Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Impact and further assessment is required.

Table 6-3 Designated sites in the Zone of Influence

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
Special Areas of Conservation (SAC)		
Lough Gill SAC (001976)	4.4	As described in Chapter 9 'Water' of the EIAR, hydrological connectivity has been identified between the proposed development and Lough Gill SAC via watercourses within the west of the site boundary. **The SAC is considered to be within the Likely Zone of Impact and further assessment is required with regard to the relevant QIs of the SAC.**
Boleybrack Mountain SAC (002032)	4.9	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. These SACs are within a separate water catchment with no hydrological connectivity to the proposed development site. No pathway for indirect effects on the terrestrial habitats for which the SAC has been designated exists. The SACs are therefore not within the Likely Zone of Impact.
Unshin River SAC (001898)	8.5	
Cuilcagh - Anierin Uplands SAC (000584)	9.2	
Lough Arrow SAC (001673)	10.1	
Bricklieve Mountains and Keishcorran SAC (001656)	12.7	
Union Wood SAC (000638)	14.6	
Special Protection Area (SPA)		
Lough Arrow SPA (004050)	9.3	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. This SPA is in a separate water catchment with no hydrological connectivity to the development site. The site is not within the core foraging range of the SCI species for which the SPA has been designated (SHN, 2016). No pathways for significant effect on the European Site was identified. Thus it can be excluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the European site, that the proposed development, individually or in combination with other plans and projects, would therefore not have a significant effect on this European Site.
Natural Heritage Areas (NHA)		

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
Corry Mountain Bog NHA (002321)	0	This designated Site is located adjacent to the proposed development . **From a precautionary perspective, it is included within the Likely Zone of Impact.**
Carrane Hill Bog NHA (002415)	0.28	The development footprint is located over 280 metres from the NHA and no part of the proposed development site is located inside the NHA. Therefore, there is no potential for direct effects. No direct or indirect hydrological connectivity has been identified between the proposed development site and the NHA. No pathway for indirect effects on the terrestrial habitats for which the NHA has been designated exists. **This NHA is therefore not within the Likely Zone of Impact.**
Lough Gill NHA (001976)	4.4	No pathway for direct or indirect effects on the terrestrial habitats for which the NHA has been designated exists. As described in Chapter 9 'Water' of the EIAR, hydrological connectivity has been identified between the proposed development and Lough Gill NHA via watercourses within the west of the site boundary. **The NHA is therefore within the Likely Zone of Impact and further assessment is required.**
Kilronan Mountain Bog NHA (000617)	5.5	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. No pathway for indirect effects on the terrestrial habitats for which the NHA has been designated exists. No direct or indirect hydrological connectivity has been identified between the proposed development site and the NHA due to differences in topography and separation in distance. This NHA is therefore not within the Likely Zone of Impact.
Crockauns/Keelogyboy Bogs NHA (002435)	14.06	This NHA is in a separate water catchment with no direct or indirect hydrological connectivity to the development site. No pathway for indirect effects on the terrestrial habitats for which the NHA has been designated exists. It is not within the Likely Zone of Impact.
Proposed Natural Heritage Areas (pNHA)		

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
Owengar Wood (001419)	0.046	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. No pathway for indirect effects on the terrestrial habitats for which the pNHA has been designated exists. However, as this designated Site is located adjacent to the proposed development site. **From a precautionary perspective, it is included within the Likely Zone of Impact and further assessment is required.**
Kilgarriff Marsh (000426)	5.6	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. No pathway for indirect effects on the terrestrial habitats for which the pNHA has been designated exists. Hydrological connectivity has been identified between the proposed development site and this pNHA via watercourses that connect to Lough Allen. **This pNHA is therefore within the Likely Zone of Impact and further assessment is required.**
Lough Gill (001976)	5.8	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. As described in Chapter 9 'Water' of the EIAR, hydrological connectivity has been identified between the proposed development and Lough Gill pNHA via watercourses within the site boundary. For this reason, potential for impact on the aquatic features of the pNHA has been identified and further assessment is required. No potential for indirect effects has been identified on the terrestrial habitats for which the pNHA has been designated. **It is within the Likely Zone of Impact and further assessment is required**.
Lough Allen, South End and Parts (000427)	7.5	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. N As described in Chapter 9 'Water' of the EIAR, hydrological connectivity has been identified between the proposed development and this pNHA via watercourses within the site boundary which

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
		discharge to Lough Allen. No potential for indirect effects has been identified on the terrestrial habitats for which the pNHA has been designated. **It is within the Likely Zone of Impact and further assessment is required**.
Meharth Lough (001900)	8.4	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. These pNHAs are located within a separate water catchment and thus no hydrological connectivity exists. This site is not within the Zone of Likely Impact.
Unshin River (001898)	8.48	
Cuilcagh - Anierin Uplands (000584)	8.7	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. No pathway for indirect effects on the terrestrial habitats for which the pNHA has been designated exists. While this pNHA is within the same catchment as the proposed development. No hydrological connectivity to the proposed development site exists. This site is not within the Zone of Likely Impact.
Lough Arrow (001673)	10.17	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. This pNHA is in a separate water catchment with no hydrological connectivity to the proposed development site. It is not within the Zone of Likely Impact.
Boleybrack Mountain (002032)	9.2	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. While this pNHA is within the same catchment as the proposed development, no hydrological connectivity to the proposed development site was identified. No potential for indirect effects has been identified on the terrestrial habitats for which the pNHA has been designated. This site is not within the Zone of Likely Impact.
Lough Dargan (001906)	10.17	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. This pNHA is in a separate water catchment with no hydrological connectivity to the proposed

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
		development site. It is not within the Zone of Likely Impact.
O'Donnell's Rock Wood (001418)	10.4	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. No pathway for indirect effects on the terrestrial habitats for which the pNHA has been designated exists. While this pNHA is within the same catchment as the proposed development, no direct or indirect hydrological connectivity to the proposed development site. This site is not within the Zone of Likely Impact.
Bricklieve Mountains & Keishcorran (001656)	10.8	There is no potential for direct or indirect effects on the terrestrial habitats for which the site has been identified as the proposed development is located entirely outside of this designated site. These pNHAs are in a separate water catchment with no direct or indirect hydrological connectivity to the proposed development site. This site is not within the Zone of Likely Impact.
Corrigeenroe Marsh (000596)	12.69	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. No pathway for indirect effects on the terrestrial habitats for which the pNHA has been designated exists. While this pNHA is within the same catchment as the proposed development, no direct or indirect hydrological connectivity to the proposed development site exists. This site is not within the Zone of Likely Impact.
Ballygawley Lough (001909)	12.9	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. These pNHAs are in a separate water catchment with no direct or indirect hydrological connectivity to the proposed development site exists. They are not within the Zone of Likely Impact.
Colgagh Lough (001658)	13.3	
Union Wood (000638)	14.2	

Potential for effects on European sites is summarised in this report and is fully addressed in the Natura Impact Statement submitted as part of the statutory consent process.

Where a nationally designated site (NHA), overlaps with the boundary of a European designated site, i.e. (SAC/SPA), the potential for impacts has been considered under the European designation.

Corry Mountain Bog NHA (002321) and Owengar Wood pNHA (001419) are located adjacent to the proposed development site. On a precautionary basis, these sites have been included within the Likely Zone of Impact for further assessment.

Surface water connectivity was identified between the proposed development Lough Allen, South End and Parts (000427), Kilgarriff Marsh (000426) and Lough Gill pNHA, NHA and SAC approximately 4.4km downstream. As this pNHA has also been designated a SAC, impacts on this designated site are fully considered under the European designation within the NIS. This is further described in Section 6.7.2 of this Chapter.

The AA Screening that accompanies this application identifies the following European Sites as being within the Likely Zone of Impact:

- Lough Gill SAC [001976]
- Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (000627)
- Cummeen Strand SPA (004035).

6.5.1.2 NPWS Article 17 Reporting

A review of the Irish Reports for Article 17 of the Habitats Directive (92/42/EEC), including the Heath, Bogs and Mires, Irish Semi-Natural Grassland Survey datasets, National Survey of Native Woodlands and Ancient and Long-Established Woodland datasets were conducted prior to undertaking the multi-disciplinary walkover survey.

In a search of the NPWS Article 17 datasets[6], was undertaken as part of the desk study. Small areas of Blanket bog [7130], Wet Heath [4010] and Dry heath [4030] were mapped within or immediately adjacent to the site boundary, see Figure 6-4. An area of *Molinia* meadows [6410] was identified outside the west of the site boundary. Following a review of the database, a small area of Oak-ash-hazel woodland (WN2), not conforming to any EU Annex I habitat, occurs outside the site and to the south of the proposed haul route at Glassait Woods, upstream of the proposed infrastructure. As shown in Figure 6-4, only a small fragment of Article 17 mapped blanket bog, along the site access road to T1, occurs within the proposed development footprint. Where Article 17 datasets occur along the grid connection route, these will not be impacted, as the proposed infrastructure will be located within the existing road.

6.5.1.3 Vascular plants

A search was made in the New Atlas of the British and Irish Flora (Preston *et al*, 2002) to investigate whether any rare or unusual plant species listed under Annex I of the EU Habitats Directive, The Irish Red Data Book, 1, Vascular Plants (Curtis, 1988) or the Flora (Protection) Order (1999, as amended 2015) had been recorded in the relevant 10km squares in which the study site is situated (G82). Each hectad contains 100 whole one kilometre squares containing terrestrial habitats. Species of conservation concern are given in Table 6-4.

Table 6-4 Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectad G82

Common Name	Scientific Name	Hectad	Status
Corn Marigold	*Chrysanthemum segetum*	G82	Red List (NT)
Prostrate Broom	*Cytisus scoparius*	G82	Red List (VU)

[6] *Including bog 2012 and 2019 datasets, Online, Available at: https://www.npws.ie/publications/article-17-reports*

Map Legend

- Molinia meadows [6410]
- Blanket bog [7130]
- Northern Atlantic wet heaths [4010]
- European dry heath [4030]
- Existing 110kV Garvagh Substation Location
- Existing Roads - Upgrade Proposed
- Proposed New Site Roads
- Proposed 38kV Underground Grid Connection Cabling Route
- Proposed Amenity Walkway
- Proposed Boardwalk
- Proposed 38kV Substation Compound
- EIAR Site Boundary
- Road Widening Works Area
- Proposed Peat & Spoil Repository
- Proposed Construction Compound
- Proposed Borrow Pit
- Existing Access Road/Track
- Proposed Viewing Platform
- Proposed Visitor Carpark Location (Operational Phase)
- Proposed Met Mast Location
- Proposed Turbine Location

1 2 3 4 5 6 7 8 9 10

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MAP TITLE: **Distribution of relevant Article 17 habitat records**		MAP NO.: **Figure 6.4**	SCALE: **25,000**
PROJECT TITLE: **180511 - Croagh Wind Farm**			DATE: **30-06-2020**
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Alpine Meadow-grass	*Poa alpina*	G82	Red List (EN)
Irish Sorrel	*Rumex acetosa*	G82	Red List (NT)

6.5.1.4 Bryophytes

A search of the NPWS online database for bryophytes (non-vascular land plants comprising of mosses, hornworts and liverworts) was also undertaken with no protected bryophytes recorded within or adjacent to the proposal (NPWS, 2020).

6.5.1.5 National Biodiversity Data Centre (NBDC) Records

A search of the National Biodiversity Data Centre (NBDC) records for the relevant hectad, G82, provided records on a number of fauna species of conservation concern, excluding marine species and bird species. These are provided in Table 6-5. Records on species of conservation concern recorded from the area are also provided and outlined in Table 6-6.

Table 6-5 NBDC Records for Species of Conservation Interest in hectad G82

Species	Scientific Name	Red List Status	Habitats Directive
Common frog	*Rana temporaria*	LC	Annex V
Badger	*Meles meles*	LC	WA
Red fox	*Vulpes vulpes*	LC	
Red deer	*Cervus elaphus*		WA
Red squirrel	*Sciurus vulgaris*	LC	WA
Fallow deer	*Dama dama*	LC	WA
Irish hare	*Lepus timidus subsp. Hibernicus*	LC	
Hedgehog	*Erinaceus europaeus*	LC	WA
Marsh fritillary	*Euphydryas aurinia*	VU	Annex II, WA
Daubenton's bat	*Myotis daubentonii*	LC	Annex IV
Leisler's bat	*Nyctalus leisleri*	NT	Annex IV
Pine marten	*Martes martes*	LC	Annex V
Soprano pipistrelle	*Pipistrellus pygmaeus*	LC	Annex IV

Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA - Wildlife Acts – Irish Wildlife Acts (1976, 2017), LC – Least concern, NT – Near threatened, VU - Vulnerable.

6.5.1.6 NPWS

National Parks and Wildlife Service (NPWS) online records were searched to see if any rare or protected species of flora or fauna have been recorded from hectad G82. An information request was also sent to the NPWS requesting records from the Rare and Protected Species Database. Table 6-6 lists rare and protected species records obtained from NPWS, as received on the 9th of April 2019, as well as those recorded available through the online NPWS map viewer.

Table 6-6 National Parks and Wildlife Service Map Viewer Records

Common name	Scientific name	Red List Status	Flora Protection Order/Red List	Habitats Directive/Birds Directive/Wildlife Act
Freshwater crayfish	*Austropotamobius pallipes*	-	-	Annex II, V, WA
Sika deer	*Cervus nippon*	-	-	WA
Cladonia lichen	*Cladonia ciliata*	-	-	Annex V
Reindeer moss	*Cladonia portentosa*	-	-	Annex V
Hedgehog	*Erinaceus europaeus*	LC	-	WA
Viviparous lizard	*Lacerta vivipara*	LC	-	WA
Irish hare	*Lepus timidus subsp. hibernicus*	LC	-	Annex V, WA
Pine marten	*Martes martes*	LC	-	Annex V
Badger	*Meles meles*	LC	-	WA

6.5.1.7 Bat Records

The National Bat Database of Ireland was searched for records of bat activity within hectad G82 on 20/03/2020. A number of observations have been recorded (Table 6-7). At least three of Ireland's nine resident bat species were recorded within 10 km of the proposed works including soprano pipistrelle, Leisler's bat and Daubenton's bat. The results of the database search are provided in Table 6-7.

Table 6-7 National Bat Database of Ireland records within 10km square G82

Species	Record Count	Latest Record	Dataset
Daubenton's Bat (*Myotis daubentonii*)	1	26/09/2009	National Bat Database of Ireland
Leisler's bat (*Nyctalus leisleri*)	1	26/08/2009	National Bat Database of Ireland
Soprano pipistrelle (*Pipistrellus pygmaeus*)	3	26/09/2009	National Bat Database of Ireland

6.5.1.8 Marsh fritillary (*Euphydryas aurinia*)

The closest NBDC records for marsh fritillary were located outside the north of the site in the townland of Corglancy. The most recent record was from 26/06/2019.

6.5.1.9 Inland Fisheries Ireland (IFI) Data

The IFI online database was reviewed for fish species records within the catchments downstream of the EIAR study area boundary. The Croagh wind farm development encompasses numerous small streams and rivers in north Leitrim, primarily on the Killanummery, Argina, Tullynascreen and Owengar river sub-catchments. Fisheries data for the Killanummery, Argina, Tullynascreen and Owengar river sub-catchments was largely lacking.

A range of fish species including Atlantic salmon (*Salmo salar*), brown trout (*Salmo trutta*), European eel, stone loach (*Barbatula barbatula*), minnow (*Phoxinus phoxinus*), *Lampetra* spp., perch (*Perca fluviatilis*), gudgeon (*Gobio gobio*), three-spined stickleback (*Gasterosteus aculeatus*), roach (*Rutilus rutilus*) and pike (*Esox lucius*) are known from the wider Bonet catchment, to which the Killanummery adjoins (IFI, 2016; Kelly et al., 2011). The Owengar River is known locally to support a stock of brown trout. Fisheries data was not available for the Argina and Tullynascreen channels (Triturus, 2019). Table 6-8 provides a summary of the available online data[7].

Table 6-8 Fish data available from IFI National Research Survey Programme

Waterbody Name & Site Code	Species	Species Richness	Draft Fish Ecological Status
Bonet River Site code: 35B060600A	Brown trout; European eel; Gudgeon; Lamprey sp.; Minnow; Perch; Salmon; Stone loach; Three-spined stickleback	9	Moderate
Lough Allen Site code: SH_26_716	Bream; Brown trout; European eel; Perch; Pike; Pollan; Roach; Roach x Bream hybrid	7	Good
Lough Gill WE_35_158	Bream; Brown trout; European eel; Perch; Pike; Roach; Roach x Bream hybrid	6	Good

[7] *IFI National Research Survey Programme, Online, Available at:* https://ifigis.maps.arcgis.com/apps/webappviewer/index.html?id=9a31fedb077c4fb2991184842b7ef025

Garavoge Estuary	Common goby; European eel; Five-bearded rockling; Flounder; Gadoid; Lesser spotted dogfish; Long-spined sea scorpion; Pogge; Pollack; Sand goby; Three-spined stickleback; Two-spotted goby	12	Good

6.5.1.10 Invasive Species

The NBDC database also contains records of invasive species identified within the relevant hectad. Records of invasive species for hectad G82 are provided in Table 6-9.

Table 6-9 NBDC records for Invasive Species

Common Name	Scientific Name
Butterfly-bush	*Buddleja davidii*
Cherry laurel	*Prunus laurocerasus*
Indian balsam	*Impatiens glandulifera*
Japanese knotweed	*Fallopia japonica*
Rhododendron	*Rhododendron ponticum*
Jenkins' spire snail	*Potamopyrgus antipodarum*
American mink	*Mustela vison*
Fallow deer	*Dama dama*

6.5.1.11 Local Hydrology and Hydrogeology

The following description has been summarised from Chapter 9 '*Water*' of the EIAR and provides a baseline of the local watercourses within and downstream of the site of the proposed development.

In terms of regional hydrology, the Proposed Development is located in 2 no. river basins and 3 no. regional surface water catchments. The southern half of the wind farm site is located in the Shannon River surface water catchment within the Shannon International River Basin District (SHIRBD). The northern half of the wind farm site is located in the Sligo Bay & Drowse surface water catchment.

In terms of turbine distribution, 4 no. are located in the Shannon River surface water catchment and 6 no. are located in the Sligo Bay & Drowse surface water catchment.

The Garvagh Windfarm grid connection option, which runs to the southeast of the site, passes through the Shannon River surface water catchment (for 6.4km) and the Garvogue River surface water catchment (for 0.7km).

In terms of local hydrology, the southern half of the EIAR Site boundary is located in the Arigna River surface water catchment. The Arigna River flows into Lough Allen approximately 16km downstream of

the site. The north half of the windfarm site is located in the Bonet River surface water catchment. The Bonet River flows into Lough Gill approximately 15km downstream of the site. The site is connected to the River Bonet via two upper tributaries; the Tullynascreen Stream and the Killanummery stream.

6.5.1.12 Water Quality

River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The online EPA Envision map viewer provides access to water quality information at individual waterbody status for all the River Basin Districts in Ireland. The EPA Envision map viewer was consulted, most recently, on 30th February 2020 regarding the water quality status of the rivers which run within and directly adjacent to the Study Area. The WFD River Waterbody Status 2013 – 2018 for the watercourses which flow through the site have been assessed in Table 6-10.

Table 6-10 Watercourses on site with relevant water quality statuses

Name	Location	Status	Risk
Arigna	Flows in a North-West to South-Easterly direction through the majority of the site	Good	Not at Risk
Killanummary, tributary of the Bonet Rvier.	Flows in a South-East to North-Westerly direction at the Northern portion of the site	Good	At risk

Status– WFD River Waterbody Status 2010-2015 Risk – WFD River Waterbodies Risk

6.5.2 Conclusions of the Desk Study

The desktop study has provided information about the existing environment in hectad G82, within which the proposed development is located. The mammal species recorded within the relevant hectad have widespread range and distributions in Ireland and are likely to be recorded frequently throughout Ireland (Marnell et al, 2009[8]). Bat records within 10km of the proposed development site revealed that the wider area has been studied for bats. This suggests that the area offers potential for foraging and commuting bat species.

As part of the desk study, a small area of Habitats Directive Annex I habitats 'Wet Heath [4010]' and Dry heath [4030] were mapped within the site boundary, while Blanket bog [7130] was recorded adjacent to the site boundary. However, no Habitats Directive Annex I habitats have been recorded within or immediately adjacent to the proposed development footprint, as per NPWS records consulted and other ecology survey reports reviewed.

A number of watercourses that drain the study area, lead to the following downstream EU Designated Sites, and are further considered in the Natura Impact Statement prepared for the proposed development:

- Lough Gill SAC [001976]
- Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (000627)
- Cummeen Strand SPA (004035)

Corry Mountain Bog NHA (002321) and Owengar Wood pNHA (001419) are located adjacent to the proposed development site. On a precautionary basis, these sites have been included within the Likely Zone of Impact for further assessment.

[8] *Marnell, F., Kingston, N. & Looney, D. (2009) Ireland Red List No. 3: Terrestrial Mammals, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.*

The desk study identified that a variety of protected faunal species are known to occur within the study area, including bats, marsh fritillary, otter, freshwater white-clawed crayfish, Atlantic salmon, badger and red squirrel. The mammal species recorded during the desk study informed the survey methodologies undertaken during the site visits. The desk study also provided useful information to inform the ecological surveys undertaken on site as well as the identification of pathways for potential impact on sensitive ecological receptors.

6.6 Description of the Existing Environment

6.6.1 Description of Habitats

The habitat classifications and codes correspond to those described in '*A Guide to Habitats in Ireland*' (Fossitt 2000). A total of fourteen habitats were recorded within the development site (Table 6.11). Peatland and grassland habitats have also been categorised to plant communities from the National Survey of Upland Habitats (Perrin et al. 2014) and the Irish Vegetation Classification. Detailed botanical data from relevés recorded in peatland and grassland habitats are provided in Appendix 6-1 of this report. A habitat map of the site is provided in Figure 6-5

. This also shows the smaller areas of peatland habitat within the site as an insert. A habitat map is also provided with the proposed infrastructure footprint overlain in Figure 6-6.

Table 6-11 Habitats recorded on the proposed development

Habitat Name	Fossitt Code
Wet grassland	GS4
Conifer plantation	WD4
Scrub	WS1
Wet willow-alder-ash woodland	WN6
Oak-ash-hazel woodland	WN2
Buildings and artificial surfaces	BL3
Recolonising bare ground	ED3
Spoil and bare ground	ED2
Eroding/upland rivers	FW1
Drainage ditches	FW4
Dystrophic lakes	FL1
Upland blanket bog	PB2
Poor fen and flush	PF2
Transition mire and quaking bog	PF3

Map Legend

Habitat legend

- Buildings and Artificial Surfaces (BL3)
- Dystrophic Lakes (FL1)
- Improved Agricultural Grassland (GA1)
- Wet Grassland (GS4)
- Upland Blanket Bog (PB2)
- Poor Fen and Flush (PF2)
- Transition Mire and Quaking Bog (PF3)
- Conifer Plantation (WD4)
- Scrub (WS1)
- EPA mapped watercourses

Proposed development legend

- Proposed Met Mast Location
- Existing 110kV Garvagh Substation Location
- Proposed Turbine Location
- Proposed New Site Roads
- Proposed 38kV Underground Grid Connection Cabling Route
- Proposed Amenity Walkway
- Proposed Boardwalk
- Existing Roads - Upgrade Proposed
- Existing Access Road/Track
- Proposed 38kV Substation Compound
- Road Widening Works Area
- Proposed Peat & Spoil Repository
- Proposed Construction Compound
- Proposed Borrow Pit
- Proposed Viewing Platform
- Proposed Visitor Carpark Location (Operational Phase)
- EIAR Site Boundary

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MAP TITLE: **Habitat map with infrastructure overlain**	MAP NO.: **Figure 6.6**	SCALE: **30,000**
PROJECT TITLE: **180511 - Croagh Wind Farm**		DATE: **30-06-2020**
DRAWING BY: **DMN**	CHECKED BY: **PR**	ISSUE NO.: **180511-2020.06.30-D1**

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Map Legend

Habitat legend

- Buildings and Artificial Surfaces (BL3)
- Dystrophic Lakes (FL1)
- Improved Agricultural Grassland (GA1)
- Wet Grassland (GS4)
- Upland Blanket Bog (PB2)
- Poor Fen and Flush (PF2)
- Transition Mire and Quaking Bog (PF3)
- Conifer Plantation (WD4)
- Scrub (WS1)
- EPA mapped watercourses

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W E
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MAP TITLE: **Habitat map**		MAP NO.: **Figure 6.5**	SCALE: **21,000**
PROJECT TITLE: **180511 - Croagh Wind Farm**			DATE: **30-06-2020**
DRAWING BY: **DMN**	CHECKED BY: **PR**		ISSUE NO.:**180511-2020.06.30-D1**

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6.6.1.1 Habitats within the EIAR Study Area Boundary

The majority of the study area (580 hectares/86.3% of the study area) is dominated by plantation forestry, comprising mainly of Sitka spruce (*Picea sitchenis*) and Lodgepole pine (*Pinus contorta*). The site is accessible via a network of existing forestry access tracks and forestry rides. The remainder of the wind farm infrastructure site is dominated by degraded Upland blanket bog (PB2). The haul route to the east of the site primarily traverses areas of Wet grassland (GS4), Scrub (WS1), Conifer plantation (WD4) and existing roads.

Conifer plantation (WD4)

In total, approximately 86.3% of the study area (580 hectares) comprises of coniferous plantation forestry (Plate 6-1 and Plate 6-2). This includes forestry (WD4) of various ages (including clear-felled areas, semi-mature and mature stands, along with immature pre-thicket areas of both first and second rotation. Sitka spruce and Lodgepole pine are the dominant species, typically 8-10m tall. Mature conifer plantation is interspersed with immature stands. The understorey is typically species-poor in forestry plantations and vegetation normally restricted to a few bryophytes and ferns which include, hard fern (*Blechnum spicant*) and *Thuidium tamariscum*.

As the forestry was originally planted on peatland habitats, forestry rides or areas where forestry failed to achieve closed canopy are dominated by ling heather (*Calluna vulgaris*), heath rush (*Juncus squarrosus*), purple moor-grass (*Molinia caerulea*) and *Sphagnum palustre*. These areas make up a very small area of the overall forestry plantation.

The majority of the proposed wind farm infrastructure (88.75%) is located within Conifer plantation (WD4) habitat which includes Turbines 2-10, temporary construction compounds, borrow pits, substation, met mast, part of the access road to T1, new site roads to other turbines and part of the turbine haul route.

Plate 6-1 Example of Conifer plantation (WD4) within the study area

Plate 6-2 Example of recently felled and replanted Conifer plantation (WD4) within the study area.

Upland Blanket Bog (PB2)

Upland blanket bog (PB2) habitat occurs within the west of the site, as well as a small pocket in the centre of the site. This habitat is typically degraded where it occurs within the site boundary associated with historic and more recent turbary. Only Turbine 1, and part of the associated access road, is located within Upland blanket bog (PB2) habitat. This represents 0.55% of the habitat loss to the development footprint. This area is surrounded by bog that has been cutover in the past and shows evidence of drying-out.

T1 is located immediately adjacent to a relatively recent cutover area which has revegetated and is dominated by a short sward comprising of ling heather and hare's-tail cottongrass (*Eriophorum vaginatum*). The peatland habitat within the infrastructure footprint was dominated by dense leggy ling heather which was relatively dry underfoot (Plate 6-3). In addition, some of the area around proposed TI footprint had been recently disturbed (Plate 6-4). Other species included hare's-tail cotton grass and bilberry (*Vaccinium myrtlus*). Although *Sphagnum capillifollium* was present, it was in low abundance and the dominant bryophytes comprise of species typical of dryer peatland habitats, including *Rhytidiadelphus loreus*, *Hylcomium splendens* and *Hypnum jutlandicum*. Purple moor-grass (*Molinia caerulea*) cover was generally sparse. Although the vegetation was characteristic of a grade between wet and dry heath, the peat depths in this area were well in excess of 50cm, and as such the habitat was categorised as Upland blanket bog (PB2). Some of this peatland was classified as inactive where *Sphagnums* were absent. In wetter areas, the peatland habitat formed a mosaic with Poor fen and flush (PF2) and Transition mire and quaking bog (PF3) which are described in the sections below.

The Upland blanket bog (PB2) habitat within the proposed development footprint at Turbine 1 was classified to communities using the Irish Vegetation Classification (IVC) following analysis using ERICA[9]. The Upland blanket bog (PB2) recorded on site was identified as confirming to the *Calluna vulgaris* - *Eriophorum vaginatum* (HE3F) and *Calluna vulgaris* - *Hylocomium splendens* (HE3A)

[9] *Engine for Relevés to Irish Communities Assignment (ERICA)*

communities. The *Calluna vulgaris - Eriophorum vaginatum* (HE3F) is a heathy bog community where ling heather forms dense cover. It is a high-altitude bog community which is usually found upper mountain slopes over 450m. However, the altitude where it is located at the study site is between 270-280m (Perrin, 2017[10]). The *Calluna vulgaris - Hylocomium splendens* (HE3A) community is a heath community (Perrin, 2017[11]) and is normally found higher altitudes also, over 450m. The high abundance of ling heather is likely to be an indicator of drying-out and past degradation and turbary activity is present in the surrounding area. Although the *Calluna vulgaris - Hylocomium splendens* (HE3A) is considered a dry heath community, as peat depths across the peatland were between 1.0-2.2m, the habitat is considered to be blanket bog.

Plate 6-3 Degraded Upland blanket bog (PB2) along proposed access road to T1

[10] *Perrin, P., 2017, IVC - Calluna vulgaris – Eriophorum vaginatum heathy bog (HE3F), Available at: https://www.biodiversityireland.ie/wordpress/wp-content/uploads/HE3F.pdf, Accessed, 24.03.2020*

[11] *Perrin, P., 2017, IVC* - Calluna vulgaris - Hylocomium splendens *(HE3A) https://www.biodiversityireland.ie/wordpress/wp-content/uploads/HE2B.pdf, Accessed, 24.03.2020*

Plate 6-4 Degraded Upland blanket bog (PB2) withinT1 footprint

Poor fen and flush (PF2)

Poor fen and flush (PF2) habitat was recorded within the Upland blanket bog (PB2) within a low lying area and subsequent movement of ground and surface water through this area of peatland (Plate 6-5). This habitat was also recorded occurring within an intimate mosaic with Transition mire and quaking bog (PF3). Poor fen and flush (PF2) generally formed linear features and was characterised by species which were indicative of higher nutrients than the surrounding bog, such as soft rush (*Juncus effusus*), Yorkshire fog (*Holcus lanatus*), wavy hair-grass (*Deschampsia flexuosa*), sweet vernal grass (*Anthoxanthum odoratum*), sharp-flowered rush (*Juncus acutiflorus*), sorrel (*Rumex acetosa*) *Polytrichum commune* and *Spagnum palustre*.

ERICA analysis of the quadrat data within this habitat assigned the quadrats to *Agrostis canina/vinealis - Rhytidiadelphus squarrosus* (GL4D) community. This community is an intermediate between the upland acid grassland and wet grassland. The presence of *Sphagnum fallax*, *Sphagnum palustre* and *Polytrichum commune* characterise this habitat as poor fen and flush.

Plate 6-5 Poor fen and flush (PF2) at T1 location

Transition mire and quaking bog (PF3)

Transition mire and quaking bog (PF3) was recorded in an intimate mosaic with Poor fen and flush (PF2) within the north-west corner of the EIAR Site boundary and was also recorded along the southern shore of Lough Nacroagh within the centre of the site.

Where it occurred in association with Poor fen and flush (PF2) within the peatland complex in the north-west of the site, it was found as small linear features where there was movement of ground and surface water (Plate 6-6). A much larger area of the habitat (0.46ha) was recorded in association with Lough Nacroagh, along its southern shore (Plate 6-7). The transition mire habitat is encroaching on the lake as a *Sphagnum* lawn. The species composition of Transition mire and quaking bog (PF3) habitat primarily consisted of bottle sedge (*Carex rostrate*), bogbean (*Menyanthes trifoliata*), common cottongrass (*Eriophorum angustifolium*), *Sphagnum fallax* and *Sphagnum palustre*. The access road to Turbine 1 will cross a small area of this Transition mire and quaking bog (PF3) habitat. However, there is no wind farm infrastructure proposed within or adjacent to the habitat where it exists adjacent to Lough Nacroagh.

Quadrats recorded within this habitat were assigned to the IVC community *Menyanthes trifoliata* – *Sphagnum recurvum* agg. mire (FE2E) following ERICA analysis.

Plate 6-6 Transition mire and quaking bog (PF3) along proposed access road to T1

Plate 6-7 Transition mire and quaking bog (PF3) adjacent to Lough Nacroagh

Dystrophic lakes (FL1)

Lough Nacroagh in the centre of the proposed windfarm site was categorised as a Dystrophic lake (FL1) (see Plate 6-7 andPlate 6-8). The lake is relatively small and is being encroached by Transition mire and quaking bog (PF3) habitat to the south, as described previously. The lake is surrounded by coniferous forestry (WD4) along its northern shore and where there is a small gap in tree cover, purple moor-grass and ling heather occur up to the water edge. The lake did not contain any emergent vegetation during the site visits.

Plate 6-8 Lough Nacroagh categorised as a Dystrophic lake (FL1)

Spoil and bare ground (ED2)

Unbound forestry tracks throughout the site were categorised as Spoil and bare ground (ED2). The access track verges across much of the site contained of wet grassland or surrounding peatland habitats (Plate 6-9). Species recorded comprised mainly of sweet vernal grass (*Anthoxanthum odoratum*), daisy (*Bellis perennis*), dandelion (*Taraxacum officinale* agg.), colt's-foot (*Tussilago farfara*), soft rush (*Juncus effusus*), purple moor-grass, *Carex* ssp, crested dogs-tail (*Cynosurus cristatus*) and heather (*Calluna vulgaris*). Upgrading of existing forestry tracks is proposed across the site, as shown in Figure 4-1, Chapter 4 of the EIAR.

Plate 6-9 Example of existing unbound forestry tracks categorised as Spoil and bare ground (ED2)

Eroding/upland rivers (FW1)

A number of watercourses drain the site windfarm site with the watercourses draining the northern part of the site including the Killanummery River and Tullynascreen stream, which flow into the River Bonet further north, and those draining the southern part of the site forming the Arigna River. The streams within the windfarm site were generally small, up to a metre wide, high-energy and with boulder and cobble substrate. Most of the streams were surrounded by forestry and did not contain aquatic macrophytes or where forestry cover was absent, they were bordered by heath or wet grassland vegetation such as ling, soft rush, heath bedstraw (*Galium saxatile*) and Yorkshire fog (*Holcus lanatus*) (Plate 6-10).

The Gowlaunrevagh and Tinnybeg Rivers will be crossed as part of the proposed haul road located to the southeast of the site of the proposed development. These rivers enter the Owengar River located within a steep valley to the north of the haul road. An example of the Gowlaunrevagh River crossing location is provided in Plate 6-11.

Plate 6-10 Tullynascreen stream (FW1) flowing through the north-west of the windfarm site

Plate 6-11 The Gowlaunrevagh River (FW1) - The image shows the approximate location of the proposed haul route to the east of the proposed windfarm site