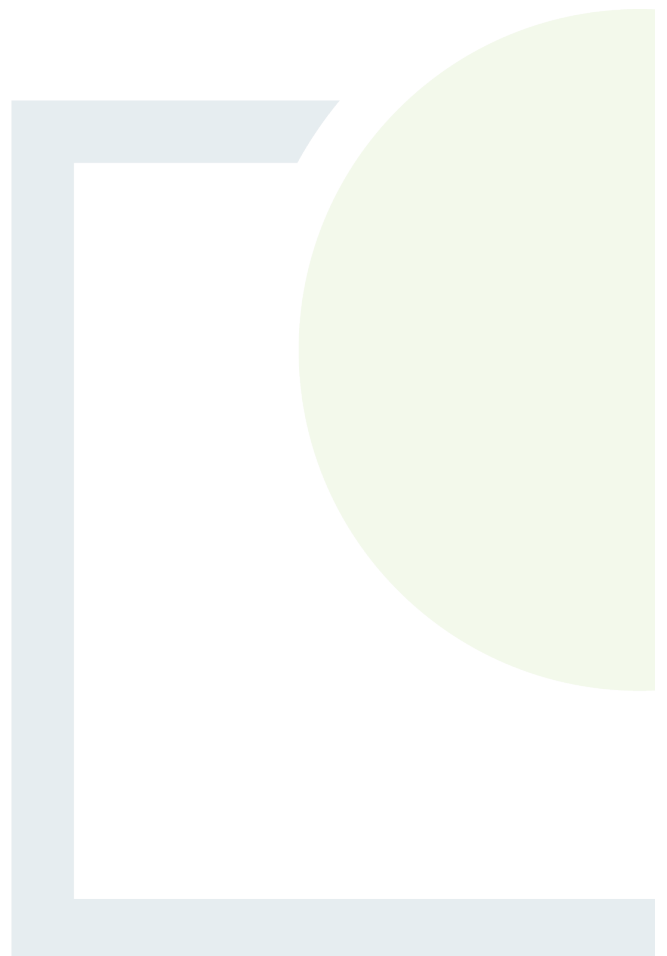**FEHILY TIMONEY**

CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

APPENDIX 7.1

Carbon Calculator Input Data

Carbon Calculator Inputs	Value	Explanation
Windfarm characteristics:		
No. of Turbines	10	
Duration of consent	40	
Power rating of 1 turbine (MW)	6.0 TO 7.2	
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	Taken from Air and Climate chapter
average depth of peat at site (m)	0.16	Depth varies
C Content of dry peat (% by weight)	49%	49% is at the high end of the range for worst case scenario. Overall the C content will not be as high as a peat bog.
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; water table is deeper than 1m
Dry soil bulk density (g cm-3)	0.2 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)	30	Life time of restoration - 30 is as high as the calculator goes.
Carbon accumulation due to C fixation by bog plants in undrained peats (tC ha-1 yr-1)	0.25	0.25 tC ha-1 yr-1 is the value given by SNH guidance (not a sensitive input).
Forestry Plantation Characteristics:		

Carbon Calculator Inputs	Value	Explanation
area of forestry to be felled (ha)	5.4ha	
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 CO_2 MWh-1)	0.45	Fixed value
Borrow pits (if any):		
no. of borrow pits	1	
average length of borrow pits (m)	150	
average width of borrow pits (m)	100	
average depth of peat removed from pit (m)	0.15	
Foundations and hard-standing area associated with each turbine:		
Method used to calculate CO_2 loss from foundations and hard-standing	Rectangular with vertical walls	25 diameter
Average length of turbine foundations (m)	25	
Average width of turbine foundations (m)	25	
average depth of peat excavated when constructing foundations (m)	0.15	Estimate average under total turbines. Limited 0.1-0.25m peaty topsoil deposits recorded during site walkover.
Approximate geometric shape	Circular	
Average length of hard-standing (m)	192	
Average width of hard-standing (m)	57	
Average depth of peat excavated when constructing hardstandings (m)	0.15	Estimate average under total turbines. Limited 0.1-0.25m peaty topsoil deposits recorded during site walkover.
Volume of concrete used in construction of the ENTIRE windfarm		
Volume of concrete used (m3)	25,000	
Access tracks:		
Existing track length (m)	2,580	2.580km
length of access track that is floating road (m)	0	No floating roads.
Floating road width (m)	N/A	No floating roads.
floating road depth (m)	N/A	No floating roads.

Carbon Calculator Inputs	Value	Explanation
Length of floating road that is drained (m)	0	No floating roads.
Average depth of drains associated with floating roads (m)	0.5m	Average
Length of access track that is excavated road (m)	2,580	
Excavated road width (m)	5	
Average depth of peat excavated for road (m)	0.15	Depth varies 0-0.25m, average used
Length of access track that is rock filled road (m)	25,430	
Rock filled road width (m)	5	
Rock filled road depth (m)	0.5	
Length of rock filled road that is drained (m)	25,430	= same as length of rock filled road
Average depth of drains associated with rock filled roads (m)	0.5	
total length of access track (m)	28,010	
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 peat removal counted above
Average depth of peat cut for cable trenches (m)	0	
Additional peat excavated (not already accounted above):		
Volume of additional peat excavated (m3)	23,032	Substation, Met Mast, Temporary Construction Compounds
Area of additional peat excavated (m2)	193,917	Substation, Met Mast, Temporary Construction Compounds
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

FEHILY TIMONEY

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

www.fehilytimoney.ie

Cork Dublin Carlow