipated unless GCR option pursued. Assumed a maximum of 1m for potential peat removal along GCR
Additional peat excavated (not already accounted above):		
Volume of additional peat excavated (m3)	0	
Area of additional peat excavated (m2)	0	
Peat landslide Hazard	negligible	
Improvement of C sequestration at site by blocking drains, restoration of habitat, etc.		
Area of degraded bog to be improved (ha)	0	None
Water table depth in degraded bog before improvement (m)	1	N/A
Water table depth in degraded bog after improvement (m)	1	N/A

