

Technical Appendix 11G: Habitat Loss Calculations

1. Introduction

1.1 Background

This technical appendix details the approach, assumptions and results of the process adopted to quantify habitat loss and disturbance/degradation as a result of the construction of the Proposed Development for the ecological impact assessment presented in **Chapter 11: Ecology**.

Habitat loss, disturbance and potential degradation have been estimated using the Phase 1 habitat survey results and the layout of the Proposed Development. Where there is uncertainty in design layout (dimensions, extent etc.) various assumptions have been made regarding the construction methodology to arrive at realistic 'worst case' estimates.

Habitat loss has been estimated using the Phase 1 habitat and NVC survey results (**Technical Appendix 11.B**) and the layout of the Proposed Development.

1.2 Approach

Estimating Habitat Loss/Potential Change

There are three main ways by which habitat features may be affected during the construction and operational phase of the Proposed Development:

- Direct habitat loss: to accommodate the Proposed Development infrastructure, such as the wind turbine bases, internal wind farm tracks, crane hardstandings and grid connection infrastructure including substation. These losses are considered permanent in the context of this assessment.
- Disturbance/temporary habitat loss: the effects of disturbance are variable in their extent, depending on the nature of the disturbance and sensitivity of the habitat feature. Some disturbance types (for example, temporary habitat loss for the creation of construction areas) result in medium to long-term disturbance which require extended recovery periods. In other cases (for example, installation of cables at the sides of access tracks, presence of a temporary construction compound and traversing of machinery) disturbance is short-term, and certain habitat types are able to recover quickly; and,
- Indirect effects: these primarily relate to changes in hydrology of peatland and wetland habitats in the context of this development, including dewatering of habitats, disruption to flow paths and changes to drainage regime.

1.3 Footprint Calculations

The dimensions and extents of the various infrastructure elements for the Project are detailed in **Chapter 3: Description of the Proposed Development**; and are summarised in Table 11.G.1 below.

Table 11.G.1 Dimensions and Extents of the Proposed Development

Wind Farm Component	Nature of infrastructure	Number or Length (km)	Maximum Dimensions assumed (m)
Turbines, including adjacent Crane Hardstandings and Laydown Areas	Permanent	15 turbines	25m x 70m – main pad 12m x 20m – Auxiliary pads 15m x 150m Blade storage areas Footprint per Crane Pad: ~ 0.4ha
New Access Track (including turning heads)	Permanent	19 km	Assumed 6m running surface
Temporary Construction Compounds	Temporary	2	50m x 50m
Met Mast Foundation	Temporary	1	400m ²
Borrow Pits	Temporary	2	Not confirmed
Substation	Permanent	2	Substation A 100m x 50m Maximum Compound Footprint: 0.5ha Substation B 25m x 20m Maximum Compound Footprint: 0.05ha

Zone of Influence for Temporary and Indirect Habitat Loss

Temporary habitat loss - Construction Disturbance

As well as direct habitat losses there will be an area of ground surrounding built infrastructure which will be subject to temporary physical disturbance (for example temporary laydown areas, a construction compound comprising plant traffic and excavations, drainage ditches, cable trenches, banked cut faces/batters etc.).

These areas would be subject to the following buffers surrounding infrastructure to allow machinery to work outwith the permanent footprint of any infrastructure component.

- Buffering access tracks 3 m either side of the track
- Buffering construction compound and turbine and crane pads by 5 m on all dimensions.

These areas would be subject to restoration as detailed in the Construction Environmental Management Plan (CEMP) (as detailed in **Chapter 3: Description of the Proposed Development**).

Hydrological Change – Indirect effects

Potential impacts on the hydrology of surface waters are addressed in detail in **Chapter 13: Geology, Hydrology and Hydrogeology**.

This assessment focuses on wetland and peatland habitats that are considered to be particularly sensitive to changes to surface water or groundwater hydrology resulting from construction activities associated with the Proposed Development. Although there may be some construction disturbance experienced by the surrounding drier habitats, such habitats are expected to recover in the short term and, as such, no indirect drainage effects are expected to impact or alter the quality of composition of dry habitats.

Some habitats adjacent to the zone of physical construction disturbance, particularly those sensitive to changes in surface hydrology such as blanket mire, wet heath and flush communities, may be indirectly affected due to hydrological changes associated with the permanent footprint. Hydrological changes can occur through the excavation of soil and bedrock during the construction of cable trenches, where localised disruption to groundwater flow can occur. This can impact on associated groundwater abstractions (especially shallow sources, i.e. springs and wells) or on potential GWDTEs. Discharge of groundwater/surface water contaminated during excavation may cause physical or chemical contamination to terrestrial habitats and nearby watercourses. An example of this is when blanket bog has new drainage ditches created adjacent to it, resulting in a lowering in the water level and losses of bog specialist plant species being replaced by species that can tolerate drier conditions. This change over time is regarded as an indirect loss or degradation of habitat.

For the purposes of this assessment a 10m hydrological disturbance zone has been assumed around all other hard infrastructure comprising access tracks, construction compounds, storage and laydown areas.

Effects would be further minimised through the implementation of good practice environmental measures (Section 11.8 and Table 11.10, **Chapter 11: Ecology**), including proposals for full habitat re-instatement or restoration of temporarily disturbed habitat.

1.4 Results

Habitat Loss – Direct, temporary and indirect

Table 11.G.2 provides the total estimated direct, temporary and indirect habitat loss from the construction of the Proposed Development based on Phase 1 habitat classification.

Table 11.G.2 Predicted Effects to habitats from Project Infrastructure – Phase 1 habitats and NVC communities

Phase 1 Habitat	NVC Community	Direct Habitat Loss (Ha)	Temporary habitat loss /disturbance (Ha)	Indirect habitat modification (Ha)	Total area of habitat affected (Ha)	Total areas of habitat within Study Area (Ha)	% of total habitat in footprint affected by construction
Blanket bog	M4/M6	0.52	-	1.41	1.93	312	0.62
	M17c	2.98	0.4	9.4	12.78		4.1
	M17/U4/U6 mosaic	0.22	-	1.09	1.31		0.42
	M19a	2.55	-	7.41	9.96		3.19
Wet modified bog	M20a	0.06	0.07	0.3	0.43	30	1.43
Wet dwarf shrub heath	M15d	0.04	-	0.22	0.26	2.7	0.1
Acid flush	M6c	0.04	-	0.2	0.24	92.8	0.26
	M6d	0.72	1.53	2.1	4.35		4.69
	M6d/M17 /M23a/U6d mosaic	0.42	0.09	1.87	2.38		2.56
Marshy grassland	M23a	2.68	0.33	7.62	10.63	257	4.14
	M23/M6/ U20 mosaic	0.39	0.34	2.18	2.91		1.13
	M23c/U4	0.1	-		0.1		0.04
Acid grassland	U2b	0.32	-	n/a	0.32	728	0.04
	U4	0.38	-	n/a	0.38		0.05

Phase 1 Habitat	NVC Community	Direct Habitat Loss (Ha)	Temporary habitat loss /disturbance (Ha)	Indirect habitat modification (Ha)	Total area of habitat affected (Ha)	Total areas of habitat within Study Area (Ha)	% of total habitat in footprint affected by construction
	U5	1	3.33	n/a	4.33		0.59
	U6d	4.67	4.79	n/a	9.46		1.3
Semi-improved neutral grassland	MG9	-	-	n/a	-	1	-
Continuous bracken	-	0.13	-	-	0.13	54	0.24

Table 11.G.3 Predicted Effects to NVC communities from Project Infrastructure – by wind farm components

Wind Farm Component	NVC Community	Direct Habitat Loss (Ha)	Temporary habitat loss /disturbance (Ha)	Indirect habitat modification (Ha)	Total area of habitat affected (Ha)
Temporary Construction Compounds	M23a	-	0.33	-	0.33
	M23c/U4	-	0.35	-	0.35
Access tracks	M4/M6	0.23	-		0.23
	M15d	0.04	-	0.22	0.26
	M17a/U4	0.05	-	0.25	0.3
	M17a/U6d	0.05	-	0.25	0.3
	M17c	1.85	-	7.14	8.99
	M17c/U6d	0.11	-	0.59	0.7
	M19a	1.36	-	5.93	7.29
	M20a	0.06	-	0.3	0.36
	M23a	15.6	-	6.97	22.57
	M23a/M6	0.2	-	0.71	0.91
	M23a/U20	0.2	-	0.98	1.18
	M23c/U4	0.1	-	0.5	0.6
	M6c	0.04	-	0.2	0.24
	M6d	0.32	-	1.6	1.92
	M6d/M17/M23a/U6d	0.42	-	1.87	2.29

Wind Farm Component	NVC Community	Direct Habitat Loss (Ha)	Temporary habitat loss /disturbance (Ha)	Indirect habitat modification (Ha)	Total area of habitat affected (Ha)
	U2b	0.15	-	0.8	0.95
	U4	0.38	-	2.04	2.42
	U5	1	-	4.8	5.8
	U6d	2.31	-	10.65	12.96
Turbine foundations	M4/M6	-	-	0.25	0.25
	M17c	0.07	-	0.24	0.31
	M19a	0.15	-	0.48	0.63
	M6d	0.05	-	0.16	0.21
	M23a	0.05	-	0.16	0.21
	U2b	0.05	-	-	0.05
	U6d	0.29	-	-	0.29
Crane pads	M4/M6	0.29	-	0.59	0.88
	M17c	1.14	-	2.63	3.77
	M6d	0.4	-	0.87	1.27
	M23a	0.49	-	1.14	1.63
	U2b	0.16	-	-	0.16
	U6d	2.33	-	5.01	7.34
Substation and control building	M23a	0.63	0.53		1.16



Wind Farm Component	NVC Community	Direct Habitat Loss (Ha)	Temporary habitat loss /disturbance (Ha)	Indirect habitat modification (Ha)	Total area of habitat affected (Ha)
Borrow pit search area	M6d	-	1.53	-	1.53
	M17c	-	0.4	-	0.4
	M20a	-	0.07	-	0.07
	M23a	-	0.36	-	0.36
	U5	-	3.3	-	3.3
	U6d	-	4.79	-	4.79