5 TERRESTRIAL ECOLOGY

5.1 INTRODUCTION

This chapter assesses the impacts of the Project (**Figure 1.2**) on terrestrial ecology. The Project refers to all elements of the application for the construction of Letter Wind Farm (**Chapter 2:** Project **Description**). Where negative effects are predicted, the chapter identifies appropriate mitigation strategies therein. The assessment will consider the potential effects during the following phases of the Project:

- Construction of the Project
- Operation of the Project
- Decommissioning of the Project

Common acronyms used throughout this EIAR can be found in **Appendix 1.2**. This chapter of the EIAR is supported by Figures provided in Volume III and by the following Appendix documents provided in Volume IV of this EIAR:

- **Appendix 5.1: Target Note Survey Results**
- **Appendix 5.2: Habitat Management Plan**

A Construction and Environmental Management Plan (CEMP) is appended to the EIAR in **Appendix 2.1**. This document will be developed into a Site-Specific Letter CEMP post consent/pre-construction once a contractor has been appointed and will cover construction of the Project It will include all of the mitigation recommended within the EIAR. For the purpose of this application, a summary of the mitigation measures is included in **Appendix 17.1**.

The potential for the Project to have adverse effects on the integrity of any designated European Sites has been assessed within a Natura Impact Statement (NIS).

5.1.1 Statement of Authority

This Chapter has been prepared by Mr. Pat Doherty BSc., MSc, MCIEEM, of DEC Ltd. Mr. Doherty is a consultant ecologist with over 20 years' experience in completing ecological impact assessments and environmental impact assessments. Pat has been involved in the completion of assessment reports for proposed developments and land use activities under the EIA Directive and Article 6 of the Habitats Directive since 2003 and 2006 respectively. He has extensive experience completing such reporting for projects located in a variety of environments and has a thorough understanding of the biodiversity issues that may arise from proposed land use activities. Pat was responsible for completing one of the first

Appropriate Assessment reports for large scale infrastructure developments in Ireland when he prepared the Appropriate Assessment for the N25 New Ross Bypass in 2006/07. Since then, Pat has completed multiple examinations of both plans and projects in Ireland. He has completed Natura Impact Statements for national scale plans such as Ireland's CAP Strategic Plan and National Seafood Development Plan and regional and county scale plans including County Development Plans, Local Area Plans, Tourism Strategies and Climate Action Plans. Pat has completed multiple Natura Impact Statements for a range of development types that include large scale infrastructure developments in sectors such as transport and energy as well as industrial, commercial and residential developments.

Pat has completed focused certified professional development training in Appropriate Assessment as well as in a range of ecological survey techniques and assessment processes. Training has been completed for National Vegetation Classification (NVC) and Irish Vegetation Classification (IVC) surveying, bryophyte survey for habitat assessment and identification, professional bat survey and assessment training, mammal surveying and specific training for bird and bat survey techniques. Ongoing training has been completed by approved training providers such as CIEEM, British Trust for Ornithology, the Botanic Gardens and the Field Studies Council.

5.1.2 Assessment Structure

In line with the revised EIA Directive and current EPA guidelines the structure of this Terrestrial Ecology chapter is as follows:

- Assessment Methodology and Significance Criteria
- Description of baseline conditions at the Site
- Identification and assessment of impacts to terrestrial ecology associated with the Development, during the construction, operational and decommissioning phases of the Development.
- Mitigation measures to avoid or reduce the impacts identified.
- Identification and assessment of residual impact of the Development considering mitigation measures.
- Identification and assessment of cumulative impacts if and where applicable.

5.2 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Ecology surveys of the Site were undertaken following specific guidelines for habitats and species as outlined in the following sections.

The importance of the habitats and species present is evaluated using the guidance document Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal, and Marine published by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018 v.1.1). This document outlines an accepted approach for the evaluation of potential impacts from such developments.

5.2.1 Guidance

5.2.1.1 CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal

The 'CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine'[1] (the CIEEM Guidelines"), published by the Chartered Institute of Ecology and Environmental Management ("CIEEM"), are the acknowledged reference on ecological impact assessment and reflect the current thinking on good practice in ecological impact assessment across the UK and Ireland. They are consistent with the British Standard on Biodiversity, which provides recommendations on topics such as professional practice, proportionality, pre-application discussions, ecological surveys, adequacy of ecological information, reporting and monitoring. These CIEEM Guidelines have the endorsement of the Institute of Environmental Management and Assessment ("IEMA"), the Chartered Institute of Water and Environmental Management (CIWEM), Northern Ireland Department of the Environment (DoeNI), Scottish Natural Heritage (SNH), The Wildlife Trusts and other leading environmental organisations.

5.2.1.1.1 Guidelines for the information to be contained in Environmental Impact Assessment Reports

The Environmental Protection Agency (EPA) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports', which were published in 2022, were prepared in accordance with the 1992 Environmental Protection Agency Act (Section 72), which requires the EPA to prepare guidelines on information to be contained in environment impact assessment reports.

The Guidelines have been drafted with the primary objective of improving the quality of EIARs with a view to facilitating compliance with the EIA Directive (Directive 2014/52/EU). By doing so they contribute to a high level of protection for the environment through better

[1] CIEEM (2018 v 1.1) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester. Version 1.1. Updated September 2019 – Available online at: https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-Sept-2019.pdf (Accessed March 2023).

informed decision-making processes. They are written with a focus on the obligations of developers who are preparing EIARs.

The Guidelines are also intended to provide all parties in the EIA process, including competent authorities (CAs), with an authoritative reference to be regarded when considering an EIAR.

5.2.2 Desktop Analysis

A desktop analysis was carried out to collate available information on the ecological baseline of the proposed land-holding and surrounding area. Consultation was undertaken with current landowners as well as relevant statutory and non-statutory agencies. In addition to the above the following research was also undertaken:

- A review of the National Biodiversity Database Centre (NBDC) to identify the presence or otherwise of protected species occurring within close proximity to the proposed Site;
- A review of the NPWS online database to identify the presence or otherwise of designated conservation areas (i.e. Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Natural Heritage Areas (NHAs) etc.);
- A review of Site-specific Conservation Objectives (SSCO) mapping, published by the NPWS, for SACs and SPAs;
- A review of EPA water quality data, on-line mapping and catchment information;
- A review of relevant Inland Fisheries Ireland (IFI) reports;
- A review of the online Bat Conservation Ireland Batlas;
- A review of the New Atlas of the British and Irish Flora (Preston et al., 2002);
- Review of aerial photography, satellite imagery and historical mapping for the proposed Site.

5.2.3 Identification of Designated Areas

No element of the Site is located within a designated area[2] as such a Source-Pathway-Receptor Model is used to identify any designated area occurring within the potential zone of influence of the Project. The approach to the identification of SACs and SPAs occurring within the potential zone of influence of the Project is set out in the Screening Report for Appropriate Assessment that accompanies the planning application documentation for the proposed Letter Wind Farm. The approach to identifying NHAs within the potential zone of influence of the Project begins with the establishment of a long-list of these areas occurring

[2] For the purposes of this Chapter designated areas comprise SACs, SPAs, NHAs, pNHAs, National Parks & Nature Reserves.

within the surface water catchments in which the project is located. In terms of the SPR model and with respect to NHAs and pNHAs the hydrological pathway is used to represent the widest area over which a potential pathway could connect an NHA to the project. All NHAs occurring within the two surface water catchments in which the Project is located (i.e. the Sligo Bay and Upper Shannon catchment) are identified and then an examination of whether or not these areas are located within the project is undertaken. This examination is set out in **Section 5.3.2** below.

For pNHAs the approach to their identification was underpinned by establishing a 5km buffer around all elements of the Project and establishing a list of all pNHAs occurring in this area.

There are no National Parks or Nature Reserves occurring within the wider surrounding geographical area of the project and as such no further consideration is given to such areas in this Chapter.

5.2.4 Existing Ecological Records

The NPWS and NBDC were consulted in order to establish historic records of important and protected species, or the likelihood of their occurrence (through range information). Important and protected species includes those identified in the Wildlife Act (as amended), listed under the Flora Protection Order (FPO), and in the EU Habitats and Birds Directive.

Records for bird species are not included here and have been dealt with in **Chapter 7: Ornithology**.

NBDC collects and manages biodiversity data for the island of Ireland and incorporates data from a number of different sources. The NBDC records were reviewed to inform this assessment. An area of search was used to collate all records held for the proposed Development and a surrounding buffer area of 2km. A 2km distance was set as this buffer area will provide adequate coverage for all terrestrial non-volant mammal species, invertebrate species and flora species that may be sensitive to the proposed Development. For instance, terrestrial mammals' species are sensitive to proposed Development activities to a distance of c. 150m from the source of the activity (NRA, 2007). The area of search is shown on **Figure 5.1**. A wider search area was used to collate records for bat species in the surrounding area. All records for bat species held for the hectad S10 were explored. A

Data Information Request was issued to the NPWS for all protected species records occurring within the area of search shown on **Figure 5.1**.

5.2.5 Site Investigations

5.2.5.1 Habitat Surveys

Habitat surveys have been carried out at the proposed wind farm site between June 2020 and October 2023. Habitat surveys were carried out to identify, describe, map and evaluate habitats and to verify information gathered at the desk study stage. The habitat surveys were completed on the 24th & 25th June 2020; 9th & 10th September 2021; 9th September 2022; 15th February 2023; and 21st March 2023.

ArcGIS and ESRI Field Maps were used to collect information on vegetation and habitats during the initial Phase 1 Habitat Survey, which was completed on the 24th and 25th June 2021. A preliminary habitat map was drawn using ArcMap following the completion of the initial Phase 1 Habitat Survey. The preliminary habitat map was then further interrogated during subsequent habitat and vegetation community surveys as described below.

5.2.5.2 Vegetation Community Surveys

The Irish Vegetation Classification (IVC) has been developed as a collaboration between the NPWS, BEC Consultants and the NBDC over a series of phases commencing in 2015 when the vegetation community classification for the grassland division was completed along with the development of the ERICA[3] analysis tool and associated hosting website. Since 2015 community classifications have been completed for woodlands, heaths, bogs, fens, mires, rocky habitat as well as other community divisions.

The IVC now provides a comprehensive and systematic catalogue and description of the plant communities of Ireland. The IVC is a system of classifying natural plant communities in Ireland according to the species they contain and provides a standardised methodology for detailed environmental assessments. The methodology is repeatable and incorporates the use of quadrat and/or target note sampling within which the types and relative abundance of plant species is recorded. From these results, plant community types can be classified.

[3] ERICA - Engine for Releves to Irish Communities Assignment: https://biodiversityireland.shinyapps.io/vegetation-classification [Accessed: March 2023]

Detailed target note surveys to identify IVC plant communities and sub-communities were completed in areas of semi-natural habitat occurring within the project Site. These include:

- Peatland, wet heath and wet grassland habitats;

The study area covered by the IVC survey is shown in **Figure 5.2** and focused effort on the area within the wind farm Site layout. A digital camera was used to take representative photographs of the Site and vegetation communities. Vegetation recorded at each quadrat/target note location was analysed using ERICA software.

The target notes that were chosen to represent the range of plant communities found within and surrounding the proposed wind farm Site area are mapped in **Figure 5.2**. Due to the complexity of the Site, ground-truthing aerial imagery as well as the initial Phase 1 habitat Surveys were used in combination with the results of the IVC surveys to delineate habitat and community boundaries to enable mapping to be produced to the highest possible degree of accuracy.

Plant species were identified and recorded using the keys and nomenclature of Stace (2010) for higher plants and Atherton *et al*. (2010) for bryophytes (mosses and liverworts). IVC communities were recorded by taking detailed target notes of representative samples of vegetation communities. Each location was given a 'TN' number, as indicated in the table in **Appendix 5.1**. Plant species abundances were made using the DAFOR scale, as defined below.

DAFOR definitions, where applied, are as follows:

- Dominant
- Abundant
- Frequent
- Occasional
- Rare

5.2.5.3 Survey for Rare or Protected Flora

Whilst undertaking habitat and vegetation surveys particular attention was paid to searching suitable habitat for rare or protected flora species, to determine whether they were present within, or close to, the Development. Surveys were conducted during the optimum time of year for these species to occur, in order to assist in ascertaining their presence within, or close to the Site. It is noted that no FPO species were identified on the Site during the surveys completed between 2020 and 2023.

5.2.5.4 Terrestrial Mammal Surveys

A survey for field signs indicating the presence of terrestrial mammals and particularly otters was undertaken during the field surveys. This survey was undertaken during the daytime and particular attention was given to habitat features normally associated with otters and other protected terrestrial mammals. Any mammal field signs typical of otter activity were recorded during the surveys. These field signs, as described in Neal & Cheeseman (1996) and Bang & Dahlstrom (1990), include:

- mammal breeding and resting places, such as setts, holts, couches, lairs;
- pathways;
- prints;
- spraints and faecal deposits;
- latrines (and dung pits used as territorial markers);
- prey remains and feeding signs (snuffle holes);
- hair; and
- scratch marks

5.2.5.5 Bats

5.2.5.5.1 Bat Activity Surveys

Bat activity surveys were undertaken during the 2020 and 2022 bat activity seasons. The 2020 surveys have been informed by the NIEA NED (2021 & 2022) guidance document *Guidance on Bat Surveys, Assessment and Mitigation for Onshore Wind Turbine Developments in Northern Ireland;* the Scottish Natural Heritage (2019) guidance document Bats and Onshore Wind turbines – survey, assessment and mitigation; and Bat Conservation Trust (BCT) Guidelines (Hundt, 2012 & Collins, 2016). Extended automatic monitoring for bat activity has been undertaken during the spring, summer and autumn season of 2020. Additional surveys were completed during September 2023 bat activity season. Wildlife Acoustics SM4BAT FS and Song Metre Mini (full spectrum) remote bat detectors were used during the 2020 bat survey. All SM4BAT FS and Song Metre Mini detectors were set to record bat activity in full spectrum (at 192 kHz Stereo). SMX U2 microphones were used with the SM4BAT FS and Song Metre Mini recorders. Fresh branded batteries (e.g. Duracell; Panasonic) were used at the start of each monitoring session.

The bat monitoring surveys were completed in accordance with the NIEA Natural Environment Division guidelines "*Guidance on Bat Surveys, Assessment & Mitigation for*

Onshore Wind Turbine Developments – Version 1.1" August 2021 and May 2022. The monitoring surveys completed meet the requirements set out in these guidelines for the completion for monitoring at low-risk sites. The NIEA guidelines require a minimum of 10 nights monitoring per season to be completed at low-risk sites at each turbine for a wind farm of a size comprising 4 turbines. This would amount to a total of 30 nights monitoring during a bat activity season at each turbine. It is noted that bat activity monitoring was completed for greater than 10 nights during each season (see **Table 5.1**) and as such the monitoring completed meets and exceeds the recommendations set out in the NIEA guidelines.

All automatic bat detectors were mounted at least 2m above ground level. The location of each automatic monitoring point was positioned adjacent to the proposed turbine locations as shown on **Figure 5.3a & b.** Each detector was set to record nightly from 30 minutes before sunset and 30 minutes after sunrise.

Table 5.1 provides information on the monitoring completed during the 2022 bat activity season.

Table 5.1: Details of Automatic Monitoring

MP No.	Turbine No.	Dates	No Monitoring Nights	Season	Detector Type
T1	T1	10/04/2020 – 16/05/2020	37	Spring	SM4 Bat FS
		19/08/2020 – 31/08/2020	13	Summer	SM4 Bat FS
		10/09/2020 – 24/09/2020	15	Autumn	SM4 Bat FS
		09/09/2023 = 27/09/2023	19	Autumn	SM4 Bat FS
T2	T2	10/04/2020 – 16/05/2020	37	Spring	SM4 Bat FS
		19/08/2020 – 31/08/2020	13	Summer	SM4 Bat FS
		10/09/2020 – 24/09/2020	15	Autumn	SM4 Bat FS

MP No.	Turbine No.	Dates	No Monitoring Nights	Season	Detector Type
		09/09/2023 = 27/09/2023	19	Autumn	SM4 Bat FS
T3	T3	10/04/2020 – 16/05/2020	37	Spring	SM4 Bat FS
		19/08/2020 – 31/08/2020	13	Summer	SM4 Bat FS
		10/09/2020 – 22/09/2020	13	Autumn	SM4 Bat FS
		09/09/2023 = 10/09/2023	1	Autumn	SM4 Bat FS
T4	T4	10/04/2020 – 16/05/2020	37	Spring	Songmeter Mini Bat
		19/08/2020 – 31/08/2020	13	Summer	Songmeter Mini Bat
		10/09/2020 – 24/09/2020	15	Autumn	Songmeter Mini Bat
		09/09/2023 = 27/09/2023	19	Autumn	SM4 Bat FS

The habitats occurring at each of the monitoring points shown in **Figure 5.3a** are described in **Table 5.2** below.

Table 5.2: Description of Automatic Detector Locations

Habitat No.	Habitat	Habitat Category	Description
MP1	Conifer plantation edge	Edge	The microphone was mounted onto the top of a pole at a height of approximately 2.5m.
MP2	Conifer plantation edge/scrub	Edge	The microphone was mounted onto the top of a pole at a height of approximately 3m.

Habitat No.	Habitat	Habitat Category	Description
MP3	Upland cutover/degraded blanket bog	Open	The microphone was mounted onto the top of a pole at a height of approximately 3m.
MP4	Upland cutover/degraded blanket bog	Open	The microphone was mounted onto the top of a pole at a height of approximately 2.5m.

In addition to the automatic surveys, manual activity surveys have also been undertaken at the proposed wind farm. The manual surveys have been completed in accordance with the Bat Conservation Trust Guidelines for Onshore Wind Farms. Night-time manual activity surveys, involving foraging transects were completed at locations in the vicinity of the proposed turbines. Surveys were completed on the 16th May, 19th August and 24th September 2020. The transect used is shown on **Figure 5.3a.** Transect surveys commenced at sunset and took approximately 2 hours to complete.

An Echometer Pro and Petersson's D230 bat detector, featuring both heterodyne and frequency division was used during the manual transect surveys.

5.2.5.5.2 Bat Roost Surveys

One no. structure occurs within a 200m buffer zone of the proposed wind farm site. SNH (2019) guidelines for bat surveys at onshore wind farm sites recommend that all structures within this zone should be subject to investigation for their potential to function as bat roosts. The 1 no. structure occurring within this zone is comprised of a corrugated farm shed located to the south of the proposed wind farm site. The farm shed was examined for its potential to function as a roost site for bats.

Trees occurring within the project site were examined for their potential to function as tree roosts for bats. The examination was completed in line with the methods set out by Collins (2016). This involved examining trees within the site for the presence of preferred roost features (PRF).

5.2.5.6 Herpetofauna

Incidental records of herpetofauna were noted during all field surveys undertaken between 2019 and 2023.

5.2.5.7 Other Species

Incidental observations of other species such as terrestrial invertebrates were recorded during field surveys.

The prevalence of the marsh fritillary foodplant devil's-bit scabious *Succisa pratensis* is overall rare at the Site, with the only areas of potentially suitable habitat occurring in wet grassland habitat to the west and outside of the proposed wind farm footprint. Given the absence of suitable habitat occurring within the footprint of the proposed wind farm layout no dedicated surveys for marsh fritillary butterfly were completed.

5.2.5.8 Grid Connection Route Surveys

The grid connection route will be installed in the public road system and will entail 7 no. watercourse crossings of watercourses. The grid connection route and the 7 no. watercourses were surveyed during 27th and 28th September 2023.

5.2.5.9 Turbine Deliver Route Surveys

The haul route will be restricted to the existing public road corridor between Killybegs and the Site. It is proposed to provide road widening for turbine deliveries at 6 no. locations. A habitat survey of each of these locations was completed during surveys completed on the 27th and 28th September 2023. The Level 3 habitat occurring at these locations and the vegetation associated with these habitats was recorded during the surveys.

5.2.5.10 Limitations and Coverage

Limitations can arise during the course of ecological assessments. These limitations may be foreseen, whilst others will not present themselves until the assessment is underway. The limitations can be associated with methods, equipment and health and safety considerations.

Habitat surveys were completed throughout the year, during the optimum growing season as well as outside of the growing season. Habitat surveys were completed during optimum weather conditions, with low winds and dry and bright conditions prevailing.

Limitations noted during bat surveys, analysis and assessment include:
Difficulties inherent in assigning all bat calls to species level;

The sensitivity of bat detector equipment to the calls of different bat species, with calls of some species more easily detected (e.g Leisl'r's bat) that others (e.g. brown long-eared bat).

5.2.6 Impact Assessment Methodology

5.2.6.1 Establishing the Potential Zone of Influence (ZOI) of the Project

The 'zone of influence' for a development is the area over which ecological features may be subject to significant impacts as a result of the Project and associated activities. The Zone of Influence (ZoI), or distance over which a likely significant effect may occur will differ across the Ecological Receptors identified for the proposed Project, depending on the potential impact pathway(s). The results of both the desk study and the suite of ecological field surveys undertaken have established the habitats and species present at and surrounding the Site. The ZoI is then informed and defined by the sensitivities of each of the ecological receptors present, in conjunction with the nature and potential impacts associated with the Project.

The ZoI of the Project in relation to terrestrial habitats is generally limited to the footprint of the Project, and the immediate environs. Disturbances to the hydrological regime of wetland/aquatic habitats from impact sources can often result in impacts occurring at distances beyond the immediate adjacent areas of the impact source.

With regard to hydrological impacts, the distances over which aqueous pollutants are likely to remain at concentrations that have potential to result in perturbations to water quality and associated freshwater habitats is difficult to quantify. The potential for such effects to occur are also highly site-specific and related to the predicted magnitude of any pollution event. The impact of a pollution event will depend on the volumes of discharged waters, concentrations and types of pollutants (in the case of the proposed development these being comprised of sediment, hydrocarbons, cement-based products and other related construction solutions), volumes of receiving waters, and the sensitivity of the ecology of the receiving waters. With respect to the Project, this includes all freshwater habitat and ecological receptors downstream of the Project that have been identified as ecological receptors.

The ZoI for other terrestrial mammals in terms of potential impacts to breeding and resting places is 150m from the Development. This distance is in line with the maximum distance

for potential disturbance to terrestrial mammals (otters and badgers) as specified by TII guidance documentation (NRA, 2009 a & b).

The ZoI for herpetofauna is considered to be limited to the direct habitat loss arising from the Project.

5.2.6.2 Evaluating Ecological Features within the Zone of Influence

The nature conservation value of habitats and ecological sites occurring within the Site are based upon an established geographic hierarchy of importance as outlined by the National Roads Authority (NRA, 2009). The outline of this geographic hierarchy is provided below, and this has been used to determine ecological value in line with the ecological valuation examples provided by the NRA (see NRA, 2009). The geographic evaluation hierarchy is as follows:

- International Sites (Rating A)
- National Importance (Rating B)
- County Importance (Rating C)
- Local Importance (higher value) (Rating D)
- Local Importance (lower value) (Rating E)

Table 5.3: Geographic frame of reference used to determine value of ecological resources[4]

Importance	Criteria

International Importance (Rating A)	• 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
	• Proposed SpeciaL Protection Area (pSPA).
	• Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).
	• Features essential to maintaining the coherence of the Natura 2000 Network.
	• Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
	• Resident or regularly occurring populations (assessed to be important at the national level) of the following:
	  ○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or,
	  ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
	• Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
	• World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
	• Biosphere Reserve (UNESCO Man & The Biosphere Programme).
	• Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
	• Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
	• Biogenetic Reserve under the Council of Europe.
	• European Diploma Site under the Council of Europe.
	• Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).

National Importance (Rating B)	• Site designated or proposed as a Natural Heritage Area (NHA).
	• Statutory Nature Reserve.
	• Refuge for Fauna and Flora protected under the Wildlife Acts.
	• National Park.
	• Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
	• Resident or regularly occurring populations (assessed to be important at the national level) of the following:
	  • Species protected under the Wildlife Acts; and/or,
	  • Species listed on the relevant Red Data list.
	  • Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.

[4] Adapted from CIEEM 2018 v 1.1 - Available online at: https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-Sept-2019.pdf and NRA 2009 - Available at: http://www.tii.ie/technical-services/environment/planning/Guidelines-for-Assessment-of-Ecological-Impacts-of-National-Road-Schemes.pdf [Accessed March 2023].

Importance	Criteria

County Importance (Rating C)	• Area of Special Amenity.
	• Area subject to a Tree Preservation Order.
	• Area of High Amenity, or equivalent, designated under the County Development Plan.
	• Resident or regularly occurring populations (assessed to be important at the County level) of the following:
	  • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
	  • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
	  • Species protected under the Wildlife Acts; and/or
	  • Species listed on the relevant Red Data list.
	• Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
	• County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared.
	• Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
	• Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (Higher Value) (Rating D)	• Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared. • Resident or regularly occurring populations (assessed to be important at the Local level) of the following: • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; • Species protected under the Wildlife Acts; and/or • Species listed on the relevant Red Data list. • Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality. • Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (Lower Value) (Rating E)	• Sites containing small areas of semi-natural habitat that are of some local importance for wildlife. • Sites or features containing non-native species that is of some importance in maintaining habitat links.

The Ecological Receptors of the Development are those features which are within the ZoI and are evaluated as being of Local Importance or greater.

5.2.6.3 *Method for Assessing Potential Risk to Bats*

The NatureScot (2021) guidelines provide a method for assessing the overall risk of a wind farm development to bats. This overall risk is based on assessing the site level risk alongside the Ecobat/Kepel activity outputs recorded for each species during site surveys. The site level risk is based upon an evaluation of the project's size and the habitats occurring within the project site. Wind farm projects are ranked from small to medium to large in size. Habitat risk increases with an increase in the present of habitats known to be relied upon by bats. **Table 5.4** details the approach to calculating site level risk using the size of the project and the habitat risk present at the project site.

Table 5.4: Site Risk Assessment

Site Risk Level (1 – 5)*		Project Size		
		Small	Medium	Large
Habitat Risk	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5
Green (1-2) = lowest/low site risk Amber (3) = medium site risk Red (4 – 5) = high/highest site risk				
Habitat Risk	Description			
Low	Small number of potential roost features, of low quality. Low quality foraging habitat that could be used by small numbers of foraging bats. Isolated site not connected to the wider landscape by prominent linear features.			
Moderate	Buildings, trees or other structures with moderate-high potential as roost sites on or near the site. Habitat could be used extensively by foraging bats. Site is connected to the wider landscape by linear features such as scrub, tree lines and streams.			
High	Numerous suitable buildings, trees (particularly mature ancient woodland) or other structures with moderate-high potential as roost sites on or near the site, and/or confirmed roosts present close to or on the site. Extensive and diverse habitat mosaic of high quality for foraging bats. Site is connected to the wider landscape by a network			

Site Risk Level (1 – 5)*		Project Size		
		Small	Medium	Large
Habitat Risk	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5
	of strong linear features such as rivers, blocks of woodland and mature hedgerows. At/near edge of range and/or on an important flyway. Close to key roost and/or swarming site			
Project Size	Description			
Small	Small scale development (≤10 turbines). No other wind energy developments within 10km. Comprising turbines <50m in height			
Medium	Larger developments (between 10 and 40 turbines). May have some other wind developments within 5km. Comprising turbines 50-100m in height.			
Large	Largest developments (>40 turbines) with other wind energy developments within 5km. Comprising turbines >100m in height.			

Table 5.5 illustrates the approach to identifying the overall risk level to each bat species/genus recorded at the proposed wind farm site.

Table 5.5: Overall Risk Assessment

Site Risk	Ecobat Activity Category					
	Nil (0)	Low (1)	Low-moderate (2)	Moderate (3)	Moderate – high (4)	High (5)
Lowest (1)	0	1	2	3	4	5
Low (2)	0	2	4	6	8	10
Medium (3)	0	3	6	9	12	15
High (4)	0	4	8	12	16	20
Highest (5)	0	5	10	15	20	25

Green (0 -4) = Low Risk Amber (5 – 12)–= medium risk Red (15 - 25) = high risk

5.2.6.4 *Identification and Characterisation of Effects*

When describing the magnitude or scale of ecological impacts reference should be made to the following characteristics:

- Positive or negative
- Extent: the size of the affected area/habitat and/or the proportion of a population affected by the effect
- Duration: the period of time over which the impact will occur. The EPA's guidelines on information to be included in Environmental Impact Assessment Reports (EPA, 2022) sets out the following terms for defining the duration of an impact: Momentary Effects - effects lasting from seconds to minutes; Brief Effects - effects lasting less than a –ay; Temporary Effects - effects lasting less than a ye–r; Short-term Effects - effects lasting one to seven year–; Medium-term Effects - effects lasting seven to fifteen years; Long-term Effects - effects lasting fifteen to sixty years; Permanent Effects - effects lasting over sixty years.
- Frequency & Timing: how often the effect will occur; particularly in the context of relevant life-stages or seasons; and,
- Reversibility: will the effect be permanent or temporary. Will an impact reverse, either spontaneously or as a result of a specific action.

The assessment describes those characteristics relevant to understanding the ecological effect and determining the significance, and as such it does not need to incorporate all stated characteristics (CIEEM, 2018 v.1.1).

5.2.6.5 *Significant Effects on Important Ecological Features*

For the purpose of Ecological Impact Assessment, a 'significant effect', is an effect to an ecological feature from an impact, that either supports or undermines biodiversity conservation objectives for those ecological features which have been identified as important. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy). As such, effects can be considered significant in a wide range of geographic scales from international to local. Consequently, 'significant effects' should be qualified with reference to the appropriate geographic scale (CIEEM, 2018 v.1.1).

In order to predict likely ecological impacts and effects, the assessor must take account of the relevant aspects of the ecosystem structure and function, which include (CIEEM, 2018 v.1.1):

- The resources available (e.g. territory, prey availability, habitat connectivity etc.);
- Environmental processes (e.g. eutrophication, drought, flooding etc.);
- Ecological processes and relationships (e.g. population / vegetation dynamics, food webs etc.);
- Human influences (e.g. fertilisation, turbary, grazing, burning etc.);
- Historical context (natural range, trends etc.);
- Ecosystem properties (e.g. the carrying capacity, fragility etc.); as well as,
- Other environmental influences such as air quality, hydrology, water quality, nutrient inputs and salinity etc.

The determination of significance is made in line with the terminology set out in the EPA's guidelines on information to be included in Environmental Impact Assessment Reports.

These criteria are as follows:

- No change – no discernible change in the ecology of the affected feature–
- Imperceptible effect - An effect capable of measurement but without noticeable consequences
- Not Significant - An effect which causes noticeable changes in the character of the
- environment but without significant consequences.
- Slight effect - An effect which causes noticeable changes in the character of the
- environment without affecting its sensitivities.
- Moderate effect - An effect that alters the character of the environment that is consistent.
- with existing and emerging trenches.
- Significant effect - An effect which, by its character, its magnitude, duration or intensity alters.
- a sensitive aspect of the environment
- Very Significant - An effect which, by its character, magnitude, duration or intensity
- significantly alters most of a sensitive aspect of the environment.
- Profound effect - An effect which obliterates sensitive characteristics.

5.2.6.5.1 Integrity

The integrity of an ecological receptor refers to the coherence of the ecological structure and function that enables the ecological receptor to be sustained (NRA, 2009). The term 'integrity' is most often used when determining impact significance in relation to designated areas for nature conservation (e.g. SACs, SPAs or pNHA/NHAs) but can often be the most appropriate method to use for non-designated areas of biodiversity value where the component habitats and/or species exist with a defined ecosystem at a given geographic scale.

An impact on the integrity of an ecological site or ecosystem is considered to be significant if it moves the condition of the ecosystem away from a favourable condition: removing or changing the processes that support the sites' habitats and/or species; affect the nature, extent, structure and functioning of component habitats; and/or, affect the population size and viability of component species.

5.2.6.5.2 Conservation Status

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status.

As per the definitions provided in the EU Habitats Directive, the conservation status of a habitat is favourable when:

- Its natural range and areas it covers within that range are stable or increasing.
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.
- The conservation status of its typical species is favourable as defined below under species.

The conservation status of a species is favourable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

According to the TII/CIEEM methodology, if it is determined that the integrity and/or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur

(i.e. local, county, national, international). In some cases, an impact may not be significant at the geographic scale at which the ecological feature has been valued but may be significant at a lower geographical level. For example, a particular impact may not be considered likely to have a negative effect on the overall conservation status of a habitat which is considered to be internationally important. However, an impact may occur at a lower geographic scale on this internationally important habitat. Under such a scenario, such an impact on an internationally important habitat is considered to be significant only at the lower scale e.g. local, county, rather than international scale.

5.2.6.6 Assessment of Residual Effects

After characterising the potential impacts of the Project and assessing the potential effects of these impacts on the 'Important ecological features', mitigation measures are proposed to avoid and / or mitigate the identified ecological effects. Once measures to avoid and mitigate ecological effects have been finalised, assessment of the residual impacts and effects should be undertaken to determine the significance of their effects on the 'Important ecological features'.

5.2.6.7 Assessment of Cumulative Effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location (CIEEM, 2018 v.1.1). Different types of actions can cause cumulative impacts and effects. As such, these types of impacts may be characterised as;

- Additive/incremental – in which multiple activities/projects (each with potentially insignificant effects) add together to contribute to a significant effect due to their proximity in time and space (CIEEM, 2018 v.1.1); and,
- Associated/connected – a development activity 'enables' another development activity e.g. phased development as part of separate planning applications. Associated developments may include different aspects of the project which may be authorised under different consent processes. It is important to assess the potential impacts of the 'project' as a whole and not ignore impacts that fall under a separate consent process (CIEEM, 2018 v.1.1).

5.3 BASELINE DESCRIPTION

Baseline conditions represent a summary of the existing environment within the Site before the commencement of the Development. This section of the report provides information regarding these baseline conditions.

5.3.1 General Site Description

The proposed wind farm Project is located within a cutaway peatland landscape near the Corry Mountains, Co. Leitrim. The Site is located approximately 2.9km west of Drumkeeran Village, Co. Leitrim and approximately 21km southeast of Sligo Town. The Site is located within the townlands of Letter, Boleybaun and Stangaun. The proposed grid connection is located in the townlands of Letter, Greaghnadarragh, Stangaun, Corralustia, Turpaun, Gortnasillagh West, Lugmeeltan, Leckaun, Lisgavneen, Treannadullagh, Drumcashagh and Corderry.

Temporary works will be required to accommodate the delivery of the turbine components. These temporary works are not included as part of the planning application but are assessed a part of this EIAR and are located on the R263, N56, N15, N4, R285, and R280. The Site extends to c. 45ha and has a mixed use as both commercial forestry and upland grazing.

The closest inhabited dwelling (H3) is located 710m from the nearest turbine. There are 17 houses within 1.5km of the proposed turbines.

The Northern portion of the site is connected via partially existing and proposed new access tracks. The Southern portion of the site requires new access tracks which includes for connection to a substation at the site. The Site is characterised by relatively complex (hilly) topography with associated elevations ranging between c. 170 to 260 Metres above datum (mAOD). The site can be broken up into two sections, the north-western section is mostly forestry and has elevations around 250-260mAOD, the south-eastern section is mostly peatland and ranges from 170 – 240mAOD.

Landcover at the proposed Site is predominantly comprised of blanket peatlands, turbary, mature forestry and areas of improved and semi-improved grassland. Land cover exists along the Grid Connection Route (Corine 2018); 'land principally occupied by agriculture with natural vegetation', 'transitional woodland scrub', 'peat bogs'. The Turbine Delivery Route traverses the previously described land use as well as areas of 'discontinuous urban fabric', 'continuous urban fabric', 'pastures', 'beaches, sand dunes', 'intertidal flats', and 'industrial and commercial units'.

Land in the vicinity of the proposed Letter Wind Farm site is predominantly underlain by the Dergvone Shale Formation. Where blanket peat is absent the underlying mineral soils are consistent with tills derived from Namurian Shales.

The Site is characterised by a network of non-mapped natural and artificial drainage channels which are often found in forestry plantations and peat turbary areas. Commercial forestry inherently possesses extensive drainage networks. Historic peat cutting activities have left drains present on the site. These can be categorised as both non-mapped significant drains (which feed into the mapped river for example) and minor drains. While some drains were generally dry during site visits, the Site is considered to have a flashy regime with low permeability soils and standing water in some areas. A flashy regime is where intense rainfall periods will raise the levels of the rivers significantly as the groundwater recharge will reach capacity quickly.

The Letter Wind Farm Project and the southern part of the and Grid Connection Route are situated within the Upper Shannon Catchment (ID:26A; Area: 604.47km^2). The Northern part of the and Grid Connection Route is situated in the Sligo Bay Catchment (ID:35, Area: 1605.94km^2). The Turbine Delivery Route passes through the Donegal Bay North Catchment (ID:37, Area: 807km^2), the Erne Catchment (ID:36, Area: 3440.55km^2) the Sligo Bay Catchment (ID:35, Area: 1605.94km^2), the Upper Shannon Catchment (ID:26B, Area: 674.13km2), the Upper Shannon Catchment (ID:26; Area: 604.47km^2) near the red line boundary of the Site.

Surface water runoff associated with the Site drains into two sub catchments and/or three river sub basins, or three no. rivers, 1 no. lough:

- Sub Catchment: Owengar (Leitrim)_SC_10, River Sub Basins: Owengar (Leitrim)_SC_010 and Diffagher_10, Rivers: Owengar (Leirtim)_010, Owengar (Leitrim)_020, Diffagher_010

- Sub Catchment: Shannon Upper_SC_020; River Sub Basin: Shannon Upper_040, Lough: Lough Allen

All of the above sub-catchments are located within the Upper Shannon catchment (Catchment ID26A). The surface waters draining from the Site eventually combine into Lough Allen, from which waters eventually flow to the Upper Shannon, Lough Corry, Tap North and Lough Boderg, Lough Forbes, Lough Ree, the Lower Shannon, Lough Derg, and Shannon Estuary through to the mouth of the Shannon and into the South Western Atlantic Seaboard.

The WFD status (2016-2021) for surface water bodies / rivers and streams directly draining the Site range are Good.

5.3.2 Designated Areas

Table 5.6 below outlines the designated sites within the potential Zone of Influence of the Project (see also **Figure 5.4 to 5.8**; and the **NIS (DEC Ltd. 2023)**).

Table 5.6: Designated Areas

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
Special Area of Conservation (SAC)			
Lough Gill SAC (Site Code: 001976)	Natural eutrophic lakes with Magn–potamion or Hydrocharition - type vegetation [3150] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa and Fraxinus excelsior* (Alno-Padion, *Alnion incanae, Salicion albae*) [91E0] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	5.5km from the proposed grid connection route. 8.3km from the proposed wind farm site 11km from the nearest turbine delivery route widening location.	Yes, see Screening for Appropriate Assessment.

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
Cummeen Strand/Drumcliff Bay SAC (Site Code: 000627	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] Petrifying springs with tufa formation (*Cratoneurion*) [7220] *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra fluviatilis* (River Lamprey) [1099] *Phoca vitulina* (Harbour Seal) [1365]	20km from the proposed grid connection route 21.5km from the proposed wind farm site 25km from the nearest turbine delivery route widening location	Yes, see Screening for Appropriate Assessment.

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
Lough Forbes Complex SAC (Site Code: 001818)	Natural eutrophic lakes with Magn–potamion or Hydrocharition - type vegetation [3150] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae, Salicion albae*) [91E0]	45km from the proposed wind farm site and the proposed grid connection route. 34km from the nearest turbine delivery route widening location.	Yes, see Screening for Appropriate Assessment.
Lough Arrow SAC (Site Code: 001673)	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]	13.6km from the proposed wind farm site and the proposed grid connection route. 8.4km from the nearest turbine delivery route widening location.	No, see Screening for Appropriate Assessment.
Unshin River SAC (Site Code: 001898)	Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation [3260]	13.6km from the proposed wind farm site and the	Yes, see Screening for Appropriate Assessment.

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae, Salicion albae*) [91E0] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355	proposed grid connection route. 14km from the nearest turbine delivery route widening location.	
Bricklieve Mountains and Keishcorran SAC (Site Code: 001656)	Turloughs [3180] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510] Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii)* [8120] Euphydryas aurinia (*Marsh Fritillary*) [1065] Austropotamobius pallipes (*White-clawed Crayfish*) [1092]	12.2km from the nearest turbine delivery route widening location. 16.5km from the proposed wind farm site and the proposed grid connection route.	No, see Screening for Appropriate Assessment.

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
Boleybrack Mountains SAC (Site Code: 002032)	Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Blanket bogs (* if active bog) [7130]	4.7km from the proposed grid connection route. 7.4km from the proposed wind farm site. 5.4km from the nearest turbine delivery route widening location.	No, see Screening for Appropriate Assessment.
Cuilcagh - Anierin Uplands SAC (Site Code: 000584)	Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] Petrifying springs with tufa formation (*Cratoneurion*) [7220]	5.6km from the nearest turbine delivery route widening location. 13km from the proposed wind farm site and proposed grid connection route.	No, see Screening for Appropriate Assessment.

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
	Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) [8110] Siliceous rocky slopes with chasmophytic vegetation [8220] *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]		
Special Protection Aea (SPA)			
Cummeen Strand SPA (Site Code: 004035	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Oystercatcher (*Haematopus ostralegus*) [A130] Redshank *(Tringa totanus*) [A162] Wetland and Waterbirds [A999]	20km from the proposed grid connection route 21.5km from the proposed wind farm site 25km from the nearest turbine delivery route widening location	Yes, see Screening for Appropriate Assessment.
Ballykenny-Fisherstown Bog SPA (Site Code: 004101)	Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	45km from the proposed wind farm site and the proposed grid connection route.	No, see Screening for Appropriate Assessment.

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
		34km from the nearest turbine delivery route location.	
Natural Heritage Areas (NHAs)			
Corry Mountain Bog NHA (Site Code: 002321)	Peatlands	330m to the southwest of the wind farm site. 550m southwest of the proposed grid connection route. 2.5km from the nearest turbine delivery route location.	No potential for direct effects to this NHA as the project is located outside of this NHA. No connectivity occurs between the project and this NHA and the peatland habitats for which it is designated. This NHA is not located within the zone of influence of the project.
Carrane Hill Bog NHA (Site Code: 002415)	Peatlands	3.6km to the west of the proposed wind farm site. 3.8km to the west of the proposed grid connection route.	No potential for direct effects to this NHA as the project is located outside of this NHA. No connectivity occurs between the project and this NHA and the peatland habitats for which it is designated.

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
		6.8km to the west of the nearest turbine delivery route location.	This NHA is not located within the zone of influence of the project.
Kilronan Mountain Bog NHA (Site Code: 00617)	Peatlands	7.3km to the south of the proposed wind farm site 7.5km to the south of the proposed grid connection route 16km north of the nearest turbine delivery route location.	No potential for direct effects to this NHA as the project is located outside of this NHA. No connectivity occurs between the project and this NHA and the peatland habitats for which it is designated. This NHA is not located within the zone of influence of the project.
Dough/Thur Mountains NHA (Site Code: 002384)	Peatlands	18km from the proposed wind farm site 15km from the proposed grid connection route 16.5km from the nearest turbine delivery route location	No potential for direct effects to this NHA as the project is located outside of this NHA. No connectivity occurs between the project and this NHA and the peatland habitats for which it is designated.

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
			This NHA is not located within the zone of influence of the project.
Crockauns/Keelogyboy Bogs NHA (Site Code: 002435)	Peatlands	18km from the proposed wind farm site 13km from the proposed grid connection route 19km from the nearest turbine delivery route location	No potential for direct effects to this NHA as the project is located outside of this NHA. No connectivity occurs between the project and this NHA and the peatland habitats for which it is designated. This NHA is not located within the zone of influence of the project.
Slieveward Bog NHA (Site Code: 001902)	Peatlands	20km from the proposed wind farm site and the proposed grid connection route. 24km from the nearest turbine delivery route location	No potential for direct effects to this NHA as the project is located outside of this NHA. No connectivity occurs between the project and this NHA and the peatland habitats for which it is designated.

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
			This NHA is not located within the zone of influence of the project.
Cashel Bog (Leitrim) NHA (Site Code: 001405)	Peatlands	38km from the proposed wind farm site and the proposed grid connection route. 26km from the nearest turbine delivery route location	No potential for direct effects to this NHA as the project is located outside of this NHA. No connectivity occurs between the project and this NHA and the peatland habitats for which it is designated. This NHA is not located within the zone of influence of the project.
Corracramph Bog NHA (Site Code: 001420)	Peatlands	39km from the proposed wind farm site and the proposed grid connection route. 27km from the nearest turbine delivery route location	No potential for direct effects to this NHA as the project is located outside of this NHA. No connectivity occurs between the project and this NHA and the peatland habitats for which it is designated.

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
			This NHA is not located within the zone of influence of the project.
Rinn River NHA (Site Code: 000691)	Peatlands	39km from the proposed wind farm site and the proposed grid connection route. 27km from the nearest turbine delivery route location	No potential for direct effects to this NHA as the project is located outside of this NHA. No connectivity occurs between the project and this NHA and the peatland habitats for which it is designated. This NHA is not located within the zone of influence of the project.
Aghnamona Bog NHA (Site Code: 000422)	Peatland	41km from the proposed wind farm site and the proposed grid connection route. 29km from the nearest turbine delivery route location	No potential for direct effects to this NHA as the project is located outside of this NHA. No connectivity occurs between the project and this NHA and the peatland habitats for which it is designated.

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
			This NHA is not located within the zone of influence of the project.
Cloonageeher Bog NHA (Site Code: 001423)	Peatlands	43km from the proposed wind farm site and the proposed grid connection route. 31km from the nearest turbine delivery route location	No potential for direct effects to this NHA as the project is located outside of this NHA. No connectivity occurs between the project and this NHA and the peatland habitats for which it is designated. This NHA is not located within the zone of influence of the project.
Derrycanan Bog NHA (Site Code: 000605)	Peatlands	50km from the proposed wind farm site and the proposed grid connection route. 38km from the nearest turbine delivery route location	No potential for direct effects to this NHA as the project is located outside of this NHA. No connectivity occurs between the project and this NHA and the peatland habitats for which it is designated.

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
			This NHA is not located within the zone of influence of the project.
Mount Jessop Bog NHA (Site Code: 001450)	Peatlands	58km from the proposed wind farm site and the proposed grid connection route. 46km from the nearest turbine delivery route location	No potential for direct effects to this NHA as the project is located outside of this NHA. No connectivity occurs between the project and this NHA and the peatland habitats for which it is designated. This NHA is not located within the zone of influence of the project.
Proposed Natural Heritage Areas			
Lough Allen, South End and Parts	Woodland and Fringing Lake habitats	10km to the east of the proposed wind farm site and grid connection route 2km to the east of the nearest turbine delivery route location	No potential FOR direct effects to this pNHA as the project IS located outside of this pNHA. No connectivity occurs between the project and this pNHA and the woodland and fringing lake habitats for which it is designated.

Designated Areas	Qualifying Interests (QI's)	Approximate Distance (Km) (overland) from Site (at closest point)	Does the Designated Area occur within the zone of influence of the project
			This pNHA is not located within the zone of influence of the project.
Owengar Woods	Woodland habitats	50m to the south of the nearest turbine delivery route location. **Figure 5.8** shows the spatial relationship between the turbine delivery route locations No. 4, 5 and 6.	No potential FOR direct effects to this pNHA as the project IS located outside of this pNHA. This pNHAs is located in close proximity to the turbine delivery route locations no. 4, 5 and 6. Given the short distance buffering these elements of the project from this pNHA and following a precautionary approach it is considered to occur within the zone of influence of the project.

5.3.3 Desktop Study for Recorded Species

The results of the desk study are provided in **Table 5.7** below:

Table 5.7: Rare, threatened or protected Species Recorded within 2km of the Application Site (10 km for bat records)[5]

Species	Scientific Name	Habitats Dir. (Annex II / IV)	Birds Dir. (Annex I)	Wildlife Acts (as amended)	Red List Status	Flora Protection Order	Birds of Conservation Concern (2021– 2026)	Likelihood on the Site	Likelihood within 2km	Most recent record	Record Source
Mammals											
Otter	*Lutra lutra*	Y	-	Y	LC	-	-	3	1	2010	NBDC & NPWS
Badger	*Meles meles*	-	-	Y	LC	-	-	3	1	2018	NBDC & NPWS
Red Squirrel	*Sciurus vulgaris*	-	-	Y	LC	-	-	3	1	2015	NBDC
Irish hare	*Martes martes*	-	-	Y	LC	-	-	3	1	2021	NBDC
Irish stoat	*Cervus elaphus*	-	-	Y	LC	-	-	3	1	2015	NBDC
Hedgehog	*Erinaceus europaeus*	-	-	Y	LC	-	-	3	1	2013	NBDC
Pine Marten	*Martes martes*	-	-	Y	LC	-	-	3	1	2018	NBDC
Stoat	*Mustela erminea*	-	-	Y	LC	-	-	3	1	2005	NPWS
Red Squirrel	*Sciurus vulgaris*	-	-	Y	LC	-	-	3	1	2012	NBDC
Pygmy Shrew	*Sorex minutus*	-	-	Y	LC	-	-	3	1	2015	NBDC
Bats (within 10 km)											
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Y	-	Y	LC	-	-	3	1	2014	NBDC
Common Pipistrelle	*Pipistrellus pipistrellus*	Y	-	Y	LC	-	-	3	1	2009	NBDC
Daubenton's bat	*Myotis'daubentonii*	Y	-	Y	LC	-	-	3	1	2009	NBDC
Leisler's bat	*Nyctalus leisleri*	Y	-	Y	LC	-	-	3	1	2009	NBDC
Herpetofauna											
Common frog	*Rana temporaria*	-	-	Y	Vulnerable	-	-	2	1	2018	NBDC
Common lizard	*Zootoca vivipara*	-	-	Y	Vulnerable	-	-	2	1	2020	NBDC
Invertebrates											
Marsh fritillary	*Euphydryas aurinia*	Y	-	Y	Vulnerable	-	-	4	1	2014	NBDC
Plants											
Irish Lady's-tresses	*Spiranthes romanzoffiana*	-	-	Y	Vulnerable	-	-	3	1	2005	NPWS
Mudwort	*Limosella aquatica*	-	-	Y	Vulnerable	Y	-	4	1	2009	NPWS
Invasive Species											
Butterfly bush	*Buddleja davidii*	-	-	-	-	-	-	3	1	2017	NBDC
Rhododendron	*Rhododendron ponticum*	-	-	-	-	-	-	3	1	2018	NBDC

[5] (Sources: NPWS, NBDC & BCI databases) – Please note the below list is not an exhaustive species list for the area.

Species	Scientific Name	Habitats Dir. (Annex II / IV)	Birds Dir. (Annex I)	Wildlife Acts (as amended)	Red List Status	Flora Protection Order	Birds of Conservation Concern (2021– 2026)	Likelihood on the Site	Likelihood within 2km	Most recent record	Record Source
Cherry laural	*Prunus laurocerasus*	-	-	-	-	-	-	3	1	2004	NBDC
Japanese Knotweed	*Fallopia japonica*	-	-	-	-	-	-	3	1	2017	NBDC
Sycamore	*Acer pseudoplatanus*	-	-	-	-	-	-	1	1	2017	NBDC
Jenkin's spire snail	*Potamopyrgus antipodarum*	-	-	-	-	-	-	3	1	2012	NBDC

LC = Least Concern;; Key to likelihood of species presence: 1 = Confirmed; 2 = Likely; 3 = Possible; 4 = Unlikely

5.3.4 Article 17 habitats

Under Article 17 of the EU Habitats Directive Ireland is required to report to the European Commission every six years on the status of habitats and species listed in the Annexes of the Directive. The latest Article 17 Report prepared for Ireland were published by the NPWS in 2019. Article 17 Reports provide estimates for the area of Annex 1 habitats occurring in Ireland. This area calculation is based upon the overall area of these habitats occurring within the country, as mapped by the NPWS. As part of the Article 17 publication, the digital mapping dataset for the location of Annex 1 habitats has also been made publicly available. This dataset was reviewed to identify the presence of any area of Annex 1 habitat occurring within or adjacent to the Development that forms part of the current national area of these habitats. No examples of Annex 1 habitat that have been included in the national database of Article 17 Annex 1 habitat occur within the project site. The nearest examples of areas that has been included in the Article 17 database of Annex 1 habitat is blanket bog habitat occurring approximately 300m to the south of the Site's southern boundary and a strip of blanket bog habitat, associated with Coillte plantation, approximately 400m to the west of the project site. **Figure 5.9** shows the location of these areas of blanket bog with respect to the Site. Both examples are buffered by existing stands of conifer plantation and tracks or roads and are no connected to the project via any pathways.

5.3.5 Existing Ecological baseline

5.3.5.1 Designated sites with potential ecological/hydrological connections with the project

Designated Sites are referred to above in **Table 5.3.2**.

A NIS has been prepared for the Project (December, 2023) which assesses if the integrity of European Sites will be adversely affected. As such, this EIAR Chapter focusses on the potential for impacts upon National and Local Sites of Ecological Importance and does not reassess impacts upon European Sites. The findings of the NIS report are nonetheless referred to, as necessary, within this Chapter.

The European Sites occurring in the wider area surrounding the Project are shown on **Figure 5.4**.and **5.5.** Those European Sites that are hydrologically connected to the Project site are listed in **Table 5.4** above.

In addition to the European Sites identified in **Table 5.6** and examined further in the Natura Impact Statement, the Owengar Woods pNHA has also been identified as having potential ecological connections with the turbine delivery route widening locations no. 4, 5 and 6.

5.3.5.2 Habitats occurring at the proposed wind farm site

A description of the Level 3 Habitats, as per the Guide to Habitats in Ireland, occurring within the Site is provided below. The extent and distribution of these habitats within the Site are shown on **Figure 5.10**. A total of 13 habitats have been identified as occurring within the Site. These habitats are described in **Table 5.8** below.

Table 5.8: Primary Fossitt 2000 Habitat Communities recorded at the proposed wind farm site during surveys.

Fossitt 2000 Code (s)	Name of Fossitt 2000 Habitat Communities	Brief Description* *The brief descriptions below, are based on the Site Habitat Surveys – refer to the Guide for Habitats in Ireland (Fossitt, 2000) for further information regarding these Habitat Classifications.
FW1	Eroding Watercourse	A description of the eroding watercourses occurring within and adjacent to the proposed wind farm site is provided in **Chapter 6 Aquatic Ecology.**
FW4	Drainage ditches	Artificial drainage channels occur throughout the proposed wind farm site and are described further in **Chapter 6 Aquatic Ecology.**
HR1	Hedgerow	Hedgerows occur to the south of the proposed wind farm site within areas of grassland habitat. The hedgerows are a mix of gappy hedgerow to the north of the public road and more established and mature hedgerows to the south of the public road. The species occurring within the hedgerows include *Crataegus mongyna*, which is dominant, *Prunus spinosa, Fraxinus excelsior, Sambuca nigra, Salix aurita, Salix cinerea and Sorbus aucuparia.*
GS4	Wet grassland	The wet grassland habitats occur in areas of cut over peat where *Juncus effusus* is dominant and to the south of the fenceline that separates the areas of remaining peatland with grassland habitat.

Fossitt 2000 Code (s)	Name of Fossitt 2000 Habitat Communities	Brief Description* *The brief descriptions below, are based on the Site Habitat Surveys – refer to the Guide for Habitats in Ireland (Fossitt, 2000) for further information regarding these Habitat Classifications.
		The wet grassland to the south of the fenceline is dominated by *Juncus effusus* and is species-poor. Other grasses occurring in association within this habitat include *Anthoxanthum odoratum. Deschampsia flexuosa, Deschampsia cespitosa, Festuca ovina, Agrostis stolonifera, Agrostis capillaris* and *Holcus lanatus*. *Juncus acutiflorus* is also frequent in this habitat and becomes dominant in places.
GA1	Improved agricultural grassland	Improved agricultural grassland dominates the land cover within the proposed wind farm site boundary to the south. This habitat is nutrient enriched and intensively managed for livestock grazing and silage. Species indicative of high nutrient conditions in the habitat were noted throughout the land holding. These species include an abundance of *Lolium perenne, Holcus lanatus, Alopecurus pratensis, Ranunculus repens, R. acris, Trifolium repens, Trifolium pratense, Cirsium arvense, Cirsium vulgare* and *Urtica dioica*. Overall, the improved agricultural grassland is species-poor and widespread on a local to national scale. This habitat plays a limited function in supporting wildlife although it does provide foraging and dispersal habitat for badgers and can support a limited range of invertebrates.
WN6	Wet willow-alder-ash woodland	The example of wet willow-alder-ash woodland occurring within the Site is situated along a steep v-shaped valley of the upper Owengar River. The steep slopes are colonised by stands of *Salix cinerea, Salix aurita, Salix caprea, Alnus glutinosa and Sorbus acuparia.*
WD4	Conifer plantation	Conifer plantation occurs to the north of the Site at higher elevations and at the proposed turbine location T1 and T2. The conifer plantations occurring within and adjacent to the Site are of various ages (including semi-mature and mature stands, along with immature pre-canopy areas of both first and second rotation). Sitka spruce (*Picea sitchensis*) is the dominant species making up the stands of plantation within and adjacent to the Site.
WS1	Scrub	Scrub habitat occurs within the proposed wind farm site in the form of spreading *Ulex europeaus* and *Rubus fruticosus* agg., with *Salix aurita, Salix cinerea*, *Crataegus mongyna.*
HH3	Wet heath	A small area of wet heath habitat is located within the proposed wind farm site. It occurs on an area of thin peat and has been subject to past turbary activity. The sward supports species typical of wet heath vegetation such as *Calluna vulgaris, Vaccinium myrtillus, Juncus effusus, Eriophorum vaginatum, Narthecium ossifragum, Erica tetralix, Potentilla erecta, Hypnum jutlandicum, Hypnum cupressiforme, Hylocomium splendens, Sphagnum palustre* and *Sphagnum recurvum.*
PB2	Blanket bog	The remaining areas of uncut upland blanket bog habitat occurring within the proposed wind farm site are situated within gaps in conifer plantation to the north of the project site. These areas are underlain by deep peat. The sward is representative of a *Calluna vulgaris* dominated blanket bog. The blanket bog habitat generally occurs on relatively flat ground *Trichophorum germanicum, Erica tetralix, Eriophorum vaginatum* and *Eriophorum angustifolium* occur throughout. *Agrostis ovina, Deschampsia flexuosa,*

Fossitt 2000 Code (s)	Name of Fossitt 2000 Habitat Communities	Brief Description* *The brief descriptions below, are based on the Site Habitat Surveys – refer to the Guide for Habitats in Ireland (Fossitt, 2000) for further information regarding these Habitat Classifications.
		Carex echinata, Carex panicea, Narthecium ossifragum, Potentilla erecta and *Drosera rotundifolia* occur constantly. The bryophyte layer is dominated by *Sphagnum* species with *Sphagnum capillifolium, Sphagnum papillosum, Sphagnum palustre, Sphagnum denticulatum, Sphagnum subnitens* and *Sphagnum tenellum* occurring. Other frequently occurring bryophytes include *Pleurozia purpurea, Pleurozium schreberi, Racomitrium lanuginosum, Aulacomium palustre, Hypnum jutlandicum*, *Rhytidiadelphus loreus* and *Odontoschisma sphagni*.
PB4	Cutover blanket bog	Turbary activity has been undertaken throughout the remaining areas of peatland cover within the project site. Cells of cutover blanket bog where the surface acrotelm and underlying catotelm have been removed are apparent within the section of the site surrounding the proposed turbine T3 and to the north of the fenceline that divides the remaining area of peatland cover from grassland habitat to the south. The cutover blanket bog is comprised of a dense vegetation cover with *Calluna vulgaris*, *Molinia caerulea*, *Vaccinium myrtillus*, *Juncus effusus* representing the dominant species in the sward. Sphagnum mosses are present in the cutover blanket bog habitat and they include *Sphagnum recurvum, Sphagnum palustre, Sphagnum cuspidatum* and *Sphagnum auriculatum.*
PB4	Degraded Blanket bog	Areas of degraded blanket bog occurring within the proposed wind farm site are those areas that represent uncut banks of peatland that are fringed by cut cells of turbary. The degraded blanket bog is desiccated and is characterised by species-poor swards of leggy and over-mature *Calluna vulgaris.* The bryophyte layer is dominated by *Hypnum cupressiforme, Hypnum jutlandicum, Hylocomium splendens* and *Rhytidiadelphus loreus.*
BL3	Buildings and artificial surfaces	The examples of this habitat occurring within the Site is characterised by existing public roads, farm access tracks, farmyards and associated structures.
ED2	Spoil and bare ground	An area of spoil and bare ground habitat occurs along the northern bankside of the Owengar River to the south of the proposed turbine T2. This bankside is currently devoid of surface vegetation.

5.3.5.3 Habitats occur at the turbine delivery route widening locations

Temporary widening at 6 locations on the haul route to allow a load bearing surface will be provided as part of the EIA Project.

At the first and second widening area the existing R285 will be widened to the north side of the road. The habitats occurring here comprise improved agricultural grassland, amenity grassland and a box cut hedgerow dominated by *Crataegus mongyna.* A habitat map showing the habitats occurring at this temporary widening location is provided as **Figure 5.11**.

At the third temporary widening area the existing R285 will be widened to the south side of the regional road. The habitats occurring here comprise improved agricultural grassland, a field boundary hedgerow comprised of *Fraxinus excelsior, Crataegus monogyna, Prunus spinosa* and *Rubus fruticosus* agg., a drainage ditch, scrub, recolonising bare ground and buildings and artificial surfaces. A habitat map showing the habitats occurring this temporary widening location is provided as **Figure 5.12**. The Arigna River is located approximately 20m to the north of this widening location and is separated from it by the R280 regional road.

The fourth, fifth and sixth widening locations are situated along the west side of a minor local road that veers northwest off the R280 to the south Drumkeeran. The habitats occurring within these three widening locations comprises grassy verge. A habitat map showing the habitats occurring at this temporary widening location is provided as **Figure 5.13**.

5.3.5.4 Habitats occurring along the proposed grid connection route

The entire stretch of the grid connection route from the proposed wind farm site to the existing ESB substation at Corderry will be located within the footprint of existing public road corridors.

The habitat occurring along the cable route is entirely comprised of road surface which is representative of buildings and artificial surfaces (BL3).

5.3.6 Fauna

5.3.6.1 Bats

5.3.6.1.1 Scale of the project

The project size has been identified by examining the proposed wind farm against the project size criteria detailed in **Table 5.4** above. **Table 5.9** provides the details for evaluating the project size in the line with the criteria referenced in NatureScot Guidelines.

Table 5.9: Evaluation of the Project Size

Evaluation Criteria	Individual Criteria Project Size Representativeness	Overall Project Size
Small-scale development (less than 10 no. turbines)	Small	Medium

Other wind farm developments occur within 5km of the project	Medium	
The project comprises turbines >100m in height	Large	

5.3.6.1.2 Habitat Suitability Risk

The proposed wind farm is situated between an altitude of 170 to 260m and is located within open moorland and conifer plantation habitat. The upper Owengar River Valley forms the western boundary of the site. The river valley towards the south of the site where the steep v-shaped valley is covered with woodland habitat provides suitable foraging habitat for bats. The valley represents the best example of potential bat foraging habitat within the site.

The hedgerows within the grassland habitats to the south are of varying structure with some characterised by gappy and low heights (representative of low value habitat), others continuous but of low high and offering little shelter (representative of moderate value habitat) as well as hedgerow to the south of the local road which supports mature trees and continuous established hedgerow vegetation (high value habitat).

Figure 5.14 shows the lands occurring within and within a 200m buffer of the Site, classified according to their assigned bat habitat value. Overall, the site is identified as being of low risk due to the absence of roosting opportunities; and the presence (within a 200m radius of the rotor swept areas of the proposed turbine positions) of largely low-quality foraging habitat with the exception of some isolated habitat along the Owengar River valley.

Overall, the habitats occurring at the wind farm site are identified as being representative of low risk, as per the details described for such a site in **Table 5.4** above.

5.3.6.1.3 Potential Roost Sites

No structures occur within 200m of a proposed turbine location. One structure occurs within the Site. This is a large, corrugated farm shed located adjacent to the public road to the south of the site. The shed is of low potential to function as a roost site for bats. Inspections of the shed did not reveal the presence of roosting bats at this structure.

The trees occurring within the proposed Site are thin stemmed conifers associated with conifer plantation or willows, alder, hawthorn and blackthorns associated with woodland and hedgerows. These trees are of low potential to function as roosts for bats and are not likely to support PRFs.

5.3.6.1.4 Manual Activity Surveys

Manual bat activity surveys were completed along transects within the Site. The transects were completed along a route within the Site that included the location of the four wind turbines.

During the manual transects in the vicinity of all turbines, bat activity was very low during all transects with only a low number of Common pipistrelle, Soprano pipistrelle and Leisler's bat being recorded.

5.3.6.1.5 Automatic Surveys

5.3.6.1.5.1 2020 Surveys

Static detector surveys were completed during the 2020 bat activity season. As detailed in **Section 5.2** above Wildlife Acoustics static bat detectors were installed at each of the four turbine locations during the spring, summer and autumn seasons of the 2020 bat activity season.

Nightly monitoring was completed at all four static detectors (one at each proposed turbine location) during the spring, summer and autumn 2020. Monitoring during the 2020 season significantly exceeds the recommended monitoring effort for a proposed 4-turbine wind farm at a low value site. The requirement for such a site is 30 nights of monitoring during the season with 10 nights being completed during spring, summer and autumn. A minimum of 63 nights surveying was completed at each turbine location during the 2020 bat activity season. A total of 258 monitoring nights was completed at the wind farm site during the 2020 activity season.

The following bat species were recorded during the automatic static bat detector surveys during the 2020 summer session:

- Myotis species;
- Leisler's bat;
- Soprano pipistrelle;
- Common pipistrelle;
- Nathusius pipistrelle;
- Brown long-eared bat

The total number of bat passes recorded during monitoring are presented in **Table 5.10** below while **Table 5.11** presents the number of bat passes recorded at each monitoring

point during each of the seasonal monitoring sessions. As can be seen in **Table 5.10** and **Table 5.11** activity was dominated by Common pipistrelle, which accounted for approximately 70% of all activity recorded. Leisler's bat and Soprano pipistrelle accounted for approximately 12% each of all activity recorded, while Nathusius pipistrelle, Myotis species and brown long-eared bat accounted for the remaining circa 6% of activity.

Table 5.10: Total No. Passes/Species Recorded during 2020 Bat Activity Surveys

Species	Passes (No.)	Percentage of Total (%)
Leisler's bat	1,142	12.23
Soprano pipistrelle	1,124	12.04
Common pipistrelle	6,531	69.96
Myotis species	144	1.54
Brown long-eared bat	162	1.74
Nathusius pipistrelle	232	2.49
Total	**9,335**	**100**

Table 5.11: Total No. Bat Passes Recorded at Each Monitoring Point

Season	Turbine	MYOSPP	NYCLEI	PIPNAT	PIPPIP	PIPPYG	PLEAUR	Totals
Spring	T1	19	119	96	2,384	45	4	2,667
	T2	11	136	79	1,289	56	4	1,575
	T3	8	49	5	67	21	1	151
	T4	6	56	2	43	35	1	143
Summer	T1	2	9	1	24	27	0	63
	T2	12	49	8	385	76	10	540
	T3	2	79	1	26	20	2	130
	T4	28	12	0	25	14	9	88
Autumn	T1	6	80	12	329	130	7	564
	T2	14	311	15	1,158	264	7	1,769
	T3	2	210	7	663	355	111	1,348
	T4	34	32	6	138	81	6	297

MYOSPP = Myotis species; NYCLEI = Leisler's bat; PIPNAT = Nathusius pipistrelle; PIPPIP = Common pipistrelle; PIPPYG = Soprano pipistrelle; PLEAUR = brown long-eared bat

The number of bat passes recorded per hour provides a metric against which activity levels can be assigned. Kepel (2011) has assigned the number of passes per hour to three activity categories. These activity categories are as follows:

- Pipistrelle species and Leisler's bat: Low = <3.5 passes per hour; Moderate = 3.6 – 6.5 passes per hour; High = >6.5 passes per hour;
- All Other Bat species: Low = <4.0 passes per hour; Moderate 4.1 to 10 passes per hour; High = >10 passes per hour.

The median bat species pass per hour per night for each of the monitoring sessions at each monitoring point/turbine has been used to assign bat activity levels in line with the Kepel approach. As per Lintott & Matthews (2018) median bat pass per hour per night is used during this analysis as it is recognised as providing a more accurate representation of activity, as bat activity levels between nights can be highly variable and thus the median provides a more reliable value than the mean or maximum. In addition, given the high variability of bat activity between nights the data set is unlikely to be normally distributed, therefore the median is the most appropriate metric to use when quantifying bat activity. The median bat species pass per hour per night for each species for all nights (including nights when bats were absent) for each recording session was calculated. **Table 5.12** lists the median bat pass per hour per night for each species and assigns each median value to a bat activity category following the Kepel approach described above.

As can be seen on **Table 5.12** below the median bat activity levels recorded were consistently low during monitoring.

A spatial distribution in the levels of activity recorded is also presented by the monitoring data. The proposed turbines T1 to T2 are located at higher elevation but within conifer plantation where sheltered forestry edge and firebreaks etc. occur. In contrast turbines T3 to T4 are located at slightly lower elevations but in an exposed and open landscape. Approximately 86% (8,029 passes) of all bat passes recorded during the automatic monitoring was recorded at the monitoring locations of T1 to T2. This activity was underpinned by higher levels of Common pipistrelle during spring and autumn at the T1 and T2 monitoring locations.

Table 5.12: Activity Categorisation of Median Bat Passes per Hour as per Kepel (2011): Kepel Activity Categories – Green = Low; Amber = Moderate

Season	MP No.	MYOSPP	NYCLEI	PIPNAT	PIPPIP	PIPPYG	PLEAUR
Spring	MP1	0.00	0.10	0.00	0.30	0.00	0.00
	MP2	0.00	0.11	0.00	0.25	0.00	0.00
	MP3	0.00	0.00	0.00	0.00	0.00	0.00
	MP4	0.00	0.00	0.00	0.00	0.00	0.00
Summer	MP1	0.00	0.00	0.00	0.00	0.00	0.00
	MP2	0.00	0.00	0.00	0.25	0.00	0.00
	MP3	0.00	0.00	0.00	0.00	0.00	0.00
	MP4	0.00	0.00	0.00	0.13	0.00	0.00
Autumn	MP1	0.00	0.11	0.00	1.00	0.56	0.00
	MP2	0.11	0.22	0.00	3.78	0.44	0.00
	MP3	0.00	0.00	0.00	1.56	0.56	0.00
	MP4	0.22	0.11	0.00	0.67	0.44	0.00

Table 5.13: Summary of Seasonal Bat Activity Levels per Species and Overall Activity Levels during the 2020 Bat Activity Season

Species	Season	Overall Activity Level
Leisler's bat	Spring	Low
	Summer	Low
	Autumn	Low
	Overall	**Low**
Common pipistrelle	Spring	Low
	Summer	Low
	Autumn	Low
	Overall	**Low**
Soprano pipistrelle	Spring	Low
	Summer	Low
	Autumn	Low
	Overall	**Low**
Nathusius pipistrelle	Spring	Low
	Summer	Low
	Autumn	Low
	Overall	**Low**
Myotis Species	Spring	Low
	Summer	Low
	Autumn	Low
	Overall	**Low**
Brown long-eared	Spring	Low
	Summer	Low
	Autumn	Low
	Overall	**Low**

5.3.6.1.5.2 2023 Surveys

Static detector surveys were completed during the 2023 early autumn season. As detailed in **Section 5.2** above, Wildlife Acoustics static bat detectors were installed at each of the four turbine locations during the spring, summer and autumn seasons of the 2020 bat activity season.

Nightly monitoring was completed at all four static detectors (one at each proposed turbine location) during the autumn 2020. Monitoring during the 2023 autumn season was completed for 19 consecutive nights at the proposed turbine location T1, T2, and T4. Monitoring at the proposed turbine T3 was completed for 1 night. No data was recorded after the initial night of monitoring at this location, indicating a failure of the bat detector.

The following bat species were recorded during the automatic static bat detector surveys during the 2023 autumn session:

- Myotis species;
- Leisler's bat;
- Soprano pipistrelle;
- Common pipistrelle;
- Nathusius pipistrelle;
- Brown long-eared bat

The total number of bat passes recorded during monitoring are presented in **Table 5.14** below while **Table 5.15** presents the number of bat passes recorded at each monitoring point during each of the seasonal monitoring sessions. As can be seen in **Table 5.14** and **Table 5.15** activity was dominated by Common pipistrelle, which accounted for approximately 86% of all activity recorded. Of the total 2,607 Common pipistrelle passes recorded, 2,562 (or 84%) were recorded at the proposed turbine T1 monitoring location.

Soprano pipistrelle followed by Leisler's bat and Myotis species accounted for approximately 13% of all activity recorded, while brown long-eared bat accounted for the remaining circa 1% of activity.

Table 5.14: Total No. Passes/Species Recorded during 2023 Bat Activity Surveys

Species	Passes (No.)	Percentage of Total (%)
Leisler's bat	81	2.67
Soprano pipistrelle	221	7.25
Common pipistrelle	2,607	85.95
Myotis species	83	2.74
Brown long-eared bat	42	1.38
Nathusius pipistrelle	0	0.00
Total	**3,034**	**100.00**

Table 5.15: Total No. Bat Passes Recorded at Each Monitoring Point

Season	Turbine	MYOSPP	NYCLEI	PIPNAT	PIPPIP	PIPPYG	PLEAUR	Totals
Autumn	T1	43	7	0	2,562	190	10	2,812
	T2	7	10	0	31	15	4	67
	T3	0	0	0	0	1	0	1
	T4	33	64	0	14	15	28	154

Table 5.16 lists the median bat pass per hour per night for each species and assigns each median value to a bat activity category following the Kepel approach described above.

As can be seen on **Table 5.16** and **Table 5.17** below the median bat activity levels recorded were consistently low during monitoring. Aside from the Common pipistrelle activity recorded at the proposed turbine T1 monitoring location for 7 of the 19 monitoring nights, all activity levels recorded were low. The seven nights of higher Common pipistrelle activity levels recorded at the T1 monitoring location accounted for approximately 80% of the total number of bat passes recorded.

Table 5.16: Activity Categorisation of Median Bat Passes per Hour as per Kepel (2011): Kepel Activity Categories – Green = Low; Amber = Moderate

Season	MP No.	MYOSPP	NYCLEI	PIPNAT	PIPPIP	PIPPYG	PLEAUR
Autumn	MP1	0.00	0.00	0.00	2.00	0.33	0.00
	MP2	0.00	0.00	0.00	0.00	0.00	0.00
	MP3	0.00	0.00	0.00	0.00	0.00	0.00
	MP4	0.00	0.00	0.00	0.00	0.00	0.00

Table 5.17: Summary of Seasonal Bat Activity Levels per Species and Overall Activity Levels during the 2023 Autumn Bat Activity Season

Species	Season	Overall Activity Level
Leisler's bat	Autumn	Low
Common pipistrelle	Autumn	Low
Soprano pipistrelle	Autumn	Low
Nathusius pipistrelle	Autumn	Low
Myotis species	Autumn	Low
brown long-eared bat	Autumn	Low

5.3.6.1.6 Summary of Site Value for the local bat population

No bat roosts occur within or in the immediate vicinity of the Site. The overall distribution of bat activity at and in the vicinity of the Letter Wind Farm site was recorded within sheltered areas closely associated with the structured vegetated habitat provided by the forestry

edges in the vicinity of the proposed turbine T1 and T2. There was a significant decrease in the use of more exposed and elevated areas by all bat species. The results of the activity surveys are consistent with established knowledge of bat habitat associations. Bat activity has consistently been shown to reduce at greater distances from structured vegetation and the majority of bat species occurring in Ireland and the UK are closely associated linear habitats and woodlands (Frey-Ehrenbold et al. 2013; Boughey et al. 2011; Downs & Racey, 2006; Russ & Montgomery, 2002; Verboom & Spoelstra, 1999; Robinson and Stebbings, 1997; Walsh & Harris, 1996; Entwistle et al. 1996; Limpins and Kapteyn, 1991). While certain species of bats such as Leisler's bats (N. Leisleri) are known to forage and commute over open ground (Bat Conservation Trust, 2007), the elevated nature and high wind exposure within much of the site is likely to restrict such species foraging throughout the site. The results of the activity surveys support this assumption with low levels of bat activity dominating bat activity trends during monitoring. The avoidance of such areas has been suggested by Russ & Montgomery (2002) who studied the habitat association of bat species in Northern Ireland and reported that open habitat features such as upland unimproved grassland and bogs are avoided by bats. A similar study, carried out in the UK, concluded that bats "strongly" avoid moorland habitats (Walsh & Harris, 1996).

It is also noted that exposure to wind can have significant effects on bats by reducing their manoeuvrability and increasing their "flight costs" (Norberg, 1990). Several other studies have reported an impact of wind on commuting and foraging bat species (Arnett *et al*, 2008; Russ *et al*, 2003; Verboom & Huitema, 1997; Blake *et al*., 1994). During a study of bats in Northeast Scotland Racey *et al* (1987) reported that bats did not emerge from roosts during periods of hostile weather conditions of high winds, rain and sleet. Verboom and Spoelstra (1999) showed that Common pipistrelles relied on the presence of tree lines during periods of high wind with an increase in the number of bats commuting on the leeward side of tree lines during high wind conditions. In light of the location and habitats associated with the proposed Letter Wind Farm site and the low levels of bat activity that dominated the findings of the bat monitoring undertaken during the 2020 season it is considered that the wind farm site supports low numbers of foraging bats and is of local importance for the surrounding bat population.

In terms of site risk, as per **Table 5.4** the Project has been identified as a medium scale wind farm project. This is based on the number of proposed turbines being 4 (i.e. less than 10), the presence of other wind farms in the 10km surrounding area and the size of the turbines associated with the project, which are greater than 100m in height.

The habitat risk at the proposed wind farm site have been identified as low based on the absence of roost features and the dominance of low-quality habitats that could be used by a small number of foraging bats and the isolated nature of the site with an absence of linear habitat connections to the wider landscape.

Based on the medium scale of the Project and the low habitat risk the proposed wind farm site has been identified as having a low site risk (risk level of 2 as per the NatureScot (2021) guidelines) for bats.

5.3.6.2 Terrestrial mammals

The main channel of the Owengar River downstream of the Site is known to support otters and suitable habitat for otters occurs throughout this watercourse downstream of the proposed wind farm site.

No evidence indicating the presence of otters, their holts or couches were observed along the stretch of the Owengar River that bounds the proposed wind farm site or 200m downstream of the proposed wind farm site. Similarly, no evidence indicating the presence of otters, their holts or couches was recorded at or in the immediate vicinity (i.e. 150m upstream and downstream of the 7 no. watercourse crossings along the proposed grid connection route.

No badgers or their setts were observed during field surveys within the proposed wind farm site. All hedgerows occurring within a 50m buffer zone of the proposed wind farm access track were searched for the presence of a badger sett entrance and none were recorded.

Evidence of rabbit was recorded in agricultural lands to the south of the proposed wind farm site. A fox was observed scavenging within the peatland habitats of the site in the vicinity of the proposed T4 location. No evidence of other mammal species such as pine marten, Irish stoat, red squirrel, hedgehog, and pygmy shrew were recorded during surveys. However, these species are likely to occur in the surrounding area.

5.3.6.3 Herpetofauna

Common frog (*Rana temporaria*) was frequently recorded within the proposed wind farm site. The blanket bog and wet grassland habitats occurring within the proposed development site provide suitable breeding habitat for common frog. Common lizard or smooth newt were not recorded during field surveys. However, the peatland habitats of the

proposed wind farm site provide suitable habitat for both these species, and they are likely to occur within, and surrounding the Site.

5.3.6.4 *Terrestrial Invertebrates*

The foodplant of the marsh fritillary butterfly is rare to absent across the proposed wind farm site and as such the site is considered to be unsuitable for supporting colonies of this species.

The small heath butterfly was recorded within the peatland habitats during field surveys. Other species observed include orange tip, small tortoiseshell, common blue, green-veined white, meadow brown, ringlet and small white.

5.3.6.5 *Invasive Alien Species (IAS)*

No IAS were recorded at the proposed wind farm site, along the proposed grid connection route or at the turbine delivery route widening locations during field surveys.

5.4 ASSESSMENT OF POTENTIAL EFFECTS

5.4.1 Identification & Evaluation of Ecological Receptors

Table 5.18 below lists and evaluates the ecological features identified as occurring within the ZoI of the project and identifies those which are considered to be ecological receptors following the methodology previously described within **Section 5.2.**

Table 5.78: Evaluation of Ecological Features Identified at and surrounding the Development

Ecological Feature	Evaluation	Ecological Receptor?
National and Local Designated Sites		
European Sites	The 5 no. European Sites occurring within the zone of influence of the project are of international importance for nature conservation. They support a range of freshwater, coastal and woodland Annex 1 habitats and also supports internationally important populations of Atlantic salmon, lamprey species and otters all of which occur downstream of the proposed development site. They also support a other species such as white-clawed crayfish.	Yes – International Importance (Rating A). Assessment of this ecological feature is provided in the NIS for the Development.

Ecological Feature	Evaluation	Ecological Receptor?
Owengar Woods pNHA	The Owengar Wood pNHA is of national conservation importance given that it is listed as a pNHA. It has been identified as occurring within the potential zone of influence of the project owing to its proximity to the turbine delivery route widening locations no. 4, 5 and 6.	Yes – National Importance (Rating B).
Habitats		
Hedgerow	The dry heath habitat occurring within the wind farm site comprises vegetation communities that are representative of the Annex 1 habitat European Dry Heath (4030).	Yes - National Importance (Rating B)
Wet heath	The wet heath habitat occurring within the wind farm site is located in areas of previous turbary activity where shallow peat substrate of c. 0.5m or less remain. The vegetation comprises a community that is typical of Annex 1 habitat Northern Atlantic Wet heath with *Erica tetralix* (4010). The presence of this habitat in previously modified peatland limits the naturalness of this example of wet heath and its overall representativeness of an example of Annex 1 wet heath habitat	Yes – County Importance (Rating C)
Blanket bog	The blanket bog occurring within the project site is representative of active blanket bog which is representative of the priority habitat Active blanket bog* (7130). As such this habitat is of international importance.	Yes - International Importance (Rating A)
Blanket bog - cutover	The examples of degraded/cutover blanket bog occurring within the project site are examples of the Annex 1 habitat blanket bog (7130). However, they are examples of disturbed blanket bog habitat that are not in favourable conservation condition. Nevertheless, they do support a typical suite of blanket bog species and with the implementation of appropriate land management measures have the potential to be restored to blanket bog condition.	Yes - County Importance (Rating C)
Blanket bog - degraded	The examples of degraded/cutover blanket bog occurring within the project site are	Yes - County Importance (Rating C)

Ecological Feature	Evaluation	Ecological Receptor?
	examples of the Annex 1 habitat blanket bog (7130). However, they are examples of disturbed blanket bog habitat that are not in favourable conservation condition. Nevertheless, they do support a typical suite of blanket bog species and with the implementation of appropriate land management measures have the potential to be restored to blanket bog condition.	
Wet grassland	The wet grassland habitat occurring within the proposed wind farm site are generally species poor being dominated by stands of *Juncus effusus*. However, they provide cover and habitat for fauna species and are therefore considered to be of local value.	Yes - Local importance (higher value) (Rating D)
Improved agricultural grassland	This is an intensively management habitat that supports low flora diversity and is of low value for fauna.	No - Local importance (lower value) (Rating E)
Wet willow-alder-ash woodland	The wet willow-alder-ash woodland habitat occurring within the Site provides shelter and foraging habitat for a range of fauna.	Yes – Local importance (higher value) (Rating D)
Conifer plantation	Conifer plantation is located within the wind farm site with the proposed turbines T1 and T2 being located within this habitat. This is an artificial and modified habitat of low biodiversity value.	No - Local importance (lower value) (Rating E)
Scrub	The scrub habitat occurring within the Site provides shelter and foraging habitat for a range of fauna.	Yes – Local importance (higher value) (Rating D)
Buildings and artificial surfaces	The examples of this habitat occurring within the Site is characterised by existing public roads, farm access tracks, farm yards and associated structures.	No - Local importance (lower value) (Rating E)
Spoil & bare ground	Minor areas of recolonising bare ground occur within the Development site in areas of previously disturbed agricultural lands.	No - Local importance (lower value) (Rating E)
Species		
Otters	While no otter resting places or signs of foraging otters were observed during field surveys along the first order streams draining the proposed wind farm site. Further downstream from the proposed	Yes - local importance (higher value) (Rating D)

Ecological Feature	Evaluation	Ecological Receptor?
	wind farm site the Owengar River is known to support otters. Based on the absence of otter records within the site, the low number of otter records in the wider study area and the low suitability of the aquatic habitats to support fish species, otter has been assessed as of Local Importance (Higher value).	
Bats	All bat species in Ireland are protected under national and European legislation. At least 5 species of bats were recorded at the proposed wind farm site during bat monitoring surveys.	Yes - local importance (higher value) (Rating D)
Badgers	Whilst not recorded during field surveys, the habitats within the proposed wind farm site provide suitable habitat for this species and, following a precautionary approach, this species is included as an ecological receptor.	Yes - local importance (higher value) (Rating D)
Red squirrel	Whilst not recorded during field surveys, the habitats within the proposed wind farm site provide suitable habitat for this species and, following a precautionary approach, this species is included as an ecological receptor.	Yes - local importance (higher value) (Rating D)
Irish hare	Whilst not recorded during field surveys, the habitats within the proposed wind farm site provide suitable habitat for this species and, following a precautionary approach, this species is included as an ecological receptor.	Yes - local importance (higher value) (Rating D)
Irish stoat	Whilst not recorded during field surveys, the habitats within the proposed wind farm site provide suitable habitat for this species and, following a precautionary approach, this species is included as an ecological receptor.	Yes - local importance (higher value) (Rating D)
Hedgehog	Whilst not recorded during field surveys, the habitats within the proposed wind farm site provide suitable habitat for this species and, following a precautionary approach, this species is included as an ecological receptor.	Yes - local importance (higher value) (Rating D)

Ecological Feature	Evaluation	Ecological Receptor?
Pygmy Shrew	Whilst not recorded during field surveys, the habitats within the proposed wind farm site provide suitable habitat for this species and, following a precautionary approach, this species is included as an ecological receptor.	Yes - local importance (higher value) (Rating D)
Herpetofauna	Common frog were encountered within the commonage area of the proposed wind farm site. The Site also provides suitable habitat for common lizard and smooth newt.	Yes - local importance (higher value) (Rating D)
Invertebrates	Other species of local importance are likely to be supported by the Site.	Yes - local importance (higher value) (Rating D)
Marsh fritillary	The nearest record for this species is approximately 8km to the southwest of the project site. Stands of *Succisa pratensis* occur in association with wet grassland habitat to the west of the proposed wind farm site within the commonage area at Broemountain. No suitable marsh fritillary habitat has been identified as occurring within the proposed development footprint.	N/A - no suitable habitat present in the proposed development footprint.
Non-native invasive species	No IAS were recorded at the proposed wind farm site, along the proposed grid connection route or at the turbine delivery route widening locations.	N/A – potential for spread of this non-native invasive species

5.4.2 Do Nothing Scenario

Land use activities at the Site comprise livestock grazing in the form of sheep and cattle grazing and forestry in the form of conifer plantation.

The grassland occurring within the proposed wind farm site are intensively managed and subject to high levels of livestock grazing as well as nutrient application. These lands will continue to be used for intensive agricultural purposes in line with current agricultural policies for the use of productive farmlands. The conifer plantation is managed as a commercial forest. This forest will continue to be managed as a commercial forest with harvesting occurring on maturation of the stock followed by replanting. The rotation of harvesting and replanting is likely to continue to occur in these areas of commercial forestry.

Artificial drainage, associated with past turbary activity will continue to direct surface water away from the proposed wind farm site with resultant water loss from remaining peatland habitats.

5.4.3 Construction & Decommissioning Phase potential Effects

The construction phase will involve disturbance to existing vegetation during the construction activities. This will be largely in the form of excavation and removal of habitats to facilitate the construction of the wind farm site infrastructure comprising the site. Access Tracks, hardstand areas and turbine foundations and substations. A section of electrical cable will be undergrounded within the proposed Access Track. Vegetation clearance and minor excavations will also be required for temporary infrastructure required for the construction phase of the Project. The temporary construction phase infrastructure comprises the Temporary Construction Compound, blade set-down areas, and assembly areas.

The provision of the electrical cable will result in excavations along the public road corridor between the proposed wind farm site and the substation at Corderry.

The turbine delivery route from Killybegs to the proposed wind farm site will require temporary widening at six locations to allow a load bearing surface.

5.4.3.1 Direct Effects

Potential sources of direct impacts during the construction phase include:

- Clearance of vegetation, soil and peat substrate and rock for the construction of the Site infrastructure as listed above;
- Creation of temporary infrastructure within the Site as listed above;
- Deposition of spoil material arising from infrastructure works; and
- Access by construction equipment, including access away from the proposed infrastructure location (compaction and other damage).

Estimates of habitat loss are provided within **Tables 5.14** below.

5.4.3.1.1 Potential Direct Effects on Designated Areas

No elements of the Project are located within the boundary of any European Sites, NHAs or pNHAs. There will be no direct effects, in terms of direct habitat loss, damage or disturbance on any designated conservation area as a result of the construction phase of the Project; the provision of the grid connection cable along the public road between the

wind farm site and the 110kV substation at Corderry; or the provision of the turbine delivery route widening locations.

5.4.3.1.2 Potential Direct Effects on habitats

Direct Effects Arising from the Proposed Wind Farm Site

Loss and disturbance of habitats will be the principal adverse ecological effect of this Project. The installation of the wind turbines and associated infrastructure will result in direct and permanent habitat loss under the footprint of the proposed wind farm.

The temporary construction infrastructure elements associated with the wind farm will result in direct and temporary habitat loss under the footprint of the wind farm.

Direct habitat loss during the construction stage of the Project will occur under the footprint of each of the wind farm infrastructure elements comprising turbines and their hardstands; access tracks, access track upgrades; areas of cut and fill for access track, substation and battery storage area.

Table 5.19 which follows, provides an assessment of the significance of habitat loss to habitats occurring within the footprint of the Project. The total loss of habitat, in square meters, is provided in **Table 5.19** and a summary list of the elements of the Project infrastructure that will result in this loss is also provided.

Table 5.89: Assessment of Estimated Habitat Loss at the Site

Habitat	Area under footprint (m^2)	% of Habitat under footprint of the proposed wind farm	Annex 1 Habitat	Significance of habitat loss
Permanent Habitat Loss				
Blanket bog - Cutover	3,797	9	Blanket bog 7130	The cutover blanket bog habitat has been evaluated at county importance (Rating C). This habitat has been subject to inappropriate turbary in the past and extensive area of cutover blanket bog occur in the wider area surrounding the proposed development site. As such the loss of approximately 9% of the extent of this habitat to the footprint of the proposed wind farm will represent a significant impact to the integrity of this habitat within the wind farm site and at the local scale. This impact will be irreversible and permanent. Mitigation measures, including habitat management measures will be implemented to offset the loss of cutover blanket bog and this impact.
Blanket bog - Degraded	1,307	4	Blanket bog 7130	The degraded blanket bog habitat has been evaluated at county importance (Rating C). This habitat has been subject to inappropriate turbary in the past and extensive area of degraded blanket bog occur in the wider area surrounding the proposed project site. As such the loss of approximately 4% of the extent of this habitat to the footprint of the wind farm site will represent a significant impact to the integrity of this habitat within the wind farm site and at the local scale. This impact will be irreversible and permanent. Mitigation measures, including habitat management measures will be implemented to offset the loss of cutover blanket bog and this impact.
Scrub	1,666	13	-	The Development will result in a minor loss in the area of scrub habitat occurring at the site entrance and along the proposed Access Track. The extent of scrub occurring within the Site is minor due to the predominance of peatland habitats. As such the loss of minor areas of scrub habitat will amount to approximately 11% of the area of this habitat occurring within the Site. While the extent of this habitat is limited within the Site it occurs widely in the wider area surrounding the Site and the minor loss of this habitat to the wind farm footprint will not undermine the extent and integrity of this habitat occurring in the surrounding

Habitat	Area under footprint (m^2)	% of Habitat under footprint of the proposed wind farm	Annex 1 Habitat	Significance of habitat loss
				locality. As such the Development will not result in a significant effect to the conservation status of this habitat at the local scale.
Wet grassland	4,214	5	-	The proposed wind farm will result in the loss of wet grassland. This habitat is evaluated at local importance (higher value). The stands of wet grassland occurring under the permanent footprint of the wind farm layout is species-poor *Juncus effusus*-dominated wet grassland in areas of previous cutover peatland or subject to current agricultural management. The proposed development will result in a small loss of this habitat occurring within the overall wind farm site and given that this habitat is widespread in the wider surrounding area, the loss of wet grassland will represent a slight negative effect at the local scale.
Temporary Habitat Loss				
Blanket bog - Cutover	2089	5	Blanket bog 7130	The cutover blanket bog habitat has been evaluated at county importance (Rating C). This habitat has been subject to inappropriate turbary in the past and extensive area of cutover blanket bog occur in the wider area surrounding the proposed development site. As such the loss of approximately 5% of the extent of this habitat to the temporary footprint of the proposed wind farm will represent a significant impact to the integrity of this habitat within the wind farm site and at the local scale. This impact will be a reversible effect over the short to medium term before habitat management measures associated with the project are expected to result in re-establishment of blanket bog vegetation community.
Blanket bog - Degraded	2083	7	Blanket bog 7130	The degraded blanket bog habitat has been evaluated at county importance (Rating C). This habitat has been subject to inappropriate turbary in the past and extensive area of degraded blanket bog occur in the wider area surrounding the proposed project site. As such the loss of approximately 7% of the extent of this habitat to the temporary footprint of the wind farm site will represent a significant impact to the integrity of this habitat within the wind farm site and at the local scale. This impact will be a reversible effect over the short to medium term before habitat management measures associated with the project are expected to result in re-establishment of blanket bog vegetation community.
Wet heath	85	2	North Atlantic Wet Heath 4010	The wet heath habitat has been evaluated at county importance (Rating C). This habitat has colonised an area that has been subject to inappropriate turbary in the past and extensive area of similar wet heath habitat occur in the wider area surrounding the proposed project site. As such the loss of approximately 2% of the extent of this habitat to the temporary footprint of the

Habitat	Area under footprint (m^2)	% of Habitat under footprint of the proposed wind farm	Annex 1 Habitat	Significance of habitat loss
				wind farm site, within the wind farm site, will represent a slight impact to the integrity of this habitat within the wind farm site and at the local scale. This impact will be a reversible effect over the short to medium term before habitat management measures associated with the project are expected to result in re-establishment of blanket bog vegetation community.
Wet grassland	455	0.5	-	The proposed wind farm will result in the loss of wet grassland. This habitat is evaluated at local importance (higher value). The stands of wet grassland occurring under the temporary footprint of the wind farm layout is species-poor *Juncus effusus*-dominated wet grassland in areas of previous cutover peatland or subject to current agricultural management. The proposed development will result in a negligible loss of this habitat occurring within the overall wind farm site and given that this habitat is widespread in the wider surrounding area, the loss of wet grassland will represent a slight negative effect at the local scale.

Direct Effects Arising from the Turbine Delivery Route Widening Locations

The turbine delivery route widening locations will result in the provision of six road widenings along its route. The widening at these locations will result in the loss of roadside verge, improved agricultural grassland, hedgerows and the resurfacing of existing made ground. These existing habitats are of low nature conservation value (Rating E) and have not been identified as ecological receptors. The temporary loss of these features will not result in significant negative biodiversity impacts.

Direct Effects Arising from the Proposed Grid Connection Route

The proposed Grid Connection Route will be restricted to the existing public road corridor, which does not support any ecological receptors identified for the project. The installation of the Grid Connection cable ducting will not require any instream works as the cable will cross watercourses through installation in the formation of existing bridge and culvert watercourse crossings.

5.4.3.1.3 Potential Direct Effects on Bats

Potential direct effects on bats during the Construction and Decommissioning Phase relate to the direct loss of or disturbance to roost sites. Given that works associated with the proposed wind farm Development do not propose to demolish any structures and will not result in the loss of any trees that have been identified to be of roost potential for bats, there will be no potential for direct habitat loss to bats and their roost sites.

The bridges and culverts that will be used for the crossing of watercourses along the grid connection route are of low potential to function as bat roosts and works associated with the installation of the electrical cable within the formation of these structures will not present a risk of disturbance to roosting bats.

5.4.3.1.4 Potential Direct Effects on non-volant mammals

Potential direct impacts on Otters from construction works are associated with the loss of or damage to holts and couches or the abandonment of these breeding/resting sites as a result of ongoing disturbance. As detailed in **Section 5.3.6.2**, no holts, couches or field signs indicating the presence of an otter breeding/resting site were recorded within the Site during field surveys. Given the absence of such features there will be no potential for the construction phase of the Project to result in significant negative effects to otters.

Potential direct impacts on badgers and other non-volant mammals from construction works are associated with the loss of or damage to setts and breeding/resting places of other non-volant mammals, the abandonment of these breeding/resting sites as a result of ongoing disturbance and the potential for the loss of foraging habitat for these species. As detailed in **Section 5.3.6.2,** no setts, breeding or resting places of badger or other protected non-volant mammals were recorded within the project site during field surveys. Given the absence of such features there will be no potential for the construction phase of the project to result in significant negative effects to badgers and other non-volant mammals by way of loss of or disturbance to their breeding/resting places.

The construction phase will result in the loss of vegetation ground cover which will cause loss of potential foraging and commuting/shelter habitat for badgers and other protected non-volant mammals. The loss of such potential habitat for non-volant mammals will represent a permanent negative impact of slight significance at the local scale.

5.4.3.1.5 Potential Direct Effects on Herpetofauna

Potential direct impacts to common frog, smooth newt and common lizard during the construction works will be limited to direct mortality during vegetation clearance, excavations and spoil deposition works particularly in wet grassland and peatland habitats. As detailed in **Section 5.3.6.3**, common frogs were recorded during surveys within the peatland habitats of the proposed wind farm site. The population at the proposed wind farm is considered to be of Local (Higher) Importance (Rating D). The nature of the proposed Site means that they have the potential to occur immediately adjacent to the existing infrastructure.

Potential impacts to herpetofauna can vary depending on the time of year, with destruction of hibernacula (locations being used for winter hibernation) being a particular concern. Hibernacula need to be frost-free, humid and safe from predators and flooding (Baker et al., 2011). Such areas can include bunds and rocky areas, notably when these occur within slightly drier habitats such as dry heath. In light of the above it is considered that, in the absence of mitigation measures, there is potential for significant temporary impacts to herpetofauna at the local level. Mitigation proposals in this respect are provided in **Section 5.5** below.

5.4.3.1.6 Potential Direct Effects on Terrestrial Invertebrates

The loss of habitats to the footprint of the proposed wind farm will result in the loss of terrestrial invertebrate habitat and therefore reduce the abundance and potentially the

diversity of this group. The impact of the proposed Development to terrestrial invertebrates will be at the local scale and restricted to local populations occurring at the Site.

Impacts on terrestrial invertebrates are considered temporary moderate negative where infrastructure is reinstated post construction e.g. proposed site compound, temporary construction areas. Impacts on terrestrial invertebrate habitat are assessed as permanent moderate negative where infrastructure remains post construction.

5.4.3.1.7 Potential Direct Effects on Notable Flora

No notable flora species were identified as occurring within the footprint of the Project and as such there will be no potential for the direct loss of such species.

5.4.3.1.8 Potential Direct Effects Arising from the Spread of Invasive Alien Species

Fraga, et al. (2008) have identified a link between wind farms and the spread of IAS in upland habitats. No IAS have been identified as occurring within the Project. Notwithstanding this, in the absence of appropriate bio-security measures construction works will present a risk of the spread of such species in the event that plant, machinery or personnel act as vectors for the introduction of IAS to areas of works. Bio-security measures that aim to eliminate the potential for the introduction and spread of IAS during the construction and/or decommissioning phase are set out in **Section 5.5** below.

5.4.3.2 Indirect Effects

5.4.3.2.1 Potential Indirect Effects on Designated Areas

The designated conservation areas that have been identified as occurring within the zone of influence of the Project and representative of key biodiversity features are:

- Lough Gill SAC;
- Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC
- Lough Forbes SAC
- Unshin River SAC
- Cummeen Strand SPA

The potential for indirect impacts to these designated conservation areas have been examined within the Screening Report for Appropriate Assessment and the NIS prepared for the Project.

The Screening Report for Appropriate Assessment for the Project concluded that it cannot be excluded, on the basis of objective information, that the Project, individually or in

combination with other plans or projects, will not have a significant effect on these European Sites.

As such, an Appropriate Assessment is required for the proposed development and an NIS has been prepared to assist the competent authority during the completion of its Appropriate Assessment.

The NIS for the Project has concluded that in light of the best scientific knowledge in the field, the Project, alone or in-combination with other plans or projects will not result in adverse impacts to the integrity of relevant European Sites and associated/overlapping pNHAs provided all mitigation measures set out in the NIS are implemented in full. These mitigation measures have been evaluated for their effectiveness to remove the potential for adverse effects to European Sites. These measures have been found to represent effective safeguards. These findings have been reached in the absence of reasonable scientific doubt and it is concluded that the Project will not adversely affect the integrity of the relevant European Sites examined.

The Owengar Woods pNHA has been identified as occurring within the zone of influence of the Project owing to its proximity to the turbine delivery route widening locations no. 4, 5 and 6. It is noted that there are no hydrological pathways connecting these widening locations to this pNHA. No surface water feature drains from the widening locations to the pNHA and given that the topography at the widening locations falls to the south and west away from the pNHA there will be no potential for overland surface water runoff from the widening locations to the pNHA.

The widening locations are situated along an existing road and is buffered from the pNHA by existing residential dwellings. Given that the works associated with the widening locations will be temporary nature that will be akin to road maintenance works and the existing sources of human activity at these locations, the potential for works to result in noise disturbance effects to fauna associated with this pNHA is considered to be imperceptible.

The works associated with the widening locations will have the potential to result in the generation of dust, where works are undertaken during dry conditions. Guidance outlined by Holman *et al.* (2014), provides a risk assessment for ecological impacts arising from dust deposition. Designated Areas, for which pNHAs are included, are ranked as highly sensitive sites and the risk to high sensitive sites ranges from high (at less than 20m from source)

and medium (at less than 50m from source), while low risks, representative of insignificant and de-minimis effects, arise at distances greater than 50m from source. Given that the pNHA is located within 50m of the widening locations there will be, under a worst case scenario, the potential for dust emissions to the pNHA and associated impacts of dust deposition to woodland vegetation. Mitigation measures are set out in **Section 5.5** below that aim to minimise to an imperceptible level the potential for dust emissions and associated impacts to the pNHA.

5.4.3.2.2 Potential Indirect Effects on habitats

Peatland habitats are representative of wetland habitats and are sensitive to changes in the hydrological regime that underpin the status of these habitats. Drainage of peatland habitats, by increasing outflow, reduces the water stored in peat. The water table of intact blanket bog is generally at or near the surface. For instance, Murphy (2008) noted that water tables of intact blanket bog are generally within 5cm of the surface, while the water levels of drained bogs were generally more than 30cm below the surface. The drainage of peatlands can result in the lowering of the otherwise high-water table, an increase in the depth of the aerated and non-peat forming layer with an associated increase of peat oxidation. The new hydrological conditions created by drainage can in turn promote vegetational changes (Fraga et al., 2008). Drained peatlands have a lower frequency or abundance of peat forming vegetation such as *Sphagnum* and *Eriophorum* species (Shepherd et al., 2013). Numerous studies have investigated the effects of water down from surrounding peat bog as a result of drainage ditches and gullies. A review of such studies was undertaken by Nayak *et al*. (2008) which summarised the extent of drainage around sites of disturbance to be confined to a distance of 1.5m to 50m. Allot *et al*. (2009) showed that the zone of drawdown extends 2m into the peatland from the edges of gullies and that gully depth did not affect the zone of water draw down. It is noted that in the Allot study gully depths were between 1.5 and 3m deep, which is similar to the peat depths recorded under the footprint of the wind farm layout.

Holden *et al*. (2011) recorded blanket bog water tables at their lowest nearest drains but found that the water table increased rapidly over 2m either side of the drain. The findings of the Holden et al. study are consistent with that of Allot (2009) indicating that bog water table levels recovered within a short distance of the drain.

However, Lindsay (2010, 2014) suggests that the commonly held view that the effects of drainage are restricted to within a narrow band of disturbance adjacent to drainage features does not take into account responses to drainage such as peat consolidation, compression

and oxidation/decomposition. The impact of these processes is dependent on the existing condition of the peatland. In areas of intact and active bog, the impact can be significant. Lindsay (2005, 2014) asserts that the effects of drawdown on acrotelmic peat forming vegetation in such intact and active blanket bogs can be up to 200m from the site of disturbance.

These more wide-ranging impacts arise as a result of primary consolidation (over the short-term) and secondary compressions and oxidation (over the longer term). These short-term and long-term processes as shown on **Plate 5.1** below.

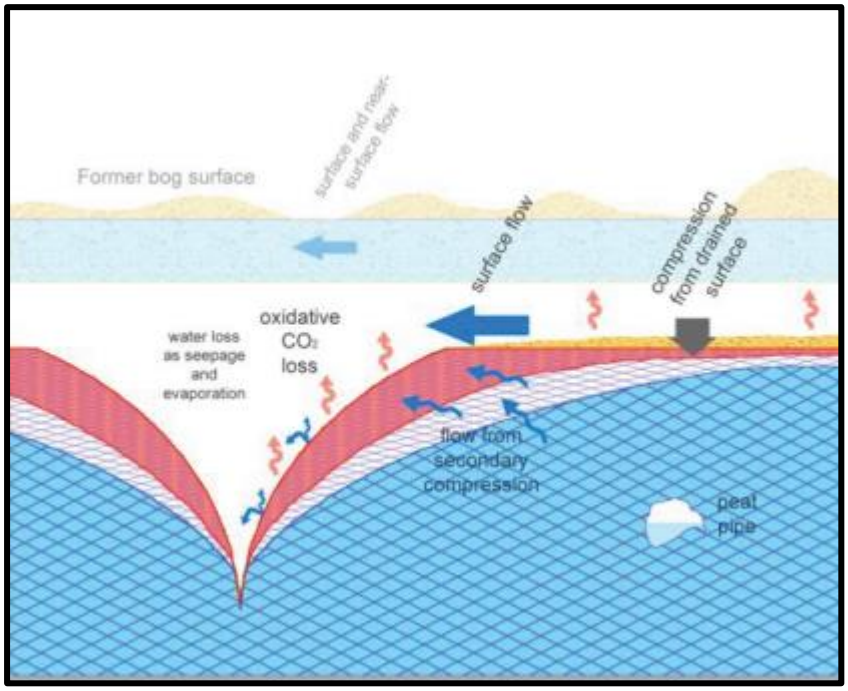

Plate 5.1: Impacts of Drainage to Bogs (reference Lindsay et al. 2014)

As noted above the existing condition of the peatland represents a significant factor when considering the potential for indirect peatland disturbance such as consolidation, compression and oxidation/decomposition. Given that the peatland habitats occurring within the wind farm site have been subject to past disturbance and changes to the underlying hydrological regime through forestry mounding and drainage in the north of the site and turbary cutting and artificial drainage in the southern unplanted areas of peatland, the potential for such wide-ranging effects to occur is considered to be limited. In contrast to intact and active blanket bog, in areas of already drained blanket bog, such as at the wind farm site, where hydrological disturbance has occurred in the past the peat will already be consolidated and compressed, and the impact of additional drainage will be reduced. It is noted that the examples of blanket bog habitat occurring at and surrounding the proposed

turbine T3 and T4 and the peat substrate underlying the proposed turbine T1 and T2 within conifer plantation is representative of modified blanket bog where the effects of past drainage have already undermined the hydrological regime. In view of this it is considered that the potential for indirect disturbance to peatland will be restricted to areas immediately adjacent to the proposed wind farm infrastructure, at distance similar to those found by Allot *et al.* (2009) and Holden *et al.* (2011).

5.4.3.2.3 Potential Indirect Effects on Bats

Potential indirect effects on bats relate to the loss of habitat that may be used bats for foraging or commuting.

Given the absence of roost sites for bats occurring at or surrounding the proposed wind farm site there will be no potential for the Construction and Decommissioning Phase to result in the loss of roosting habitat for bat species.

The construction phase will have the potential to result in changes to commuting or foraging routes through the removal of conifer plantation and the alternation of forestry edge habitat.

5.4.3.2.4 Potential Indirect Effects on non-volant mammals

The main pressure affecting otters in Ireland is pollution, particularly from organic pollution resulting in fish kills and accidental deaths as a result of road traffic and fishing gear (NPWS, 2019b). The NPWS also list diffuse and point source pollution of freshwaters as a likely indirect impact to otters through changes in prey abundance. However, the NPWS conclude that these threats are considered to produce local impacts only and are not of significance for the national otter population. Nevertheless, such impacts have the potential to be of local significance in the context of a population supported by an SAC river catchment. As such in the event of pollution, arising from construction activities to suitable otter foraging habitat downstream of the project, the potential will exist for indirect impacts to the conservation status of otters associated with the Lough Gill SAC and the Unshin River SAC, by way of reductions in the abundance of prey species.

Given that no breeding/resting sites for badgers or other non-volant mammals were recorded within or in the vicinity of the proposed Development there will be no potential for significant indirect disturbance to badgers and other non-volant mammals during the construction phase.

Other potential negative impacts to badgers during the construction phase of the proposed Project include:

- The exposure of badgers to polluting substances such as chemicals, fuels and cement-based products; and
- The entrapment of badgers within excavation areas.

Without the implementation of appropriate construction practices these impacts will have the potential to negatively affect badgers occupying the sett adjacent to the Site. **Section 5.5** below provides measures to ensure that disturbance associated with the sustained presence of humans is avoided.

5.4.3.2.5 Potential Indirect Effects on Herpetofauna

Potential indirect effects on common frog, smooth newt and common lizard during the Construction and Decommissioning Phase are generally considered to be those associated with disturbance. However, although these species are easily disturbed when approached, the impact of disturbance is not considered likely to carry over a significant distance. As noted in **Section 5.4.3.1.5** above these species are considered to be sensitive to impacts associated with the direct loss of habitat to the footprint of the wind farm site. The proposed works will be undertaken from the temporary infrastructure provided for the construction phase and from the existing wind farm infrastructure during the decommissioning phase. Suitable habitat for these species will extend into the wider area, ensuring that there is sufficient habitat remaining to support these species in an undisturbed state. Given the limited likely effective disturbance distance for these species and the extensive area of suitable habitat for them in the wider area the potential indirect effects on these species during the construction phase are not considered to be significant.

5.4.3.2.6 Potential Indirect Effects on Terrestrial Invertebrates

Potential indirect effects on terrestrial invertebrates during the Construction and Decommissioning Phase will relate to effects associated with disturbance. Whilst terrestrial invertebrates are easily disturbed when approached, the impact of disturbance is not considered likely to carry over a significant distance. As noted in **Section 5.4.3.1.6** above these species are considered to be sensitive to impacts associated with the direct loss of habitat to the footprint of the wind farm site. The proposed works will be undertaken from the temporary infrastructure provided for the construction phase and from the existing wind farm infrastructure during the decommissioning phase. Suitable habitat for terrestrial invertebrates will extend into the wider area, ensuring that there is sufficient habitat remaining to support these species in an undisturbed state. Given the limited likely effective disturbance distance for these species and the extensive area of suitable habitat for them

in the wider area the potential indirect effects on terrestrial invertebrates during the construction phase are not considered to be significant.

5.4.3.2.7 Potential Indirect Effects Notable Flora

No notable flora species were identified as occurring within the footprint of the project site and as such there will be no potential for the indirect effect to such species.

5.4.3.3 Cumulative effects during the construction and/or decommissioning phase

Past land use practices have resulted in negative impacts to peatland habitats within and adjacent to the wind farm site. Turbary and agricultural activity have resulted in damage and/or disturbance to peatland and grassland habitats. The presence of extensive forestry to the north of the wind farm site has also resulted in the conversion of peatland habitats and the loss of areas of blanket bog.

In the absence of future habitat management measures the proposed wind farm will have the potential to combine with these historical land use activities to result in further loss of peatland habitats within the proposed wind farm site. In addition, the risks to receiving waterbodies posed by the wind farm will also have the potential to combine with existing land use activities such as forestry plantation and intensive agricultural activity to result in cumulative pollution loss to Owengar River sub-catchment with associated pressures to water quality and the freshwater ecology supported by this catchment.

It is noted that the provision of habitat enhancement measures such as the implementation of and commitment to drainage management and appropriate grazing regimes within the wind farm site and the rehabilitation of peatland habitats will have the potential to reduce the cumulative impact of historical land use activities and habitat loss associated with the proposed wind farm site, with positive impacts for the status of peatland and grassland habitat that will be subject to these measures.

In terms of other projects, a search of Leitrim County Council planning portal was completed in October 2023 to identify any other projects in the area surrounding the proposed wind farm site, along the proposed grid connection route and in the vicinity of the proposed TDR widening locations. In terms of other projects in the vicinity of the proposed wind farm site, with the exception of the Croagh Wind Farm planning application, there are no other recent (i.e. within the last 5 years) planning applications for the wider area surrounding the wind farm site. An assessment of the impact of the Croagh Wind Farm to biodiversity and terrestrial ecology receptors was completed as part of the planning application for that

project. The assessment found that the wind farm will not have the potential to result in any significant residual effects to terrestrial ecology receptors. On this basis it is considered that the construction and/or decommissioning phase of the current Letter Wind Farm will not have the potential to combine with the Croagh Wind Farm to result in significant cumulative effects, arising from direct habitat loss, damage or disturbance or fauna species disturbance, displacement or mortality.

One recent planning application, Planning Reference No. 21152, has been identified along the proposed grid connection route. This planning application is located in the townland of Cloonagh, approximately 200m to the east of the Corderry Substation. This planning application relates to the development of a new slatted shed together with all associated site works. This project will not have the potential to result in any significant residual effects to terrestrial ecology receptors. On this basis it is considered that the construction and/or decommissioning phase of the current Letter Wind Farm will not have the potential to combine with this project to result in significant cumulative effects, arising from direct habitat loss, damage or disturbance or fauna species disturbance, displacement or mortality.

A search of the Roscommon County Council planning portal was completed in October 2023 to identify the presence of any other recent (i.e. within the last 5 years) planning applications for the wider area surrounding the TDR widening locations no. 1, 2 and 3. No planning applications were identified in the vicinity of these three locations.

A search the Leitrim County Council planning portal was completed in October 2023 to identify the presence of any other recent (i.e. within the last 5 years) planning applications for the wider area surrounding the TDR widening locations no. 4, 5 and 6. No planning applications were identified in the vicinity of these three locations.

5.4.4 Operation Phase potential effects

5.4.4.1 Direct Effects

5.4.4.1.1 Potential Direct effect on Designated Areas

No elements of the project are located within the boundary of any European Sites, NHAs or pNHAs. There will be no direct effects, in terms of direct habitat loss, damage or disturbance on any designated conservation area as a result of the operation phase of the proposed wind farm; the provision of the grid connection cable along the public road between the wind farm site and the 110kV substation at Corderry; or the provision of the turbine delivery route widening locations.

5.4.4.1.2 Potential Direct effect on habitats

The operational phase of the proposed wind farm site will not cause significant or adverse direct impacts to the quality or functionality of the habitats occurring within the Development area.

5.4.4.1.3 Potential Direct Effects on Bats

The potential direct effects on bats during the operational phase of the Project relates to the potential for collision with bats that use the Site. The proposed wind farm site has been identified as a site of low risk to bats, based on the size of the proposed wind farm and the habitats occurring within and adjacent to it.

The results of the bat monitoring on site and subsequent analysis using Kepel (2011) indicate that activity by Leisler's bat, Common pipistrelle, Soprano pipistrelle, Myotis species, brown long-eared bat and Nathusius pipistrelle within and adjacent to the proposed wind farm site is overall Low throughout the site and throughout the bat activity season.

Myotis species and brown long-eared bats are considered to be at low risk of collision with operating turbines (NatureScot (2021)) and given the low levels of activity recorded for these species during monitoring the proposed wind farm is predicted to present a low risk of collision to these species.

5.4.4.1.3.1 Leisler's bat

Table 5.20 below provides an overall seasonal risk assessment, as per **Table 3b** of the NatureScot (2021) guidelines for Leisler's bat based on the site risk level and the seasonal activity category assigned to Leisler's bat. Based on the low risk assessment for each season the overall collision risk assessment for Leisler's bat is Low.

Table 5.20: Seasonal Collision Risk Assessment to Leisler's bat (as per Table 3b of the NatureScot (2021) Guidelines)

Site Risk Level	Season	Seasonal Activity Category	Overall Seasonal Risk Assessment
Low (2)	Spring	Low (1)	Low (2)
	Summer	Low (1)	Low (2)
	Autumn	Low (1)	Low (2)

5.4.4.1.3.2 Common pipistrelle

Table 5.21 below provides an overall seasonal risk assessment, as per **Table 3b** of the NatureScot (2021) guidelines for Common pipistrelle based on the site risk level and the low to moderate activity category assigned during spring and autumn and the low activity category assigned during summer for Common pipistrelle. Based on the low risk assessment for each season the overall collision risk assessment for Common pipistrelle is Low.

Table 5.21: Seasonal Collision Risk Assessment to Common pipistrelle (per Table 3b of the NatureScot (2021) Guidelines)

Site Risk Level	Season	Seasonal Activity Category	Overall Seasonal Risk Assessment
Low (2)	Spring	Low to Moderate (2)	Low (4)
	Summer	Low (1)	Low (2)
	Autumn	Low to Moderate (2)	Low (4)

5.4.4.1.3.3 Soprano pipistrelle

Table 5.22 below provides an overall seasonal risk assessment, as per **Table 3b** of the NatureScot (2021) guidelines for Soprano pipistrelle based on the site risk level and the seasonal activity category assigned to Soprano pipistrelle. Based on the low risk assessment for each season the overall collision risk assessment for Soprano pipistrelle is Low.

Table 5.22: Seasonal Collision Risk Assessment to Soprano pipistrelle (per Table 3b of the NatureScot (2021) Guidelines)

Site Risk Level	Season	Seasonal Activity Category	Overall Seasonal Risk Assessment
Low (2)	Spring	Low (1)	Low (2)
	Summer	Low (1)	Low (2)
	Autumn	Low (1)	Low (2)

5.4.4.1.3.4 Nathusius pipistrelle

Table 5.23 below provides an overall seasonal risk assessment, as per **Table 3b** of the NatureScot (2021) guidelines for Nathusius pipistrelle based on the site risk level and the seasonal activity category assigned to Nathusius pipistrelle. Based on the low risk assessment for each season the overall collision risk assessment for Nathusius pipistrelle is Low.

Table 5.23: Seasonal Collision Risk Assessment to Nathusius pipistrelle (per Table 3b of the NatureScot (2021) Guidelines)

Site Risk Level	Season	Seasonal Activity Category	Overall Seasonal Risk Assessment
Low (2)	Spring	Low (1)	Low (2)
	Summer	Low (1)	Low (2)
	Autumn	Low (1)	Low (2)

5.4.4.1.4 Potential Direct effect on non-volant mammals

The operation phase of the proposed wind farm will not have the potential to result in direct effects to otters. No otter holts or couches were identified within the Site and there will be no potential for operation phase maintenance activities to result in disturbance to otters.

No effects to badgers or other protected non-volant mammals are predicted during the operation phase of the proposed wind farm. As no field signs indicating the presence of such species were noted within the site during field surveys and due to the limited human presence for maintenance works during daylight hours, outside the period of peak badger and other protected non-volant mammals' activity, no significant effects are predicted to affect such species during the operation of the proposed wind farm.

5.4.4.1.5 Potential Direct effect on herpetofauna

As amphibians are reliant on waterbodies a potential risk of contamination of waterbodies from oil or other polluting substances leaking from turbine machinery, spills during maintenance, or leaks from maintenance vehicles will have the potential to occur during the operation phase of the proposed wind farm. Prevention of these effects is further discussed in **Section 5.5** and **Chapter 9: Hydrology and Hydrogeology** of this EIAR.

5.4.4.1.6 Potential Direct effect on Terrestrial Invertebrates

No effects to terrestrial invertebrates are predicted during the operation phase of the proposed wind farm.

5.4.4.1.7 Potential Direct effect on Notable Flora

No notable flora species were identified as occurring within the footprint of the project site and as such there will be no potential for the direct loss of such species.

5.4.4.1.8 Potential Direct effect Arising from the Spread of Alien Invasive Species

Fraga, et al. (2008) have identified a link between wind farms and the spread of IAS in upland habitats. No IAS have been identified as occurring within the Site. Notwithstanding this, in the absence of appropriate bio-security measures maintenance works associated with the operation phase of the wind farm will have the potential to present a risk of the spread of such species in the event that plant, machinery or personnel act as vectors for the introduction of IAS to areas of works. Bio-security measures that aim to eliminate the potential for the introduction and spread of IAS during the construction and/or decommissioning phase are set out in **Section 5.5** below.

5.4.4.2 Indirect Effects

5.4.4.2.1 Potential Indirect Effects on Designated Areas

The designated conservation areas that have been identified as occurring within the zone of influence of the project and representative of key biodiversity features are:

- Lough Gill SAC
- Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC
- Lough Forbes SAC
- Unshin River SAC
- Cummeen Strand SPA

The potential for indirect impacts to these designated conservation areas during the operation phase have been examined within the Screening Report for Appropriate Assessment and the NIS prepared for the Project.

The Screening Report for Appropriate Assessment for the project concluded that it cannot be excluded, on the basis of objective information, that the project, individually or in combination with other plans or projects, will have a significant effect on the above listed European Sites and overlapping NHAs/pNHAs.

As such, an Appropriate Assessment is required for the Project and an NIS has been prepared to assist the competent authority during the completion of its Appropriate Assessment.

The NIS for the Project has concluded that in light of the best scientific knowledge in the field, the project, alone or in-combination with other plans or projects will not result in adverse impacts to the integrity of European Sites, and all other relevant European Sites, provided all mitigation measures set out in the NIS are implemented in full. These mitigation

measures have been evaluated for their effectiveness to remove the potential for adverse effects to European Sites. These measures have been found to represent effective safeguards. These findings have been reached in the absence of reasonable scientific doubt and it is concluded that the project will not adversely affect the integrity of the relevant European Sites examined.

5.4.4.2.2 Potential Indirect Effects on habitats

During the operation of the wind farm, the increased area of hard standing within the Site and surrounding the proposed wind turbine locations will have the potential to lead to changes in the volume and nature of site runoff. The worst-case scenario net increase of surface water runoff associated with the wind farm site is calculated to be 30.06l/s/ha, or 2.61% relative to the area of the wind farm site during the average wettest month of the year (December).

The use of construction materials with a different mineralogical composition to that of the surrounding substrate can lead to changes in the hydrochemistry of the substrate into which these materials are placed. Peatland habitat, such as blanket bog, in particular are sensitive to changes in hydrochemistry and pH levels given the low pH of these habitats. Where materials with different mineralogical composition are used, waters percolating through these materials will acquire a different hydro chemical signature to waters associated with the native substrate of the site. The impact of this percolating water to the surrounding substrate will depend on the difference between the mineralogy of the imported material and native substrate. Imported material that is highly alkaline in nature, such as cement-based products, can leach highly alkaline waters into the native substrate adjacent to these areas. This can result in the alteration of the hydrochemistry of sub-soil waters by elevating pH levels, which in turn can lead to a change in vegetation community. As such in the absence of the use of appropriate materials, such an effect could result in significant effects to the status of dry heath and non-calcareous spring habitats occurring in the immediate vicinity of the wind farm infrastructure.

Aside from the potential changes to surface water runoff rates and mineralogy the operation of the project will not result in any additional land take or loss of revegetated habitats and as such there is no potential for any significant effects in this regard. In addition, the operational phase has the potential to result in enhancement of the surrounding areas within the Site and within the Habitat Management Plan area through habitat rehabilitation management (as described in the Biodiversity Management Plan) that will be implemented

during the construction phase of the Development and maintained during the operational phase.

5.4.4.3 Cumulative Effects

It is anticipated that, in the absence of mitigation, the key cumulative impacts upon biodiversity during the operation of the Project are largely as a result of existing drainage on the wind farm site which could exacerbate erosion within the vicinity of the proposed infrastructure. As such, the potential for cumulative impacts as a result of the operation of the Project is considered to be significant at the local level, taking into consideration the potential for cumulative effects of other land use operations, such as drainage from neighbouring conifer plantations and public road corridors, in the vicinity of the wind farm site. This is because, cumulatively and before mitigation is introduced at the wind farm site, the installation of wider surface areas of hardstanding and potentially operational drainage as required, in-combination with other land uses such as forestry could result in greater surface water runoff in the region as a whole. This could potentially result in increased washout to receiving watercourses during operation. In the absence of appropriate mitigation, increased surface water runoff can lead to an exacerbation of erosion and/or sediments entering local watercourses, particularly during the first few years of operation. Mitigation proposals in this respect are provided in **Section 5.5**.

5.5 MITIGATION MEASURES AND RESIDUAL EFFECTS

Section 5.4 identified the need for mitigation of the following potentially significant effects summarised in **Table 5.24** below.

Table 5.24: Summary of Significant Effects before Mitigation

Potential significant effects during the construction phase on:	Potential significant effects during the operational phase on:
• Designated sites (indirect effects)	• Designated sites (indirect effects)
• Habitats with links to Annex 1 habitats: blanket bog and wet heath (direct and indirect effects)	• Watercourses and lake habitats (indirect effects)
• Terrestrial habitats: Acid grassland; wet grassland & hedgerow	• Annex 2 species: Otters
• Annex 2 species: Otters, Atlantic salmon, Lamprey species (indirect effects)	• Other non-volant mammals (indirect effects)
• Badgers & Other protected non-volant mammals (indirect effects)	• Herpetofauna (indirect effects)
• Herpetofauna (indirect effects)	• Terrestrial Invertebrates (indirect effects)

Core areas of mitigation required relates to aspects such as minimising the extent of working areas and control of sediment and other pollution, in addition to timing and specific methods to avoid impact on particular species. The incorporation of these requirements into appropriate compliance documents and overseeing of mitigation measures by an Ecological Clerk of Works is also fundamental.

This section sets out the required mitigation and draws on other sections and reports as necessary. Notably, the mitigation from **Chapter 9: Hydrology and Hydrogeology** and **Chapter 8: Soils and Geology** are highly pertinent as these chapters set out the required mitigation to avoid impact on watercourses and water-based erosion and avoid/minimise the risk of a slope failure event during the construction phase of the project. These mitigation requirements are not repeated in this section but need to be implemented in full to avoid impacts on ecological features and are referred to as appropriate.

5.5.1 Construction Phase Mitigation

5.5.1.1 Mitigation by Avoidance

5.5.1.1.1 Protection of Designated Areas

The Project is not located within any designated areas and as such the potential for direct impacts to these areas will be avoided. As set out in the accompanying Natura Impact Statement the principal risk posed by the Project to designated areas in the surrounding area relate to indirect impacts arising from negative impacts to water quality and associated adverse effects to freshwater dependent habitats and species. Mitigation measures are set out in **Chapter 6: Aquatic Ecology** and **Chapter 9: Hydrology and Hydrogeology** that aim to protect water quality in receiving watercourses and thereby avoid the potential for adverse effects to the freshwater dependent qualifying habitats and qualifying species of surrounding designated areas.

5.5.1.1.2 Protection of Important Habitats

The Project will result in the loss of areas of blanket bog and wet heath habitat that have links to Annex 1 habitat. It is essential that the direct loss of such peatland habitat is fully minimised (notably also taking account of the international/national nature conservation value of these habitats) and so mitigation by avoidance is essential to limit such losses within the footprint of the wind farm, and its zone of influence. Mitigation in this respect is:

- The full extent of the infrastructure footprint will be marked out prior to the commencement of works, with an appropriately robust and visible fencing / marker system. Where this meets Annex I habitats, this will also be the full extent of the

works corridor, with no machinery access (access will only be allowed on foot and only for the purposes of silt / pollution control if required), storage or other works allowed outside this area.

- The efficacy and coherence of the marker system (and required remediation) will form an essential part of the Site operations.

A pre-construction Invasive Species Survey will be conducted during the optimal growing season (May to August immediately prior to works occurring at this site for the Development) and shall include data on all locations, extents and potential construction impacts in relation to scheduled and non-scheduled Alien Invasive Species (IAS). This survey will be completed along with reporting on the best course of action to be implemented to avoid the spread of such IAS on the Site or further afield. The management of IAS identified as occurring within the proposed Site will be undertaken in accordance with best practice management guidelines as set out in the TII guidelines "The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads" (2010).

5.5.1.1.3 Protection of Non-volant Mammals

The Ecological Clerk of Works for the construction phase will complete a pre-construction survey of the construction footprint in order to confirm the continued absence of mammal breeding and resting places within the construction footprint and within 50m of the construction footprint or identify the presence of newly established breeding/resting places. Based upon the results of these surveys, the ECoW will establish whether or not there is a need at that stage for the implementation of further mitigation measures and the requirement for protected species licences. An example of where such a need could arise is where a badger sett becomes established along or in the immediate vicinity of a hedgerow that will be intersected by the proposed access track.

5.5.1.1.4 Protection of Bats

Any trees and treelines along approach roads and planned site access tracks will be retained unless felling is unavoidable. Retained trees should be protected from root damage by an exclusion zone of at least 7 metres or equivalent to canopy height. Such protected trees will be fenced off by adequate temporary fencing prior to other works commencing.

No structures will be demolished as part of the construction phase of the proposed Development and there will be no disturbance to confirmed bat roost structures occurring within and adjacent to the proposed wind farm site boundary.

5.5.1.1.5 Protection of Herpetofauna

The Ecological Clerk of Works for the construction phase will complete a survey of the construction footprint during spring (late February / March / early April) ahead of the proposed works in order to identify any key amphibian breeding areas. This will allow wildlife barriers to be installed where necessary to minimise impacts upon such features where these are likely to be indirectly affected by the works.

5.5.1.2 Mitigation by Design

5.5.1.2.1 Prevention of Spread of Invasive Alien Species

The following biosecurity measures will be implemented to prevent the introduction and spread of IAS during the operation phase of the project.

All vehicles or personnel that will be required to undertake work will be cleaned before being used at the wind farm site. The cleaning will include the following:

- All plant material and soil will be removed from the vehicles using shovels and brushes. Special attention shall be paid to tracks and prior to arrival on site, the Contractor's vehicles and equipment must be thoroughly cleaned. High-pressure steam cleaning, with water > 40 degrees C, is recommended for vehicles and equipment where reasonably feasible. Many roadside garages provide these facilities. If it is not possible to steam clean the equipment, a normal power hose must be used. After cleaning, a visual inspection of the equipment will be carried out to ensure that all adherent material and debris has been removed.
- Vehicles shall only leave the wind farm site and be re-used for other construction work when they have been properly cleaned, in line with the approached set out in Point No. 1 above.

5.5.1.3 Mitigation by Reduction

5.5.1.3.1 Protection of Important Habitats

A site-specific CEMP will be implemented to ensure that potential adverse impacts to upland watercourses flowing through the site are avoided. Minimum buffer zones will be implemented between areas associated with the construction of Turbine Foundations and streams/eroding gullies, except where stream crossings are required.

Within the peatland habitats of the wind farm site, site operatives, plant and machinery will be restricted to the footprint of the proposed wind farm site construction boundary and will not be permitted to encroach upon adjacent lands. This will reduce the potential for damage and disturbance to important peatland, woodland and grassland habitats.

5.5.1.4 Offsetting

A Habitat Management Plan is provided as **Appendix 5.2** and all measures set out in this plan will be implemented as part of the Project. The restoration of areas of peatland and the implementation of measures such as the control of drainage and grazing will aim to achieve the restoration and enhancement of an area of approximately 19 ha of peatland habitat.

5.5.2 Operation Phase

5.5.2.1 Mitigation by Design

5.5.2.1.1 Protection of Bats

The Natural England guidance (2014) and NatureScot (2021) recommends that potential collision to bats from wind farm developments can be minimised by siting the proposed turbines so that all parts of the turbine are over 50m from the nearest vegetated corridor. The location of the proposed Letter Wind Farm turbines will satisfy this recommendation with no vegetated corridors occurring within 50m of a turbine rotor diameter. To this end a "bat buffer" area will be implemented around all turbines such that the buffer area will remain free of suitable foraging habitat, consisting of hedgerows, treelines, scrub or conifer plantation edge. This will require the clearance of conifer plantation within the vicinity of the proposed turbines T1 and T2. The clearance of conifer plantation to satisfy this requirement will amount to approximately 3Ha. **Figure 5.15** shows the bat buffer areas surrounding turbines, the conifer plantation that will be cleared.

In order to avoid the potential for future interactions between the now proposed Letter Wind Farm and local bat populations all structures associated with the proposed Letter Wind Farm such as the substation will be built in a manner to ensure no roosting opportunities are present to bats. Also, no structured vegetation will be permitted to establish at these locations during the operational phase of the turbines.

Turbines will operate in a manner which restricts the rotation of the blades as far as is practicably possible below the manufacturer's specified cut-in speed (SNH 2021). This is usually achieved by feathering the blades during low wind speeds; the angle of the blades is rotated to present the slimmest profile possible towards the wind, ensuring they do not rotate or 'idle' when not generating power.

Turbine blades spinning in low wind can kill bats, however bats cannot be killed by feathered blades which are not spinning (Horn et al., 2008). The feathering of turbine blades combined with increased cut-in speeds have been shown to reduce bat fatalities by up to 50% (SNH

2021). As such, the feathering of blades to prevent 'idling' during low wind speeds is proposed for all turbines.

5.6 MITIGATION BY REDUCTION

5.6.1 Protection of Bats

Cut-In Speeds/Curtailment

Increasing the cut-in speed above that set by the manufacturer can reduce the potential for bat/turbine collisions. A study by Arnett et al. (2011) showed a 50% decrease in bat fatality can be achieved by increasing the cut-in speed by 1.5 m/s.

Species with elevated risk of collision (Leisler's bat, soprano and common pipistrelle) in particular would benefit from increasing the cut-in speed of turbines, as dictated on a case-by case basis depending on the activity levels recorded at each turbine.

Cut-in speeds should be increased during the bat activity season (April-October) or where temperatures are optimal for bat activity to 5.5 m/s from 30 minutes prior to sunset and to 30 minutes after sunrise at turbines where surveillance shows high bat activity levels for High and Medium-Risk species and/or if bat carcasses are recorded.

The duration required depends on the level of mitigation required for each individual turbine i.e. a full bat activity season or only spring and autumn (duration will be determined by the first year of surveillance).

Cut-in speeds restrictions will be operated according to specific weather conditions:

- When the air temperature is greater than 7°C (as bat activity does not usually occur below this temperature).
- Generally, bat activity peaks at low wind speeds (<5.5m/s). As such, it has been shown that curtailing the operations of wind turbines at low wind speeds can reduce bat mortality dramatically, particularly during late summer and the early autumn months.

Due to the considerable unnecessary down time resulting from the proposed "blanket curtailment" (above) and the advances in smart curtailment a focused curtailment regime is further proposed from the year two of operation.

This will focus on times and dates, corresponding with periods when the highest level of bat activity occurs within the Site. This includes the use of the SCADA (Supervisory Control and

Data Acquisitions) operating system (or equivalent) to only pause/feather the blades below a specified wind speed and above a specified temperature within specified time periods. Post-constructions surveys will be undertaken for the first three years of operation to confirm if blanket curtailment restrictions can be amended in line with post-construction activity levels. The post construction surveys will be used to update the current curtailment regime (blanket curtailment) designed around the values for the key weather parameters and other factors that are known to influence collision risk. This will include all of the following:

- Wind speed in m/s (measured at nacelle height)
- Time after sunset
- Month of the year
- Temperature (ºC)
- Precipitation (mm/hr)

5.7 OFFSETTING

5.7.1 Restoration of Important Habitats

Restoration of habitats will require ongoing positive management input as well as monitoring of success and necessary remedial measures. This is set out in the Habitat Management Plan in **Appendix 5.2**.

5.7.2 Decommissioning Phase Mitigation

No new impacts on the surface water and groundwater receiving environment are anticipated during the decommissioning phase of the Project. The decommissioning phase of the Project will result in the removal of Site infrastructure such as wind turbines and the Met Mast etc. No new additional mitigation measures to those proposed for the construction which will also be implemented during decommissioning are required for the decommissioning phase of the Project. The decommissioning phase and associated removal of major infrastructure components is anticipated to result in similar potential risks to surface water and groundwater as those that will be encountered during the construction phase of the project.

The excavation of greenfield land is not expected to be required during the decommissioning phase. In addition, the movement of plant, vehicles and equipment is not expected to be required during the decommissioning phase since all of the Project's hardstand areas will be pre-existing by the time the decommissioning phase is being carried out. As a result, the risk of elevated suspended solids being discharged in surface water run-off to the downstream receiving environmental is expected to be low. However, the potential risk remains for spills of fuels hazardous chemicals which is a common risk to all

developments. The mitigation measures outlined in this chapter will be implemented during the decommissioning phase to reduce the potential for such impacts.

5.8 MONITORING

An ECoW will be appointed prior to the commencement of construction. The ECoW will be an ecologist with experience of baseline ecological surveys, pre-construction surveys and construction phase supervision. The ECoW will be responsible for completing pre-construction surveys and supervising construction works and advising on the implementation of biodiversity enhancement measures that will be commenced during the construction phase.

Pre-construction confirmatory surveys required in advance of the construction phase will include as a minimum:

- Otter surveys along the Owengar River. Surveys to be completed will pay particular attention to identifying the presence/absence of otter holts/couches within 150m of the proposed wind farm infrastructure. In the event that otter holts or couches identified within 150m of the proposed Development the status of the breeding/resting place will be confirmed. Where the holt/couch is identified as a breeding site, then, in the absence of a derogation licence, no works will be permitted to proceed within a 150m radius of the breeding place, whilst it is still actively used as a breeding site. In the event that a non-breeding active holt or couch is identified within 50m of the proposed Development, then, in the absence of a derogation licence, no works will be permitted to proceed within a 50m radius of the non-breeding but active holt or couch.
- Non-native invasive plant species surveys: An up-to-date confirmatory non-native invasive plant species survey of the Site and adjacent areas will be completed during the growing season immediately prior to the commencement of construction works.
- Confirmatory surveys for the presence of plant species of conservation interest. These surveys shall be completed during the growing season immediately prior to the commencement of the construction phase. The surveys shall be completed to identify the presence of any new stands of rare or threatened. In the event that new stands of these species are identified as occurring within the footprint of the proposed wind farm, stands of these plants will be required to be translocated to a suitable receptor area either within the proposed Site or an alternative suitable location. Such translocations will only be permitted to proceed upon receipt of a derogation licence.

- The ECoW will ensure that best practice construction methods and mitigation measures detailed in this EIAR and accompanying planning documentation including the CEMP and NIS are implemented in full.
- The ECoW will be responsible for ensuring that the construction phase contractor is aware of key biodiversity receptors. The ECoW will inspect the construction works throughout the construction phase and will pay particular attention to the implementation of all biodiversity related mitigation measures.
- The ECoW will provide monitoring inspection reports during the construction phase and will also provide a close-out report following the completion of the contract construction works.
- Where necessary the ECoW will liaise with relevant authorities such as Leitrim County Council, the IFI and the NPWS with respect to construction phase activities that relate to biodiversity.
- As part of the ECoW terms of appointment, the ECoW will be vested with the authority to stop works where activities have been identified on site that are not in accordance with the mitigation measures outlined in this EIAR, the NIS and/or the CEMP prepared for the planning application for the proposed Project.

5.9 RESIDUAL EFFECTS

The direct and indirect effects of the project to terrestrial ecological receptors have been set out in **Section 5.4** above. There will be an overall permanent loss of approximately 0.5 Ha of peatland in the form of cutover blanket bog and degraded blanket bog to the footprint of the proposed wind farm. In addition, there will be a temporary loss of approximately 0.4Ha of cutover blanket bog and degraded blanket bog footprint of the proposed wind farm. The Habitat Management Plan will be implemented to mitigate for the loss of habitat to the footprint of the proposed wind farm. This plan comprises measures for the restoration and enhancement of an area of approximately 19Ha. A summary of the measures to be implement as part of the Habitat Management Plan is provided in **Table 5.25** below.

Table 5.26 provides an assessment of the residual impacts of the Project, taking into account the mitigation measures set out in **Section 5.5** and the measures set out in the Habitat Management Plan, as summarised in **Table 5.25** below.

Table 5.25: Summary of Proposed Habitat Management and & Biodiversity Receptors to be targeted

Management Element	Biodiversity Receptor		
	Habitats & Flora	Fauna	Water Quality
Restoration/enhancement and maintenance of c.19Ha of habitat. The aim of this measures will be to reinstate this area of blanket bog and heath to favourable conservation condition and to maintain woodland habitat at favourable conservation condition.	✓	✓	
Grazing Management	✓	✓	✓
Drainage Management	✓	✓	✓

Table 5.26: Assessment of Residual Effects

Biodiversity Receptor	Impact	Significance	Probability	Mitigation	Residual Impact
European Sites	Potential for the discharge of pollutants such as sediment or hydrocarbons downstream to the Lough Gill SAC, Lough Forbes SAC, Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, Cummeen Strand SPA	The significance of impact will depend upon the magnitude of the pollution event (i.e. the levels of pollution released). Any pollution event with the potential to result in short to long-term perturbations to conservation objective targets of qualifying feature of interest will represent a significant effect.	Likely	Minimise ground disturbance. Timing of works and implementation of surface water management and control measures. Implementation of all mitigation measures set out in Section 5.5, Chapter 8 & 9 and within the Natura Impact Statement (Nov 2023). The implementation of mitigation measures will negate the potential for this impact to arise.	No residual adverse effects
NHAs	No impact. No NHAs within the zone of	N/A	None	None Required	No residual impact

Biodiversity Receptor	Impact	Significance	Probability	Mitigation	Residual Impact
	influence of the Development.				
pNHAs	Potential for the discharge of dust to the Owengar Woods pNHA during construction works associated with the turbine delivery route widening locations.	The significance of impact will depend upon the magnitude of the pollution event (i.e. the levels of pollution released). Any pollution event with the potential to result in short to long-term perturbations to feature of interest will represent a significant effect.	Likely	Minimise ground disturbance. Timing of works and implementation of surface water management and control measures. Implementation of all mitigation measures set out in Section 5.5, Chapter 8 & 9 and within the Natura Impact Statement. The implementation of mitigation measures will negate the potential for this impact to arise.	No residual adverse effects.
Blanket bog – cutover and degraded	Loss of habitat to the footprint of the proposed wind farm.	Permanent loss of habitat with links to EU Annex 1 blanket bog habitats	Certain	Mitigation measures for habitats are set out under Section 5.5.	Permanent loss of habitat to the footprint of the proposed wind farm

Biodiversity Receptor	Impact	Significance	Probability	Mitigation	Residual Impact
				A Habitat Management Plan has been prepared. This includes for the restoration of approximately 12Ha of blanket bog habitat within the wind farm site. The extent of blanket bog associated with this area will be greater than the c. 0.5 Ha that will be permanently lost to the footprint of the proposed development.	In the context of the proposed mitigation measures and the aims of the HMP this will result in a significant, short to medium term impact on dry heath habitat of international importance at the international scale. The long-term residual impact will be dependent upon achieving the targets set out in the Habitat Management Plan. The successful achievement of the targets set out in this Plan will have the potential to offset the

Biodiversity Receptor	Impact	Significance	Probability	Mitigation	Residual Impact
					loss of dry heath to the footprint of the proposed wind farm through the provision of a net increase the area of dry heath habitats occurring within the proposed development boundary. The achievement of this aim of the HMP will also have the potential to contribute towards an increase of the favourable reference area of this habitat, with the potential for positive, long-term effects for this habitat at the international scale.

Biodiversity Receptor	Impact	Significance	Probability	Mitigation	Residual Impact
Wet grassland	Potential for loss of c. 0.4 Ha of species-poor wet grassland	Slight at the local scale	Certain	Mitigation measures for habitats are set out under Section 5.5. A Habitat Management Plan has been prepared. This includes for the management and enhancement wet grassland habitat.	Permanent loss of habitat to the footprint of the proposed wind farm. In the context of the proposed mitigation measures and the aims of the HMP this will result in a slight, short to medium term impact on wet grassland of local importance at the local scale. The long-term residual impact will be dependent upon achieving the targets set out in the Habitat Management Plan. The

Biodiversity Receptor	Impact	Significance	Probability	Mitigation	Residual Impact
					successful achievement of the targets set out in this Plan will have the potential to offset the loss of wet grassland habitat to the footprint of the proposed wind farm through the enhancement and management of wet grassland over the lifetime of the operation phase of the proposed wind farm.
Otters	Potential for indirect impacts to otters as result of perturbations to aquatic habitats downstream that are relied upon by otter or	The significance of impact will depend upon the magnitude of the pollution event (i.e. the levels of pollution released). Any pollution event with the	Likely	Minimise ground disturbance. Timing of works and implementation of surface water management and control measures. Implementation	Imperceptible

Biodiversity Receptor	Impact	Significance	Probability	Mitigation	Residual Impact
	provide suitable habitat for otters.	potential to result in short to long-term perturbations to the status of receiving aquatic habitats to support otters		of all mitigation measures set out in Chapter 6 & 9 and within the Natura Impact Statement (DEC, 2023). The implementation of mitigation measures will negate the potential for this impact to arise.	
Bats	Potential impacts during the operation phase associated with the risk of fatalities posed by operating wind turbines to high-risk species that comprise pipistrelle species and Leisler's bat.	Potential for impacts to the local population of Soprano pipistrelle and Common pipistrelle populations.	Possible	Implementation of mitigation measures set out in Section 5.5.	The adjudged worst-case scenario is that, during operation, the turbines may possibly cause injury or death to a few individual specimens of Leisler's bat as it is a high-flying species (10m to 70m+). However, the amount of time spent hunting at the upper height limit cannot be assessed

Biodiversity Receptor	Impact	Significance	Probability	Mitigation	Residual Impact
					accurately due to the maximum distance (60m to 80m) of detection of this species by ultrasound detectors but most activity and time can be expected to occur in the mid-region of the species hunting altitude i.e. 40m. The resulting effect of the development on local bat populations, with implemented mitigation measures, is considered to be a Slight to Imperceptible Residual Negative Reversible Effect and in the Local Context with the favourable

Biodiversity Receptor	Impact	Significance	Probability	Mitigation	Residual Impact
					conservation status (FCS) of bat species being unaffected and all species confirmed or expected on or near the study areas are predicted to persist.
Herpetofauna	Mortality resulting from construction works. Loss of foraging habitat.	Potential for impacts to the local common frog populations.	Likely	Minimise ground disturbance. Timing of works. Habitat management measures as part of the Habitat Management Plan. Implementation of mitigation measures set out in Section 5.5.	Imperceptible
Terrestrial Invertebrates	Loss of habitat.	Potential for impacts to the local terrestrial fauna populations.	Likely	Minimise ground disturbance. Timing of works. Habitat management measures as	Imperceptible

Biodiversity Receptor	Impact	Significance	Probability	Mitigation	Residual Impact
				part of the Habitat Management Plan	

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