

# 6. **BIODIVERSITY**

## 6.1 Introduction

## 6.1.1 Site Location

The Proposed Development Site is an upland site located in southeast County Clare, approximately 3 km south of Broadford, 3.5 km southeast from Kilkishen, and 4 km northeast from Sixmilebridge, Co. Clare. The Grid Reference co-ordinates for the approximate centre of the site are E554266 N669733. Lands surrounding the EIAR Site Boundary also comprise areas of forestry as well as agricultural lands and peatlands. The site location is shown in Figure 6-1.

## 6.1.2 **Brief Description of the Proposed Development**

A full description of the Proposed Development as well as development layouts and drawings are provided in Chapter 4 (Description) of the EIAR. In summary, the development will consist of 9 no. turbines, 9 No. turbines with a limited tip height range of 179.5 metres to 185 metres and all associated foundations and hardstanding areas, access roads and entrance(s) including upgrade of existing site roads and provision of new roads, 110kV electrical substation and wind farm control building(s), underground cabling, borrow pit(s), electrical cabling for 110kV grid connection, amenity works, biodiversity enhancement areas, temporary construction compounds, a permanent meteorological mast, temporary transition compound and upgrades to roads along the turbine delivery route.

The minimum and maximum turbine envelope has been assessed in this EIAR Chapter.

## 6.1.3 **Purpose of the Report**

- > To describe the baseline data collection and assessment methods used;
- > To fully describe the baseline ecological conditions;
- > To identify and describe all potentially significant ecological effects associated with the Proposed Development;
- > To set out the design, mitigation and compensation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;
- > To identify how mitigation and compensation measures will/could be delivered;
- > To provide an assessment of the significance of any residual effects in relation to the effects on biodiversity and the legal and policy implications;
- > To identify appropriate enhancement measures and how these will/could be delivered; and
- > To set out the requirements for post-construction monitoring.

## 6.1.4 **Relevant Legislation and Policy**

The following legislation is relevant to this chapter. Further detail is provided in Appendix 6-6:

- The Habitats Directive 92/43/EEC.
- European Communities (Birds and Natural Habitats) Regulations 2011 2021.
- Wildlife Acts 1976 to 2023.
- > Flora (Protection) Order 2022.



## 6.1.5 **Statement of Authority**

Ecological walkover surveys were conducted by Rachel Walsh (BSc. Env), Kailan Mitchell (BSc. Env), Sara Fissolo (BSc. Ecology and Environmental Biology), Ryan Connors (B.Sc, M.Sc.), Nathan Finn (BSc.) and Neansaí O' Donovan (BSc. Wildlife Biology), between 2021 and 2024.

Bat survey scope development and project management was overseen by Aoife Joyce (BSc., MSc.) and John Hynes (BSc., MSc., MCIEEM). Aoife is a Project Director with 5 years' experience in bat impact assessments and has completed CIEEM and BCI courses in Advanced Bat Survey Techniques, Bat Impacts and Mitigation, Bat Tree Roost Identification and Endoscope training and Kaleidoscope Pro Analysis. John is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and has over 10 years' professional ecological consultancy experience.

Bat surveys were conducted by MKO ecologists Laura McEntegart (B.Sc.), Keith Costello (B.Sc.) and Shane Connolly (B.Sc.). Data analysis was undertaken, and results were compiled by Shane Connolly and Laura McEntegart (BSc., MSc.). The baseline report was collated by Sara Fissolo (B.Sc.). Bat surveys on the temporary turbine accommodation compound were carried out by Ryan Connors (B.Sc., M.Sc.). All staff have relevant academic qualifications to complete the surveys and assessments at this level and are part of a dedicated bat unit within the wider Ecology team at MKO.

Aquatic surveys were undertaken by Triturus Environmental Ltd, a leading aquatic ecological consultancy.

This report has been written by Rachel Walsh (BSc.) who has 4 years' experience in habitat and fauna surveying and has undertaken ecological impact assessment for a wide range of projects including renewable energy developments. This report was reviewed by Pat Roberts (BSc., MCIEEM). Pat has over 16 years' experience in ecological management and assessment.

## 6.1.6 **Definitions**

- > Where the 'Proposed Development' is referred to, this relates to all the project components described in detail in Chapter 4 of this EIAR i.e. Wind Farm Site and Grid Connection as detailed below.
- > Where 'the Site' or 'EIAR Site Boundary' is referred to, this relates to the primary study area for the EIAR, as delineated by the EIAR Site Boundary in green as shown on Figure 6-1 and 6-2.
- Where 'Study Area' or 'Study Area Boundary' is referred to, this relates to the primary study area for the EIAR, as delineated by the EIAR Site Boundary in green as shown on Figure 6-1 and 6-2.
- > Where the 'Wind Farm Site' is referred to, this refers to turbines and associated foundations and hard-standing areas, meteorological mast, site entrance, junction accommodation works, access roads, temporary transition compound and upgrades to roads along the turbine delivery route, temporary construction compounds, temporary transition compound, 110kV electrical substation, underground cabling, borrow pits, site drainage, tree felling, amenity works and all ancillary works.
- > Where 'Grid Connection' is referred to, this refers to the underground 110kV electrical cabling and all associated site development works connecting the Wind Farm Site to the existing Ardnacrusha 110kV electrical substation.





## 6.2 **Methods**

### 6.2.1 **Scope**

### 6.2.1.1 **Zone of Influence**

According to CIEEM (2018), the 'zone of influence' for a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries... The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change. It may therefore be appropriate to identify different zones of influence for different features. The features affected could include habitats, species, and ecosystems and the processes on which they depend.'

The Zone of Influence of the Proposed Development was initially identified by means of a desktop ecological constraints study, initial ecological site walkovers and preliminary ecological appraisal. Ecological features of importance within the Proposed Development Site as well as within the surrounding area were identified. The potential impacts of various activities associated with construction, operation and decommissioning of the Proposed Development were identified as well as the potential for in-combination effects. The zone of influence/study area for each habitat/species field survey is set out in relevant subsections below.

### 6.2.1.2 Study Area

The 'Study Area' for terrestrial biodiversity comprises the lands within the EIAR Site Boundary as depicted in green in Figure 6-2. The study areas for the desk review and field surveys were identified through considering the nature of the Proposed Development, i.e. a wind farm development, the size and location of the Proposed Development (within a rural upland environment) and the ecological features likely, or known to be present. The experience gained from working on similar onshore wind farms was also used to determine that the study area chosen was both sufficiently sized and proportionate for the project.

#### 6.2.1.2.1 **Desk Study**

The desk study area is composed of two 10 km<sup>2</sup> grid squares that cover the proposed Wind Farm development and associated Grid Connection route and turbine delivery route. Grid squares are used to provide a study area as species records from the National Biodiversity Centre (NBDC) are provided as grid squares rather than as point data. The use of 10 km<sup>2</sup> grid squares for records provides sufficient area to capture any records within the footprint of all aspects of the Proposed Development. However, the absence of published data does not confirm absence of habitats/species.

#### 6.2.1.2.2 Field Surveys

The study area adopted for the ecology field surveys consists of the EIAR Site Boundary (shown as the 'study area' on Figure 6-2) and the associated grid and turbine delivery routes. The field survey also included the temporary transition compound area (shown inset on Figure 6-2).

### 6.2.1.3 Consultation

MKO undertook a scoping exercise during preparation of this EIAR, as described in Chapter 2, Section 2.6 of this EIAR. Copies of all scoping responses are included in Appendix 2.1 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Relevant comments were fully considered in the preparation of this chapter and are summarised below.



Table 6-1 Scoping Responses with Regard to Biodiversity

Item Raised	Section of EIAR where item is addressed					
National Parks and Wildlife Service (Development Applications U	National Parks and Wildlife Service (Development Applications Unit)					
Department noted that there was a confirmed breeding pair of Hen Harrier and one probable nesting pair on Slieve Bernagh recorded in 2022. There are a number of Lesser Horseshoe Bat Special Area of Conservation (SAC's) in the vicinity of the Proposed Development.	This item has been addressed in Chapter 7 in relation to hen harrier and the potential for adverse effect to Danes Hole, Poulnalecka SAC and Ratty River Cave SAC has been assessed in the accompanying NIS.					
The Department noted that one of the main threats identified in the threat response plan for Otter is habitat destruction.	The potential for impacts to otter are addressed in Section 6.4.2.2.1					
It was recommended that peat stability should be assessed where required.	This is assessed in Chapter 8 of this EIAR.					
Marsh fritillary surveys should be carried out as per standard Marsh Fritillary Larval Web Survey methodology.	The potential for the Proposed Development site to support Marsh Fritillary is discussed in Section 6.3.2.3.7.					
All potential cumulative, in-combination and ex situ impacts must be assessed. For example, Carrownagowan Windfarm on the western slopes of Slieve Bearnagh was recently granted permission.	Cumulative effects, including in combination with Carrownagowan Windfarm, are assessed in Section 6.5.					
Hedgerows and scrub should be maintained where possible, as they form wildlife corridors and provide areas for birds to nest in.	Loss of hedgerows and scrub has been avoided where possible with replanting proposed as part of the Biodiversity Management Plan, as discussed in Section 6.4.2.1.5.					
The EIAR should also address the issue of invasive species.	Surveys for invasive species were carried out as discussed in Section 6.3.2.2, with management measures prescribed where required in Section 6.4.2.3.					
Such developments, given their scale and duration, can be an opportunity for ecological enhancement. The EIAR should outline how the project will avoid a net loss of biodiversity.	These items have been addressed through the development of the Biodiversity Management Plan.					
Inland Fisheries Ireland	1					
IFI highlighted the need for protection of streams flowing south from the site into the Blackwater and flowing north into the Owenogarney, both of which are salmonid rivers. All watercourses that receive drainage from construction site of turbines or access roads must be assessed in terms of fish, the food of fish, spawning grounds and fish habitat. In relation to watercourse crossings for the road or Grid Connection, IFI will require to be consulted well in advance in relation to all watercourse crossings or the use of any temporary diversions. Any instream works or other works which may impact directly on a watercourse should only be carried out from 1st July to 30 <sup>th</sup> of	These concerns have been addressed in Chapter 9 'Water' and in Section 6.4.2.1.1 in relation to aquatic ecology.					



September in each year. The EIAR should indicate proposals to monitor the impact on watercourses within the site (especially environmental damage control). IFI also expressed concern with peat stability.	
Clare County Council	
Habitat Protection The EIAR must fully assess the impact of the proposed on habitats within and surrounding/connected to the site. There is a mix of habitat types within the development site including conifer plantations (WD4), recently felled woodland (WS5), mixed conifer woodland (WD3), wet heath (HH3), unknown wetland type (CWS), scrub (WS1) and dense bracken (HD1). On the eastern side of the development site, there are habitats which are identified as being on international and local importance. The Council attached target notes with their response with detailed habitat descriptions of wetland habitats adjacent to the EIAR Site Boundary to the southeast which have been considered as part of the assessment as shown in Section 6.3.1.2.	Habitats of high conservation value adjacent to the EIAR Site Boundary, including to the east, have been recorded as detailed in Section 6.3.1.2. The potential for impact on high value habitats is assessed in Section 6.4.2.1.





## 6.2.2 Baseline Data Collection

Ecological baseline conditions are those existing in the absence of proposed activities (CIEEM, 2018). The following sections outline the methods utilised to establish the baseline ecological condition of the study area(s).

## 6.2.2.1 Desk Study

A desk study was carried out to collate the available ecological information in the study area(s). Data sources used during the desk study include:

- National Parks and Wildlife Service (NPWS) online resources were accessed for information on sites designated for nature conservation such as SAC and Special Protection Areas (SPA), sites such as proposed Natural Heritage Areas (pNHA) that are not legally designated but are identified as being of conservation interest and on protected habitats and species.
- > NPWS provided records from the Rare and Protected Species Database for the hectad in which the Proposed Development is located.
- > The Irish Wetland Surveys Database.
- > The National Biodiversity Data Centre online resource was accessed for information on protected habitats and species. Only records for the past 10 years are considered within this chapter as older records are unlikely to still be relevant given their age and the changes in land use and / or management that has occurred in the intervening period. The changes in land use that occur within a period of 10 years is particularly evident in the upland afforested setting such as that of the study area. Therefore, it is considered that the use of records from the last 10 years is a proportionate approach.
- Environmental Protection Agency (EPA) Maps<sup>1</sup> were accessed for environmental information, such as surface water features, relevant to preparation of this report.
- The conservation status of mammals is evaluated using one or more of the following documents; Wildlife Acts as amended, the Red List of Terrestrial Mammals (Marnell et *al.*, 2019)<sup>2</sup> and the Annexes of the EU Habitats Directive 92/43/EEC<sup>3</sup>.
- > Bat Records for the study area were sought from Bat Conservation Ireland (BCI) Database. These are presented in Appendix 6-2.
- Where available and relevant, ecology reports prepared for other projects within the study area were reviewed. These included the Oatfield Wind Farm EIAR, Lackereagh Wind Farm EIAR and other projects EIARs within the cumulative study boundary.

The following methodology was used to establish which sites that are designated for nature conservation have the potential to be impacted by the Proposed Development:

- Initially the most up to date GIS spatial datasets for European and Nationally designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie). The datasets were utilized to identify Designated Sites which could feasibly be affected by the Proposed Development.
- > All Designated Sites that could potentially be affected were identified using a sourcepathway - receptor model (OPR 2021).

<sup>&</sup>lt;sup>1</sup> EPA Map Viewer https://gis.epa.ie/EPAMaps/

<sup>&</sup>lt;sup>2</sup> Ireland Red List No. 12 Terrestrial Mammals

https://www.npws.ie/sites/default/files/publications/pdf/Red%20List%20No.%2012%20Mammals.pdf

<sup>&</sup>lt;sup>3</sup> Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01992L0043-20130701



- Catchment mapping was used to establish or discount potential hydrological connectivity between the site of the Proposed Development and any Designated Sites.
- The site synopses and main reasons for designation of these sites, as per the NPWS website (www.npws.ie) were consulted where available.
- > Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Influence and further assessment is required.

### 6.2.2.2 Field Surveys

The Study Area for terrestrial ecological surveys was defined by the EIAR Site Boundary (shown on Figure 6-2) and were undertaken on various dates throughout 2021, 2022, 2023 and 2024.

Based on the multi-disciplinary walkover survey findings, further detailed targeted surveys were carried out during follow-up species specific survey visits. These are described in detail below. These surveys were carried out in accordance with NRA *Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna* on National Road Schemes (NRA, 2009).

During the multidisciplinary surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted.

Targeted survey methodologies undertaken within the EIAR Site Boundary are described in the following subsections. Survey dates and surveyors are provided in the table below.

Survey Type	Dates(e)	Surveyor(s) (See Section 6.1.5)
Habitat Mapping and Multidisciplinary	<ul> <li>15<sup>th</sup> of September 2022</li> <li>14<sup>th</sup> of September 2021</li> <li>19<sup>th</sup> of August 2021</li> </ul>	<ul> <li>Rachel Walsh</li> <li>Neansaí O Donovan</li> <li>Kailan Mitchell</li> </ul>
Walkover surveys	<ul> <li>6<sup>th</sup> of July 2021</li> <li>7<sup>th</sup> of November 2023</li> </ul>	Rachel Walsh
Botanical Surveys	<ul> <li>24<sup>th</sup> of October 2023</li> <li>24<sup>th</sup> of August 2023</li> <li>7<sup>th</sup> of June 2023</li> <li>26<sup>th</sup> of April 2023</li> </ul>	<ul><li>Neansaí O Donovan</li><li>Kailan Mitchell</li></ul>
Mammal Surveys	<ul> <li>7<sup>th</sup> of November 2023</li> <li>26<sup>th</sup> of September 2023</li> <li>24<sup>th</sup> of August 2023</li> <li>7<sup>th</sup> of June 2023</li> <li>26<sup>th</sup> of April 2023</li> </ul>	<ul><li>Rachel Walsh</li><li>Kailan Mitchell</li></ul>
Aquatic Surveys	Between the 25th and 28th of July 2022	Triturus Environmental Ltd
Grid Connection Route and Turbine Delivery Route Surveys (Multi- disciplinary surveys)	<ul> <li>26<sup>th</sup> of September 2023</li> <li>27<sup>th</sup> of October 2023</li> </ul>	<ul> <li>Rachel Walsh</li> <li>Sara Fissolo</li> <li>Nathan Finn</li> <li>Kieran Sugrue</li> </ul>
Transition Compound	• 11 <sup>th</sup> of January 2024	<ul><li>Rachel Walsh</li><li>Ryan Connors</li></ul>
Proposed Enhancement Lands	• 22 <sup>nd</sup> May 2024	<ul><li>Rachel Walsh</li><li>Patrick Manley</li></ul>

Table 6-2 Survey Dates

### 6.2.2.2.1 Habitat and Botanical Surveys

Habitat mapping was undertaken within the Study Area Boundary. A comprehensive walkover of the entire Study Area was completed. Surveys of vegetation involving botanical assessment and Annex I



condition assessment were completed within the optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011). Surveys undertaken outside of this period were not used to evaluate habitats. All habitats recorded on site and described in this EIAR chapter have been classified following Fossitt (2000).

Certain areas were subject to a more detailed assessment, including areas within and adjacent to the proposed infrastructure footprint. A total of 31 relevés were recorded within the Study Area, within the proposed footprint of each turbine base, borrow pits, construction compounds, substation, and met mast. The extent of each habitat on site was mapped using aerial photography, hand held GPS and smartphone technology. A representative photograph was also taken for each of the habitats recorded on site, including all relevés. Surveys on peatland habitats utilised a 2m x 2m relevé size as per Perrin et al. (2014). Surveys of woodland utilised a 10m x 10m relevé size as per Perrin et al (2008). Peatland habitats have been categorised to plant communities from the National Survey of Upland Habitats (Perrin et al. 2014) and the Irish Vegetation Classification.

The survey results were then analysed using the Irish Vegetation Classification (IVC) system by means of the ERICA tool (National Biodiversity Data Centre<sup>4</sup>). The IVC is a project with aims to classify, describe, and map in detail all aspects of natural and semi-natural vegetation in Ireland within a single, unified framework. The National Vegetation Database (NVD), upon which the IVC is based, holds data for over 30,000 relevés and is the core resource upon which the classification system is based.

Full details of the survey methodologies and results of all botanical surveys are provided in the Baseline Habitats Report in Appendix 6-1 and an assessment of the potential for the site to support Annex I habitats is also provided in this Appendix.

### 6.2.2.2.2 Species

#### Badger Survey

The badger surveys covered the footprint of the Proposed Development within the Study Area Boundary and any surrounding areas where evidence of badger activity was found. The Proposed Development Site was searched for signs of badger, incidental setts, prints, latrines, foraging signs, mammal trails or sightings. If encountered, setts were classified as per the convention set out in NRA (2009) (i.e. main, annexe, subsidiary, outlier).

The badger survey was conducted adhering to best practice guidance (NRA, 2009) and followed the 'Guidelines for the Treatment of Badger Prior to the Construction of National Roads Schemes' (NRA, 2006a) and following CIEEM best practice competencies for species surveys (CIEEM, 2013<sup>5</sup>).

#### Otter Survey

Following a review of the initial site walkover ecological surveys for constraints identification and the results of the multi-disciplinary walkover survey; areas identified as providing potential habitat for otter were subject to specialist targeted survey. Otter surveys of watercourses were undertaken along all watercourses in the vicinity of the Proposed Development infrastructure footprint during survey dates listed in previous sections. Otter surveys were also undertaken during a fisheries assessment of the watercourses both within and downstream of the study area between the 25<sup>th</sup> and 28<sup>th</sup> of July 2022.

The otter surveys were conducted as per NRA (2009) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes). This involved a search for all otter signs e.g. spraints, scat, prints, slides, trails, couches and holts. In addition to the width of the

<sup>&</sup>lt;sup>4</sup> https://biodiversityireland.ie/projects/ivc-classification-explorer/. Accessed 13.08.2024

<sup>&</sup>lt;sup>5</sup> CIEEM, 2013, Technical Guidance Series – Competencies for Species Survey, Online, Available at:

https://cieem.net/resource/competencies-for-species-survey-css/ Accessed: 19.10.2023



rivers/watercourses, a 10m riparian buffer (both banks) was also surveyed (NPWS 2009). The dedicated otter surveys also followed the guidance as set out in NRA (2008) 'Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes' and following CIEEM best practice competencies for species surveys (CIEEM, 2013).

#### **Bat Surveys**

Bat surveys undertaken in 2022, in accordance with NatureScot Guidance (NatureScot, 2021), form the core dataset for the assessment of effects on bats at the Proposed Development Site. The 2022 surveys are supplemented by additional data derived from surveys undertaken on the Proposed Development Site in 2021 in accordance with SNH (2019) Guidelines. Field surveys included a bat habitat appraisal and roost suitability assessment, manual activity surveys and ground-level static surveys.

A detailed bat survey report is provided in Appendix 6-2 of this EIAR. This document provides a detailed description of survey methodologies undertaken at the Proposed Development Site during the survey period 2021-2022, together with details of surveys undertaken along the proposed Grid Connection route and turbine delivery route. Full details of the survey times and dates and the methodologies followed are provided in Appendix 6-2 along with details of all the surveyors.

#### Aquatic surveys

The small streams within the Study Area Boundary, and downstream watercourses, were subject to biological evaluation and assessment through kick sampling, fish stock assessment (electro-fishing) and white-clawed crayfish surveys between the 25<sup>th</sup> and 28<sup>th</sup> of July 2022. A range of survey sites were selected based on their proximity to proposed infrastructure and connectivity with catchments downstream of the Proposed Development. A total of 26 sites on 18 watercourses were selected for detailed aquatic assessment (see Table 2.1, Figure 2.1 in Appendix 6-4).

The aquatic survey sites were chosen both within the Study Area Boundary, in the low-order, upper reaches of rivers, and also downstream of the Study Area Boundary, where channel size increased. This helped detect changes in fisheries composition, biological water quality and also the presence of Annex I aquatic habitats and protected species such as crayfish longitudinally in the respective sub-catchments. The aquatic survey sites were located within the Owenogarney\_SC\_010, Owenogarney\_SC\_012 and Shannon[Lower]\_SC\_100 river sub-catchments. Aquatic survey sites were selected on the Ballyvorgal North Stream (EPA code: 27B47), Belvoir Stream (27B45), Snaty Stream (27S13), Clashduff Stream (27C44), East Cloontra Stream (25E29), Glenomra Wood Stream (25G12), Gortadroma Stream (27G12), Knockshanvo Stream (25K82), Kyleglass Stream (25K83), Mountrice River (25M03), Oatfield Stream (25O07), O'Neill's Stream (25O02), Owenogarney River (27O01), River (Clare) Blackwater (25B06), Rocks Stream (27R07), Snaty River (25S34), Springmount Stream (27S93), West Cloontra Stream (25W36) and an unnamed stream (see Table 2-1, Appendix 6-4).

Full details of the survey methodologies used, and results of these surveys, are provided in Appendix 6-4. Surveys included:

- A fisheries assessment (electro-fishing and/or fisheries habitat appraisal),
- > white-clawed crayfish survey,
- > macrophyte and aquatic bryophyte survey and,
- > Biological water quality sampling (Q-sampling)/kick-sampling.

Selected locations were also tested via eDNA analysis for presence of white-clawed crayfish and freshwater pearl mussel (*Margaritifera margaritifera*).

Aquatic plant species protected under Flora (Protection) Order, 2022 (S.I. No. 235 of 2022) were searched for during all aquatic surveys.



#### Invasive species survey

During the multi-disciplinary walkover surveys, a search for non-native invasive species was undertaken. The survey focused on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (As Amended) (S.I. 477 of 2015).

### 6.2.2.3 Limitations

The information provided in this chapter describes the baseline ecological environment following surveys on numerous dates during all seasons and over 3 years; provides a comprehensive description of the baseline and allows an accurate prediction of the likely ecological effects of the Proposed Development.

Limitations relating to bat surveys and aquatic surveys are discussed in the respective baseline reports in Appendix 6-2 Bat Baseline Report and 6-4 Aquatic Baseline Report.

The Proposed Development site contains areas of dense conifer forestry plantations, certain areas of which could not be surveyed due to the density of trees and lack of accessibility. Fire breaks, forestry clearings and mature forestry plantations were accessible. This minor survey limitation has been fully accounted for in the impact assessment.

The habitats and species within the EIAR Site Boundary were readily identifiable and comprehensive assessments were made over several field visits. Habitat and species surveys were carried out within the appropriate time of year as required, and no issues with site access which could impede appropriate survey coverage were encountered.

No significant limitations in the scope, scale or context of the assessment have been identified.

## 6.2.3 Assessment Approach

### 6.2.3.1 Important Ecological Features

Ecological features can be important for a variety of reasons and the rationale used to identify them is explained in the text below. Importance may relate, for example, to the quality or extent of the site or habitats therein; habitat and/ or species rarity; the extent to which such habitats and/ or species are threatened throughout their range, or to their rate of decline.

The importance of the ecological features identified within the Study Area was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2009). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

- > International
- National
- > County
- > Local Importance (Higher Value)
- > Local Importance (Lower Value)

The NRA, 2009 Guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) features contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area.



Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna. Specific criteria for assigning each of the other levels of importance are set out in the guidelines and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological features.

Any ecological features that are determined to be of National or International, County or Local importance (Higher Value) following the criteria set out in NRA 2009 are considered to be Important ecological Features for the purposes of ecological impact assessment if there is a pathway for effects thereon. Any features that are determined to be of Local Importance (Lower Value) are not considered to be Important Ecological Features.

### 6.2.3.2 Impact Assessment

The Proposed Development will result in a number of impacts. The ecological effects of these impacts are characterised as per the CIEEM 'Guidelines for Ecological Impact Assessment in the UK and Ireland' (2018, updated 2022). These guidelines are the industry standard for the completion of Ecological Impact Assessment in the UK and Ireland. The headings under which the impacts are characterised follow those listed in the guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

- > **Positive or Negative.** Assessment of whether the Proposed Development results in a positive or negative effect on the ecological receptor.
- **Extent.** Description of the spatial area over which the effect has the potential to occur.
- Magnitude Refers to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
- Duration is defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.
- **Frequency and Timing.** This relates to the number of times that an impact occurs and its frequency. A small-scale impact can have a significant effect if it is repeated on numerous occasions over a long period.
- Reversibility. This is a consideration of whether an effect is reversible within a 'reasonable' timescale. What is considered to be a reasonable timescale can vary between features and is justified where appropriate in the impact assessment section of this report.



### 6.2.3.2.1 Assessment of Bat Collision Risk

#### **Population Risk**

NatureScot (2021) provides a generic assessment of bat collision risk for UK species, based on species behaviour and flight characteristics. In the guidelines, this measure of collision risk is used, in combination with relative abundance, to indicate the potential vulnerability of British bat populations. No such assessment is provided for Irish bat populations.

In Table 6-3, an adapted assessment of vulnerability for Irish bat populations is provided. This adaptation of the NatureScot Guidance Table 2 was based on collision risk and species abundance of Irish bat populations. Species' collision risk follows those described in NatureScot (2021). Relative abundance for Irish species was determined in accordance with Wray *et al.* (2010) using population data available in the 2019 Article 17 reports (NPWS, 2019). Feeding and commuting behaviours, and habitat preferences for bat species in Ireland were also considered.

Relative			
abundance	Low Collision Risk	Medium Collision Risk	High Collision Risk
Common			Common pipistrelle
species			Soprano pipistrelle
	Daubenton's bat		
	Brown long-eared bat		
Rarer species	Lesser horseshoe bat		Leisler's bat
	Natterer's bat		
Rarest species	Whiskered bat		Nathusius'pipistrelle

Table 6-3 Population Vulnerability of Irish Bat Species (Adapted from NatureScot, 2021)

Low Population	Medium Population	High Population
Vulnerability	Vulnerability	Vulnerability

#### Site Risk

The likely impact of a Proposed Development on bats is related to site-based risk factors, including habitat and development features. The cross-tablature result of habitat risk and project size determines the site risk (i.e. Low, Medium or High) (Table 6-4) i.e. Table 3a (NatureScot, 2021). Table 6-22 in the results section describes the criteria and site-specific characteristics used to determine an indicative risk level for the proposed site. All site assessment levels, as per NatureScot (2021) are presented in Appendix 6-3.

			/		
				Project Size	
		Small		Medium	Large
	Low		1	2	
Habitat	Moderate		2	3	
Risk	High		3	4	

Table 6-4 Site-risk Level Assessment Matrix (Table 3a, NatureScot, 2021)

Low/Lowest Site	Medium Site	High/Highest Site
Risk (1-2)	Risk (3)	Risk (4-5)

3



#### **Overall Risk Assessment**

An overall assessment of risk was made by combining the site risk level (i.e. Medium) and the population risk (i.e. site-specific bat activity outputs), as shown in the overall risk assessment matrix table (Table 6-5) i.e. Table 3b (NatureScot, 2021). The assessment was carried out for both median and maximum bat passes per hour in order to provide insight into typical bat activity (i.e. median values) and activity peaks (i.e. maximum values). The assessment of activity levels is presented in the Bat Baseline Report in Appendix 6-2.

Activity category						
	Nil	Low	Low-Moderate	Moderate	Moderate-High	High
Site Risk Level	(0)	(1)	(2)	(3)	(4)	(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

#### Table 6-5 Overall Risk Assessment Matrix (Table 3b, NatureScot, 2021)

Low		High
Overa	Medium	Overall
ll Risk	Overall Risk (5-	Risk (15-
(0-4)	12)	25)

This exercise was carried out for each high collision risk species. Overall risk assessments were also considered in the context of any potential impacts at the population level, particularly for species identified as having high population vulnerability.

### 6.2.3.3 Significant Effects

For the purpose of Ecological Impact Assessment (EcIA), 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'Important Ecological Features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2018).

When determining significance, consideration is given to whether:

- > Any processes or key characteristics of Key Ecological Features will be removed or changed
- > There will be an effect on the nature, extent, structure and function of Important Ecological Features
- > There is an effect on the average population size and viability of ecologically important species.
- > There is an effect on the conservation status of important ecological habitats and species.

As per CIEEM (2018) best practice guidelines, the following key elements should also be examined when determining the significance of effects:

> A 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives (CIEEM, 2018).



## 6.2.3.4 Cumulative Effects

The potential cumulative effects of the Proposed Development when considered together with other projects, on the biodiversity of the Study Area have been identified. The cumulative effects have been identified by considering proposed, approved and existing projects and projects pending a decision from the planning authority, and land-uses in the cumulative assessment study area. The cumulative assessment study area selected for biodiversity is a 10km radius around the Proposed Development in order to assess the potential for cumulative effects on bat species as per NatureScot guidelines (2021). The cumulative assessment also considers projects on a sub-catchment level in order to capture the potential for cumulative effects on terrestrial habitats and fauna and aquatic receptors. Projects within 500m of the Proposed Grid Connection have been considered, this distance is deemed sufficient given the small nature and scale of works associated with the Grid Connection route.

Projects within the cumulative assessment study area were identified through a search of relevant online planning registers and effects were considered following a review of associated EIARs.

## 6.2.3.5 Avoidance, Mitigation, Compensation and Enhancement

When seeking mitigation or compensation solutions, efforts should be consistent with the geographical scale at which an effect is significant. For example, mitigation and compensation for effects on a species population significant at a county scale should ensure no net loss of the population at a county scale. The relative geographical scale at which the effect is significant will have a bearing on the required outcome which must be achieved. This approach was adopted in the assessments within this EIAR.

Where potentially significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM Guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of impacts where possible, the application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied residual effects are then identified along with any necessary compensation measures, and incorporation of opportunities for enhancement.

It is important for the EcIA to clearly differentiate between avoidance mitigation, compensation and enhancement and these terms are defined here as follows:

- > Avoidance is used where an impact has been avoided, e.g. through changes in scheme design;
- Mitigation is used to refer to measures to reduce or remedy a specific negative impact in situ;
- Compensation describes measures taken to offset residual effects, i.e. where mitigation in situ is not possible; and
- > Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.



# 6.3 Baseline Ecological Conditions

## 6.3.1 **Desk Study Results**

## 6.3.1.1 Sites Designated for Nature Conservation

SACs and SPAs are designated under the EU Habitats Directive and EU Birds Directive, respectively and are collectively known as the Natura 2000 network or Natura 2000 sites<sup>6</sup>. These sites are referred to as 'European Sites' hereafter. European Sites in the vicinity of the Proposed Development are shown on Figure 6-3. The following European Sites were screened in for further assessment in the Natura Impact Statement (NIS) which accompanies this application:

- > Danes Hole, Poulnalecka SAC
- > Ratty River Cave SAC
- Lower River Shannon SAC
- > River Shannon and River Fergus Estuaries SPA

As per EPA Guidance 2022, "a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement" but should "incorporate their key findings as available and appropriate". Section 6.4.5.1 of this EIAR provides a summary of the key assessment findings with regard to European Designated Sites.

NHAs are designated under Section 18 the Wildlife Act and their management and protection is provided for by this legislation and planning policy. The potential for effects on these designated sites is fully considered in this Chapter.

Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these designated sites is fully considered in this Chapter.

The methodology used to determine which Nationally Designated Sites are within the Likely Zone of Influence of the Proposed Development is outlined in Section 6.2.2.1. Table 6-6 below provides details of all relevant Nationally Designated Sites and assesses which are within the likely Zone of Influence. Nationally Designated Sites surrounding the Proposed Development are shown in Figure 6-4.

 $<sup>^{\</sup>it 6}$  Also referred to as European Sites in the Planning and Development Acts 2000 – 2023.







Table 6-6 Nationally Designate	ed Sites	
Designated Site	Distance from EIAR Site Boundary (km)	Likely Zone of Influence Determination
Natural Heritage Areas (1	NHA)	
Gortacullin Bog NHA [002401]	Located to the north, adjacent to the site boundary.	<ul> <li>This NHA borders the Proposed Development Site boundary to the north.</li> <li>The site synopsis (NPWS, 2004) for Gortacullin Bog describes it as follows, "Gortacullin Bog NHA contains a mosaic of upland blanket bog and wet heath and is located approximately 4 km south-west of Broadford, and approximately 9 km northeast of Sixmilebridge, in Co. Clare." The NHA is further described as "a site of considerable conservation significance containing upland blanket bog and wet heath. The site supports a good diversity of blanket bog microhabitats, including hummock/hollow complexes, flushes and regenerating cutover with willow and birch scrub."</li> <li>Gortacullin Bog NHA is evaluated important at the national level as it is designated as site of national interest for peatlands.</li> <li>The NHA boundary is approx. 50m from the nearest proposed infrastructure, comprising a proposed access road. According to the Peatland Code (IUCN 2023), peatland is considered 'drained' if it is within 30m of an artificial drain or a natural drain formed by the presence of a hagg and gully. Given the distance between site infrastructure and the NHA as well as the presence of existing commercial forestry and drains along the NHA, there is no potential for significant effect to peatland habitats as a result of drainage due to proposed infrastructure. However, a potential for significant effect to the NHA as a result of adjacent felling works required for the Proposed Development (associated with the Biodiversity Management Plan) has been identified.</li> <li>The NHA is considered to be within the Likely Zone of Influence</li> </ul>
Doon Lough NHA [000337]	2.2km	The Proposed Development Site is located completely outside of the designated site, therefore there is no potential for direct effects. According to the site synopsis, the NHA consists of a raised bog
		with vegetation typical of a western raised bog. The bog also consists of cutover habitats. The site includes a large lake system with fringing habitats. Rivers within the Proposed Development Site drain northwards within the east of the Proposed Development Site to this NHA which is approx. 4km downstream. A proposed new road is located approx. 140m from the mapped EPA watercourse and hydrological catchment boundary within which the NHA is located. A source-pathway-receptor chain for impact was identified. The NHA is considered to be within the Likely Zone of Influence and further assessment is required.

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Designated Site	Distance from EIAR Site Boundary (km)	Likely Zone of Influence Determination
Woodcock Hill Bog NHA [002402]	4.3km	The Proposed Development Site is located completely outside of the designated site, therefore there is no potential for direct effects.
		According to the site synopsis, this NHA is an upland blanket bog with heath habitats. This NHA is located 4.3km south of the Proposed Development and is designated for terrestrial habitats. It is also located within a separate groundwater body to the Proposed Development Site. There is no source-pathway-receptor chain for impact.
		This NHA is therefore not within the Likely Zone of Influence and further assessment is not required.
Cloonloum More Bog NHA [002307]	5km	The Proposed Development Site is located completely outside of the designated site, therefore there is no potential for direct effects.
		According to the site synopsis, this NHA consists of a raised bog. A small lake, Lough Gara, is included at the south of the site. This NHA is located 5km north of the Proposed Development and is upgradient with no downstream hydrological connectivity from the Proposed Development Site. It is also located within a separate groundwater body to the Proposed Development Site. There is no source-pathway-receptor chain for impact.
		This NHA is therefore not within the Likely Zone of Influence and further assessment is not required.
Proposed Natural Heritag	e Areas (pNHA)	
Glenomra Wood [001013]	380m to the east of the turbine	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site.
This site is also designated as an SAC	delivery route	Given the nature of the terrestrial woodland habitat for which this pNHA has been designated, and the distance to the Proposed Development boundary, no pathway for indirect effects on the terrestrial woodland habitat for which the pNHA has been designated exists.
		This pNHA is therefore not within the Likely Zone of Influence and further assessment is not required.
Castle Lake [000239]	Overland distance: 520 meters	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site.
	Hydrological distance: 5km	According to the site synopsis, the site consists of Castle Lake and Ballymulcashel Lough, riparian woodland and a breeding cormorant colony. Hazel scrub, ash/oak woodland, a planted mixed woodland and species rich wet grasslands are also present. The site of the Proposed Development is hydrologically connected to the pNHA. At its closest, the pNHA is located approximately 5km downstream of the Proposed Development infrastructure via the Owenogarney River to the west of the site. A potential for significant effect to this designated site as a result of deterioration in water quality due to the Proposed Development was identified.



Designated Site	Distance from EIAR Site Boundary (km)	Likely Zone of Influence Determination
		The pNHA is considered to be within the Likely Zone of Influence and further assessment is required.
Danes Hole, Poulnalecka [000030] This site is also designated as an SAC	655 meters	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site. Danes Hole, Poulnalecka SAC has been designated for the presence of a winter roost (id. 59) and summer roost (id. 720) for lesser horseshoe bat ( <i>Rhinolophus hipposideros</i> ). According to map 3 of the site-specific conservation objectives, the Proposed Development is located within the core foraging range of lesser horseshoe bat (2.5km, NPWS 2018). A potential pathway for effect on this designated site was identified in the form of loss of foraging and commuting habitat, disturbance/displacement and collision risk to Lesser Horseshoe bat was identified. <b>The pNHA is considered to be within the Likely Zone of</b>
Inner Shannon Estuary - South Shore [000435] <i>This site is also</i> <i>designated as an SAC</i> <i>and SPA</i>	Overland distance from EIAR Site Boundary (including turbine delivery route transitional compound): 1.5km Overland distance from proposed Wind Farm Site: 5.3km	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site. This site is located 15km downstream of the Proposed Wind Farm Site at its closest point. This site is located approx. 1.5km downstream of the proposed temporary transitional compound area. A potential for impact on this site via water quality deterioration was identified. The pNHA is considered to be within the Likely Zone of Influence and further assessment is required.
Knockalisheen Marsh [002001] This site is also designated as an SAC	1.5km	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site. There is no downstream hydrological connectivity from the Proposed Development Site to this designated site. <b>This pNHA is therefore not within the Likely Zone of Influence and further assessment is not required.</b>
Dromore & Bleach Loughs [001030]	1.9km	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site. According to the site synopsis, the site consists of alkaline lakes and limestone outcrops. An area of fen exists between the lakes which transitions from wet fen to raised bog. This designated site is located to the south of the River Shannon in a separate hydrological catchment to the Proposed Wind Farm Site. The proposed temporary transitional compound is located 1.9km from the pNHA, however there is no hydrological connectivity between



Designated Site	Distance from EIAR Site Boundary (km)	Likely Zone of Influence Determination	
		the Proposed Development and the pNHA. There is no source- pathway-receptor chain for impact.	
		This pNHA is therefore not within the Likely Zone of Influence and further assessment is not required.	
Cloonlara House [000028]	2.6km	This site is designated for a summer roost of over 100 Leisler's ba (NPWS 2009). According to Bat Conservation Trust – <i>Bat Survey</i> <i>for Professional Ecologists</i> (Collins 2016), Leisler's bats have a Core Sustenance Zone (CSZ) of 3km from the roost. The Proposed Development Site is 2.6km from the roost, therefore a potential for impact was identified on bats commuting from the roost.	
		The pNHA is considered to be within the Likely Zone of Influence and further assessment is required.	
Fergus Estuary And Inner Shannon, North Shore [002048]	Over-land distance: 3.9km	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site.	
This site is also designated as an SAC and SPA		This is site is located within the Lower River Shannon. This site is located 13.9km downstream of the Proposed Development Site at its closest point. A potential for impact on this site via water quality deterioration was identified.	
		The pNHA is considered to be within the Likely Zone of Influence and further assessment is required.	
Lough Cullaunyheeda [001017]	4.4km	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site.	
		According to the site synopsis, this site consists of a chain of small lakes with nationally important numbers of Tufted Duck and Coot and locally important populations of other waterbirds. Shorelines consist of wet woodland and cutover bog. The pNHA is located to the northwest of the Proposed Development Site in a separate hydrological subcatchment. There is source-pathway-receptor chain for impact on this designated site.	
		This pNHA is therefore not within the Likely Zone of Influence and further assessment is not required.	
Rosroe Lough [002054]	5.4km	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site.	
		According to the site synopsis, the site consists of a lake with a complex of limestone outcrops, scrub and a small area of raised bog. There is no downstream connectivity from the Proposed Development Site to this designated site. The Proposed Development Site drains to the Owenogarney River in the west which has no hydrological connectivity with this designated site.	
		This pNHA is therefore not within the Likely Zone of Influence and further assessment is not required.	



Designated Site	Distance from EIAR Site Boundary (km)	Likely Zone of Influence Determination	
Castleconnell (Domestic Dwelling, Occupied)	5.4km	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site.	
[000433]		The Proposed Development Site is located 5.4km from the bat roost for which this site is designated and is located on the opposite side of Parteen Canal and River Shannon from the Proposed Development Site.	
		This pNHA is therefore not within the Likely Zone of Influence and further assessment is not required.	
Curraghchase Woods [000174]	5.5km	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site. There is no downstream connectivity from the Proposed Development Site to this designated site.	
		The Proposed Development Site is located outside of the 2.5km foraging range for Lesser Horseshoe Bat (NPWS 2018), therefore, there is no potential for significant effect.	
		This pNHA is therefore not within the Likely Zone of Influence and further assessment is not required.	
Fin Lough (Clare) [001010]	6.6km	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site.	
		According to the site synopsis, the site consists of a small to medium calcareous lake with diverse fringing vegetation and rare beetle. There is no downstream connectivity from the Proposed Development Site to this designated site. The Proposed Development Site drains to the Owenogarney River in the west which has no hydrological connectivity with this designated site.	
		This pNHA is therefore not within the Likely Zone of Influence and further assessment is not required.	
Loughmore Common Turlough [000438]	6.7km	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site. The pNHA is located to the south of the River Shannon, within a separate groundwater body to the Proposed Wind Farm Site. Therefore, there is no source-pathway-receptor chain for impact.	
		This pNHA is therefore not within the Likely Zone of Influence and further assessment is not required.	
Ballycar Lough [000015]	8.7km	There is no potential for direct effects as the Proposed Development is located entirely outside of this designated site.	
		According to the site synopsis, the site consists of a small calcareous lake with diverse fringing vegetation and fen. There is no downstream connectivity from the Proposed Development Site to this designated site which is 8.7km west of the Proposed Development Site. The Proposed Development Site drains to the Owenogarney River in the west which has no hydrological connectivity with this designated site	



Designated Site	Distance from EIAR Site Boundary (km)	Likely Zone of Influence Determination
		This pNHA is therefore not within the Likely Zone of Influence and further assessment is not required.
Poulnagordon Cave (Quin) [000064] This site is also	9.6km	The Proposed Development Site is located completely outside of the 2.5km foraging range (NPWS 2018 <sup>7</sup> ) for the lesser horseshoe bat roost for which this pNHA is designated. Therefore, there is no source-pathway-receptor chain for impact.
designated as an SAC		This pNHA is therefore not within the Likely Zone of Influence and further assessment is not required.

As discussed in the above table, a potential for significant effect on Gortacullin Bog NHA was identified on a precautionary basis, given that felling works are required as part of the Proposed Development, in forestry located adjacent to this NHA.

The below listed NHA and pNHAs are located hydrologically downstream of the Proposed Development Site. Given the nature and scale of the Proposed Development, a potential for deterioration in water quality which in turn could impact downstream watercourses and designated sites has been identified as a result of the Proposed Development.

- Doon Lough NHA [000337]
- Castle Lake [000239]
- > Fergus Estuary And Inner Shannon, North Shore [002048]
- > Inner Shannon Estuary South Shore [000435]

A potential for impact on the following pNHAs was identified via the potential loss of commuting and foraging habitat within the foraging ranges of Lesser Horseshoe Bat and Leisler's Bat, as well as via disturbance and collision risk to bats:

- Danes Hole, Poulnalecka [000030]
- Cloonlara House [000028]

<sup>&</sup>lt;sup>7</sup> NPWS (2018) Conservation objectives supporting document – lesser horseshoe bat (Rhinolophus hipposideros) Version 1. Conservation Objectives Supporting Document Series. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin, Ireland.



## 6.3.1.2 Habitats

### 6.3.1.2.1 Article 17 Habitats

A search of the NPWS Article 17 datasets<sup>8</sup> (2019) was undertaken to identify Article 17 habitats within or adjacent to the EIAR Site Boundary, as seen in Figure 6-5.

Dry heath (4030) is mapped at several locations within central and western areas of the Proposed Development Site. Some of these areas have been planted with forestry as visible from recent aerial imagery. No other Article 17 habitats are mapped within the Proposed Development boundary.

Gortacullin Bog NHA, located north of the EIAR Site Boundary, is mapped as Active blanket bog (7130), wet heath (4010) and dry heath (4030).

Wet heath is additionally mapped 300m south of the EIAR Site Boundary. *Molinia* meadows (6410) are mapped approx. 1.1km south of the EIAR Site Boundary. Old oak woodlands (91A0) are mapped approx. 1km north and 1.5km southeast of the EIAR Site Boundary. *Cladium* fen (7210) is mapped approx. 1.7km north of the EIAR Site Boundary.

#### 6.3.1.2.2 Irish Wetland Surveys

The Irish Wetland Surveys web map viewer was accessed on 19.10.2023<sup>9</sup>. A number of wetland areas within the EIAR Site Boundary have been mapped, including 'Snaty Cutover', 'Cloontra Bog', and 'Drumsillagh North', and a number of wetland sites are mapped adjacent to the EIAR Site Boundary including 'Oatfield', Cloghoolia, Coolycasey and 'Ballyvorgal South Exposure'.

The habitat survey descriptions (dated 2011, RPS) for the wet heath areas adjacent to the EIAR Site Boundary to the southeast of the EIAR Site Boundary were reviewed (Target Notes 2 and 3). These target notes were received from Clare County Council as part of their scoping response. These areas were categorised as wet heath (HH3) and poor fen and flush (PF2) of County Importance (TN2) and wet heath (HH3) of International Importance (TN3) (Plate 6-1).



Plate 6-1 Wetland target note areas in yellow outline to the east of the Proposed Development Site provided by Clare County Council. The EIAR Site Boundary is shown in green.

<sup>&</sup>lt;sup>8</sup> Including bog 2012 and 2019 datasets, Online, Available at: https://www.npws.ie/publications/article-17-reports

<sup>&</sup>lt;sup>9</sup> https://wetland.maps.arcgis.com/apps/View/index.html?appid=e13b75c3bcab4932b992aa0169aa4a32&extent=-12.6266,51.3236,-3.2168,55.4102





## 6.3.1.3 **Species**

### 6.3.1.3.1 Protected Flora

A search was made in the New Atlas of the British and Irish Flora (Preston *et al*, 2002) to investigate whether any rare or unusual plant species listed under Annex I of the EU Habitats Directive, The Irish Red Data Book of Vascular Plants (Wyse Jackson et al. 2016) or the Flora (Protection) Order (1999, as amended 2022) had been recorded in the relevant 10km squares in which the Proposed Development Site is situated. A record for Wood club-rush (*Scirpus sylvaticus*), listed as Near Threatened on the Red Data Book, is present within the hectad.

A search of the NPWS online database for bryophytes (non-vascular land plants comprising of mosses, hornworts and liverworts) was also undertaken with no protected bryophytes recorded within or adjacent to the proposal (NPWS, 2021).

An information request was also sent to the NPWS requesting records from the Rare and Protected Species Database. The table below lists rare and protected species records obtained from NPWS, as received on the 23<sup>rd</sup> February 2023, as well as those recorded available through the online NPWS map viewer. In addition to a number of the NBDC records listed below, the below records were obtained.

Common name	Scientific name	Designation	Hectad
Scissors Pincerwort	Cephalozia loitlesbergeri	N/A	R57
Reindeer Lichen	Cladonia portentosa	HD Annex V	R56, R57
Small White Orchid	Pseudorchis albida	FPO	R56
Austin's Bog-moss	Sphagnum austinii	HD Annex V	R57

Table 6-7 National Parks and Wildlife Service Map Viewer and Data Request Records

### 6.3.1.3.2 National Biodiversity Data Centre (NBDC) Records

A search of the NBDC records for the relevant hectads, R56 and R57, provided records on a number of fauna species of conservation concern (excluding birds which are addressed in Chapter 7). These are provided in the table below.

Common name	Scientific name	Designation	Hectad
European Otter	Lutra lutra	HD Annex II, IV, WA	R56, R57
Common Frog	Rana temporaria	HD Annex V, WA	R56, R57
Smooth Newt	Lissotriton vulgaris	WA	R56
Common Lizard	Zootoca vivipara	WA	R56
Freshwater White- clawed Crayfish	Austropotamobius pallipes	HD Annex II, WA	R56
Marsh Fritillary	Euphydryas aurinia	HD Annex II	R56, R57

Table 6-8 NBDC Records for Species of Conservation Interest in hectad R56, R57.



Common name	Scientific name	Designation	Hectad
Soprano Pipistrelle	Pipistrellus pygmaeus	HD Annex IV, WA	R56, R57
Common Pipistrelle	Pipistrellus pipistrellus	HD Annex IV, WA	R56, R57
Brown Long-eared Bat	Plecotus auritus	HD Annex IV, WA	R56
Daubenton's Bat	Myotis daubentonii	HD Annex IV, WA	R56, R57
Lesser Horseshoe Bat	Rhinolophus hipposideros	HD Annex II, IV, WA	R56, R57
Lesser Noctule	Nyctalus leisleri	HD Annex IV, WA	R56, R57
Pine Marten	Martes martes	HD Annex V, WA	R56, R57
Eurasian Badger	Meles meles	WA	R56, R57
Eurasian Red Squirrel	Sciurus vulgaris	WA	R56, R57
Eurasian Pygmy Shrew	Sorex minutus	WA	R56, R57
Fallow Deer	Dama dama	WA	R56, R57
Irish Hare	Lepus timidus subsp. Hibernicus	HD Annex V, WA	R56, R57
Irish Stoat	Mustela erminea subsp. Hibernica	WA	R56, R57
West European Hedgehog	Erinaceus europaeus	WA	R56

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

### 6.3.1.3.3 Marsh fritillary (Euphydryas aurinia)

No records of marsh fritillary have been recorded within the Proposed Development Site boundary. NBDC records for marsh fritillary are located in the hectads R56 and R57 within which the Proposed Development is located. One NPWS point record is located approx. 500m east of the Proposed Development Site boundary.

### 6.3.1.3.4 Freshwater pearl mussel (Margaritifera margaritifera)

The NPWS *Margaritifera* Sensitive Area map (Version 8, 2017) was consulted during the desk study. There is no surface water connectivity between the Proposed Development Site and any *Margaritifera* catchment. The Proposed Development Site boundary is located over 8km southwest of the Shannon-



Graney/Scariff Catchment and over 27km east of the Shannon-Cloon *Margaritifera* Sensitive Area with no downstream connectivity to either.

### 6.3.1.3.5 Invasive Species

#### National Biodiversity Data Centre

The NBDC database also contains records of invasive species identified within the relevant hectad. The following records of Third Schedule invasive species are present in hectads R56 and R57:

- > American mink (*Mustela vison*)
- > Himalayan Knotweed (Persicaria wallichii)
- > Indian Balsam (Impatiens glandulifera)
- > Japanese Knotweed (*Reynoutria japonica*)
- Rhododendron (*Rhododendron ponticum*)
- > Giant Hogweed (*Heracleum mantegazzianum*)
- > Zebra Mussel (Dreissena polymorpha)

#### Monterey Pine Engraver Pseudips mexicanus

In addition, forestry stakeholders were notified by the Department of Agricultural, Food and the Marine (DAFM) of a recent discovery of Monterey Pine Engraver (*Pseudips mexicanus*), an introduction species from Mexico. Ninety-three insects were found in 2023 in forestry locations in Co. Clare. According to DAFM, potential impacts are not clear and there are high levels of uncertainty regarding the risks posed. As a result, DAFM has established the 'Monterey Pine Engraver Demarcated Area' with a 10km radius from the traps where the beetles were captured. The Proposed Development Site is located within this radius. Therefore, restrictions will apply to the felling and movement of pine species from this area. This is to ensure that untreated wood and wood products only leave the area for treatment by DAFM and not for direct trade or export.

### 6.3.1.4 Conclusions of the Desk Study

The desktop study has provided information about the existing environment in hectads R56 and R57, within which the Proposed Development is located. The non-volant mammal species recorded within the relevant hectad have widespread range and distributions in Ireland and are likely to be recorded frequently throughout Ireland (Marnell et al, 2009<sup>10</sup>). Bat records within 10km of the Proposed Development Site (provided in Appendix 6-2) revealed that the wider area has been studied for bats. This suggests that the area offers potential for foraging and commuting bat species. Several SAC sites designated for Lesser horseshoe bat are located within the vicinity of the Proposed Development Site, therefore there is potential for the site to offer roosting, foraging and commuting habitat for this Annex II species. An NPWS record for Marsh Fritillary butterfly exists less than 500m from the Proposed Development Site, there is potential for this species to be found on suitable habitats within the site boundary.

Areas within the Proposed Development Site boundary are mapped as Article 17 Dry Heath habitat which will require further survey and assessment. Article 17 peatland habitats are also present adjacent to the northern EIAR Site Boundary within Gortacullin Bog NHA.

A number of watercourses which drain the Proposed Development flow into several European and Nationally Designated sites downstream, as well as non-statutory designated pNHAs.

<sup>&</sup>lt;sup>10</sup>Marnell, F., Kingston, N. & Looney, D. (2009) Ireland Red List No. 3: Terrestrial Mammals, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.



The faunal species and habitat types recorded during the desk study informed the survey methodologies undertaken during the site visits. The desk study also provided useful information with regard to identification of pathways for potential impact on sensitive ecological features.

## 6.3.2 Field Survey Results

### 6.3.2.1 Habitats

Detailed results of the habitat surveys undertaken and of detailed botanical assessments undertaken are provided in the Baseline Habitats Report in Appendix 6-1.

### 6.3.2.1.1 Conifer Forestry (WD5) and clear-fell (WS5)

Most of the Proposed Development Site comprises different stages of coniferous plantation forestry including recent clear-fell (WS5), second rotation, immature, semi-mature and mature conifer forestry (WD4). The species comprise mainly of sitka spruce (*Picea sitchensis*) with some areas also containing lodgepole pine (*Pinus contorta*) and European Larch (*Larix decidua*). Given the nature of such densely planted coniferous plantations, few other woody plant species occur. All 9 of the proposed turbines occur within conifer forestry (WD4). The proposed substation, met mast, 5 no. borrow pits and construction compounds also occur within conifer forestry.

These habitats are classified as local importance (lower value) given their low biodiversity value. They are not considered to be Important Ecological Features.

### 6.3.2.1.2 Oak-ash-hazel Woodland (WN2)

A small area of oak-ash-hazel woodland (WN2) is found within the EIAR Site Boundary to the southeast, within the footprint of the proposed access road. This is a small woodland on the periphery of conifer plantations and recently felled areas. The woodland consists of mature hazel (*Corylus avellana*), willows (*Salix sp.*) and ash (*Fraxinus excelsior*). The southeastern access road is proposed within oak-ash-hazel woodland (WN2).

This habitat is of local importance (higher value) given it is a semi-natural habitat which is of value to local fauna). This habitat is carried forward as an Important Ecological Feature in Table 6-10.

#### 6.3.2.1.3 Dry Siliceous Heath (HH1)

As discussed in Section 6.3.1.4.1, some areas within the EIAR Site Boundary have been mapped under NPWS Article 17 Reporting as Annex I Dry Heath habitat. Some of these areas occur as pockets of dry siliceous heath (HH1) between forestry and close to amenity trails towards the west of the site. This area is of National importance given it is mapped under Article 17 reporting. This habitat is carried forward as an Important Ecological Feature in Table 6-10.

### 6.3.2.1.4 Upland Blanket Bog (PB2) and Wet Heath (HH3)

There are areas adjacent to the EIAR Site Boundary which comprise upland blanket bog (PB2) and wet heath (HH3) mosaic, including Gortacullin Bog NHA which is adjacent to the northern boundary of the EIAR Site Boundary.

Some areas within the EIAR Site Boundary which have been mapped under NPWS Article 17 Reporting as Annex I Dry Heath habitat, have been identified during surveys as actually corresponding to Wet Heath (HH3)/Upland Blanket Bog (PB2) mosaic and Cutover Bog (PB4). The parcel of land to the east of the site consists of conifer plantations which have been planted on a mosaic of wet heath and upland blanket bog and the peatland habitats occur as very small and fragmented areas where trees have not grown in this area. Small patches of peatland within forestry plantations in this area



occur in the footprint of turbines 8 and 9. Short sections of the proposed wind farm roads are proposed within small areas of this habitat located within firebreaks. All other proposed infrastructure completely avoid peatland habitats.

Where upland blanket bog (PB2) and wet heath (HH3) mosaic occurs within the boundary of Gortacullin Bog NHA, this habitat is of National Importance. Where this mosaic occurs within the EIAR Site Boundary, it is classified as County Importance due to its degraded state as a result of forestry and drainage within the Site. These habitats are carried forward as an Important Ecological Feature in Table 6-10.

### 6.3.2.1.5 Grassland Habitats

Small, isolated areas of wet grassland (GS4) are present within the EIAR Site Boundary, usually adjacent to peatland habitats or conifer plantations. Communities are dominated by soft rush (*Juncus effusus*), purple moor grass (*Molinia caerulea*), with small areas of devils bit scabious (*Succisa pratensis*). These areas are mainly found along forestry tracks as small areas and for the most part have not been represented on the habitat map due to their small size and rare occurrence. Dry grassy verge habitat (GS2) is present along forestry tracks within the site and occurs in small, isolated areas. As such this habitat has not been represented on the habitat map. These areas are dominated by common graminoids including cocks foot (*Dactylis glomerata*), false oat grass (*Arrhenatherum elatius*), Yorkshire fog (*Holcus lanatus*), sweet vernal grass (*Anthoxanthum odoratum*), and meadow grasses (*Poa spp.*). Improved agricultural grasslands (GA1) are present adjacent to the EIAR Site Boundary, including along the proposed access road from the southeast. These fields are species-poor and are typically dominated by perennial rye grass (*Lolium perenne*) with white clover (*Trifolium repens*), Broadleaved dock (*Rumex obtusifolius*), creeping buttercup (*Ranunculus repens*) and dandelion (*Taraxacum officinale agg.*).

These habitats are of local importance (lower value) given they comprise small, fragmented verge areas or species poor agricultural fields. They are not considered to be Important Ecological Features.

#### 6.3.2.1.6 Watercourses

Due to the upland nature of the Proposed Development Site, the majority of watercourses within the site are eroding in nature, typical of headwaters and as such are categorised as eroding/upland rivers (FW1). Several small streams are found throughout the site. The Clashduff and Gortadroma streams drain the western portion of the site to the Owenogarney River. The Snaty, O'Neill's Stream, Knockshanvo stream and Mountrice stream drain the central areas of the site southwards towards the Blackwater River. The Glenomra Wood Stream is found to the east of the site which also drains to the Blackwater River. No Annex I river habitats, nor rare or protected aquatic macrophytes or bryophytes were found within the EIAR Site Boundary. As is typical of FW1 type rivers, these watercourses were typically narrow and shallow with trickling to fast flows, and the substrate typically comprised bedrock, boulders, cobbles and gravels.

A pond has been constructed for biodiversity purposes by the Irish Forestry Unit Trust (IForUT) within the EIAR Site Boundary within the middle-east of the site in the vicinity of Turbine 6. The pond is surrounded by a clear-fell area (WS5) and planted broadleaved trees and its edges are dominated by soft rush (*Juncus effusus*) with pondweeds (*Potamogeton spp.*) beginning to colonise within. The Drumsillagh River (FW1) flows into the pond.

These habitats are of local importance (higher value) given their value to local fauna and the fact they act as conduits to downstream habitats and species and are carried forward as an Important Ecological Feature in Table 6-10.



#### Drainage ditches

Drainage ditches (FW4) associated with forestry plantations are found throughout the site. These ditches were often completely dry during the survey periods. Other drains contained pools and standing water. Drainage ditches are present within forestry plots, along forestry tracks and through peatlands associated with forestry. Drainage ditches are also present within the proposed temporary transition compound along the turbine delivery route.

Drainage ditches are of local importance (lower value) given that they are man-made, species-poor features. They are not considered to be Important Ecological Features.

### 6.3.2.1.7 Treelines and Hedgerows

The Proposed Wind Farm Site is dominated by conifer forestry and as such does not comprise a large amount of linear habitat such as treelines (WL2) or hedgerows (WL1). However, the area to the southeast of the EIAR Site Boundary associated with the proposed access road into the site consists of agricultural fields bordered by treelines (WL2) of ash (*Fraxinus excelsior*) and hedgerows (WL1) of hawthorn (*Crataegus monogyna*), bramble (*Rubus fruticosus agg.*), false oat grass (*Arrhenatherum elatius*), common gorse (*Ulex europaeus*), and occasional elder (*Sambucus nigra*) and rowan (*Sorbus aucuparia*).

Large treelines are also present within the proposed temporary transition compound area along the proposed turbine delivery route. Trees include willow, poplar (*Populus tremula*), hawthorn, sycamore (*Acer pseudoplatanus*) and ash (*Fraxinus excelsior*). These habitats are of local importance (higher value) given they provide food and shelter and commuting corridors for wildlife, and are carried forward as an Important Ecological Feature in Table 6-10.

### 6.3.2.1.8 Other Habitats

Areas of scrub (WS1) are found throughout the Proposed Development Site, occurring on peatland habitats, within or adjacent to forestry edges or associated with grassland habitats. Scrub within the site is comprised of bramble (*Rubus fruticosus agg.*), willows (*Salix spp.*), or common gorse (*Ulex europaeus*).

A number of areas where ground disturbance and rock breaking has been undertaken in the recent past still exist as bare surfaces (ED2) or have begun to recolonise (ED3). Several man-made structures are present within the EIAR Site Boundary including an existing substation, sheds and areas of former house ruins (BL3). Forestry roads within the site are also within this category. These areas are small and as such are not represented on the habitat map.

These areas are small and limited in extent within the EIAR Site Boundary and are not considered Important Ecological Features.

### 6.3.2.1.9 Protected Habitats and Flora

The following Annex I habitats occur within the EIAR Site Boundary:

- > Upland blanket bog (PB2) corresponds to 7130 Blanket bogs (\* if active);
- > Wet heath (HH3) corresponds to 4010 Northern Atlantic wet heaths with *Erica tetralix;*
- > Dry siliceous heath (HH1) corresponds to 4030 European dry heaths.

No botanical species listed under the Flora (protection) Order (1999, as amended 2022), listed in the EU Habitats Directive (92/43/EEC), or listed in the Irish Red Data Books were recorded on the Proposed Development Site. All species recorded are common in the Irish landscape. No rare and


protected plant species recorded in the desk study, including those obtained from NPWS data request (see Section 6.3.1.3), were recorded within the study area.

## 6.3.2.2 Invasive species

During field surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted. Within the EIAR Site Boundary (including Grid Connection route and turbine delivery route accommodation areas), the following Third Schedule invasive species were found:

- > Japanese knotweed (*Reynoutria japonica*)
- > Rhododendron (*Rhododendron ponticum*)
- > Himalayan knotweed (Persicaria wallichii)

Details with regard to the infestations and locations are provided in the table below. Locations of Third Schedule invasive species are shown in Table 6-9. The locations of invasive species are shown on Figure 6-6.

Species	Location (ITM)	Photo	Description
Japanese knotweed <i>(Reynoutria japonica)</i>	555954 669096		Occurs as a stand at the end of a forestry plantation adjacent to a forestry road. Outside of the infrastructure footprint.
Japanese knotweed <i>(Reynoutria japonica)</i>	558312 665034		Along the verge of a rough track along the Grid Connection route. A sign for Japanese knotweed was present at this point, however no signs of the plant were evident.
Rhododendron ( <i>Rhododendron</i> <i>ponticum</i> )	554086 669689		Occurs on wet heath alongside colonising sitka spruce. Outside of the infrastructure footprint.
	551306 668839		Occurs as a stand within forestry to the west of the site. Outside of infrastructure footprint.
	552709 670243		Occurs as a stand amongst forestry within the northwest of the site. Outside of infrastructure footprint.

Table 6-9 Third Schedule Invasive Species within the EIAR Site Boundary.



Species	Location (ITM)	Photo	Description
	555754 669642		Small stand (3 to 4m length) present adjacent to proposed road to be upgraded in proximity to borrow pit 2 (BP02).
Himalayan knotweed <i>(Persicaria wallichii)</i>	Start: 552880 669017 End: 552880 669001		This occurs along the road verge just outside of the EIAR boundary to the south for a stretch of approx. 15m.
	552906 670364		A small stand measuring approx. 4m2. Outside of infrastructure footprint.





## 6.3.2.3 Fauna

The following subsections provide a breakdown of the species recorded within the Proposed Development boundary during the site visits and assessment.

Evidence of fauna recorded within the Proposed Development Site is shown on Figure 6-7.

#### 6.3.2.3.1 Badger

Records of Badger are present within the hectads which overlap with the Study Area Boundary as detailed in the desk study in Section 6.3.1.

During surveys of the Proposed Development Site undertaken between 2021 and 2023, signs of badger i.e. badger foraging signs, latrines etc. were searched for. Badger scat and mammal trails were found in areas throughout the site. Further surveys of these areas did not result in observations of any sett in the area. Although no badger setts were recorded within or adjacent to the Study Area Boundary or within or adjacent to the Proposed Development footprint, it is evident that there is badger activity within the site. Locations of signs of badger recorded are shown on Figure 6-7.



Plate 6-2 Mammal trail leading into forestry from grassland area. Badger scat was present in the area.

#### 6.3.2.3.2 **Otter**

Records of Otter are present within the hectads which overlap with the Study Area Boundary as detailed in the desk study in Section 6.3.1.

No otter signs were recorded along the smaller watercourses within the Study Area Boundary or in close proximity to any of the Proposed Development infrastructure i.e. turbines, hardstands, new wind farm roads etc. A mustelid print, likely otter, was recorded close to the existing water crossing over the Mountrice River in the east of the Proposed Development Site. The main watercourses were assessed as providing suitable commuting and foraging habitat for the species and otter may occur within the Study Area Boundary, at least on occasion. Following aquatic surveys and fisheries assessments, it was assessed that the fisheries potential of the upper reaches of watercourses within the site is poor and therefore otter are more likely to utilise the lower reaches of the watercourses, downstream of the



Proposed Development Site. Otter spraint was recorded at 3 locations on larger watercourses downstream of the Study Area Boundary during aquatic surveys (see Figure 6-7 and Aquatic Baseline Report).

#### 6.3.2.3.3 **Red Squirrel**

Records of Red Squirrel are present within the hectads which overlap with the EIAR Site Boundary as detailed in the desk study in Section 6.3.1.

One Red squirrel (*Sciurus vulgaris*) was recorded within coniferous plantation forestry (WD4) within the north of the Study Area Boundary (see Figure 6-7).

). However, no dreys were recorded within the Study Area Boundary during the surveys. Evidence of red squirrel feeding remains in the form of stripped sitka spruce cones was found within the north of the Study Area Boundary (Plate 6-3).



Plate 6-3 Evidence of spruce cone stripping by red squirrel found within the Study Area

#### 6.3.2.3.4 Amphibians and Reptiles

Records of Common Frog, Smooth Newt and Common Lizard are present within the hectads which overlap with the EIAR Site Boundary as detailed in the desk study in Section 6.3.1.

Common Frog (*Rana temporiana*) was recorded in suitable habitats for the species which exist across the Study Area Boundary within wet peatland habitats. An adult frog was recorded within the footprint of proposed Turbine 5 as shown on Figure 6-7. The habitat at this location consists of replanted forestry (WD4) on willow scrub (WS1) mosaic. A juvenile smooth newt (*Lissotriton vulgaris*) was recorded within a river during aquatic surveys undertaken at a site downstream of the Study Area Boundary (see Figure 6-7 and Aquatic Baseline Report).

Common lizard (Zootoca vivipara) was not recorded during the surveys within the Study Area.

No significant breeding habitat for reptiles or amphibians was found within or adjacent to the Proposed Development footprint. Suitable potential habitat for the species is present in the wider Study Area,



Detailed bat survey results are provided in the Baseline Bat Report in Appendix 6-2 and are summarised below.

#### Bat Habitat Appraisal

With regards to foraging and commuting bats, the conifer habitats within the Study Area provide suitable foraging and commuting grounds for bat species. A lack of artificial light pollution and good connectivity with the wider landscape, which primarily consists of agricultural lands lined by treelines and hedgerows, provide *High* suitability for foraging and commuting bats. The peatland habitats within the Study Area are less relevant to commuting bat species but can provide some prey diversity suitable to foraging bats. Overall, peatland habitats were assigned *Low* potential for bats. With regards to roosting bats, the Study Area is comprised primarily of commercial conifer forestry and in general does not provide significant suitable roosting opportunities for bats. However, a number of potential roosting features, including structures and broadleaved trees, were identified within the Study Area.

#### Roost surveys (Buildings)

Four buildings were identified within the Study Area, comprising of one corrugated iron shed, an ESB building, an old block built stable and an unused cow shed. A daytime inspection of the buildings found no signs of bats. An emergence survey was conducted on the derelict cow shed and nearby stable. Two bats were observed emerging from the block stable: both bats were not picked up by the detector, so it was not possible to confirm a species ID, however it is likely to have been soprano pipistrelle as this was the only species recorded before and after the emergence was observed.

#### Roost surveys (Trees)

The majority of the trees located within the Study Area consist of commercial conifer plantation stock with *Negligible* roosting potential. A deciduous tree line located to the southeast of the site was found to contain a number of mature trees with potential roosting features (ITM Ref: 556889 669131). The trees are located just off a track within the site south of proposed turbine T6. In addition, a wooded area including mature deciduous trees was also identified south of proposed turbine T06, in proximity to the stable and derelict sheds described above. These trees will not be affected by the Proposed Development. The Proposed Development includes a temporary transition compound in Co. Limerick. The Temporary Transition Compound consists of four distinct broadleaf treelines, with an additional three mature sycamore trees in the centre of the site. While no bat roosts were identified within any of these trees, a number of trees on this site which are within the footprint of the temporary transition compound were identified as containing potential roost features.

#### Manual transects

Manual activity surveys were undertaken in the form of walked and driven transects in Spring, Summer and Autumn 2022. Bat activity was recorded on all surveys. In general, Common pipistrelle (n=410) was recorded most frequently, followed by Soprano pipistrelle (n=172). Instances of *Myotis* spp. (n=12) and Leisler's bat (n=10) were less frequent.

#### Ground-level Static Surveys

NatureScot Guidance (2021) requires static detector surveys at proposed turbine bases and the results of those surveys are provided below. The location of all static detectors is provided in the Bat Baseline Report (Appendix 6-2). In total, 155,355 bat passes were recorded across all deployments. In general, Common pipistrelle (n=104,169) occurred most frequently, followed by Soprano pipistrelle (n=30,201), Leisler's bat (n=11,294) and *Myotis spp.* (n=7,029). Instances of Brown long-eared bat (n=1,556) and Lesser horseshoe bat (n=1,098) were significantly less. Nathusius' pipistrelle (n=8) was rare. The Bat Baseline Report presents activity levels for each species at each detector. Activity levels for (Lesser



horseshoe bat) were generally Low across the survey period, with median activity levels reaching Moderate numbers for this species only in Autumn, at detector D06. Highest activity levels, considered High for this species, were recorded at D04 in Spring. This detector, and detector D06, also recorded High peak activity levels in Autumn.

### 6.3.2.3.6 Fisheries and Aquatic Fauna

The small streams that flow off the Proposed Development Site, and downstream watercourses, were subject to biological evaluation and assessment through kick sampling, fish stock assessment (electro-fishing) and white-clawed crayfish surveys between the 25<sup>th</sup> and 28<sup>th</sup> of July 2022. Full details of the results of these surveys are provided in Appendix 6-4. Surveys at each of the 26 no. survey sites included a fisheries assessment (electro-fishing and or fisheries habitat appraisal), white-clawed crayfish survey, macrophyte and aquatic bryophyte survey and (where suitable) biological water quality sampling (Q-sampling).selected locations were also tested via eDNA analysis for presence of white-clawed crayfish and freshwater pearl mussel (*Margaritifera margaritifera*).

The survey included a general habitat assessment and biological water quality assessment at watercourses within or downstream of the Study Area Boundary. The water quality, as per Q-value (Quality Rating System)<sup>11</sup>, is fully described in Appendix 6-4.

The majority of the surveyed watercourses within the vicinity of the Proposed Development Site were upland and eroding in nature.

The Aquatic Baseline Report (Appendix 6-4) summarises the results as follows:

Broadly speaking, the most important watercourses for aquatic ecology within vicinity of the Proposed Development were the larger Owenogarney River, River Blackwater and Glenomra Wood Stream. These supported higher conservation value species such as Atlantic salmon, lamprey (Lampetra sp.), European eel, otter and or white-clawed crayfish...Localised areas of higher value aquatic habitats (e.g. salmonid spawning/nursery) were also present on smaller watercourses including the Clashduff Stream and Mountrice River. No rare or protected macro-invertebrates (with the exception of crayfish), macrophytes, aquatic bryophytes or Annex I habitats were recorded in any of the survey watercourses.

With the exception of site B3 on the Oatfield Stream (three-spined stickleback only), salmonids were recorded at all 13 no. sites supporting fish during the survey. Atlantic salmon were present at 5 no. sites, on the Clashduff Stream (A2), Owenogarney River (A7), Mountrice River (B12), River Blackwater (B13) and Glenomra Wood Stream (N4). Brown trout populations were widespread in the survey area. Lamprey ammocoetes (Lampetra sp.) were recorded from 2 no. sites on the River Blackwater (B13) and its tributary the O'Neill's Stream (B9). European eel were only recorded in low densities from site A7 on the Owenogarney River at Annagore Bridge.

Otter signs (spraints) were only recorded at a total of 3 no. sites on the Owenogarney River (A7), River Blackwater (B13) and the Glenomra Wood Stream (N4). The paucity of signs was considered to mainly reflect the high energy characteristics of most watercourses in the survey area, as well as the influence of low (summer) water levels and flows on fish distribution and populations. No breeding (holt) or couch (resting) areas were identified in the vicinity of the survey sites in July 2022.

No freshwater pearl mussel eDNA was detected in samples collected from the Owenogarney River (A7), River Blackwater (B13) or Glenomra Wood Stream (N4) in July 2022...Suitability was poor or absent throughout the survey sites (heavy siltation, historical modifications, small and or spate channels, low summer flows etc.). These results were in keeping with the known absence of this species within the wider survey area (Ross, 2017).

<sup>&</sup>lt;sup>11</sup> Toner, P., Bowman, J., Clabby, K., Lucey, J., McGarrigle, M., Concannon, C., & MacGarthaigh, M. (2005). Water quality in Ireland. Environmental Protection Agency, Co. Wexford, Ireland.



Only a total of 6 no. sites on the Clashduff Stream (site A2), Owenogarney River (A7), Snaty River (C1), Snaty Stream (B5), West Cloontra Stream (B6) and Rocks Stream (C1) achieved Q4 (good status) water quality and therefore met the target good status ( $\geq$ Q4) water quality requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC)...No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from 26 riverine sites in July 2022.

Whilst no white-clawed crayfish were detected via hand searching (26 sites) or field examination of otter spraint, white-clawed crayfish eDNA was detected at sites B13 on the River Blackwater and N4 on the Glenomra Wood Stream in July 2022...These results support the known historical distribution of the species in the wider survey area, i.e. only present in the River (Clare) Blackwater catchment.

### 6.3.2.3.7 Marsh Fritillary

One NPWS point record is located approx. 500m east of the Study Area Boundary. Devil's bit scabious (*Succisa pratensis*) is present within grassy verges along some forestry tracks within the Study Area, however these areas are too small and fragmented to provide significant habitat for the species. Devil's bit scabious is present within the peatland area within the Study Area to the north, adjacent to Gortacullin Bog NHA. The habitats throughout the remainder of the Study Area, including areas of wet heath (HH3), do not contain a sufficient amount of Devil's bit scabious (*Succisa pratensis*) to support the species.

#### 6.3.2.3.8 Pine Marten

A number of scats recorded within the Study Area Boundary are likely to be of pine marten (*Martes martes*) given the black colour and coiled, discrete shape. These scats contained seeds of ivy and blackberry, which are known to make up to 30% of the pine marten's diet (Lynch et al. 2007<sup>12</sup>), as well as evidence of fur.



Plate 6-4 Likely evidence of Pine Marten

<sup>&</sup>lt;sup>12</sup> Lynch, Á. B., & McCann, Y. (2007). The Diet Of The Pine Marten (Martes Martes) In Killarney National Park. Biology and Environment: Proceedings of the Royal Irish Academy, 107B(2), 67–76. http://www.jstor.org/stable/20728625





# 6.3.3 **Summary of Important Ecological Features**

Table 6-10 Summary of Important Ecological Features Subject to Detailed Assessment

Ecological feature or species	Scale at which Feature is Important	Legal Status or Importance
<ul> <li>European Designated Sites</li> <li>The following European Sites are identified in the AA Screening as being within the Likely Zone of Influence and are assessed fully in the NIS that accompanies this application:</li> <li>Danes Hole, Poulnalecka SAC [00030]</li> <li>Ratty River Cave SAC [002316]</li> <li>Lower River Shannon SAC [002165]</li> <li>River Shannon and River Fergus Estuaries SPA [004077]</li> </ul>	International Importance	Natura 2000 Sites are protected under the European Habitats Directive.
<ul> <li>Nationally Designated Sites</li> <li>The following Nationally designated sites are identified as being within the likely Zone of Influence:</li> <li>Doon Lough NHA [000337]</li> <li>Castle Lake pNHA [000239]</li> <li>Fergus Estuary And Inner Shannon, North Shore pNHA [002048]</li> <li>Inner Shannon Estuary - South Shore pNHA [000435]</li> <li>Gortacullin Bog NHA</li> <li>Danes Hole, Poulnalecka pNHA [000030]</li> <li>Cloonlara House pNHA [00028]</li> </ul>	National Importance	NHAs are protected under the Wildlife Acts as amended. Proposed Natural Heritage Areas (pNHAs) do not have statutory protection. However, where they are also designated as a Natura 2000 site, they are protected under the European Habitats Directive.
Eroding/upland rivers (FW1) A number of natural watercourses are located within the EIAR Site Boundary. These watercourses include the Glenomra Wood Stream to the east, the Blackwater River and associated tributaries which drain central areas of the site, the Owenogarney River and upstream tributaries which drain the western portion of the site Lowland/depositing river (FW2) The Faha River is present downstream of the proposed Temporary Transition Compound. Aquatic species associated with these rivers include populations of salmon,	The listed watercourses are of <b>Local</b> <b>importance (Higher value)</b> and many act as conduits to the downstream Lower River Shannon which is a designated European Site and is therefore of <b>International Importance</b> . Populations of the following species associated with the SAC are of <b>International Importance:</b> Salmon and Lamprey. Other aquatic species are likely to be of populations of at least <b>Local importance (Higher value)</b> .	The Lower River Shannon SAC and associated populations of Salmon and Lamprey species, located downstream of the listed watercourses, are protected under the European Habitats Directive and Wildlife Act. White-clawed crayfish is also protected under the European Habitats Directive and Wildlife Act. Other aquatic species are protected under the Wildlife Act and Fisheries Act. European eel is a red-listed species (Critically Endangered).



	Scale at which	
Ecological feature or species	Feature is Important	Legal Status or Importance
trout and lamprey species, European eel, white-clawed crayfish, aquatic invertebrates along with otter and other aquatic species.		
Upland Blanket Bog (PB2)	This habitat is assigned <b>National</b> <b>Importance</b> where it occurs within the boundary of Gortacullin Bog NHA adjacent to the EIAR Site Boundary, as the habitat conforms to EU Habitats Directive Annex I habitat Blanket Bog [7130]. However, where this habitat occurs within the EIAR site boundary, it is assigned <b>County</b> <b>Importance</b> given its degraded state due to adjacent forestry and drainage.	This habitat is a listed habitat under Annex I the European Habitats Directive. Where this habitat occurs within Gortacullin Bog NHA (outside of the EIAR Site Boundary, adjacent to the northern boundary) it is also protected under the Wildlife Act.
Cutover bog (PB4)	This habitat is assigned <b>County</b> <b>Importance</b> as it is representative of Annex I blanket bog habitat has been degraded as a result of historic peat cutting activities, with large face banks, drains and areas of bare peat present.	This is a degraded example of an Annex I habitat, which does not meet the criteria for National Importance.
Wet heath (HH3)	Areas of wet heath within the EIAR Site Boundary conform to the Annex I habitat, European wet heaths with <i>Erica tetralix</i> . These habitats have been included under Article 17 mapping as 'European Dry Heath' but actually conform to Annex I wet heath habitat. This habitat is of <b>National Importance</b> where it is mapped under Article 17 Reporting. Areas of wet heath within the EIAR Site Boundary which have been assessed as being degraded (see Baseline Habitats Report, Appendix 6-1) are of <b>County Importance</b> .	This habitat is a listed habitat under Annex I the European Habitats Directive.
Dry siliceous heath (HH2)	Areas of Dry siliceous heath conform to the Annex I habitat 'European Dry Heaths'. These areas are mapped under Article 17 and are of <b>National</b> <b>Importance</b> .	This habitat is a listed habitat under Annex I the European Habitats Directive.
Oak-ash-hazel woodland (WN2)	Approx. 0.45ha of this habitat is present within the footprint of the Proposed Development and is of <b>Local Importance (Higher value).</b>	Afforded some protection under CDP 15.19 of the Clare County Development Plan 2023-2029



Ecological feature or species	Scale at which Feature is Important	Legal Status or Importance
Hedgerows (WL1) and treelines (WL2)	These habitats border fields to the southeast of the EIAR Site Boundary in the footprint of the proposed access road as well as along the turbine delivery route and proposed Grid Connection route. These habitats are of <b>Local Importance (Higher value)</b> and provide important wildlife corridors, shelter and food for fauna.	Afforded some protection under CDP 15.19 of the Clare County Development Plan 2023-2029
Fauna		
Badger	The badger population in the vicinity of the Proposed Development is of <b>Local Importance (Higher value),</b> given that this is a resident local population of a species protected under the Wildlife Act.	Wildlife Act
Otter	Otter which are potentially associated with the downstream Lower River Shannon SAC, are a population of <b>International Importance.</b>	Annexes II and IV of the Europeans Habitats Directive and Wildlife Act
Red squirrel	The population of Red Squirrel within the EIAR Site Boundary is of <b>Local Importance (Higher value)</b> given that this is a resident local population of a species protected under the Wildlife Act.	Wildlife Act
Pine marten	The population of Pine marten within the EIAR Site Boundary is of <b>Local</b> <b>Importance (Higher value)</b> given that this is a resident local population of a species protected under the Wildlife Act.	Annex V of the European Habitats Directive and Wildlife Act
Bats	Part of the western section of the Proposed Development site (T01, T02, T03 and enhancement area) overlaps with the core foraging range of the Lesser Horseshoe Bat roosts designated under Danes Hole, Poulnalecka SAC, therefore, the Lesser horseshoe population recorded within the western section of the Proposed Development site is likely to be of <b>International Importance</b> . Populations of other bat species recorded within the Proposed Development Site have been assigned <b>Local Importance (Higher value)</b> .	All bat species in Ireland are protected under both the Wildlife Act and Annex IV of the European Habitats Directive. Lesser Horseshoe Bat are further protected under Annex II of the European Habitats Directive.

The majority of the proposed windfarm infrastructure is located within Conifer Plantation (WD4) and clearfell (WS5). A total of 107.56ha hectares of forestry will be felled for the Proposed



Development. This represents a small fraction of the total amount of forestry within the EIAR Site Boundary. The habitat is species poor and is of limited value for biodiversity, therefore this habitat is not included as an Important Ecological Feature.

Small areas of scrub (WS1), wet grassland (GS4) and grassy verges (GS2) are present within the EIAR Site Boundary, present along conifer forestry fire breaks and tracks. These are small, fragmented areas and are common and widespread. They are therefore not included as Important Ecological Features.

Improved agricultural grassland (GA1) is present in small areas within the Proposed Development footprint to the southeast of the EIAR Site Boundary, within the northern enhancement land plot and turbine delivery route transition compound. This habitat is highly managed and species poor and is therefore not included as an Important Ecological Feature. Furthermore, this area will be fully reinstated post construction.

Drainage ditches (FW4) are present within conifer forestry plots and agricultural fields within the EIAR Site Boundary. These are man-made features which are commonly found throughout Ireland, as such they are not included as Important Ecological Features.

The Proposed Development will not result in a significant loss of suitable habitat for reptiles and amphibians. No evidence of populations of amphibians being significant at more than a local level was recorded. Based on the low number of amphibian records for the Proposed Development Site and the highly afforested nature of the study area, amphibians are not included as an Important Ecological Feature.

The Proposed Development footprint is located completely outside of any areas of potentially suitable habitat for Marsh Fritillary. Therefore, this species is not included as an Important Ecological Feature.

Based on the above, the following Important Ecological Features are brought forward for further assessment:

- > Eroding/upland rivers (FW1)
- > Lowland/depositing river (FW2)
- > Upland Blanket Bog (PB2)
- Wet heath (HH3)
- > Dry siliceous heath (HH2)
- > Oak-ash-hazel woodland (WN2)
- > Hedgerows (WL1) and treelines (WL2)
- > Badger
- > Otter
- Red squirrel
- > Pine marten
- > Bats

The following designated sites are also brought forward for further assessment:

- Danes Hole, Poulnalecka SAC [000030]
- Ratty River Cave SAC [002316]
- Lower River Shannon SAC [002165]
- > River Shannon and River Fergus Estuaries SPA [004077]
- Castle Lake pNHA [000239]
- Fergus Estuary And Inner Shannon, North Shore pNHA [002048]
- > Inner Shannon Estuary South Shore pNHA [000435]
- > Gortacullin Bog NHA
- > Doon Lough NHA [000337]
- Danes Hole, Poulnalecka pNHA [000030]
- > Cloonlara House pNHA



# 6.4 Assessment of Effects and Mitigation Measures

## 6.4.1 **Do-Nothing Effect**

If the Proposed Development were not to proceed, the majority of the lands within the site would continue to be managed as commercial forestry. This would continue to involve the harvesting of timber as it matures, followed by the coniferous forestry replanting. The other habitats identified within the Study Area, including peatlands and associated habitats, would likely remain in a similar condition. In some drier areas of the peatland habitat, scrub is likely to develop and in time, this may undergo succession to small areas of woodland. The general biodiversity on the site, as described in this chapter, would likely remain similar to its current state as activity levels and land use would not change significantly.

## 6.4.2 Likely Significant Effects During Construction Phase

## 6.4.2.1 Direct Habitat Loss During Construction

The minimum and maximum turbine envelope has been assessed in this EIAR Chapter.

Table 6-11 below provides details of the extent of each habitat that will be lost to facilitate the Proposed Development. The Baseline Habitats Report (Appendix 6-1) provides the habitat map overlain with the Proposed Development layout.

Habitat	Area to be lost to development footprint
Conifer plantation (WD4)/clearfell (WS5)	107.56ha (48.89ha of permanent felling for site infrastructure, 52.98ha of felling for enhancement measures, 5.69ha temporary felling for temporary infrastructure)
Wet heath/Upland Blanket Bog (HH3/PB2)	0.9ha
Dry siliceous heath (HH1)	Negligible area/Less than 10m <sup>2</sup>
Oak-ash-hazel woodland (WN2)	0.45ha
Improved agricultural grassland (GA1)	1.5ha
Wet grassland (GS4)	0.4ha
Hedgerows (WL1)/Treeline (WL2)	920m (880m permanent, 50m of temporary felling for the temporary transition compound)
Drainage ditch (FW4)	115m

Table 6-11 Extent of habitat lost to the Proposed Development

As described in Section 6.3.3, conifer plantation/ clearfell (WD4/WS5), improved agricultural grassland (GA1), wet grassland (GS4), drainage ditches (FW4), grassy verges (GS2) as well as artificial surfaces, have not been included as Important Ecological Features. The following habitats are included as Important Ecological Features and are assessed further below:

> Watercourses (FW1, FW2) and associated aquatic fauna



- > Wet heath/Upland Blanket Bog (HH3/PB2)
- > Dry Siliceous heath (HH1)
- > Oak-ash-hazel woodland (WN2)
- > Hedgerows (WL1) and Treelines (WL2)

## 6.4.2.1.1 Assessment of Potential Effects on Rivers and Streams and Sensitive Aquatic Faunal Species

## Table 6-12. Potential for Effects on Rivers, Streams and Sensitive Aquatic Species

Description of Effect	This section assesses the potential for likely significant effects on aquatic features including aquatic habitats (i.e. watercourses), salmonids, lamprey, coarse fish, European eel, white-clawed crayfish, aquatic invertebrates and other aquatic species identified during the desk study and field surveys and which are likely to occur downstream of the Proposed Development.
	Access roads within the site will cross 6 mapped and unmapped watercourses and will require the construction of 5 new water crossings (see Section 9.5.2.9). These crossings will consist of bottomless and clear-span structures in order to avoid the requirement for instream works. There will therefore be no direct effects to watercourses or aquatic fauna as a result of the construction of these water crossings.
	There is potential for the construction activities associated with the Proposed Development to result in the run-off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material into watercourses. This could result from clearance and excavation works, cut and fill works, culverting of drainage ditches, or the use of concrete and other construction materials. The construction of water crossings for access roads (see Section 9.5.2.9) could result in run-off of sediments and pollutive materials to the watercourses. In addition, due to the nature of the Proposed Wind Farm Site being located on peat soils, there is a potential for impact on watercourses in the event of a loss of peat stability.
	There is a risk of run-off of sediments and other pollutive materials associated with trenching works for the proposed Grid Connection route, and frac-out from directional drilling works, given the presence of watercourses located along the route.
	These potential effects on water quality are fully described and assessed in Chapter 9 'Hydrology and Hydrogeology' of this EIAR and are described here in relation specifically to ecology.
Assessment of Significance prior to mitigation	In the absence of mitigation, the indirect effect of water pollution on aquatic features during construction has the potential be a significant effect on surface water quality of local and downstream surface water features. This is assessed as having potential to be a temporary, reversible significant effect at the county scale given that watercourses act as conduits to the wider catchment. This effect has the additional potential of being significant at the International scale where impacts occur to downstream European Designated sites.
Mitigation	Mitigation by Design
	The footprint of the Proposed Development has been specifically designed to avoid significant impacts on watercourses. This was initially achieved by way of a constraints mapping exercise and subsequent mitigation by avoidance, i.e. the avoidance of sensitive hydrological features where possible, by application of suitable buffer zones (i.e. 50m to EPA mapped watercourses). Field surveys also informed the locations of unmapped watercourses on the site which also informed the layout of the Proposed Development (e.g., the locations of Turbine 1 and a borrow pit were moved due to discovery of unmapped watercourses during site surveys). The majority of the key Proposed Development work areas are located outside of the delineated 50m natural watercourse (river and stream) buffer zones.

Within the Wind Farm Site, there are a total of 6 no. crossing locations over natural watercourses (rivers and streams) associated with the proposed internal wind farm roads. Five of these crossings will require new crossing structures, however these new stream crossings will be bottomless or clear span culverts and the existing banks will remain undisturbed. No in-stream excavation works are proposed and therefore there will be no direct impact on the streams.

#### Specific Mitigation

	Specific mitigation is provided in relation to water quality in Chapter 9: 'Hydrology and Hydrogeology' of this EIAR. This provides specific mitigation for the identified pathways for impact discussed above, including mitigation against release of suspended solids, hydrocarbons, cementitious materials, clear-felling mitigations, dewatering works controls, controls associated with construction of water crossing structures, specific controls designed for infrastructure located within the 50m watercourse buffer (cut and fill of turbines 1 and 5 and certain sections of proposed roads), and directional drilling controls associated with the Grid Connection route.
	In relation to risk to peat stability and the potential for subsequent impact to watercourses, a Peat Stability Risk Assessment (PSRA, Appendix 8-1) has been completed for the Proposed Development and it concludes that with the implementation of the proposed mitigation measures detailed in Chapter 8 of this EIAR, the risk of a peat failure at the Proposed Development Site is low.
	As detailed in Chapter 9 and in the CEMP (Appendix 4-3 of this EIAR), monitoring of construction phase mitigation will be carried out by an ECoW.
Residual Effect	Following the implementation of the mitigation measures as described above and in Chapter 8 and Chapter 9 of this EIAR, there is no potential for significant residual effect on aquatic habitats or species as a result of the Proposed Development.

## 6.4.2.1.2 Assessment of Potential Effects on Wet Heath and Upland Blanket Bog

Table 6-13 Assessment of Potential Effects on Wet Heath and Upland Blanket Bog

Description of Effect	Direct habitat loss:
	There will be a loss of 0.9ha of degraded wet heath within the footprint of Turbines 8 and 9 and associated access roads and construction compound. The direct loss of 0.9ha of degraded wet heath is considered further in this assessment.
	There will be no other direct impacts on peatland habitats within the EIAR Site Boundary.
	Indirect effects due to drainage:
	The majority of the Proposed Development is located within conifer forestry and completely outside of peatland habitats. However, the potential for indirect effects to nearby peatland habitats as a result of drainage effects from adjacent construction areas requires further assessment. Small scale temporary dewatering may occur at some excavations associated with Wind Farm infrastructure (i.e., turbine bases, cable trenches), and these have the potential to temporarily affect local groundwater levels. According to the Peatland Code (IUCN 2023) <sup>13</sup> , peatland is considered 'drained' if it is within 30m of an artificial drain or a natural drain formed by the presence of a hagg and gully.

<sup>&</sup>lt;sup>13</sup> https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2023-03/Peatland%20Code%20V2%20-%20FINAL%20-%20WEB\_2.pdf



Assessment of	Direct habitat loss
Significance prior to mitigation	As discussed above, there will be a permanent loss of 0.9ha of fragmented, degraded wet heath (HH3) of County Importance. According to the 2019 Article 17 Report dataset for County Clare, the total area of mapped wet heath habitat is 7937ha. The loss of 0.9ha represents a tiny fraction of the County land cover. This impact is therefore considered to be negligible at the County scale, however there is potential for significant effect on the habitat at the local scale.
	Indirect effects due to drainage
	Temporary reductions in groundwater levels and transient dewatering works will be very localised and of small magnitude due to the nature and permeability of the local subsoil and bedrock geology. Groundwater level effects will not be significant due the local hydrogeological regime and the elevation of the Wind Farm Site. Any effects will be temporary and localised.
	Given the distance between most site infrastructure and peatland habitats as well as the presence of existing commercial forestry and drains along the perimeter of peatland habitats within the site, there is no potential for significant effect to peatland habitats as a result of drainage due to permanent proposed infrastructure.
	No potential for significant effect on peatland habitats as a result of drainage impacts is anticipated at any geographic scale.
Mitigation/Compensation	Mitigation by Design
	The Proposed Development has been specifically designed to avoid Article 17 mapped and unmapped areas of peatland habitat where possible and to minimise impacts thereon. This was achieved through an early-stage ecological constraints study informed by field surveys and habitat mapping. The proposed layout was thereby altered through the iterative design process to avoid important peatland habitats.
	Specific Mitigation/Compensation
	The loss of 0.9ha of wet heath for the Proposed Development will be offset through the Biodiversity Management Plan (BMP) which includes for the restoration of peatland habitats which are currently forested within the EIAR Site Boundary. This will involve felling an area measuring approx. 52.98ha and a bespoke management and monitoring plan for restoration of peatland within these areas. In addition, the selected areas will provide linkages and join up previously fragmented areas of peatlands in the vicinity of the EIAR Site Boundary which will support the objective of Article 10 of the Habitats Directive to maintain landscape connectivity for flora and fauna. The BMP is provided as Appendix 6-5 to this EIAR.
	On completion of successful peatland restoration to peatland habitats, this will result in an additional area of approx. 52.98ha of peatland habitat as a result of the Proposed Development. The mitigation/restoration measures will be monitored over the lifetime of the Proposed Development as part of the BMP to determine their effectiveness and to allow for alteration in approaches where necessary.
	A <i>Peat &amp; Spoil Management Plan</i> (FTC) has been prepared and is provided in Appendix 4-2 of this EIAR. This Plan outlines construction methodologies with regard to infrastructure located on peat spoils which will minimise impacts on peat hydrology and prevent issues with peat stability during construction.
Residual Effect	With the implementation of the Biodiversity Management Plan, there is no potential for residual significant effect. There will be a positive effect on the extent of



peatland habitat within the Proposed Development Site upon implementation of the Plan which will provide an overall long-term net gain in terms of area.

## 6.4.2.1.3 Assessment of Potential Effects on Dry Siliceous Heath

Table 6-14 Assessment of Potential Effects on Dry Siliceous Heath

Description of Effect	It is proposed to upgrade an amenity viewing area along the existing 12 O' Clock Hills trail with a new picnic bench, fixed binoculars and signage. This will result in the loss of a small area (less than 10m2) of highly degraded dry siliceous heath (HH1).
Assessment of	The loss of a small area of dry siliceous heath (HH1), which is currently highly
Significance prior to	degraded and consisting solely of bare peat (see Baseline Habitat Report, Appendix 6-
mitigation	1), is not considered significant at any geographical scale.
Mitigation	Mitigation by Design
	The Proposed Development has been specifically designed to avoid Article 17 mapped and unmapped areas of Dry Heath where possible and to minimise impacts thereon. This was achieved through an early-stage ecological constraints study informed by field surveys and habitat mapping. The proposed layout was thereby altered through the iterative design process to minimise impacts on important peatland habitats.
	No further mitigation to prevent impacts to Dry Heath is required.
Residual Effect	There is no potential for residual significant effect to Dry Siliceous Heath.

### 6.4.2.1.4 Assessment of Potential Effects on Oak-Ash-Hazel Woodland

#### Table 6-15 Assessment of Potential Effects on Oak-Ash-Hazel Woodland and Scrub

Description of Effect	The construction of the southeastern access road will result in the direct loss of approximately 0.45ha of oak-ash-hazel woodland (WN2) which occurs as a small, peripheral area of woodland adjacent to forestry. This habitat, while limited in extent within the EIAR Site Boundary, provides shelter for a range of fauna and comprises a community of native flora which adds to the biodiversity value of the local area.
Assessment of Significance prior to mitigation	The permanent loss of approx. 0.45ha of oak-ash-hazel woodland located on the periphery of conifer forestry is considered to be a significant effect at the local level.
Mitigation	The BMP includes for the replanting of approx. 0.9ha of oak-ash-hazel woodland around the proposed southeastern access road after completion of turbine blade delivery. This will be a linear woodland and will therefore be of a similar nature to that being lost. Details of this woodland replanting are provided in the BMP (Appendix 6-5).
Residual Effect	With the above habitat creation and BMP implemented, there will be no residual significant effect as the result of loss of native woodland habitat associated with the Proposed Development.



## 6.4.2.1.5 Assessment of Potential Effects on Hedgerows/Treelines

Table 6-16 Assessment of Potential Effects on Hedgerows and Treelines

Description of Effect	Due to nature of the habitats within the EIAR Site Boundary, i.e. commercial conifer forestry, there are limited areas of hedgerow and treeline habitat within the Wind Farm Site itself. However, hedgerows and treelines are found bordering agricultural fields to the southeast of the site within the footprint of the proposed wind farm access road. In addition, there will be some loss of these habitats within turbine delivery route accommodation areas (overrun and oversail areas) as well as the temporary transition compound proposed along the turbine delivery route. In total, approx. 920m of linear habitat will be lost within these areas.	
Assessment of Significance prior to mitigation	The loss of 920m of hedgerow and treeline habitat is considered a significant effect at the local scale. These areas, comprising the footprint of the wind farm access road, and turbine delivery route accommodation areas, are significantly geographically separated from each other, therefore the effect is of a lesser magnitude than if the loss were concentrated in one locality, however, the effect is considered significant at the local level where the works occur.	
Mitigation	The BMP (Appendix 6-5) provides for the replanting of 1,170m of native hedgerow within the lands to the southeast of the site in the vicinity of the proposed wind farm access road. This includes the replanting of hedgerows along the proposed new road. Additionally, the loss of treelines for the temporary transition compound located to the south of the Shannon Estuary will be mitigated post-construction through replanting of trees lost during restoration of the compound site. It is proposed to replant the trees being lost in their original locations. Advanced nursery stock will be planted in order to reduce the amount of time required to reach the age class of the trees being removed. The species to be planted will comprise poplar, willow, or hawthorn, or another native species that is found locally and which is suited to local soil conditions and to be being planted as advanced stock. The above measures are fully described in the BMP in Appendix 6-5.	
Residual Effect	With successful implementation of the above-described mitigation and implementation of the BMP, there is no potential for residual significant effect	



## 6.4.2.2 Effects on Protected Fauna During Construction

The Proposed Development has the potential to result in habitat loss and disturbance impacts on faunal species that were recorded on the site but were not included as Important Ecological Features, see Table 6-10. The majority of the Proposed Development is within conifer forestry. Given the extensive area of conifer forestry that will remain undisturbed throughout the site and the avoidance of the most significant areas of faunal habitat such as peatlands, no significant effects on fauna not included as Important Ecological Features are anticipated as a result of the Proposed Development. Therefore, these species were excluded from further assessment.

The potential for significant effects on aquatic species is restricted to indirect effects on their habitat resulting from water pollution as a result of construction works. This has been assessed in Section 6.4.2.1.1 above and is not repeated below.

### 6.4.2.2.1 Assessment of Potential Effects on Otter

Table 6-17 Assessment of Potential Effects on Otter

Description of Effect	No instream works are proposed within any watercourses. There is therefore no potential for direct effect on habitat that is significant for otter. As described in Section 6.3.2.4, no evidence of otter holts or resting places were found in the vicinity of any of the proposed works. However, otter activity within the EIAR Site Boundary in the form of an otter privalong the Mountrice River was identified.		
	Taking a precautionary approach, the construction of wind farm infrastructure in the vicinity of watercourses within the EIAR Site Boundary may result in disturbance effects to otter due to noise impacts, particularly if any new holts have been constructed in the interim between planning consent and construction. The construction of the proposed Grid Connection route may have potential for disturbance related impacts to otter where it passes over the Blackwater River.		
	The Proposed Development also has the potential to result in indirect effects on otter habitat in the form of water pollution resulting from construction activity as described in Section 6.4.2.1.1 above. Pollution to watercourses may result in a depletion of food prey biomass for otter in watercourses within the EIAR Site Boundary and downstream of the site.		
Assessment of Significance prior to mitigation	Taking a precautionary approach, due to the records of otter activity found on larger watercourses within and downstream of the Proposed Development Site, there is potential for temporary significant effect via disturbance to otter, deemed to be a receptor of potentially <b>International Importance</b> due to the potential for otter in the area being associated with the population designated under Lower River Shannon SAC. In the absence of mitigation and following the precautionary principle, there is also potential for the Proposed Development to result in temporary significant effect on otter in the form of habitat deterioration and prey reduction resulting from pollution.		
Mitigation	Mitigation by Design		
	The Proposed Development layout has been designed so that the majority of the key infrastructure are located outside of the delineated 50m natural watercourse (river and stream) buffer zones. No in-stream excavation works are proposed and therefore there will be no direct impact on streams.		
	Specific Mitigation		
	Water Quality Impacts resulting in Deterioration of Water Quality and Reduction of Prey:		
	Specific mitigation is provided in relation to water quality in Chapter 9: 'Hydrology and Hydrogeology' of this EIAR and is assessed in Section 6.4.2.1.1 above.		

	<u>Disturbance</u>
	Prior to the commencement of construction works associated with the installation of new watercourse crossings or water crossing works over the Blackwater River, the following measures will be undertaken for the avoidance of disturbance/displacement and direct mortality and to ensure that no otter holts/breeding sites have been established since the original surveys undertaken (TII, 2007):
	<ul> <li>From a precautionary basis, a pre-commencement otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works. In the unlikely event that an otter holt is identified within or immediately adjacent to the Proposed Development footprint, construction works which are likely to disturb otter will not proceed until a derogation licence is obtained.</li> <li>All conditions of a derogation licence will be implemented in full</li> <li>No works will be undertaken within 150m of any holts at which breeding females or cubs are present</li> <li>No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will also not take place within 15m of such holts, except under licence (NRA, 2006<sup>14</sup>).</li> <li>All of the above works will be undertaken or supervised by an appropriately qualified ecologist.</li> </ul>
Residual Effect	Following the implementation of mitigation, there will be no significant residual effect on otter as a result of the Proposed Development at any geographic scale.

## 6.4.2.2.2 Assessment of Potential Effects on Bats

This risk and impact assessment has been undertaken in accordance with Northern Ireland Environmental Agency (NIEA) and NatureScot Guidance. As per the NatureScot Guidance, wind farms present four potential risks to bats:

- > Collision mortality, barotrauma and other injuries
- > Loss or damage to commuting and foraging habitat
- Loss of, or damage to, roosts
- > Displacement of individuals or populations

For each of these four risks, the detailed knowledge of bat distribution and activity within the EIAR Site Boundary has been utilized to predict the potential effects of the proposed Wind Farm on bats. Potential risk of collision, barotrauma and other injuries relate to the operational phase and are presented in Section 6.4.3.2.1.

Table 6-18 Assessment of Potential Effects on Bats

Description of Effect	Loss of, or Damage to, Roosts A single, small, bat roost was identified within the Proposed Development Site during	
	the surveys. A number of structures and trees with potential roosting features suitable	
	for both opportunistic and regular use were also identified, however these will not be impacted by the Proposed Development works as they are outside the Proposed	

<sup>&</sup>lt;sup>14</sup> 4 NRA, 2006. Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes. Dublin: Transport Infrastructure Ireland. Available at: www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-TreatmentofOtters-prior-to-the-Construction-of-National-Road-Schemes.pdf

Development footprint. The Proposed Development Site consists primarily of conifer plantation which does not provide roosting habitat of significance for bats.

No roosting potential was identified along the sections of hedgerow and treelines which will need to be trimmed/removed to accommodate the transport of turbine blades into the Proposed Development Site and to create the wind farm access road.

The Proposed Development site does not present significant roosting habitat for lesser horseshoe bat.

Limited roosting potential was identified within the water crossing infrastructure present along the Grid Connection route. One concrete bridge with a stone base was assessed as having *Low* potential on a precautionary basis. The works proposed along this stretch of road involve horizontal directional drilling (HDD) and are not anticipated to result in disturbance of any bats potentially roosting within the structure.

A number of trees within the footprint of the proposed transition compound were identified as containing potential roost features (see Appendix 6-2).

No roosts were identified within the footprint of the Proposed Development and no significant habitat for roosting bats was identified. However, following the precautionary principle, the potential for loss of roosts as a result of construction activity still exists, due to the potential for bats migrating into the Proposed Development site in the future. The potential for this effect is considered further in this assessment.

#### Loss or Damage to Commuting and Foraging Habitat

Hedgerows and treelines bordering the agricultural fields to the southeast of the site are expected to be removed to accommodate the footprint of the proposed wind farm access road. In addition, there will be some loss of these habitats within turbine delivery route accommodation areas (overrun and oversail areas) as well as within the temporary transition compound proposed along the turbine delivery route. In total, approx. 920m of linear habitat will be lost within these three separate areas as a result of the Proposed Development.

The construction of the Proposed Development will result in the felling of conifer trees around the Proposed Development infrastructure, which has the potential to increase available edge habitat throughout the site, which will provide additional foraging areas for bats. Bat buffers will be created around existing turbines as detailed in Section 6.4.3.2.2. The creation of buffers is not anticipated to sever existing corridors and has the potential to create additional linear habitat for foraging and commuting bats along proposed keyhole boundaries, where trees are not harvested by ongoing external forestry operations.

#### Displacement of Individuals or Populations

Temporary lighting may be required during construction which could result in barrier effects to commuting bats, which avoid lit up areas. The potential for construction noise to result in displacement of bats is also assessed below.

Assessment of Significance prior to mitigation

#### Loss of, or Damage to, Roosts

No potential for significant effect with regard to the loss of, or damage to, roosting habitat as a result of the Proposed Wind Farm or Grid Connection is anticipated. However, a number of trees within the footprint of the temporary transition compound were identified as containing potential roost features. Taking a precautionary approach, a potential for significant effect as a result of direct mortality of roosting bats or via removal of bat roosting habitat through the removal of trees with potential roosting features.

	Loss or Damage to Commuting and Foraging Habitat			
	The unmitigated loss of 920m of hedgerow and treeline habitat within the footprint of the proposed wind farm access road and along the turbine delivery route accommodation areas is considered to be a significant effect on bats at the local scale, despite all these felling areas being significantly geographically separated from each other and an extensive area of habitat remaining undisturbed throughout the site. Commuting and foraging habitats will remain available to all bat species throughout the site and no significant effects are expected at any other geographic scale.			
	The felling of plantation forestry (WD4) within the site, to facilitate site access roads and turbine infrastructure, will result in the creation of more woodland edge habitat and as such can benefit feeding and commuting bat species. There is no potential for significant effect on commuting and foraging habitat with regard to felling of forestry.			
	Displacement of Individuals or Populations			
	Temporary impacts from construction phase noise and lighting have the potential to result in negative effects in the form of disturbance on local bat populations recorded at the site. However these are not expected to be significant.			
Mitigation	Loss of, or Damage to, Roosts			
	As described above, no roosts were identified within the footprint of the Proposed Development. However, a number of trees within the proposed transition compound were identified as having potential roost suitability. Therefore, the following mitigation is proposed:			
	<ul> <li>A pre-commencement survey will be carried out by a suitably qualified ecologist prior to the felling of trees with potential roost features associated with the transition compound. The requirement for a pre-commencement survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the surveys.</li> <li>If a roost is identified during pre-commencement surveys, felling works of the trees in question will not be undertaken until a derogation is obtained. The need for a derogation licence has not been identified at this stage; however, should evidence of roosting bats be identified during the pre-commencement survey, a derogation will be required at that stage.</li> <li>Any trees identified as containing Potential Roost Features throughout the rest of the Proposed Development will be avoided and retained.</li> </ul>			
	Loss or Damage to Commuting and Foraging Habitat			
	The loss of treelines for the temporary transition compound located to the south of the Shannon Estuary will be mitigated post-construction through replanting of trees lost during restoration of the compound site. It is proposed to replant the trees being lost in their original locations. Advanced nursery stock will be planted in order to reduce the amount of time required to reach the age class of the trees being removed. The species to be planted will comprise poplar, willow, hawthorn, or another native species that is found locally and which is suited to local soil conditions. All linear features being lost to accommodate the site access road to the south east will be replaced as detailed in the BMP.			

	Displacement of Individuals or Populations		
	The following construction best practice will be employed to minimise general noise and disturbance potential. During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001).		
	Where lighting is required, directional lighting will be used to prevent overspill on to forestry edges. Exterior lighting during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the Proposed Development, and consequently on bats i.e. Lighting will be directed away from mature trees/treelines around the periphery of the site boundary to minimize disturbance to bats. Directional accessories can be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands. The proposed lighting around the site shall be designed in accordance with the Institute of Lighting Professionals Guidance Note 08/23 Bats and artificial lighting at Night.		
	In addition, the applicant commits to the use of lights during construction (such that they are necessary) in line with the following guidance that is provided in the Dark Sky Ireland Lighting Recommendations:		
	<ul> <li>Every light needs to be justifiable,</li> <li>Limit the use of light to when it is needed,</li> <li>Direct the light to where it is needed,</li> <li>Reduce the light intensity to the minimum needed,</li> <li>Use light spectra adapted to the environment,</li> <li>When using white light, use sources with a "warm" colour temperature (less than 3000K).</li> </ul>		
Residual Effect	There is no potential for the construction of the Proposed Development to result in Significant effects on the local bat population at any geographic scale. There will be no significant effect on the conservation status of any bat species as defined in 'The Status of Protected Habitats and Species in Ireland' (NPWS, 2019)		

## 6.4.2.2.3 Assessment of Potential Effects on Badger

#### Table 6-19 Assessment of Potential Effects on Badger

Description of Effect	During the ecological surveys undertaken of the Proposed Development Site, no badger setts were found. However, evidence of badger activity was found within the Proposed Development Site. No direct impacts to badger via habitat loss or mortality are anticipated. However, taking a precautionary approach, there is potential for badger within the site to build new setts in the vicinity of proposed infrastructure during the interim between the grant of planning and construction phase. Therefore, it is considered there is a potential for disturbance of badger as a result of construction works.	
	There is no potential for significant loss of badger foraging habitat or barriers to movement as a result of the Proposed Development, due to the nature of the habitats being lost for the Proposed Development and lack of structures which could cause a barrier to movement.	
Assessment of Significance prior to mitigation	No badger setts were found within the Proposed Development Site and no significant effects to badger are predicted. However, taking a precautionary approach, the potential for disturbance to badger during construction works is considered and mitigation is provided below.	

Mitigation	Prior to the commencement of construction works, the following measures will be undertaken for the avoidance of disturbance and to ensure no additional setts have been established since the original surveys undertaken. The following measures are in line with <i>Guidelines For The Treatment Of Badgers Prior To The Construction Of National Road</i> <i>Schemes</i> (TII 2009).	
	<ul> <li>From a precautionary basis, a pre-commencement badger survey will be undertaken by a qualified ecologist in accordance with standard best practice guidance prior to the commencement of site works to ensure that no additional setts in close proximity to proposed infrastructure have been built. In the event that a badger sett is identified within or immediately adjacent to the Proposed Development footprint, mitigations as per the above referenced TII document will be implemented for the new sett.</li> <li>If any new setts are found within the vicinity of proposed infrastructure, mitigations as per the above mentioned TII document will be implemented to prevent disturbance of the sett.</li> </ul>	
Residual Effect	Following the implementation of the mitigation proposed above, there will be no significant residual effect on badger as a result of the Proposed Development at any geographic scale.	

## 6.4.2.2.4 Assessment of Potential Effects on Red Squirrel and Pine Marten

Table 6-20 Assessment of Potential Effects on Red Squirrel and Pine Marten

Description of Effect	During the ecological surveys undertaken of the Proposed Development Site, no pine marten dens or red squirrel dreys were found. However, as described in Section 6.3.2.2, evidence of pine marten and red squirrel activity was found within the Proposed Development Site. No direct impacts to these species via habitat loss or mortality are anticipated. However, taking a precautionary approach, there is potential for red squirrel within the site to build new dreys in the vicinity of proposed infrastructure during the interim between the grant of planning and construction phase. There is potential for pine marten to create dens within the infrastructure footprint. Therefore, it is considered there is a potential for disturbance to these species as a result of construction works. There is no potential for significant loss of pine marten or red squirrel foraging habitat or barriers to movement as a result of the Proposed Development, due to the nature of the habitats being lost for the Proposed Development and lack of structures which could cause a barrier to movement.		
Assessment of Significance prior to mitigation	No red squirrel dreys or pine marten dens were found within the Proposed Development Site and no significant effects to these species are predicted. However, taking a precautionary approach, the potential for disturbance to these species during construction works is considered and mitigation is provided below.		
Mitigation	<ul> <li>Prior to the commencement of construction works, the following measures will be undertaken for the avoidance of disturbance and to ensure no dreys or dens have been established since the original surveys undertaken. The following measures are in line with <i>Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes</i> (NRA 2009).</li> <li>From a precautionary basis, a pre-commencement survey will be undertaken by a qualified ecologist in accordance with standard best practice guidance prior to the commencement of site works to ensure that no red squirrel dreys or pine marten dens are present within or in close proximity to the infrastructure footprint.</li> <li>In the event that a red squirrel drey or pine marten den is identified within the Proposed Development footprint during pre-commencement surveys, further surveys will be undertaken to ascertain whether the drey/den is in use.</li> </ul>		



	Consultation will be carried out with NPWS and a Species Protection Plan as agreed by the project ecologist and NPWS will be put in place in advance of felling works.	
Residual Effect	Following the implementation of the mitigation proposed above, there will be no significant residual effect on pine marten or red squirrel as a result of the Proposed Development at any geographic scale.	

## 6.4.2.3 Biosecurity

A small stand of *Rhododendron ponticum* was identified within the footprint of a proposed existing road to be upgraded, located to the northwest of T4. The infestation is approximately 4m in width and is located adjacent to the road on the western side. Due to the construction works associated with the upgrade of this road, in the absence of mitigation there is potential for spread of this species to other habitats within the Proposed Development Site and outside of the Proposed Development Site. This could occur via dispersal of seeds locally, or inappropriate disposal of the plant material whereby seeds or propagatable material are spread to another area. Vector material may also be spread to other sites as a result of entrainment within machinery or staff clothing.

All other records of invasives species within the Proposed Development Site are completely avoided.

In addition, the Proposed Development Site is located within the 10km radius of the discovery of Monterey Pine Engraver. The felling and movement of pine trees from the Proposed Development Site could result in a risk of spread of the invasive insect.

The following measures will be in place to avoid impacts to biosecurity as a result of construction of the Proposed Development:

Rhododendron regrows vigorously when cut. As a result, some method of stump killing or removal is always necessary. Any untreated cut stump will regrow and in most cases flower within 3-4 years. The following measures will be in place:

- A pre-commencement survey for invasive species within the footprint of the Proposed Wind Farm Site will be carried out by a suitably qualified ecologist to ensure there is no new growth of Third Schedule invasive species in these areas.
- If additional invasive species are recorded within the construction areas, an Invasive Species Management Plan will be prepared in advance of construction which will incorporate the measures necessary to prevent spread additional to the measures laid out below.
- > A Toolbox Talk will be given by the Environmental Clerk of Works or Ecological Clerk of Works in relation to the management of invasive species within construction areas.
- > The infested area will be demarcated and works in the vicinity of the infestation will only be carried out under supervision by a suitably qualified Ecological Clerk of Works or Environmental Clerk of Works.
- > In advance of construction of the road upgrade works in the vicinity of the infested area, it will be necessary to completely remove the infestation outside of the flowering period (May to July) and dig the roots completely out. The effectiveness of this technique is increased by removing all viable roots. To avoid regrowth, stumps will be turned upside down and soil will be brushed off roots. The roots are relatively shallow, seldom being deeper than 45cm.<sup>15</sup>
- > Once the supervising ecologist confirms that the material is dried out and non-viable, it will be chipped and composted on-site.

<sup>15</sup> TII (2020) - The Management of Invasive Alien Plant Species on National Roads – Technical Guidance GE-ENV-01105



It is envisaged that no contaminated soil is to be removed from the Proposed Development Site but is to be reinstated within the site, thus negating the need for transport off-site, further risk of spread, and licencing requirements. Should potentially contaminated spoil be required to be removed from the site, it will be transported to a suitably licenced waste facility and will require a licence from the NPWS prior to its transportation.

In order to avoid the potential for spread of invasive species into the Proposed Development Site:

- > Any construction material imported into the Proposed Development Site will come from a source confirmed to be free of invasive species.
- > All plant and machinery will be thoroughly cleaned before entering and exiting the Proposed Development Site.

With regard to Monterey Pine Engraver, all biosecurity protocol issued by DAFM to Coillte will be followed to ensure that any pine trees removed from the Proposed Development Site will be treated by DAFM for the species and not exported or traded.

# 6.4.3 Likely Significant Effects During Operational Phase

## 6.4.3.1 Effects on Habitats during Operation

The operation of the Proposed Development will not result in any additional land take or loss of habitats and as such there is no potential for any significant effects in this regard. However, the Proposed Development has the potential to result in enhancement of the surrounding areas through habitat rehabilitation management (as described in the Biodiversity Management Plan) that will be implemented during the construction phase of the Proposed Development, and maintained during the operational phase. Details of the management that will be undertaken are provided in the Biodiversity Management Plan in Appendix 6-5.

Potential for effects on rivers, streams and sensitive aquatic species remains during operation and is assessed in detail in the following subsection.

## 6.4.3.1.1 Effects on Rivers and Streams and Sensitive Aquatic Faunal Species.

Table 6-21 Assessment of Potential Effects on Rivers, Streams and Sensitive Aquatic Faunal Species Note: Whilst this impact assessment is in the habitats section, it also assesses the impact on the Description of Proposed Development on aquatic species including salmonids, lamprey, European eel, white-Effect clawed Crayfish, aquatic invertebrates and other aquatic species. The Proposed Development will have no direct impact on the aquatic habitat of these species and there is no potential for disturbance. The only pathway for effect to occur is as a result of water pollution and this is discussed in this section in relation to habitats and species. These impacts on water quality are fully described in Chapter 9: 'Hydrology and Hydrogeology' of this EIAR and are described here in relation specifically to biodiversity. The increased amount of hard standing associated with the windfarm infrastructure has the potential to result in faster run off of water from the site to the surrounding watercourses. This may have the indirect effect of causing erosion, which could lead to deterioration of surface water and supporting habitat quality. Additionally, there is the potential for the faster run off of any pollutants that may be associated with vehicular usage on the site. However, the emplacement of the proposed permanent development footprint, assuming emplacement of impermeable materials as a worst-case scenariocould result in an average total site increase in surface water runoff of approximately 5,365m<sup>3</sup>/month. This represents a potential increase of approximately 0.6% in the average daily/monthly volume of runoff from the Wind Farm Site area in comparison to the baseline pre-development site runoff conditions. This is a very small increase in average runoff and results from the naturally high surface water runoff rates

	and the relatively small area of the Wind Farm Site being developed, the proposed total permanent development footprint being, representing 1.7% of the Wind Farm Site area of 1,072ha. The increase in runoff from the Proposed Development will, therefore, be negligible.
	During the operational phase, the potential for silt-laden runoff to watercourses is much reduced compared to the construction phase. In addition, all permanent drainage controls will be in place and the disturbance of ground and excavation works will be complete. Some minor maintenance works may be completed, such as maintenance of site entrances, internal roads and hardstand areas. These works would be of a very minor scale and would be very infrequent. Potential sources of sediment laden water would only arise from surface water runoff from small areas where new material is added during maintenance works.
	These minor activities could, however, result in the release of suspended solids to surface water and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies. During such maintenance works there is a small risk associated with release of hydrocarbons from site vehicles, although it is not envisaged that any significant refuelling works will be undertaken on site during the operational phase. Maintenance works will likely be contained within the Wind Farm Site and no maintenance works will be required along the Grid Connection.
Assessment of Significance prior to mitigation	As described above, the predicted increase in runoff from the Proposed Development Site will be negligible. Therefore, there is no potential for significant effect to water quality associated with increased run-off or pollutant input as a result of maintenance works.
Mitigation	Whilst no significant effects on water quality are anticipated, potential for effects on water quality associated with the operational phase drainage of the site has been fully mitigated through appropriate design and mitigation as fully described in Section 4.7 'Site drainage', and Section 9.5.3 of the EIAR. The detailed mitigation measures are not repeated here to reduce repetition throughout the document.
Residual Effect	Following the implementation of the mitigation measures outlined in Chapter 9, no potential for significant effect on water quality and on rivers and associated aquatic fauna during operation of the Proposed Development has been identified at any geographic scale.

## 6.4.3.2 **Effects on Fauna during Operation**

The operation of the Proposed Development will not result in any additional habitat loss or deterioration, nor will it result in a significant increase in anthropogenic activity due to its location and scale.

The implementation of the Biodiversity Management Plan will ensure that any wet heath habitat that is lost to facilitate the proposed infrastructure will be replaced within the Proposed Development Site and will result in the establishment of habitats of higher value for local faunal species. As such the operation of the Proposed Development will not result in a significant impact at any geographic scale. Such measures will have positive effects on the non-volant terrestrial fauna at the site of the Proposed Development. There is no potential for significant negative effects on non-volant terrestrial fauna including otter and badger which were identified as Important Ecological Features during the construction phase of the development.

It should be noted that no significant habitat for salmonids, lamprey, European eel, white-clawed crayfish, aquatic invertebrates or other aquatic species was recorded within the footprint of the Proposed Development. The potential for significant effects on the above aquatic species is restricted to indirect effects on their habitat resulting from water pollution. This has been assessed in the section above and is not repeated below.



Potential for significant effects on bat species resulting from the operation of the Proposed Development were identified in the form of collision mortality, barotrauma and other injuries. Bats are identified as Important Ecological Features during the operational phase.

### 6.4.3.2.1 Collision Mortality

#### Assessment of Site-Risk

The likely impact of a Proposed Development on bats is related to site-based risk factors, including habitat and development features. The site risk assessment, as per Table 3a of the NatureScot guidance, is provided in Table 6-22 below.

Criteria	Site-specific Evaluation	Site Assessment
Habitat Risk	A small number of PRFs of low quality were identified within the site with no roosts identified during the surveys undertaken. The habitats within the site provide suitable foraging habitat for bats and are connected to the wider landscape by linear features, primarily conifer plantation edges. The wider environment provides suitable features such as scrub, treelines and rivers/streams. The site does not provide an extensive and diverse habitat mosaic of high quality for foraging bats or meet any of the criteria of a high- risk site as set out in Table 3a of NatureScot, 2021.	Moderate
Project Size	Following the criteria set out in NatureScot, 2021 the project is of Small scale as it consists of 10 no. turbines. Whilst those turbines are over 100m in height, it is not a strategic infrastructural development and is well below the number of turbines that would constitute a Large development (NatureScot, 2021). Other wind energy developments within 5km. Comprising turbines >100 m in height	Medium
Site Risk Assessment (from criteria in Table 6-3)		Medium Site Risk (3)

Table 6-22 Site-risk Level Determination for the Proposed Development Site (Adapted from NatureScot 2021)

The site of the Proposed Development is located in an area of predominantly conifer plantation forestry. As per table 3a of the NatureScot Guidance (2021), it has a *Moderate* habitat risk score. As per Table 3a, the Proposed Development is a *Medium* project size (10 turbines). The cross tabulation of a Medium project on a Moderate risk site results in an overall **Medium** risk score (NatureScot Table 3a).

#### Assessment of Collision Risk

The following high-risk species were recorded during the dedicated surveys:

- > Leisler's bat,
- > Common pipistrelle
- > Soprano pipistrelle
- Nathusius' pipistrelle

The Overall Risk Assessment for high collision risk species is provided in the sections below. Overall Risk was determined, in accordance with Table 3b of NatureScot guidance, by a cross-tablature of the



site risk level (i.e. Moderate) and bat activity outputs for each species. The assessment was carried out for both median and maximum activity categories in order to provide insight into typical bat activity (i.e. median values) and activity peaks (i.e. maximum values). NatureScot recommends that that most appropriate activity level (i.e. median or maximum) be utilised to determine the overall risk assessment for a species.

As per NatureScot guidance there is no requirement to complete an Overall Risk Assessment for lowrisk species. During the extensive suite of surveys undertaken that following low risk species were recorded:

During the extensive suite of surveys undertaken that following low risk species were recorded:

- Myotis spp.
- Brown long-eared bat
- > Lesser horseshoe bat

Overall activity levels were low or moderate for the above species, with high peak activity levels recorded in spring for all three species at a small number of detectors, in summer for brown long-eared bats at one detector, and in autumn for lesser horseshoe bats and two detectors.

It is determined that the Typical Activity (i.e. Median) is reflective of the nature of the site, with low levels of bat activity recorded for these species during the walked transects undertaken. Due to these species' ecology and the lack of regular high activity levels across the site, no significant collision related effects are anticipated on *Myotis* spp., brown long-eared bats and lesser horseshoe bats.

#### Leisler's bat

This site is within the current range of the Leisler's bat (NPWS, 2019). Leisler's bats are classed as a rarer species of a high population risk which have a high collision risk. Leisler's bats were regularly recorded during activity surveys across the proposed site. When assessed in the context of the identified site risk and in line with Table 3b (NatureScot, 2021) overall activity risk for Leisler's bat was found to be *Low* in Spring and Autumn and *Medium* in Summer at typical activity levels, and *High* in Summer at peak activity levels (See Table 6-23 below).

Based on site visit and survey data, including walked transects, it is determined that the Typical Activity (i.e. Median) is reflective of the nature of the site, which is conifer plantation forestry with low numbers of bats recorded during the transects undertaken.

Taking a precautionary approach, there is a **Medium** collision risk level assigned to the local population of Leisler's bat.

Survey	Site Risk	Typical Activity	Typical Risk	Activity Peaks	Peak Risk
Period		(Median)	Assessment (as	(Maximum)	Assessment (as per
			per Table 3b		Table 3b
			NatureScot 2021)		NatureScot 2021)
Spring		Low (1)	Typical Risk is	Low –	Peak Risk is
			Low (3)	Moderate (2)	Medium (9)
Summer	Medium	Low - Moderate	Typical Risk is	High (5)	Peak Risk is High
	(3)	(2)	Medium (6)		(15)
Autumn		Low (1)	Typical Risk is	Moderate -	Peak Risk is
			Low (3)	High (4)	Medium (12)

Table 6-23 Leisler's bat - Overall Risk Assessment



#### Detector locations with High median Leisler's bat activity levels

No detectors registered nights with High median levels of Leisler's bat activity across any season in 2022.

#### Soprano pipistrelle

This Site is within the current range of the soprano pipistrelle bat (NPWS, 2019). Soprano pipistrelle are classed as a common species of a medium population risk which have a high potential collision risk. Soprano pipistrelle were recorded during activity surveys across the proposed site. When assessed in the context of the identified site risk and in line with Table 3b (NatureScot, 2021) overall activity risk for soprano pipistrelle was found to be *Medium* at typical activity levels, with *Low* risk in Spring, and *Medium* at peak activity levels, with *High* risk in Summer (See Table 6-24 below).

Based on site visit and survey data, including walked transects, it is determined that the Typical Activity (i.e. Median) is reflective of the nature of the site, which is conifer plantation forestry with low numbers of bats recorded during the walked transects undertaken.

Thus, there is **Medium** collision risk level assigned to the local population of soprano pipistrelle.

Survey Period	Site Risk	Typical Activity (Median)	Typical Risk Assessment (as per Table 3b NatureScot, 2021)	Activity Peaks (Maximum)	Peak Risk Assessment (as per Table 3b NatureScot, 2021)
Spring		Low (1)	Typical Risk is Low (3)	Moderate – High (4)	Peak Risk is Medium (12)
Summer	Medium (3)	Moderate (3)	Typical Risk is Medium (9)	High (5)	Peak Risk is High (15)
Autumn		Low - Moderate (2)	Typical Risk is Medium (6)	Moderate – High (4)	Peak Risk is Medium (12)

Table 6-24 Soprano pipistrelle - Overall Risk Assessment

#### Detector locations with High median soprano pipistrelle activity levels

In Summer, Detector D05 and D06 registered nights with High median levels of soprano pipistrelle activity. These detectors correspond to Turbines T5 and T6 respectively (Figure 2-1 of the Bat Baseline Report). Given that High median activity levels were recorded near Turbines 5 and 6 in autumn, an adaptive monitoring and mitigation strategy has been devised for the Proposed Development in line with the case study example provided in Appendix 5 of the NatureScot Guidance. Further details on proposed curtailment can be found in Section 6.2 below.

No other detectors recorded High median levels of soprano pipistrelle activity across any other season.

#### **Common pipistrelle**

This site is within the current range of the common pipistrelle bat (NPWS, 2019). Common pipistrelle are classed as a common species of a medium population risk which have a high collision risk. Common pipistrelle were recorded during activity surveys across the Proposed Development site. When assessed in the context of the identified site risk and in line with Table 3b (NatureScot 2021); overall activity risk for common pipistrelle at typical activity levels was found to be *Medium* at typical activity levels and *High* at peak activity levels across all seasons (See Table 6-25 below).



Based on site visit and survey data, including walked transects, it is determined that the Typical Activity (i.e. Median) is reflective of the nature of the site, which is conifer plantation forestry with low numbers of bats recorded during the walked transects undertaken.

Thus, there is **Medium** collision risk level assigned to the local population of common pipistrelle.

Survey Period	Site Risk	Typical Activity (Median)	Typical Risk Assessment (as per Table 3b NatureScot, 2021)	Activity Peaks (Maximum)	Peak Risk Assessment (as per Table 3b NatureScot, 2021)
Spring		Moderate (3)	Typical Risk is Medium (6)	High (5)	Peak Risk is High (15)
Summer	Medium	Moderate to	Typical Risk is	High (5)	Peak Risk is High
	(3)	High (5)	Medium (12)		(15)
Autumn		Moderate (3)	Typical Risk is	High (5)	Peak Risk is High
			Medium (6)		(15)

Table 6-25	Common	pipistrelle -	Overall.	Risk As.	sessment

#### Detector locations with High median common pipistrelle activity levels

In Spring, Detectors D07 and D09 registered nights with High median levels of common pipistrelle activity. In Summer, High median levels were recorded across the site at detectors D03, D05, D06, D07 and D09. In Autumn, High levels were recorded at Detectors D05 and D06. These detectors correspond to Turbines T3, T5, T6, T7 and T9 respectively (Figure 2-1 of the Baseline Bat Report). Given that high median activity levels were recorded near these turbines, an adaptive monitoring and mitigation strategy has been devised for the Proposed Development in line with the case study example provided in Appendix 5 of the NatureScot Guidance. Further details on proposed curtailment can be found in Section 6.2 below.

No High median levels of common pipistrelle activity were recorded at D01, D02, D04, and D08; however, High peak activity levels were recorded.

#### Nathusius' pipistrelle

This Proposed Development Site is within the current known range of the Nathusius' pipistrelle bat (NPWS, 2019). Nathusius' pipistrelle are classed as a rarest species of a high population risk which have a high collision risk. Low numbers of Nathusius' pipistrelle (n=8) were recorded during Autumn static activity surveys across the Proposed Development Site. When assessed in the context of the identified site risk and in line with Table 3b (NatureScot, 2021); overall activity risk for Nathusius' pipistrelle at typical and peak activity levels was found to be *Low*. (See Table 6-26 below).

Thus, there is **Low** collision risk level assigned to the local population of Nathusius' pipistrelle.

Survey Period	Site Risk	Typical Activity (Median)	Typical Risk Assessment (as per Table 3b NatureScot, 2021)	Activity Peaks (Maximum)	Peak Risk Assessment (as per Table 3b NatureScot, 2021)
Spring	Medium	Low (1)	Typical Risk is Low (3)	Low (1)	Peak Risk is Low (3)
Summer	(3)	Low (1)	Typical Risk is Low (3)	Low (1)	Peak Risk is Low (3)

Table 6-26 Common Pipistrelle - Overall Risk Assessment



Survey Period	Site Risk	Typical Activity (Median)	Typical Risk Assessment (as per Table 3b NatureScot, 2021)	Activity Peaks (Maximum)	Peak Risk Assessment (as per Table 3b NatureScot, 2021)
Autumn		Low (1)	Typical Risk is Low (3)	Low (1)	Peak Risk is Low (3)

#### Detector locations with High median Nathusius' pipistrelle activity levels

No detectors registered nights with High median levels of Nathusius' pipistrelle activity across any season.

#### **Collision Risk Summary**

Site-level collision risk for high collision risk bat species was typically *Medium*, except for Nathusius' pipistrelle which was considered *Low*.

However, following per detector analysis, all detectors but D01, D02, D04, and D08 showed high median activity levels across at least one season (Table 6-27), in particular for common and soprano pipistrelles. Given the potential for high collision risk was recorded at median activity levels at these detectors, an adaptive monitoring and mitigation strategy has been devised for the Proposed Development, in line with the case study example provided in Appendix 5 of the NatureScot (2021) Guidance and based on the site-specific data. This would involve curtailment during periods with high median bat activity (i.e. Spring at T7 and T9, Summer at T3, T5, T6, T7 and T9 and Autumn at T5 and T6), with simultaneous activity monitoring taking place. Turbines would be curtailed during the weather conditions most suitable for bat activity at the site, see the Section "Determining curtailment" below. Proposed curtailment and monitoring is outlined in the sections below.

Species	Survey Period	Detector ID	Corresponding Turbine	Median Bat Activity (bpph)	Median Bat Activity Level	Max Bat Activity	Max Bat Activity Level
Soprano	Summer	D05	Т5	23.11	High	67.52	High
Pipistrelle		D06	Т6	20.62	High	48.32	High
Common	Spring	D07	Τ7	48.27	High	159.00	High
Pipistrelle		D09	Т9	31.33	High	134.99	High
	Summer	D03	Т3	17.91	High	114.83	High
		D05	Т5	21.65	High	49.74	High
		D06	T6	63.32	High	106.12	High
		D07	Τ7	36.72	High	89.08	High
		D10	n/a	30.29	High	98.05	High
	Autumn	D05	T5	21.97	High	117.8	High
		D06	T6	39.90	High	128.67	High

#### Table 6-27 Analysis Results: Detectors with High Median Bat Activity

### 6.4.3.2.2 Best Practice and Mitigation Measures

This section describes the best practice and site-specific mitigation measures that are in place to avoid and reduce the potential for significant effects on local bat populations as a result of the operational phase of the Proposed Development.



#### Lighting

With regard to the potential for lighting to increase collision risk, it is noted that there will be some illumination of the turbines in the form of aviation lighting, and whilst this lighting is unlikely to result in any significant increase in collision risk, a comprehensive and site-specific mitigation and monitoring programme for a period of at least 3 years post construction is proposed. If in the course of this monitoring, any potential for significant effects on bats is identified, specific measures including curtailment, will be implemented to avoid any such impacts.

#### Buffering

In accordance with NatureScot and NIEA Guidance, a minimum 50m buffer to all habitat features used by bats (e.g., hedgerows, tree lines etc.) should be applied to the siting of all wind turbines (See example provided in Plate 6-5 below). However, Eurobats No. 6 guidance and NIEA recommends increased buffers of 100m and 200m around woodland/forestry areas, however, there is no scientific evidence to support these increased buffer distances in the UK.

NatureScot recommends that a distance of 50m between turbine blade tip and nearest woodland (or other key habitat features) is adequate mitigation. This 50m buffer will be implemented from the outset and monitored as per the post-construction monitoring. The success of the buffer mitigation will be assessed as part of post construction monitoring (outlined in 'Operational Monitoring' section below) and updated where necessary. All turbines are located within or at the edge of forestry habitats. In the case of proposed T6, where the proposed buffer would reach beyond the existing road into newly planted oak treelines, felling will remain to the western side of the road to ensure the treeline is retained.

The turbine model to be installed on the site will have an overall ground-to-blade tip height in the range of 185m maximum to 179.5m minimum; rotor diameter in the range of 163m maximum to 149m minimum and hub height of 110.5m maximum and 102m minimum. The buffer calculation is based on the lowest potential swept area of the turbine blades, and therefore the largest area of required forestry felling. Should a turbine with a higher blade swept area be built, the area of temporary felling required will be lower. The largest felling buffer for the proposed Wind Farm is 102.4m.

It is necessary to calculate the distance between the edge of the habitat feature and the centre of the tower (b). Using the formula:

$$b = \sqrt{(50 + bl)^2 - (hh - fh)^2}$$

Where, **bl** =Blade length, **hh** = hub height, **fh** = feature height all in metres.

E.g. (below)  $\mathbf{b} = 69.3 \text{m}$  (Plate 6-5)



Plate 6-5 Calculate buffer distances (Natural England, 2014).



#### **Blade Feathering**

NIEA Guidelines also recommend that, in addition to buffers applied to habitat features, all wind turbines are subject to 'feathering' of turbine blades when wind speeds are below the cut-in speed of the proposed turbine. This means that the turbine blades are pitched at 90 degrees or parallel to the wind to reduce their rotation speed to below two revolutions per minute while idling. This measure has been shown to significantly reduce bat fatalities (by up to 50%) in some studies (NIEA, 2021).

In accordance with NIEA Guidelines, blade feathering will be implemented as a standard across all proposed turbines when wind speeds are below the cut-in speed of the turbine.

#### Curtailment

Overall risk levels for high collision risk bat species was typically *Medium*, except for Nathusius' pipistrelle which was *Low*. Given the potential for high collision risk, at five turbine locations, was recorded at median activity levels, an adaptive monitoring and mitigation strategy has been devised for the Proposed Development, in line with the case study example provided in Appendix 5 of the NatureScot (2021) Guidance and based on the site-specific data.

Curtailment involves raising the cut-in speed with associated loss of power generation in combination with reducing the blade rotation (blade feathering) below the cut-in speed. Blade feathering will be introduced as standard across the site, as above.

Curtailment will be implemented during periods with high median bat activity (i.e. Spring at T7 and T9, Summer at T3, T5, T6, T7 and T9 and Autumn at T5 and T6), with simultaneous activity monitoring taking place. Turbines will be curtailed during the weather conditions most suitable for bat activity at the site.

Recent research used to inform NatureScot guidance has found that 90% of all bat activity can occur on sites when temperature exceeded 11.5°C and windspeed was below 5m/s. Therefore, a software module will be programmed into the SCADA system controlling the turbines to curtail turbines when all these criteria are met from sunset to sunrise during the seasons specified in Table 6-28 below. These criteria will be reviewed following operational monitoring or as a result of planning conditions. Curtailment is achieved by opening the blade pitch into the fully-feathered position, which reduces blade rotation speed to <1rpm.

The effectiveness of curtailment will be monitored in order to determine (a) whether it is working effectively (i.e. whether bat mortality is detected, thereby confirming its effectiveness), and (b) whether the curtailment regime can be refined such that turbine down-time can be minimised whilst ensuring that it remains effective at preventing casualties.

A summary of the proposed seasonal curtailment is provided in Table 6-28 below.

Turbine	Proposed Curtailment Perio	od	
No.	Spring (April to May)	Summer (June to mid- August)	Autumn (mid-August to October)
Turbine 3	No	Yes	No
Turbine 5	Yes	Yes	Yes
Turbine 6	Yes	Yes	Yes
Turbine 7	No	Yes	No

Table 6-28 Turbine Specific Curtailment Strategy for High-risk Species



Turbine	Proposed Curtailment Period				
No.	Spring (April to May)	Summer (June to mid- August)	Autumn (mid-August to October)		
Turbine 9	No	Yes	Yes		

#### **Operational Monitoring**

As per NIEA and NatureScot Guidance, at least 3 years of post-construction monitoring is required to assess the effects of construction related habitat modification on bat activity i.e. the 50 metre separation between the proposed turbine blade tips and the nearest landscape feature. For example, it may be that the construction of wind turbines reduces bat activity patterns at the site relative to that recorded preconstruction, due to the implementation of the 50-metre buffer described above, and to a level at which there is no longer potential for significant effects on bats (NatureScot, 2021).

Post-construction monitoring will include static detector surveys, walked survey transects and corpse searching to record any bat fatalities resulting from collision. At a minimum, monitoring will be conducted for 3 years post-construction.

The results of post-construction monitoring shall be utilised to assess changes in bat activity patterns post-construction and to monitor the implementation of the mitigation strategy. The performance of the curtailment programme in terms of its ability to respond to the changes in bat abundance based on temperature and wind speed would be analysed to confirm the efficacy of the curtailment during different periods of bat activity. At the end of each year, the efficacy of the curtailment programme will be reviewed, and any identified efficiencies incorporated into the curtailment programme. This approach allows for an evidence-based review of the potential or bat fatalities at the site, post construction, to ensure that the necessary measures, based on a new baseline post-construction, are implemented for the protection of bat species locally.

The below subsections provide additional detail on the proposed survey effort, timing, and mitigation.

#### **Monitoring Year 1**

#### Bat activity surveys

The post-construction surveys will be carried out as per the pre-construction survey effort. Static monitoring will take place at each turbine during the bat activity season (between April and October) (NatureScot, 2021, NIEA, 2021). Full spectrum recording detectors will be utilised for the same duration as during pre-application surveys and at the same density (NatureScot, 2021). As described in the Bat Baseline Report (Appendix 6-2), the assessment of bat activity levels will include the use of 'Ecobat' (or similar alternative), a web-based interface, allowing uploaded activity data to be contrasted with a comparable reference range, allowing objective and robust interpretation. Walked survey transects will also be conducted.

Key weather parameters and other factors that are known to influence collision risk will be monitored and shall include:

- > Windspeed in m/s (measured at nacelle height)
- > Temperature (°C)
- Precipitation (mm/hr)


#### **Carcass searches**

Carcass searches, to monitor and record bat fatalities, shall be conducted at each turbine in accordance with NatureScot/NIEA Guidance. This shall include searcher efficiency trials and an assessment of scavenger removal rates to determine the appropriate correction factor to be applied in relation to determining an accurate estimate of collision mortality. Surveys should cover all activity seasons and the use of a trained dog detection team will be carried out to ensure maximum efficiency.

#### Monitoring Years 2 & 3

Monitoring surveys shall continue in Year 2 and 3, and the success of the curtailment strategy shall be assessed in line with the baseline data collected in the preceding year(s).

The performance of the curtailment programme in terms of its ability to respond to the changes in bat abundance based on temperature and wind speed shall be analysed to confirm it is neither significantly over- nor under- curtailing during different periods of bat activity.

At the end of each year, the efficacy of the mitigation/curtailment programme shall be reviewed, and any identified efficiencies incorporated into the programme. The requirement for continued postconsent monitoring will also be considered. Should no bat fatalities be recorded in Year 1, curtailment (where applicable) in Year 2 and Year 3 could be reduced/re-evaluated or removed with monitoring continuing to inform this strategy. A monitoring programme will be submitted to, and agreed with, the Planning Authority. Any subsequent changes will be agreed with the Planning Authority.

### Summary of Assessment of Potential Effects on Bats during Operation

Description of Effect	<ul> <li>The following high-risk species were recorded during the dedicated surveys:</li> <li>Leisler's bat,</li> <li>Common pipistrelle</li> <li>Soprano pipistrelle</li> <li>Nathusius' pipistrelle</li> </ul>
	<ul> <li>Together with the following low-risk species:</li> <li><i>Myotis</i> spp.</li> <li>Brown long-eared bat</li> <li>Lesser horseshoe bat</li> </ul> Overall activity levels were low or moderate for the low-risk species. High peak activity levels were recorded in spring for all three species at a small number of detectors, in summer for brown long-eared bats at one detector and in autumn for lesser horseshoe bats at two detectors.
	Site-level collision risk for high collision risk bat species was typically Medium, except for Nathusius' pipistrelle, for which was considered Low. However, following per detector analysis, all detectors excluding D01, D02, D04, and D08 showed high median activity levels across at least one season, in particular for common and soprano pipistrelles.
Assessment of Significance prior to mitigation	Due to the lack of regular high activity levels across the site, no significant collision related effects are anticipated on <i>Myotis</i> spp., brown long-eared bats and lesser horseshoe bats. A potential for long-term negative effects was identified for high-risk species (Pipistrelles and Leisler's bats) due to the high levels of activity recorded within

Table 6-29 Assessment of Potential Effects on Bats



	the site. The effects on high-risk species as a result of their potential interaction with wind turbines prior to mitigation are <i>Significant</i> at the local level. No significant effects are anticipated at a county, national level or international level.
Mitigation	<ul> <li>Mitigation measures are proposed together with post-construction monitoring:</li> <li>Manage felling buffers around turbines</li> <li>Implement blade feathering as a standard</li> <li>Implement curtailment on proposed turbines which recorded high median activity levels, as per Table 6-28.</li> <li>A minimum of three years operational monitoring to assess changes in bat</li> </ul>
	<ul> <li>A minimum of three years operational monitoring to assess changes in bat activity patterns post construction and to monitor the implementation of the mitigation strategy.</li> <li>Adaptive mitigation strategy based on the results of the post-construction</li> </ul>
	nomoring.
Residual Effect	Taking into consideration the sensitive design of the project, the proposed best practice and adaptive mitigation measures, significant residual effects on bats are not anticipated.

# 6.4.4 Likely Significant Effects During Decommissioning phase

There will be no additional habitat loss associated with the decommissioning of the Proposed Development and therefore there will be no significant effects in this regard.

The wind turbines proposed as part of the Proposed Development are expected to have a lifespan of approximately 35 years. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the Proposed Development will be decommissioned fully. The onsite substation will remain in place as it will be under the ownership of the ESB and will form a permanent part of the national electricity grid.

Upon decommissioning of the Proposed Development, the wind turbines will be disassembled in reverse order to how they were erected. All above ground turbine components will be separated and removed off-site for recycling. Turbine foundations will remain in place underground and will be covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in significant environment nuisances such as noise, dust and/or vibration. Site roadways will be left in situ, as appropriate to facilitate on-going forestry operations. If it were to be confirmed that the roads were not required in the future for any other useful purpose, they could be removed where required, however, this is not envisaged at this time. Underground cables, including Grid Connection, will be removed and the ducting left in place. A decommissioning plan will be agreed with the local authorities three months prior to decommissioning the Proposed Development.

The impacts on biodiversity will also be similar in nature to those experienced during construction but on a far lesser scale and magnitude. There would be no additional or ancillary impacts associated with the decommissioning phase. The existing site roads would be used during decommissioning. The redundant underground cables will be pulled from their trenches without the requirement for significant excavation.

The same mitigation to prevent significant impacts on water quality and associated aquatic fauna and other terrestrial fauna during construction will be applicable to the decommissioning phase. The measures incorporated into the construction phase, in Section 6.4.2 of this EIAR, including specific mitigation provided in relation to water quality in Chapter 9: 'Hydrology & Hydrogeology', will be



implemented during decommissioning. It can be concluded that following the implementation of preventative mitigation, there is no potential for the decommissioning of the Proposed Development to result in significant effects on biodiversity.

# 6.4.5 Effects on Designated Sites

None of the elements of the Proposed Development are located within the boundaries of any Nationally or European designated sites. There will be no direct effects on any designated site as a result of the construction, operation and decommissioning the wind farm project including the turbine delivery route, substation and Grid Connection.

# 6.4.5.1 European Designated Sites

In relation to European sites, an Appropriate Assessment Screening and Natura Impact Statement (NIS) have been prepared to provide the competent authorities with the information necessary to complete an Appropriate Assessment for the Proposed Development in compliance with Article 6(3) of the Habitats Directive.

As per the EPA Guidance (2022), "A biodiversity section of an EIAR, for example, should not repeat the detailed assessment of potential effects on European sites contained in documentation prepared as part of the Appropriate Assessment process, but it should refer to the findings of that separate assessment in the context of likely significant effects on the environment, as required by the EIA Directive". This section provides a summary of the key assessment findings with regard to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

The Screening for Appropriate Assessment concluded as follows:

'it cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the Proposed Development, individually or in combination with other plans and projects, would be likely to have a significant effect on the following sites:

- Danes Hole, Poulnalecka SAC
- > Ratty River Cave SAC
- > Lower River Shannon SAC
- > River Shannon and River Fergus Estuaries SPA

The findings presented in the NIS are that,

'Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction and operation of the Proposed Development does not adversely affect the integrity of European sites.

Therefore, it can be objectively concluded that the Proposed Development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site'.

## 6.4.5.2 Nationally Designated Sites

As discussed in Section 6.3.1, the Nationally Designated Sites listed below have been identified as occurring within the Likely Zone of Influence of the Proposed Development.

### 6.4.5.2.1 Hydrological Effects



Hydrological connectivity was identified between the Proposed Development and the following Nationally designated sites:

- Doon Lough NHA [000337]
- Castle Lake [000239]
- > Fergus Estuary And Inner Shannon, North Shore [002048]
- > Inner Shannon Estuary South Shore [000435]

The potential for the construction and operation of the Proposed Development to result in a significant effect on water quality within local and downstream watercourses has been assessed in Section 6.4.2.1 and 6.4.3.1.. A range of mitigation measures to protect downstream water quality are in place as summarised in the aforementioned sections and are detailed in Chapter 9 of this EIAR. With these mitigation measures in place, there is no potential for residual significant effect on local water quality and in turn on the above listed downstream Nationally Designated Sites as a result of construction or operation of the Proposed Development.

#### 6.4.5.2.2 Damage to Peatland

On a precautionary basis, a potential for effect on the following nationally designated site which is adjacent to the northern boundary of the Proposed Development Site was identified via damage during felling works required within the identified enhancement lands adjacent to designated peatland:

#### > Gortacullin Bog NHA

As described in Section 6.4.2.1.2, small scale temporary dewatering may occur at some excavations (i.e., turbine bases, cable trenches), and these have the potential to temporarily affect local groundwater levels. However, temporary reductions in groundwater levels by short duration and transient dewatering works will be very localised and of small magnitude due to the nature and permeability of the local subsoil and bedrock geology (described in Section 6.3.1.13). Groundwater level effects will not be significant due the local hydrogeological regime and the elevation of the Wind Farm Site. Any effects will be temporary and localised.

The following mitigations will be in place to ensure protection of peatland habitats within Gortacullin Bog NHA:

- > Felling operations will be restricted to within the EIAR Site Boundary and will not extend into the adjacent NHA.
- The area to be felled will be accessed using existing forest/local road(s).
- Measures specified in the Felling & Reforestation Standards will be adhered to.
- Machine traffic and timber stacking will not be permitted on adjacent peatland habitats within the NHA.

With above mitigations implemented, there is no potential for residual significant effect on Gortacullin Bog NHA as a result of the Proposed Development.

#### 6.4.5.2.3 Effects on Bats

A potential for impact on the following nationally designated sites was identified via habitat loss, disturbance and collision risk to bat species (Lesser horseshoe bat, Leisler's bat):

- Danes Hole, Poulnalecka [000030]
- Cloonlara House [000028]

The potential for impacts on Danes Hole, Poulnalecka [000030] has been fully assessed under the site's SAC designation within the NIS which accompanies this application and is also assessed here under its pNHA designation.



Detailed bat surveys have been carried out of the Proposed Development Site as detailed in the Bat Baseline Report (Appendix 6-2). As described in Section 6.4.2.2 and 6.4.3.2, bespoke mitigation measures are in place to prevent habitat loss, disturbance and collision risk to local bat population. These mitigations will in turn serve to prevent any potential for residual significant impact to populations of bat species associated with nearby Nationally Designated sites.

# 6.5 **Cumulative Impact**

The Proposed Development was considered in combination with other plans and projects in the area that could result in cumulative impacts on the Important Ecological Features identified in Section 6.3.3 of this report, including European Sites and Nationally designated sites. This included a review of online Planning Registers and served to identify past, present and future plans and projects, their activities and their predicted environmental effects. The projects considered are listed in Chapter 2: Background of the Proposed Development.

# 6.5.1 Plans

The following development plans have been reviewed and taken into consideration as part of this assessment:

- Clare County Development Plan 2023-2029
- > Ireland's 4<sup>th</sup> National Biodiversity Action Plan 2023-2030
- Northern and Western Regional Assembly Regional Spatial and Economic Strategy 2020-2032

The review focused on policies and objectives that relate to designated sites for nature conservation, biodiversity and protected species. Policies and objectives relating to the conservation of peatlands and sustainable land use were also reviewed, particularly where the policies relate to the preservation of surface water quality. An overview of the search results with regard to plans is provided in Table 6-30.

European sites are considered in the Natura Impact Statement that accompanies this application.



#### Table 6-30 Assessment of Plans

Plans	Key Policies/Issues/Objectives Directly Related To European Sites. Biodiversity and	Assessment of development compliance with
	Sustainable Development In The Zone of Influence	policy
Clare County Development Plan 2023-2029	<ul> <li>Sustainable Development In The Zone of Influence</li> <li>CDP3.3 It is an objective of the Clare County Council: <ul> <li>a) To require compliance with the objectives and requirements of the Habitats Directive, specifically Article 6(3) and where necessary 6(4), Birds, Water Framework, and all other relevant EU Directives and all relevant transposing national legislation;</li> <li>b) To require project planning to be fully informed by</li> <li>ecological and environmental constraints at the earliest stage of project development and any necessary assessment to be undertaken, including assessments of disturbance to species, where required together with the preparation of both statutory and non-Statutory Ecological Impact Assessments (EcIA);</li> <li>c) To protect, manage and enhance ecological connectivity and improve the coherence of the Natura 2000 Network;</li> <li>d) To require all proposals to ensure there is 'no net loss' of biodiversity within developments</li> </ul> </li> <li>CDP15.3 - It is an objective of Clare County Council: <ul> <li>a) To afford the highest level of protection to all designated European sites in accordance with the relevant Directives and legislation on such matters;</li> <li>b) To require all planning applications for development that may have (or cannot rule out) likely significant effects on European Sites in view of the site's Conservation Objectives, either in isolation or in combination with other plans or projects, to submit a Natura Impact Statement in accordance with the requirements of the EU Habitats Directive and the Planning and Development Art; 2000 (as amended); and c) To recognise and afford appropriate protection to any new or modified SPAs or SACs that are identified during the lifetime of this Development Plan through the planning application process bearing in mind proposals for development outside of a European site (SACs and SPAs), whether directly or indirectly or in combination with any other plan(s) or project(s); and b) To have regard to Appropriate</li></ul></li></ul>	policy Having reviewed Clare County Development Plan, the Proposed Development is in accordance with the objectives described in relation to biodiversity and Natura 2000 sites. On review of the Plan, no potential for cumulative impacts in combination with the Proposed Development was identified.
	CDP15.12	



Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and	Assessment of development compliance with
	Sustainable Development In The Zone of Influence	policy
	It is an objective of Clare County Council: a) To protect and promote the sustainable management of	
	the natural heritage, flora and fauna of the County both within protected areas and in the general	
	landscape through the promotion of biodiversity, the conservation of natural habitats, the enhancement	
	of new and existing habitats, and through the integration of Green Infrastructure (GI), Blue Infrastructure	
	and ecosystem services including landscape, heritage, biodiversity and management of invasive and alien	
	species into the Development Plan; b) To promote the conservation of biodiversity through the	
	protection of sites of biodiversity importance and wildlife corridors, both within and between the	
	designated sites and the wider Plan area; c) To support the implementation of the All-Ireland Pollinator	
	Plan, National Biodiversity Action Plan and National Raised Bog SAC Management Plan; d) To ensure	
	there is no net loss of potential Lesser Horseshoe Bat feeding habitats, treelines and hedgerows within	
	2.5km of known roosts; e) To implement and monitor the actions as set out in the Clare County	
	Biodiversity Plan; and f) To promote biodiversity net gain in any new plans/projects/policies to promote	
	development that leaves biodiversity in a better state than before.	
	<b>CDP15.19</b> - It is an objective of Clare County Council: a) To preserve and conserve individual or groups	
	of trees identified in Volume 2 of this Plan as 'Trees for Preservation' which will enhance the character	
	and appearance of an area; b) To carry out tree survey work during the lifetime of this Plan to identify	
	future trees of importance in the County and facilitate their future protection; c) To protect individual or	
	groups of trees within the Plan area which are important for environmental, recreational, historical,	
	biodiversity and/or aesthetic reasons or by reason of contribution to sense of place, including groups of	
	trees which correspond with protected habitats, or which support protected species, under the Habitats	
	Directive; d) To work with landowners, local communities and other relevant groups to promote the	
	retention and conservation of existing trees and hedgerows and encourage development proposals that	
	enhance the landscape through positive management and additional planting/sensitive replanting of	
	native tree species; e) To protect woodlands and hedgerows from damage and/or degradation and to	
	prevent disruption of the connectivity of woodlands and hedgerows of the County; f) To ensure, where	
	required, applications for development include proposals for planting / leave a suitable ecological buffer	
	zone, between the development works and areas/features of ecological importance; g) Where hedgerows	
	are required to be removed in the interests of traffic safety or where breaches to hedgerows occur due to	
	river drainage/maintenance works and flood repair, to require the applicant/developer to reinstate the	
	hedgerows with a suitable replacement of native species to the satisfaction of the Council; h) To require	
	each green space in new residential developments to have at least one native oak tree, or other	
	naturalised tree species of similar stature and lifespan, integrated into the agreed planting/landscaping	



Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and	Assessment of development compliance with
	Sustainable Development In The Zone of Influence	policy
	<ul> <li>scheme; and i) To require, where possible, that all trees felled as a result of development proposals be replaced at a minimum ratio of 10 new native species per 1 tree felled.</li> <li>CDP 15.22 – It is an objective of the Development Plan: To manage, enhance and protect the wetlands in County Clare having regard to the County Clare Wetlands Survey (2008), the map of Irish Wetlands (www.wetlandsurveyireland.com), the Irish Wetland Types – An Identification Guide and Field Survey Manual, EPA 2018, the Planning and Development Regulations 2001 (as amended) and 'Drainage and Reclamation of Wetlands – Draft Guidelines for Planning Authorities, 2011' and any subsequent guidance documents</li> </ul>	
	CDP11.42It is an objective of Clare County Council:a) To require proposals for development that include the provision of external lighting, to clearlydemonstrate that the lighting scheme is the minimum needed for security and working purposes;b) To ensure that external lighting and lighting schemes are designed so that the incidence of lightspillage is minimised ensuring that the amenities of adjoining properties, wildlife and the surroundingenvironment are protected; andc) To require that external lighting is designed taking the Bat Conservation Ireland Guidance Notes for:planners, engineers, architects and developers on bats and lighting into consideration, together withEUROBATS Guidelines for consideration of bats in lighting projects.	The proposed external lighting schemes for the Proposed Wind Farm Site have been designed in line with the most up to date bat mitigation guidelines, and designed such that there will be no significant impacts on wildlife.
4th National Biodiversity Action Plan 2023-2027	<ul> <li>Objective 1: Adopt a Whole-of Government, Whole of Society Approach to Biodiversity. Proposed actions include capacity and resource reviews across Government; determining responsibilities for the expanding biodiversity agenda providing support for communities, citizen scientists and business; and mechanisms for the governance and review of this National Biodiversity Action Plan.</li> <li>Objective 2: Meet Urgent Conservation and Restoration Needs. Supporting actions will build on existing conservation measures. Efforts to tackle Invasive Alien Species will be elevated. The protected area network will be expanded to include the Marine Protected Areas. The ambition of the EU Biodiversity Strategy will be considered as part of an evolving work programme across Government.</li> <li>Objective 3: Secure Nature's Contribution to People. Actions highlight the relationship between nature and people in Ireland. These include recognising the tangible and intangible values of biodiversity, promoting nature's importance to our culture and heritage and recognising how biodiversity supports our society and our economy.</li> </ul>	No cumulative impacts were identified upon review of the Plan in conjunction with the Proposed Project. The Proposed Project will not contravene the proposed objectives of the NBAP.



Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	<b>Objective 4:</b> Enhance the Evidence Base for Action on Biodiversity. This objective focuses on biodiversity research needs, as well as the development and strengthening of long-term monitoring programmes that will underpin and strengthen future decision-making. Action will also focus on collaboration to advance ecosystem accounting that will contribute towards natural capital accounts.	
	<b>Objective 5:</b> Strengthen Ireland's Contribution to International Biodiversity Initiatives. Collaboration with other countries and across the island of Ireland will play a key role in the realisation of this Objective. Ireland will strengthen its contribution to international biodiversity initiatives and international governance processes, such as the United Nations Convention on Biological Diversity.	
Northern and Western Regional Assembly Regional Spatial and Economic Strategy 2020-2032	<ul> <li><u>Regional Policy Objective 5.5 – Ensure efficient and sustainable use of all our natural resources, including inland waterways, peatlands, and forests in a manner which ensures a healthy society a clean environment and there is no net contribution to biodiversity loss arising from development supported in this strategy. Conserve and protect designated areas and natural heritage area. Conserve and protect European sites and their integrity.</u></li> <li><u>Regional Policy Objective 5.7 -</u> Ensure that all plans, projects and activities requiring consent arising from the RSES are subject to the relevant environmental assessment requirements including SEA, EIA and AA as appropriate</li> </ul>	The strategy was reviewed, with particular reference to Policies and Objectives that relate to biodiversity. No potential for cumulative impacts when considered in conjunction with the current proposal were identified. There will be no impact on designated sites or biodiversity as a result of the development. Mitigation measures will be implemented as well as a bespoke Biodiversity Management and Enhancement Plan to ensure no net loss to biodiversity.



# 6.5.2 **Other Projects**

As described in Section 2.7 of this EIAR, relevant projects have been assessed in-combination with the proposed Wind Farm development and include planning applications in the vicinity of the site, within the zone of influence of all habitats and species considered in this report, and include other wind energy applications within the wider area. These have not been repeated here to reduce the duplication of information within this EIAR. However, they have been fully considered in the assessment with further detail provided below. Section 6.5.5 concludes on their potential for impact on biodiversity.

For the purposes of this cumulative assessment, wind farms within a 10km radius of the Proposed Development area were considered in further detail below. This distance was chosen in line with that recommended for the assessment of cumulative impacts on bats by NatureScot Guidelines 2021 (Section 4). Projects within the same subcatchments as the Proposed Development have been considered for cumulative assessment in order to capture potential cumulative effects on aquatic receptors. This geographic boundary is also considered sufficient in relation to the assessment of terrestrial habitats and fauna identified as Important Ecological Features in this report (excluding birds and bats).

Cumulative impacts on bird species considered other wind farms within a 25km radius and is fully assessed in Chapter 7 of this EIAR.

In particular, an assessment of the potential for cumulative effects of the Proposed Development incombination with the proposed Oatfield Wind Farm Development, located on lands adjacent to the Proposed Development Site, was carried out and is provided below.

# 6.5.2.1 **Other Wind Farm Projects**

For the purposes of this cumulative assessment, wind farms within a 10-kilometre radius of the Proposed Development area were considered in further detail below. Details of wind farm projects within 10km of the Proposed Development are provided in Section 2.5.4 of this EIAR and are summarised below also in the context of terrestrial ecology. A total of five wind farms and one single turbine were identified within the cumulative study boundary.

Pl. Ref.	Distance from Proposed Development	Separatio n distance between nearest turbines	Wind Farm	Status	Turbine No.
ABP-	Adjacent to the	500m	Oatfield	Proposed	11
315239	Proposed Development				
	boundary				
ABP-	Approx. 3.4km east	4.3km	RWE Fahybeg WF	Permitted	8
317227	of proposed Wind				
Dre	Approx 4km	51.000	Lookoroogh WE	Proposed	7
nlannin	Appiox 4kiii	JKIII		rioposed	/
g	proposed Wind				
0	Farm Site boundary				
ABP-	4.4km south of			Proposed	12
312193-	proposed Wind	4.8km	Ballycar Wind Farm	Lodged	
21	Farm Site boundary			26/01/2024	
ABP.308	Approx. 4.7km	5.7km	Carrownagown Wind Farm	Permitted	19
799	northeast of				

Table 6-31 Wind farm projects within 10km of the Proposed Development



Pl. Ref.	Distance from Proposed Development	Separatio n distance between nearest turbines	Wind Farm	Status	Turbine No.
	proposed Wind				
	Farm Site boundary				
10/453	Approx. 7.8km	8.9km	Parteen Turbine	Existing	1
(EOD	south of proposed				
15/812),	Wind Farm Site				
22254,	boundary				
ABP-					
314887-					
22					

### 6.5.2.1.1 **Oatfield Wind Farm**

The EIAR Biodiversity Chapter for the Proposed Development (RSK 2023) was reviewed.

#### Habitats

Habitat losses arising from the Oatfield development include conifer forestry, heath and bog, scrub, immature woodland, mixed broadleaved woodland, hedgerow and treeline.

The Species and Habitat Management Plan prepared for the Oatfield development (SHMP, RSK 2023) includes for the creation and/or enhancement of heath and bog, grassland, scrub, hedgerows and conifer plantation. The Biodiversity Management Plan for the Proposed Development at Knockshanvo (Appendix 6-5) provides for the offsetting and enhancement of habitats within the Proposed Development Site just that there will be an increase in area of peatland habitat (blanket bog and wet heath) and hedgerows. As such, no potential for significant cumulative effect on habitats as a result of the two developments when considered in-combination is predicted.

#### **Invasive Species**

A specific Invasive Species Management Plan has been prepared as part of the Oatfield EIAR. With the prescribed mitigations in place for the Oatfield and the prescribed biosecurity mitigations for the Proposed Development, no potential for cumulative effects are predicted.

#### Bats

According to the EIAR, the area of the Oatfield development is used by all species present in Ireland, and the *Myotis* genus. Compensatory measures for habitat loss have been described in the Species and Habitat Management Plan, including 14km of linear features. No details of other mitigation measures are available in the EIAR, however the report concludes: *"it is deemed that these mitigation and enhancement measures will be sufficient to avoid significant effects on these Key Ecological Features (i.e., habitats and species). As such, no residual effects are anticipated."*. Similarly, while evidence of bat activity was recorded on the Proposed Development Site, appropriate mitigation measures are in place such that no cumulative effects are predicted.



### Otter

According to the EIAR, no otter breeding or resting places were identified during the surveys undertaken for the Oatfield development. Otter activity was recorded within the proposed Oatfield site but mitigation measures are prescribed such that no significant effects on otter are predicted. Similarly, while evidence of otter activity was recorded on the Proposed Development Site, appropriate mitigation measures are in place such that no cumulative effects are predicted.

#### Badger

According to the EIAR, no badger breeding or resting places were identified during the surveys undertaken for the Oatfield development. Badger activity was recorded within the proposed Oatfield site but mitigation measures are prescribed such that no significant effects on badger are predicted. Similarly, while evidence of badger activity was recorded on the Proposed Development Site, appropriate mitigation measures are in place such that no cumulative effects are predicted.

#### Red Squirrel and Pine Marten

According to the EIAR, no breeding or resting places for red squirrel or pine marten were identified during the surveys undertaken for the Oatfield development. Red squirrel and pine marten activity was recorded within the proposed Oatfield site but mitigation measures are prescribed such that no significant effects on these species are predicted. Similarly, while evidence of activity was recorded on the Proposed Development Site, appropriate mitigation measures are in place such that no cumulative effects are predicted.

The potential for cumulative effect as a result of loss of suitable habitat in the form of conifer forestry was considered. However, considering the small-scale loss of forestry habitat resulting from the Proposed Development and the Oatfield Development combined, relative to the wide availability of conifer forestry in adjacent areas, no significant cumulative effects are predicted.

#### Aquatic Habitats and Fauna

Results of aquatic surveys carried out along rivers in the vicinity of the Oatfield development are analogous to the results of baseline aquatic surveys undertaken for the Proposed Development, being the same watercourses. The EIAR for the above Oatfield development details potential hydrological and hydrogeological issues relating to the operation and decommissioning phases of these developments and propose a suite of best practice mitigation measures designed to ensure that the developments do not in any way have a negative effect on downstream surface water quality and quantity. Similarly, the mitigation and best practice measures proposed in this EIAR chapter and Chapter 9 will ensure that the Proposed Development does not have the potential to result in significant effects on the hydrological/hydrogeological environment and aquatic habitats and species even if construction periods for both developments were to overlap.

#### Conclusion

In conclusion, taking account of the potential for cumulative effects, and exacerbation of identified individual effects, and the potential for synergistic effects as result of the combination of the construction and operational phases of Oatfield Wind Farm and the Proposed Development, no potential for significant cumulative effect on terrestrial fauna, aquatic fauna or habitats are predicted, once the prescribed mitigations for both developments are in place as detailed in their respective EIARs.



A cumulative assessment specific to the potential for cumulative effects on birds as a result of the Oatfield and the Proposed Development combined is provided in Chapter 7 of this EIAR.

### 6.5.2.1.2 RWE Fahybeg Wind Farm

The potential for the Proposed Development to result in significant cumulative effects when assessed alongside Fahybeg Wind Farm, which is c.4.3km from the nearest proposed turbine, was considered. The EIAR<sup>16</sup> for Fahybeg Wind Farm was consulted. The EIAR concluded that with the mitigations outlined in the Biodiversity Chater, Hydrology Chapter and land and soils Chapter, there will be no residual significant impacts to biodiversity.

With the mitigation prescribed for the Proposed Development there is no potential for significant cumulative effect.

This project was granted planning permission by An Bord Pleanála on the 21st March 2024.

#### 6.5.2.1.3 Ballycar Wind Farm

The potential for the Proposed Development to result in significant cumulative or in combination effects when assessed alongside Ballycar Wind Farm, which is c.4.8km from the nearest proposed turbine, was considered. The EIAR<sup>17</sup> for Ballycar Wind Farm was consulted. Ballycar Wind Farm is located within predominately improved agricultural grassland and areas of commercial forestry. The EIAR contains mitigation with regard to water quality, protection of habitats and fauna, and management and treatment of invasive species. A Biodiversity Enhancement Management Plan is proposed as part of the Ballycar wind farm development. With the prescribed mitigations in place for the Ballycar Wind Farm and Knockshanvo Wind Farm, no potential for cumulative effects is predicted.

#### 6.5.2.1.4 Lackareagh Wind Farm

The potential for the Proposed Development to result in significant cumulative or in combination effects when assessed alongside Lackareagh Wind Farm, which is c.5km from the nearest proposed turbine, was considered. The EIAR for Lackareagh Wind Farm was reviewed (MKO 2024). Lackareagh Wind Farm is located within agricultural grassland and commercial forestry. Considering the reported residual effects from Lackareagh Wind Farm and the documented mitigation measures, and the mitigation measures set out in this Biodiversity Chapter and the lack of potential for residual significant effect, no potential for significant cumulative effects in-combination with Lackareagh Wind Farm are predicted.

#### 6.5.2.1.5 Carrownagown Wind Farm

The potential for the Proposed Development to result in significant cumulative or in combination effects when assessed alongside Carrownagowan Wind Farm, which is c.5.7km from the nearest proposed turbine, was considered. The EIAR<sup>18</sup> for Carrownagowan Wind Farm was consulted. No potential for residual significant impacts on biodiversity were predicted as agreed with in the Inspector's Report. Given the range of mitigations prescribed for the Proposed Development (Knockshanvo Wind Farm), no potential for significant cumulative effects in-combination with this permitted development are predicted.

<sup>&</sup>lt;sup>16</sup> https://www.eplanning.ie/ClareCC/AppFileRefDetails/23148/0

<sup>&</sup>lt;sup>17</sup> https://ballycargreenenergyplanning.ie/wp-content/uploads/2024/01/Chapter-6-Biodiversity.pdf

<sup>&</sup>lt;sup>18</sup> https://www.pleanala.ie/en-ie/case/308799



### 6.5.2.1.6 Parteen Turbine

The potential for the Proposed Development to result in significant cumulative or in combination effects when assessed alongside Knockballynameath turbine, which is c.8.9km from the nearest proposed turbine, was considered. The planning files<sup>19</sup> on the Clare County Council website was reviewed. Given the size of the development, it did not fall under the mandatory requirement for EIA. Therefore, no impact assessment on biodiversity was conducted. This turbine is located within improved agricultural grassland and no potential for significant cumulative effects on biodiversity are predicted.

## 6.5.2.2 Other Non-Wind Farm Projects

A search for non-wind farm projects was carried out throughout the hydrological subcatchment boundaries of the Shannon (Lower) \_SC-100, Owenogarney\_10 and Owenogarney\_20 subcatchments, within which the Proposed Development is located. Given the Key Ecological Features identified within the EIAR Site Boundary, the subcatchment was ascertained to be the largest reaching boundary which could potentially result in impacts from cumulative effects due to the potential for interacting downstream and upstream hydrological effects.

Other planning applications were identified within the subcatchments. The planning applications identified within the study area were for new dwellings or renovations of existing dwellings, as well as for the erection of farm buildings. Based on the scale of the works, their proximity to the Proposed Development Site and the temporal period of likely works, no cumulative effects will occur as a result of the Proposed Development (construction, operation and decommissioning phases). Two licensed waste and IPPC facilities are located within the subcatchment:

Name	SubCateg	Categ	LicenceStatus	ActiveLicenceN	LicenceType	Address
	ory	ory	Туре	umber	Name	
Longpave	EPA	Waste	Licensed	W0076-01	Waste	Monabrahe
ment	Licensed					r,
landfill site	Activity					Longpave
						ment,
						Limerick
Stabright	IE	Indust	Licensed	P0356-01	IEL	Clondrina,
Limited (in		ry				Ennis
voluntary						Road,
liquidation						Limerick
)						

#### Table 6-32 IPCC and Waste Facilities within the Subcatchment

Other proposed forestry operations located within the subcatchment were also reviewed and include the following:

Table 6-33 Other Forest	vO	perations	2021-2025	within	the	subcatchment
rabic 000 Chief roresh	, 0	peradono	2021 2020	·· · · · · · · · · · · · · · · · · · ·	unc	Subcutemient

Property Name	Hectares	Percentage	Nature of Operation
Cratloe	356.74	1-10%	Thinning
Cratloe	356.74	11-20%	Clearfell
Bunnabinna	95.6	1-10%	Clearfell

<sup>&</sup>lt;sup>19</sup> https://www.eplanning.ie/ClareCC/AppFileRefDetails/15812/0



Property Name	Hectares	Percentage	Nature of Operation
Glennagross	78.66	21-30%	Clearfell
Ballycannan	56.5	1-10%	Clearfell
Reaskcamoge	60.7	1-10%	Thinning
Derrynaveagh	12.95	11-20%	Thinning
Ballyroe	27.78	51-60%	Thinning
Derrynaveagh	176.36	1-10%	Clearfell
Corlea	114.6	1-10%	Clearfell
Cooleycasey	44.11	11-20%	Thinning
Castlecrine	32.89	31-40%	Thinning
Ballyvorgal	95.74	31-40%	Clearfell
Snaty	325.23	21-30%	Clearfell & Thinning
Cloontra	7.5	91- 100%	Clearfell
Knockshanvo	164.55	11-20%	Clearfell
Formoyle	139.43	1-10%	Clearfell & Thinning
Kilbane	17.27	41-50%	Clearfell
Ballykelly	20.01	11-20%	Thinning
Ballykelly	20.01	61-70%	Clearfell
Doon	26.96	21-30%	Thinning
Doon	26.96	1-10%	Clearfell
Violet Hill	12.72	31-40%	Clearfell
Violet Hill	46	11-20%	Thinning
Lackareagh	19.05	51-60%	Clearfell
Killokennedy	71.08	41-50%	Clearfell
Gortatrassa	12.39	31-40%	Thinning
Inchalughoge	122.63	1-10%	Thinning
Ballydonaghan	38.03	1-10%	Thinning
Killokennedy	231.38	1-10%	Thinning



Property Name	Hectares	Percentage	Nature of Operation
Kilbane	101.09	1-10%	Thinning
Carrownagowan	400.94	1-10%	Clearfell & Thinning
Coumnagun	337.07	1-10%	Thinning

# 6.5.3 **Projects in the Vicinity of the Grid Connection**

Planning applications within 500m of the proposed Grid Connection route were reviewed. Forty-seven planning applications were found which comprised works to existing single dwelling houses, singlestorey extensions, construction of agricultural sheds, demolition of small structures, upgrades to the electricity network at Ardnacrusha, construction of a preschool facility, construction of a medical centre, private wastewater treatment systems. Also included is a proposal to infill land with topsoil, subsoil, stone and inorganic construction material to raise the land level for which an NIS was prepared (Southern Scientific Services Ltd 2022) and was reviewed as part of this assessment. In addition, there is a proposal for a solar farm on a site of 70ha consisting of 309,008 sqm of solar photovoltaic panels and 38kV substation for which an Environmental Considerations Report was prepared (Aecom 2023) and which was reviewed as part of this assessment.

In addition, a study was completed to identify any grid connection routes associated with other wind farm developments which overlap with the proposed Grid Connection. From this study, the following overlaps were recorded:

- ~800m overlap with the grid connection underground cabling route associated with the proposed Lackareagh Wind Farm in the townland of Castlebank. The overlap occurs along the L3056 and along existing ESB access tracks in the vicinity of Ardnacrusha 110kV substation;
- > ~5km overlap with the grid connection underground cabling route associated with the proposed Carrownagowan Wind Farm. The overlap extends from the R471 at Cloghera as far as Ardnacrusha 110kV substation.
- ~150m overlap with the grid connection underground cabling route associated with the permitted Fahybeg Wind Farm. The overlap occurs in the vicinity of Ardnacrusha 110kV substation.

There is no overlap associated the proposed grid connection for Oatfield Wind Farm as this is a loop in connection to an existing overhead line.

As discussed in the Water Chapter (Chapter 9), the greatest potential for cumulative effects to occur would be if the construction phase of the underground grid connection routes overlapped with each other. In an unmitigated scenario, there may be some cumulative effects on the downstream receiving watercourses. However, practicalities will make it highly unlikely that the construction phase of the overlapping sections of the grid connections would occur at the same time as this would result in road closures (two trenches being excavated). Therefore, the overlapping sections of the grid connections cannot be built at the same time.

Furthermore, the EIARs for the above wind farm developments detail effects relating to the construction of the grid connection underground cabling routes. These propose a suite of mitigation measures designed to ensure that the construction of the grid connection underground cabling routes do not result in significant effects on biodiversity. Similarly, the mitigation proposed in this EIAR will ensure that the construction of the proposed Grid Connection does not have the potential to result in significant effects on biodiversity. Therefore, there is no potential for cumulative effects.



# 6.5.4 **Existing Habitats and Land Uses**

The potential for the Proposed Development to result in a cumulative loss or deterioration of habitats, or impact on the species identified, was considered in relation to the existing land uses in the area. Existing land uses in the vicinity of the Proposed Development are dominated by commercial forestry and pastoral agriculture.

The Wind Farm is primarily located in forestry habitats, which generally provide low value habitats for faunal species. In addition, due to the nature of the plantation forestry, this habitat is of low biodiversity value locally. The Proposed Development will not result in any significant net loss of valuable habitats, such as upland peatland habitats. The small-scale loss of peatland habitat that will be affected as a result of the Proposed Development, will be fully compensated through the Biodiversity Management and Enhancement Plan proposed as part of this development. The wind farm will not contribute to any overall loss of high value habitat, it has been deliberately designed to be located on habitats of low value for faunal species.

# 6.5.5 Assessment of Cumulative Effects

The residual construction, operational and decommissioning impacts of the Proposed Development, as described in Section 6.4, are considered cumulatively with other plans and projects. Particular focus has been placed on those plans and projects that are in closest proximity to the Proposed Development and those that could be potentially affected via downstream surface water.

Following the detailed surveys undertaken and impact assessment provided in Section 6.4, it is concluded that there will be no significant residual habitat loss, disturbance, or deterioration of water quality associated with the Proposed Development and therefore it cannot contribute to any cumulative effect when considered in combination with other plans and projects. The other wind farms in the area were considered (among other projects) but the Proposed Development has been deliberately designed to minimise the effects on biodiversity through the siting of the wind farm on habitats of low ecological value (conifer plantation). The project also includes a Biodiversity Management Plan, which further minimises / offsets any potential for individual or cumulative negative effects on biodiversity.

No significant effects as a result of the Proposed Development in relation to habitat loss, disturbance, displacement or mortality of faunal species has been identified. Therefore, there is no potential for the Proposed Development to contribute to any cumulative effect in this regard.

In the review of the projects and plans that was undertaken, no connection that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the Proposed Development.



# 6.6 **Conclusion**

Following consideration of the residual effects (post mitigation) it is concluded that the Proposed Development will not result in any residual significant effects on any of the identified Important Ecological Features. No significant effects on features of International, National, County Importance or Local importance (higher value) were identified.

The potential for effects on the European Designated Sites is fully described in the Natura Impact Statement that accompanies this application. The NIS concludes that in view of best scientific knowledge and on the basis of objective information, the Proposed Development either individually or in combination with other plans or projects, is not likely to have adverse effects on the European Sites that were assessed as part of the Appropriate Assessment process. Similarly, with the prescribed mitigations in place, there is no potential for impact on any nationally designated site.

Provided that the Proposed Development is constructed and operated in accordance with the design, best practice and mitigation that is described within this EIAR, significant individual or cumulative effects on ecology are not anticipated at the international, national, county or local scales.