Planning and Environmental Consultants

Environmental Impact Assessment Report (EIAR)

Briskalagh Renewable Energy Development, Co. Kilkenny

Chapter 6 - Biodiversity

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6. BIODIVERSITY

6.1 Introduction

This chapter assesses the likely significant effects (both alone and cumulatively with other plans and projects) that the Proposed Project may have on Biodiversity. Mitigation by design was applied to the finalised Proposed Project layout wherever possible to avoid impacts on Biodiversity. This chapter sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified. The residual impacts on biodiversity are then assessed. Particular attention has been paid to species and habitats of ecological importance. These include species and habitats with national and international protection under the Wildlife Acts 1976-(as amended) and the EU Habitats Directive 92/43/EEC. Impacts on avian receptors are considered in Chapter 7 of this EIAR.

The full description of the Proposed Project is provided in Chapter 4 of this EIAR.

The chapter is structured as follows.

- The Introduction provides a description of the legislation, guidance and policy context applicable to Biodiversity.
- This is followed by a comprehensive description of the ecological survey and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on ecological receptors.
- A description of the Baseline Ecological Conditions and Receptor Evaluation is then provided.
- This is followed by an Assessment of Effects which are described with regard to each phase of the development: construction phase, operational phase and decommissioning phase. Potential Cumulative effects in combination with other plans and projects are fully assessed.
- Proposed mitigation and best practice measures that will be implemented in full to avoid, reduce or offset the identified effects on biodiversity, flora and fauna are described and discussed. This is followed by an assessment of residual effects taking into consideration the effect of the proposed mitigation and best practice measures.
- The conclusion provides a summary statement on the overall significance of predicted effects on Biodiversity.

As detailed in Section 1.1.1 in Chapter 1, for the purposes of this EIAR, the various project components are described and assessed using the following references:

- Where the 'Proposed Project' is referred to this encompasses the entirety of the project for the purposes of this EIA in accordance with the EIA Directive. The Proposed Project is described in detail in Chapter 4 of this EIAR.

- Where the 'Proposed Wind Farm' is referred to, this refers to turbines and associated foundations and hard-standing areas, meteorological mast, access roads, temporary construction compounds, underground cabling, borrow pit, spoil management, site drainage, biodiversity enhancement and all ancillary works and apparatus. The Proposed Wind Farm is described in detail in Chapter 4 of this EIAR.

- Where the 'Proposed Grid Connection' is referred to, this refers to the 38kV onsite substation, associated temporary construction compound and 38kV underground cabling connecting to the existing Ballyragget 110kV substation, and all ancillary works and apparatus. The Proposed Grid Connection is described in detail in Chapter 4 of this EIAR.

- Where the 'Site' 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 1-1 of the EIAR and encompasses an area of approximately 1,000 hectares.

- Where the 'Proposed Wind Farm site' is referred to, this refers to the portion of the Site surrounding the Proposed Wind Farm but excluding the portion of the site surrounding the Proposed Grid Connection underground cabling route.

6.2 Requirements for Ecological Impact Assessment

National Legislation

The Wildlife Act, (as amended), is the principal piece of legislation governing protection of wildlife in Ireland. The Wildlife Act provides strict protection for species of conservation value. The Wildlife Act conserves wildlife (including game) and protects certain wild creatures and flora. These species are therefore considered in this report as ecological receptors.

Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) are heritage sites that are designated for the protection of flora, fauna, habitats and geological sites. Only NHAs are designated under the Wildlife (Amendment) Act 2017. NHAs are legally protected from damage from the date they are formally proposed for designation[1]. A list of pNHAs were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, these sites are considered to be of significance for wildlife and habitats as they may form statutory designated sites in the future.

The Flora (Protection) Order 2022 (S.I. No. 235) lists the species, hybrids and/or subspecies of flora protected under Section 21 of the Wildlife Acts. It provides protection to a wide variety of protected plant species in Ireland including vascular plants, mosses, liverworts, lichens and stoneworts. Under the Flora Protection Order it is illegal to cut, pick, collect, uproot or damage, injure or destroy species listed or their flowers, fruits, seeds or spores or wilfully damage, alter, destroy or interfere with their habitat (unless under licence).

National Policy

Irelands 4th National Biodiversity Action Plan 2023-2030 (Department of Housing, Local Government and Heritage, 2024) (the "NBAP") strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. It demonstrates Ireland's continuing commitment to meeting and acting on its obligations to protect Ireland's biodiversity for the benefit of future generations and will implement this through a number of key targets, actions and objectives.

The Wildlife (Amendment) Act 2023 introduced a new public sector duty on biodiversity. The legislation provides that every public body, as listed in the Act, is obliged to have regard to the objectives and targets in the NBAP. The NBAP sets out five key objectives as follows:

- 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.
- 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.
- 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

[1] https://www.npws.ie/protected-sites/nha (accessed January 2024).

culture and heritage and recognising how biodiversity supports our society and our economy.

- Objective 4: 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.
- Objective 5: 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.

In addition, the National Biodiversity Data Centre published guidance on Pollinator-friendly management of Wind Farms[2]. This identifies an evidence-based action plan for wind farm operators that can help pollinators by employing changes to existing management strategies.

Such policies have informed the evaluation of ecological receptors recorded within the Site and the ecological assessment process.

European Legislation

Habitats and species of European importance are provided legal protection under the EU Habitats Directive 92/43/EEC (the Habitats Directive) and the EU Birds Directive 2009/147/EC (the Birds Directive) this legislation forms the cornerstone of Europe's nature conservation within the EU. It is built around two pillars: the Natura 2000 network of protected sites (hereafter referred to as European sites[3]) and the strict system of species protection. Both the Habitats and Bird Directives have been transposed into Irish law by Part XAB of the Planning and Development Acts 2000 (as amended) (from a land use planning perspective) and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011).

Annex I of the Habitats Directive lists habitat types whose conservation requires the designation of Special Areas of Conservation (SAC). Priority habitats, such as Turloughs, which are in danger of disappearing within the EU territory are also listed in Annex I. Annex II of the Directive lists animal and plant species (e.g. marsh fritillary, Atlantic salmon, and Killarney fern) whose conservation also requires the designation of SAC. Annex IV lists animal and plant species in need of strict protection such as lesser horseshoe bat and otter, and Annex V lists animal and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish hare, common frog and pine marten. Species can be listed in more than one Annex, as is the case with otter and lesser horseshoe bat which are listed in both Annex II and Annex IV.

The disturbance of species under Article 12 of the Habitats Directive (and in particular avoidance of deliberate disturbance of Annex IV species, particularly during the period of breeding, rearing, hibernation and migration and avoidance of deterioration or destruction of breeding sites or resting places) has been specifically assessed in this chapter.

The Birds Directive instructs Member States to take measures to maintain populations of all bird species naturally occurring in the wild state in the EU (Article 2). According to Recital 1 of the Birds Directive, Council Directive 79/409/EEC on the conservation of wild birds was substantially amended several times and in the interests of clarity and rationality, the Birds Directive codifies Council Directive 79/409/EEC. Such measures may include the maintenance and/or re-establishment of habitats in order

[2] https://pollinators.ie/wp-content/uploads/2022/12/Wind-Farm-Pollinator-Guidelines-2022-WEB.pdf *(accessed January 2024).*
[3] *The term Natura 2000 network was replaced by 'European site' under the EU (Environmental Impact Assessment and Habitats) Regulations 2011 S.I. No. 473 of 2011.*

to sustain these bird populations (Article 3). A subset of bird species has been identified in the Directive and are listed in Annex I as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction, vulnerability to specific changes in their habitat; and/or due to their relatively small population size or restricted distribution. Special Protection Areas (SPAs) are to be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (Article 4).

In summary, the species and habitats provided National and International protection under these legislative and policy documents have been considered in this Ecological Impact Assessment. A detailed assessment of the likelihood of the Proposed Project having either a significant effect or an adverse impact on any relevant European Sites (i.e. SACs, cSACs[4],, SPAs or cSPAs) has been carried out in the Appropriate Assessment Screening Report (AASR) and Natura Impact Statement (NIS). A separate assessment has not been carried out in this chapter, to avoid duplication of assessments. However, the relevant conclusions have been cross-referenced and incorporated.

In addition to the above, the following legislation applies with respect to habitats, fauna, invasive species and water quality in Ireland and has been considered in the preparation of this chapter:

- The International Convention on Wetlands of International Importance especially Waterfowl Habitat (Concluded at Ramsar, Iran on 2 February 1971)
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations 2003 which give further effect to EU Water Framework Directive (2000/60/EC).
- The following legislation applies with respect to non-native species - Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011).

6.3 Review of Relevant Guidance and Sources of Consultation

The assessment methodology is based primarily upon the National Road Authority (NRA) *'s Guidelines for Assessment of Ecological Impacts of National Road Schemes Rev 2* (NRA, 2009a) and the survey methodology is based on the NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (NRA, 2009b). Although these survey methodologies relate to road schemes, these standard guidelines are recognised survey methodologies that ensure good practice regardless of the development type.

In addition, the following guidelines were consulted in the preparation of this document to provide the scope, structure and content of the assessment:

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal (CIEEM, 2022).

This assessment has been carried out in accordance with the Environmental Impact Assessment guidance as outlined in Chapter 1 of the EIAR.

This assessment has been prepared with respect to the various planning policies and strategy guidance documents listed below:

- Kilkenny City and County Development Plan 2021-2027

[4] *Candidate SAC (cSAC) are afforded the same protection as SACs. The process of making cSAC into SACs by means of Statutory instrument has begun and while the process if ongoing the term SAC will be used to conform with nomenclature used in the National Parks and Wildlife Services (NPWS) databased. The name applies to candidate SPAs.*

- Regional Spatial and Economic Strategy for the Southern Region.
- National Planning Framework. Ireland 2040 Our Plan.
- National Development Plan 2021-2030.
- Ireland's 4th National Biodiversity Action Plan 2023-2030.

6.3.1 Statement of Authority

This EIAR chapter has been prepared by Colin Murphy (B.Sc., (Ecology), M.Sc.) and Fiona Killeen (B.Sc., (Env)) and reviewed by Corey Cannon (B.Sc, M.Sc CEcol MCIEEM) and John Hynes (B.Sc. Env., M.Sc., MCIEEM). Corey is a Project Director (Ecology) at MKO, she is also a Chartered Ecologist and Full Member of CIEEM. Corey has over ten years' consultancy experience. John is Ecology Director at MKO with over 12 years professional consultancy experience. Colin is a Project Ecologist at MKO and has over 4 years' professional consultancy experience. Fiona is an experienced Practitioner Ecologist with over 1.5 years' professional consultancy experience.

The baseline ecological surveys were undertaken in across multiple dates in 2023 and 2024 by Fiona Killeen, Tom Peters (B.Sc., M.Sc.), Rachel Minogue (B.Sc., (Env)). Rachel and Tom are Ecologists with MKO. Bat ecologists Ryan Connors (B.Sc., M.Sc.), Laura Gránicz (BSc., MSc.), Nora Szijarto (B.Sc., M.Sc.) and David Culleton (BSc., MSc.) conducted specific bat surveys within the Site between 2022 and 2024. The Bat Report has been prepared by Ryan and reviewed by Aoife Joyce (B.Sc., M.Sc.), Project Director with MKO. Aquatic surveys were conducted by Aran von der Geest Moroney (B.Sc.), Colin Murphy (B.Sc., M.Sc.), Aoife Joyce (B.Sc., M.Sc.), Niamh Rowan (B.Sc.), Ryan Connors (B.Sc., M.Sc.), Fiona Killeen (B.Sc.) and Adam Scott (B.Sc., M.Sc.). Aran and Niamh prepared the Aquatic Baseline Report. Detailed results of the botanical surveys, bat and aquatic surveys are included within the Botanical Report, Bat Report, Aquatic Report, see Appendix 6-1, Appendix 6-2 & Appendix 6-3.

All surveyors have relevant academic qualifications and are competent in undertaking the ecological surveys in which they were involved.

Map Legend

EIAR Site Boundary

Drawing Title

Site Location

Project Title

Enerco Briskalagh Wind Farm

Drawn By	Checked By
FK	CM
Project No. 230502	Drawing No. Figure 6-1
Scale 1:139,208	Date 03.10.2024

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6.4 Methodology

The following sections describe the methodologies followed to establish the baseline ecological condition of the Site and surrounding area. Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological baseline conditions are those existing in the absence of proposed activities (CIEEM, 2022).

6.4.1 Desk Study

The desk study undertaken for this assessment included a thorough review of available ecological data including the following:

- Review of NPWS Article 17 maps 2019, 2013 and 2007.
- Review of online web-mappers: National Parks and Wildlife Service (NPWS)[5], EPA maps[6], Water Framework Directive (WFD) and Inland Fisheries Ireland (IFI)[7].
- Inland Fisheries Ireland (IFI) Reports.
- Data on potential occurrence of rare plant and bryophytes – as per NPWS online map viewers; Flora Protection Order 2022 Map Viewer[8].
- A data request was sent to the National Parks and Wildlife Service, scientific data unit, and a response was received on the 27th of July 2023. The feedback is provided in Section 6.5.1 of the EIAR.
- Review of the Bat Conservation Ireland (BCI) Private Database.
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper.
- Review of specially requested records from the NPWS Rare and Protected Species Database for the hectads in which the Proposed Project is located.
- Potential for in-combination effects have been considered in Chapter 2 of this EIAR and Section 6.8 of this Chapter. This was informed by a review of the EIARs/NISs prepared for other plans and projects occurring in the wider area.

6.4.1.1 Designated Sites

6.4.1.1.1 *Identification of the Designated Sites within the Likely Zone of Influence (ZOI) of the Proposed Project*

The potential for the Proposed Project to impact on sites that are designated for nature conservation was considered in this Biodiversity Chapter.

Special Areas of Conservation (SACs) and Special Protection Areas for Birds (SPAs) are designated under the EU Habitats Directive and EU Birds Directive, respectively and are collectively known as 'European Sites'. The potential for significant effects and/or adverse impacts on the integrity of European Sites is fully assessed in the AASR and NIS that accompany this application. As per EPA Guidance (EPA, 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 6.6.5 of this EIAR provides a summary of the key assessment findings with regard to European Designated Sites.

[5] https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=8f7060450de3485fa1c1085536d477ba Accessed 31/01/2024
[6] https://gis.epa.ie/EPAMaps/ Accessed: 31/01/2024
[7] https://ifigis.maps.arcgis.com/apps/webappviewer/index.html?id=9a31fedb077c4fb2991184842b7ef025 Accessed 06/01/2024
[8] https://heritagedata.maps.arcgis.com/apps/webappviewer/index.html?id=a41ef4e10227499d8de17a8abe42bd1e Accessed: 06/01/2024

NHAs are designated under Section 18 the Wildlife (Amendment) Act 2000 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 Biodiversity Chapter.

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 Biodiversity Chapter.

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

- All designated sites within the vicinity of the Site were identified. In addition, the potential for connectivity with European or Nationally designated sites at greater distances from the Proposed Project was also considered in this initial assessment.
- The designation features of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report.
- Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Influence (ZoI) and further assessment is required.

6.4.1.2 NPWS Article 17 Reporting

A review of the Irish Reports for Article 17 of the Habitats Directive (92/42/EEC), including the Heath, Bogs and Mires, Irish Semi-Natural Grassland Survey datasets, National Survey of Native Woodlands and Ancient and Long-Established Woodland datasets was carried out as part of this assessment.

6.4.2 Scoping and 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. Although no formal scoping opinion was requested from An Bord Pleanála under S37D of the Planning and Development Act 2000 (as amended), the recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Table 6-1 in Chapter 2 of this EIAR describes where the comments raised in the scoping responses received have been addressed in this assessment.

Table 6-1 below provides a list of the organisations consulted with regard to biodiversity during the scoping process and their response.

Table 6-1 Organisations consulted with regard to biodiversity

Consultee	Response
Bat Conservation Ireland	No response was received from Bat Conservation Ireland
An Taisce	No response was received from An Taisce
Birdwatch Ireland	No response was received from Birdwatch Ireland
Forest Service	No response was received from Forest Service
Irish Wildlife Trust (IWT)	No response was received from IWT
Development Application Unit Department of	A Request was made to the DAU on the and a response was received on the 15th January 2024 stating, '*the department were not in a position to make*

Housing, Local Government and Heritage – National Parks and Wildlife Services (NPWS)	*specific comments to this particular referral at this time. No inference should be drawn from this that the Department is satisfied or otherwise with the proposed activity. The Department may submit observations/ recommendations at a later stage in the process.*' A meeting with a National Parks and Wildlife Services representative was requested by MKO ecologists on the 1st February 2024 and no response was received.
Inland Fisheries Ireland - Shannon Region & Western Region	No response was received from IFI.
Kilkenny County Council	The scoping response provides a number of recommendations regarding Biodiversity, including impacts to flora and fauna, ecology (including hydrological connectivity to Natura 2000 sites), habitats and forest tree felling and impacts. Potential impacts to these factors are dealt with in Section 6.7 below.

6.4.3 Field Surveys

A comprehensive survey of the biodiversity within the Site was undertaken to inform this Biodiversity Chapter of the EIAR. The following sections fully describe the ecological surveys that have been undertaken and provide details of the methodologies and guidance followed. Surveys were carried out between July 2023 and July 2024 and are summarised in Table 6-2 below. An assessment of the Proposed Grid Connection underground cabling route was also undertaken on the 21st & 22nd February, 21st & 22nd March, 27th June and 29th July 2024. Surveys along the route comprised a multi-disciplinary walkover, kingfisher surveys and otter surveys at watercourse crossings as well as an assessment of bat foraging, commuting and roosting habitat.

The structures of the existing 12 no. watercourse crossings along the underground cabling route were inspected for signs of bat roosts and were assessed for bat roost potential on the 21st and 22nd of March 2024. No evidence of bat roosts was found at any of the structures (further detailed provided in Bat Report, Appendix 6-2).

Table 6-2. Ecology Surveys Informing the EIAR

Survey Type	Dates	Appendix
Multi-disciplinary walkover (incl. habitats)	• 27th July 2023 • 28th July 2023 • 24th August 2023 • 21st February 2024 • 22nd February 2024 • 12th March 2024 • 2nd April 2024 • 16th April 2024 • 27th June 2024 • 29th July 2024	N/A
Detailed Botanical Surveys – Irish Vegetation Classification (IVC)	• 27th July 2023 • 28th July 2023 • 24th August 2023 • 21st February 2024 • 22nd February 2024	Botanical Report, Appendix 6-1
Badger/Mammal survey and camera trap set up	• 12th March 2024 • 2nd April 2024 • 16th April 2024	N/A
Bat Surveys	• 18th May 2023 – 12th October 2023	Bat Report, Appendix 6-2
Aquatic surveys (including otter)	• 13th September 2023 • 14th September 2023 • 21st March 2024 • 22nd March 2024 • 27th June 2024 • 29th July 2024	Aquatics Report, Appendix 6-3

6.4.3.1 Multi-disciplinary Walkover Surveys

Multidisciplinary walkover surveys were undertaken within the Site. Surveys were undertaken within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011). A comprehensive walkover of the entire Site was completed with incidental records also incorporated from other dedicated species/habitat specific surveys. 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.

The walkover surveys were also designed to detect the presence, or likely presence, of a range of protected species. The survey included a search for mammal signs (bats, badger, red squirrel etc.) and areas of suitable habitat to support these species, potential features likely to be of significance to bats and additional habitat features for the full range of other protected species that are likely to occur in the vicinity of the Proposed Project (e.g. otter etc.). Bird species observed during the multi-disciplinary surveys were also recorded.

The multi-disciplinary walkover surveys comprehensively covered the entire study area and based on the survey findings, further detailed targeted surveys were carried out for features and locations of ecological significance. Other targeted surveys undertaken within the Site are described in the following subsections.

6.4.3.2 Dedicated Habitat and Vegetation Composition Surveys

All habitats recorded on Site and described in this Biodiversity chapter have been classified in accordance with Fossitt (2000). Full details of all the botanical surveys and results are provided in Appendix 6-1 and an assessment of the potential for the Site to support Annex I habitats is also provided in this Appendix.

Detailed botanical surveys/relevé assessments of the Proposed Project were also undertaken throughout multidisciplinary walkover surveys carried out from 2023 to 2024. These surveys provided an understanding of the baseline and informed further survey work following finalisation of the Proposed Project layout.

The habitat assessment surveys described in this report have been undertaken with reference to the following guidelines and interpretation documents:

- Commission of the European Communities (2013) Interpretation manual of European Union habitats. Eur 27. European Commission DG Environment.
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill
- Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018), The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. Irish Wildlife Manuals, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.
- O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013), The Irish semi-natural grasslands survey 2007-2012. Irish Wildlife Manuals, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

Plant nomenclature for vascular plants follows '*New Flora of the British Isles*' (Stace, 2010).

6.4.3.2.1 *Vegetation composition assessment*

Detailed habitat classification and assessment was undertaken by MKO at targeted locations within the Site, with relevés undertaken within representative habitats at each turbine base and associated Proposed Wind Farm infrastructure, see Appendix 6-1 for all relevé data. The extent of each habitat on site was mapped using QGIS. A representative photograph was also taken for each of the habitats recorded on site, including all relevés. The location of all quadrats is shown in Appendix 6-1.

The survey results were then analysed in accordance the Irish Vegetation Classification (IVC) system. 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.

A fundamental requirement of the IVC is to *"aid in definition and identification of EU Habitat Directive (92/43/EEC) Annex I habitats*" and to '*inform the planning process, for example through environmental impact assessments*'.

The Engine for Relevés to Irish Communities Assignment (ERICA)[9] is a web application for assigning vegetation data to communities defined by the IVC. Data can be uploaded, checked for errors and analysed and the results can then be downloaded. ERICA works with both quantitative vegetation cover data (such as are recorded in relevés and other types of botanical recording plots) and presence/absence data, such as species lists. ERICA covers grasslands, woodland, duneland, heaths, bogs, fens, mires, freshwater, saline waters, rocky habitats, scrub, strandline, saltmarsh and weed communities (Perrin, 2018). The data collected from the botanical assessments was uploaded to ERICA, analysed and the results data downloaded.

The analysis procedure uses a clustering process to assign classification affinity to vegetation plots based on a degree of membership to each of the communities defined by the IVC. Table 6-3 details the categorizing types of plots utilising the clustering analysis. This categorizing procedure was utilised to determine if the grassland plots within the study area had any affinity to Annex I grassland and whether further assessment was required.

Table 6-3. Categorising types of plots using clustering analysis (after Wiser & de Cáceres, 2013).

Plot Type	Definition
Assigned	The plot has membership ≥ 0.5 for one of the vegetation communities and therefore relates to the core definition of that vegetation community.
Unassigned	The plot has membership ≥ 0.5 for the noise class and is poorly represented by the current classification scheme
Transitional	The plot has membership < 0.5 for all vegetation communities and for the noise class. It falls within the scope of the current classification scheme but does not relate to the core definition of any of the vegetation communities.

Habitats considered to be of ecological significance and in particular having the potential to correspond to those listed in Annex I of the EU Habitats Directive where present were identified and classified as Key Ecological Receptors (KERs).

6.4.3.3 Terrestrial Fauna Surveys

The results of the desk study, scoping replies and incidental records of protected species recorded during multidisciplinary walkover surveys were all used to inform the scope of targeted ecological surveys required. Based on these findings dedicated surveys for bats, otter and badger were undertaken at the times set out below following the methodologies also provided below. During the multidisciplinary walkover surveys, records of invertebrates including butterflies, damselflies, dragonflies, moths, beetles etc. were recorded. Following the completion of ecological walkover surveys, no requirement for additional dedicated faunal surveys was identified.

[9] *Perrin, 2019, ERICA – Engine for Relevés to Irish Communities Assignment V5.0 User's Manual, Online, Available at: https://biodiversityireland.shinyapps.io/vegetation-classification/_w_9cd4889a/manual.pdf, Accessed: 10.10.2020*

6.4.3.3.1 Badger Survey

The badger survey was conducted adhering to best practice guidance (NRA, 2009b) and CIEEM best practice competencies for species surveys[10]. Areas identified as providing potential habitat for badger were subject to specialist targeted survey. The badger survey aimed to determine the presence or absence of badger within Proposed Wind Farm and wider survey area. This involved a search for all potential badger signs (latrines, badger prints, mammal tracks and setts). Where potential setts were identified these were mapped and classified according to their status (i.e. main, annexe, subsidiary, outlier) and level of usage (disused, well-used, active) as per (NRA, 2009b). Where setts were identified as potentially being used, active camera traps were set up to confirm if they were in active use by badger. The badger survey was not constrained by vegetation given the nature of the habitats within the Proposed Wind Farm and the timing of the surveys.

6.4.3.3.2 Otter Survey

Otter surveys were conducted adhering to best practice guidance (NRA, 2009b) and CIEEM best practice competencies for species surveys[11]. All watercourses within the Proposed Wind Farm, and along the Proposed Grid Connection underground cabling route were identified as providing potential habitat for otter and were subject to targeted surveys for this species. This involved a search for all otter signs (e.g. spraints, scat, prints, slides, trails, couches and holts) within 150m of each survey site. Where otter signs were observed these were mapped. If a potential holt was identified, camera traps were deployed.

6.4.3.3.3 Marsh Fritillary

A search for Marsh Fritillary (*Euphydryas aurinia*) was carried out on the NBDC biodiversity map online viewer on the 05.07.2024. No records of this species were recorded within hectads S35 and S45 or adjacent to the Site boundary. No suitable habitat Marsh Fritillary habitat was recorded within the Proposed Wind Farm during the multidisciplinary walkover surveys.

6.4.3.3.4 Bats

A detailed description of the survey methodologies undertaken in relation to bats is provided in the Bat Report included in Appendix 6-2 of this EIAR, together with full details of the survey times and the surveyors who carried out the bat survey and assessment work.

Survey design and effort in 2023/2024 was created in accordance with the best practice guidelines available, '*Bat Surveys: Good Practice Guidelines'* prepared by the Bat Conservation Trust (Collins 2016). Surveys undertaken were undertaken in strict accordance with those prescribed in NatureScot (2021) '*Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation*'. This is in line with standard best practice industry guidelines.

6.4.3.4 Aquatic surveys

Following initial site visits and based on records in the wider area following a desk study, habitat suitability for protected aquatic species of conservation interest, known or suspected to occur within the Site boundary (e.g. fish species, otter, freshwater pearl mussel, white-clawed crayfish etc.), were conducted. Aquatic habitats and species were assessed during the multi-disciplinary walkover surveys and where appropriate, dedicated aquatic habitat and fisheries surveys were undertaken. Aquatic Habitat Assessments/ Appraisals were undertaken in order to determine the riverine habitat types

[10] *CIEEM, 2013, Technical Guidance Series – Competencies for Species Survey: Badger, Online, Available at: https://cieem.net/wp-content/uploads/2019/02/CSS-BADGER-April-2013.pdf*
[11] *CIEEM, 2013, Technical Guidance Series – Competencies for Species Survey: Otter, Online, Available at: https://cieem.net/wp-content/uploads/2019/02/CSS-EURASIAN-OTTER-April-2013.pdf*

present at each of the survey locations within and in the vicinity of the Site. The survey design and methodologies were derived from current ecological best practice guidance documents. Habitats were classified in accordance with the national habitat classification system used in Ireland - A Guide to Habitats in Ireland (Fossitt, 2000). Electro-fishing operations for the purpose of forming baseline fisheries data of the Proposed Wind Farm were undertaken on the 13th and 14th of September 2023. Macroinvertebrate surveys were carried out within watercourses along the Proposed Grid Connection underground cabling route. Dedicated fisheries assessments were undertaken at the Site for targeted species groups including salmon, trout and lamprey in September 2023 and March 2024. The methodology followed was the same as that used by the EPA for their national water sampling regime (Toner *et al.* 2005). A two-minute kick sample was collected from a stream bed area of approximately one square metre with a standard handnet (250 mm x 250 mm, with a 300 mm bag depth and a 1 mm mesh size). One minute hand searches, of large objects such as tree branches or stones, was undertaken prior to each of the kick samples. The kick sampling time was then divided proportionally among the habitats present in the area, such as fast-moving riffles, shallow water, and silted banks. Samples were sorted on site with identified species classed into groups according to their pollution tolerance levels, as per Environmental Protection Agency (EPA) practice (Toner et al., 2005). Specimens were identified using the FBA Guide to Freshwater Invertebrates (Dobson *et al.*, 2012).

A full description of the survey methodologies is provided in the Aquatic Baseline Report has also been prepared for this EIAR and is available in Appendix 6-3.

6.4.4 Methodology for Assessment of Impacts and Effects

6.4.4.1 Identification of Target Receptors and Key Ecological Receptors

The criteria used to assess the ecological value and significance of the study area for habitats and species present follows Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009a) and Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2022).

6.4.4.2 Determining Importance of Ecological Receptors

The importance of the ecological features identified within the Site boundary 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, 2009a). 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 guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC, cSAC, SPA or cSPA) 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 receptors.

In accordance with these guidelines impact assessment is only undertaken of KERs. KERs are within the ZoI of the Proposed Project and are 'both of sufficient value to be material in decision making and likely to be affected significantly'. To qualify as KERs, features must be of Local Ecological Importance (Higher Value) or higher. Features valued at Local Ecological Importance (Lower Value) are not considered to be KERs and therefore not subject to impact assessment. This is not to say that they are of no biodiversity value, but that impacts on these habitat types in their local context are not likely to result in a significant effect on biodiversity. It should be noted that this relates to the impact on the habitat itself as distinct from considering the role these habitat types play in supporting KER fauna species.

6.4.4.3 Characterisation of Impacts and Effects

The Proposed Project 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*' (2022). This chapter has also been prepared in accordance with the corresponding EPA Guidelines (EPA 2022) as detailed in Chapter 1. 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 Project 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 receptors and is justified where appropriate in the impact assessment section of this report.

6.4.4.4 Determining the Significance of Effects

The ecological significance of the effects of the Proposed Project are determined following the precautionary principle and in accordance with the methodology set out in Section 5 of CIEEM (2022).

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 geographic scales from international to local (CIEEM, 2022).

When determining significance, consideration is given to whether:

- Any processes or key characteristics of key ecological receptors 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.

Integrity

In the context of EcIA, 'integrity' refers to the coherence of the ecological structure and function, across the entirety of a site, that enables it to sustain all of the ecological resources for which it has been valued (NRA, 2009a). Impacts resulting in adverse changes to the nature, extent, structure and function of component habitats and effects on the average population size and viability of component species, would affect the integrity of a site, if it changes the condition of the ecosystem to unfavourable.

Conservation status

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status. According to CIEEM (2022) guidelines the definition for conservation status in relation to habitats and species are as follows:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

As defined in the EU Habitats Directive 92/43/EEC, the conservation of a habitat is favourable when:

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

The conservation of a species is favourable when:

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

6.4.4.5 Incorporation of Mitigation

Section 6.7 of this Biodiversity chapter assesses the potential effects of the Proposed Project to ensure that all effects on KERs are adequately addressed. Where significant effects on KERs are predicted, mitigation is incorporated into the project design or layout to address such impacts. The mitigation measures prescribed are designed to avoid, reduce or offset any potential significant effects and ensure no significant residual effects. Constraint studies, as described in Section 3.2.6 and 3.2.7 of Chapter 3 of this EIAR, have been carried out to ensure that turbines and all ancillary infrastructure are located in the most appropriate areas of the Site.

6.4.4.6 Limitations

The information provided in this assessment accurately and comprehensively describes the baseline ecological environment following surveys undertaken across all seasons between 2023 and 2024. It provides an accurate prediction of the likely ecological effects of the Proposed Project; prescribes best practice and mitigation as necessary. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines. The habitats and species on the Site were readily identifiable and comprehensive assessments were made during the field visit. No significant limitations in the scope, scale or context of the assessment have been identified.

6.5 Establishing the Ecological Baseline

6.5.1 Desk Study

The following sections describe the findings of the desk study. It provides a baseline of the ecology known to occur in the existing environment based on data sources reviewed to inform the ecological impact assessment as outlined in Section 6.4.1.

6.5.1.1 Designated Sites

A map of all the European Sites within the vicinity of the Proposed Project is provided in Figure 6-2 with all Nationally Designated Sites shown in Figure 6-3.

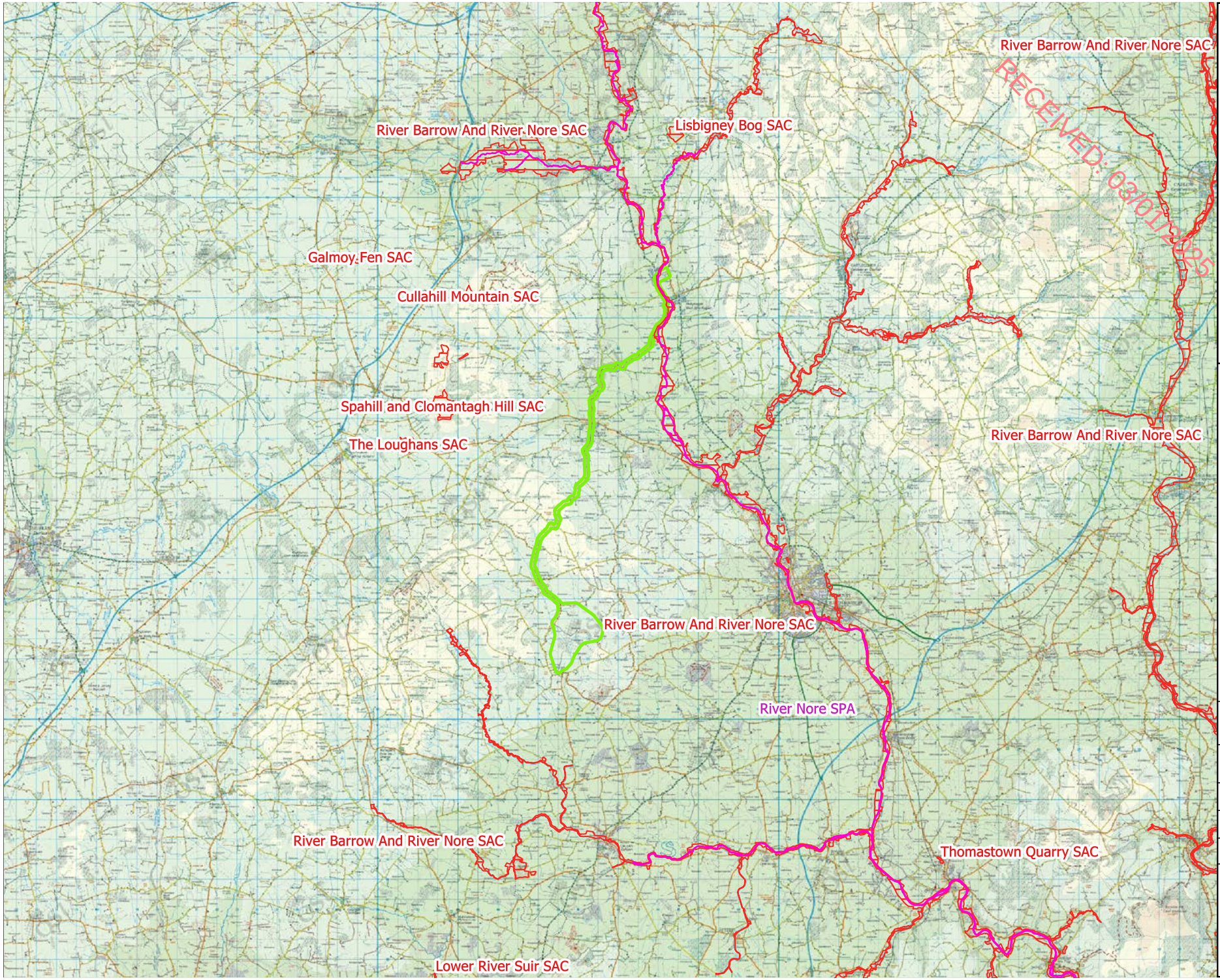
Table 6-4 provides details of all relevant European and Nationally designated sites initially considered to potentially be within the ZoI of the Proposed Project. All European Designated Sites are fully described and assessed in the NIS submitted and within Table 6-4 below. European Designated sites located further downstream and to the coast were also considered. No potential for significant effect on any other site, other than those identified, exists. In summary, two European sites were identified within the Likely Zone of Influence.

- River Barrow and River Nore SAC [002162]
- River Nore SPA [004233]

The River Barrow and River Nore SAC is located approximately 5.7km downstream of the Proposed Wind Farm and is hydrologically linked to it via watercourses which drain the site, while the Proposed Grid Connection underground cable route runs immediately adjacent the SAC. The length of the hydrological connection to the River Nore SPA is approximately 8.4km. Potential for likely significant effects was identified in relation to deterioration on water quality (and associated indirect effects on QI species) during construction in the absence of mitigation.

The following pNHAs were identified as being within the likely ZoI of the Proposed Project:

- River Nore/Abbeyleix Woods Complex pNHA [002076]
- Inchbeg pNHA [000836]



Map Legend

- EIAR Site Boundary
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)

Drawing Title
European Designated Sites in relation to the Proposed Project

Project Title
Enerco Briskalagh Wind Farm

Drawn By	Checked By
FK	CM
Project No.	Drawing No.
230502	Figure 6-2
Scale	Date
1:246,100	08.10.2024

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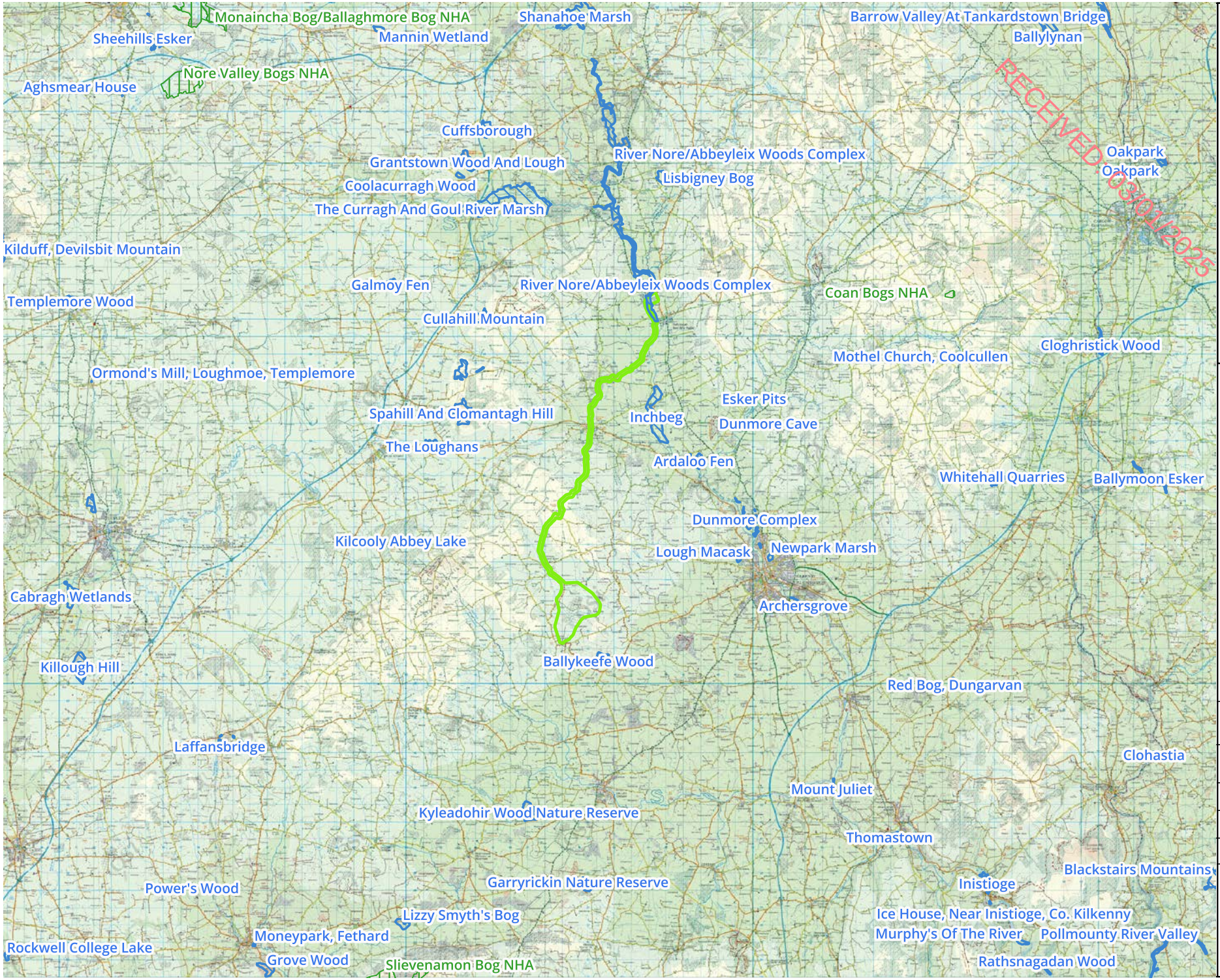

Map Legend

- EIAR Site Boundary
- Natural Heritage Area (NHA)
- Proposed Natural Heritage Area (pNHA)

Drawing Title
European Designated Sites in relation to the Proposed Project

Project Title
Enerco Briskalagh Wind Farm

Drawn By	Checked By
FK	CM
Project No.	Drawing No.
230502	Figure 6-3
Scale	Date
1:284,900	08.10.2024

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Table 6-4 Assessment of designated sites in the Zone of Influence

Designated Site	Distance from EIAR Site Boundary (km)	Assessment of designated sites in Zone of Influence	Yes/No
Special Areas of Conservation (SAC)			
River Barrow and River Nore SAC [0002162]	Approximately 4.6km south of Proposed WF site 0m from Proposed GC	The launch pit for proposed horizontal directional drilling (HDD) as part of the Proposed Grid Connection underground cabling route is located within the boundary of this SAC. However, the location of the launch pit is within the existing road corridor and Improved agricultural grassland (GA1) and completely outside of any QI designated habitat or species for this SAC. As such, there is no potential for direct effects on this SAC. The Proposed Wind Farm is hydrologically connected to the SAC via the Tullaroan Stream and the Munster River. The length of this hydrological connection is ~5.7km. The Proposed Grid Connection underground cabling route crosses 13 watercourses located within the same hydrological sub-catchment as this SAC (Munster_SC_010). All watercourses draining the Proposed Grid Connection underground cable route discharge to the River Nore, which is designated as part of the River Barrow and River Nore SAC. Groundwater hydrological connectivity exists between the Proposed Wind Farm and the Proposed Grid Connection underground cable route and the SAC via the Kilmanagh Gravels GWB. Horizontal Directional Drilling (HDD) associated with crossings along the Proposed Grid Connection underground cable route have the potential to result in sediment laden runoff during the launch pit and reception pit excavation works. There is also the unlikely risk of fracture blow out and contamination of the watercourse with drilling fluid. Works associated with the Proposed Project have the potential to result in drainage and seepage water resulting from infrastructure excavations, run-off of silt and other pollutants such as hydrocarbons and cementitious material into watercourses downstream of the Proposed Wind Farm and Proposed Grid Connection underground cable route. Large volumes of concrete will be required associated with construction of turbine foundations, therefore taking a precautionary approach potential impacts on ground water quality were also considered. Therefore, a pathway for indirect effects on the aquatic qualifying interest (QIs) species and habitats of the SAC exist in the form of water quality deterioration and habitat degradation via surface and ground water pathways.	Yes

Designated Site	Distance from EIAR Site Boundary (km)	Assessment of designated sites in Zone of Influence	Yes/No
		The SAC is considered to be within the Likely Zone of Influence and further assessment is required.	
The Loughlans SAC [000407]	Approximately 11.2km from Proposed WF site Approximately 7.5km from Proposed GC	There will be no direct effects as the project footprint is located entirely outside the designated site. This site is designated for the aquatic habitat of Turlough [3180]. There is no surface water connection, and the Site is not located within the same groundwater body as this SAC (GWDTE-The Loughlans- IE_SE_G-134), nor the same WFD sub-catchment (Goul_SC_010). Due to the lack of hydrological proximity of either surface or groundwater between the Proposed Project and the designated site, there is no potential for indirect effects on this SAC. The SAC is not considered to be within the Likely Zone of Influence.	No
Spahill and Clomantagh Hill SAC [000849]	Approximately 11km from Proposed WF site Approximately 6.8km from the Proposed GC	There will be no direct effects as the project footprint is located entirely outside the designated site. This site is designated for the terrestrial habitat [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites). Therefore, due to the distance of this SAC from the Site and the nature of the terrestrial habitat Qualifying Interest (QI), there is no potential for indirect effects. The SAC is not considered to be within the Likely Zone of Influence.	No
Special Protection Area (SPA)			

Designated Site	Distance from EIAR Site Boundary (km)	Assessment of designated sites in Zone of Influence	Yes/No
River Nore SPA [004233]	Approximately 10km southeast of the Proposed WF site 0m from the Proposed GC	There will be no direct effects as the Proposed Project footprint is located entirely outside of this designated site. The Proposed Grid Connection underground cabling route will cross the River Nore at a location 620m north of Ballyragget Bridge. The crossing will be via Horizontal Directional Drilling (HDD), and has been designed to pass cabling beneath the River Nore, thus avoiding works within the SPA boundary. As such, there is no potential for direct effects to this European site. Taking a precautionary approach a potential for indirect effect to the SPA (and associated SCI species) was identified via a direct surface water pathway between the SPA and the Proposed Project, both the Proposed Wind Farm and Proposed Grid Connection are hydrologically linked to the SPA. Given the above there is potential for deterioration of water quality during the construction and operational phases of the Proposed Project. Potential pathways for indirect effects on kingfisher were identified via a deterioration in water quality potentially resulting in habitat degradation and reduced prey availability. **The SPA is considered to be within the Likely Zone of Influence and further assessment is required.**	Yes
Natural Heritage Areas (NHA)			
No National Heritage Areas occur within the Zone of Influence.			No
Proposed Natural Heritage Areas (pNHA)			
Ballykeefe Wood pNHA [000400]	Approximately 1.8km from	There will be no direct effects as the project footprint is located entirely outside the designated site.	No

Designated Site	Distance from EIAR Site Boundary (km)	Assessment of designated sites in Zone of Influence	Yes/No
	Proposed WF site Approximately 3.7km from Proposed GC	There is no downstream surface water connection between the Site and this pNHA and no pathway for indirect effects was identified. Due to the lack of connectivity between the Site and the pNHA, no complete source-pathway-receptor chain exists. **This pNHA is not within the Likely Zone of Impact and no further assessment is required.**	
Lough Macask pNHA [001914]	Approximately 8.2km from Proposed WF site Approximately 10.8km from Proposed GC	There will be no direct or indirect effects as the Proposed Project footprint is located entirely outside the designated site. No connectivity exists between the Site and this pNHA. As such, no complete source pathway receptor chain for likely significant effect on this site was identified. **The pNHA is not considered to be within the Likely Zone of Impact and no further assessment is required.**	No
Ardaloo Fen pNHA [000821]	Approximately 9.4km from Proposed WF site Approximately 6km from Proposed GC	There will be no direct effects as the Proposed Project footprint is located entirely outside the designated site. The Ardaloo Fen pNHA is located 9.7km downstream of the HDD crossing location on the River Nore as part of the Proposed Grid Connection underground cabling route. However, the boundary of the pNHA is located completely outside of the River Nore. Therefore, there is no potential for indirect effects via the deterioration of surface water quality to this pNHA. **The pNHA is not considered to be within the Likely Zone of Impact and no further assessment is required.**	No
Inchbeg pNHA [000836]	Approximately 9.6km from	There will be no direct effects as the Proposed Project footprint is located entirely outside the designated site. Downstream hydrological connectivity exists between watercourses along the Proposed Grid Connection underground cabling route to this pNHA. This pNHA is located approximately 4.22km downstream from the Proposed Grid Connection underground cabling route. The route	Yes

Designated Site	Distance from EIAR Site Boundary (km)	Assessment of designated sites in Zone of Influence	Yes/No
	Proposed WF site Approximately 2.7km from Proposed GC	will cross multiple tributaries of the River Nore. The River Nore is designated as part of the River Barrow and River Nore SAC and as such, the potential for indirect effects are considered in tandem. Taking a precautionary approach, there is potential for indirect effects via surface water pollution to watercourses hydrologically connected to the River Nore. A complete source pathway receptor chain for likely significant effects was identified. **The pNHA is considered to be within the Likely Zone of Impact and further assessment is required.**	
Newpark Marsh pNHA [000845]	Approximately 10.2km from Proposed WF site Approximately 12.2km from Proposed GC	There will be no direct or indirect effects as the Proposed Project footprint is located entirely outside the designated sites. Therefore, given the distance and the lack of hydrological connection the pNHAs are not considered to be within the Likely Zone of Impact and no further assessment is required.	No
Dunmore Complex pNHA [001859]	Approximately 10.2km from Proposed WF site Approximately 10.6km from Proposed GC		No
River Nore/Abbeyleix	**Approximately 16.5km from**	The launch pit for the proposed horizontal directional drilling (HDD) as part of the Proposed Grid Connection underground cabling route is located within the boundary of this pNHA. However, the location of the launch pit is within the existing road corridor and	**Yes**

Designated Site	Distance from EIAR Site Boundary (km)	Assessment of designated sites in Zone of Influence	**Yes/No**
Woods Complex [002076]	**Proposed WF site** **0m from Proposed GC**	Improved agricultural grassland (GA1) and completely outside of any designated habitat or species for this pNHA. As such, there is no potential for direct effects on this pNHA. However, given this site is located within the River Barrow and River Nore SAC and given the close proximity of proposed works along the Proposed Grid Connection underground cabling route, there is potential for indirect effects to this pNHA via pollution to surface water run off during the construction phase. This pNHA is therefore considered to be within the likely zone of Impact and further assessment is required. There is no hydrological connectivity to this pNHA from the Proposed Wind Farm. **Note: This pNHA is located within the River Barrow and River Nore SAC and potential for effects are therefore assessed with the River Barrow and River Nore SAC above.**	

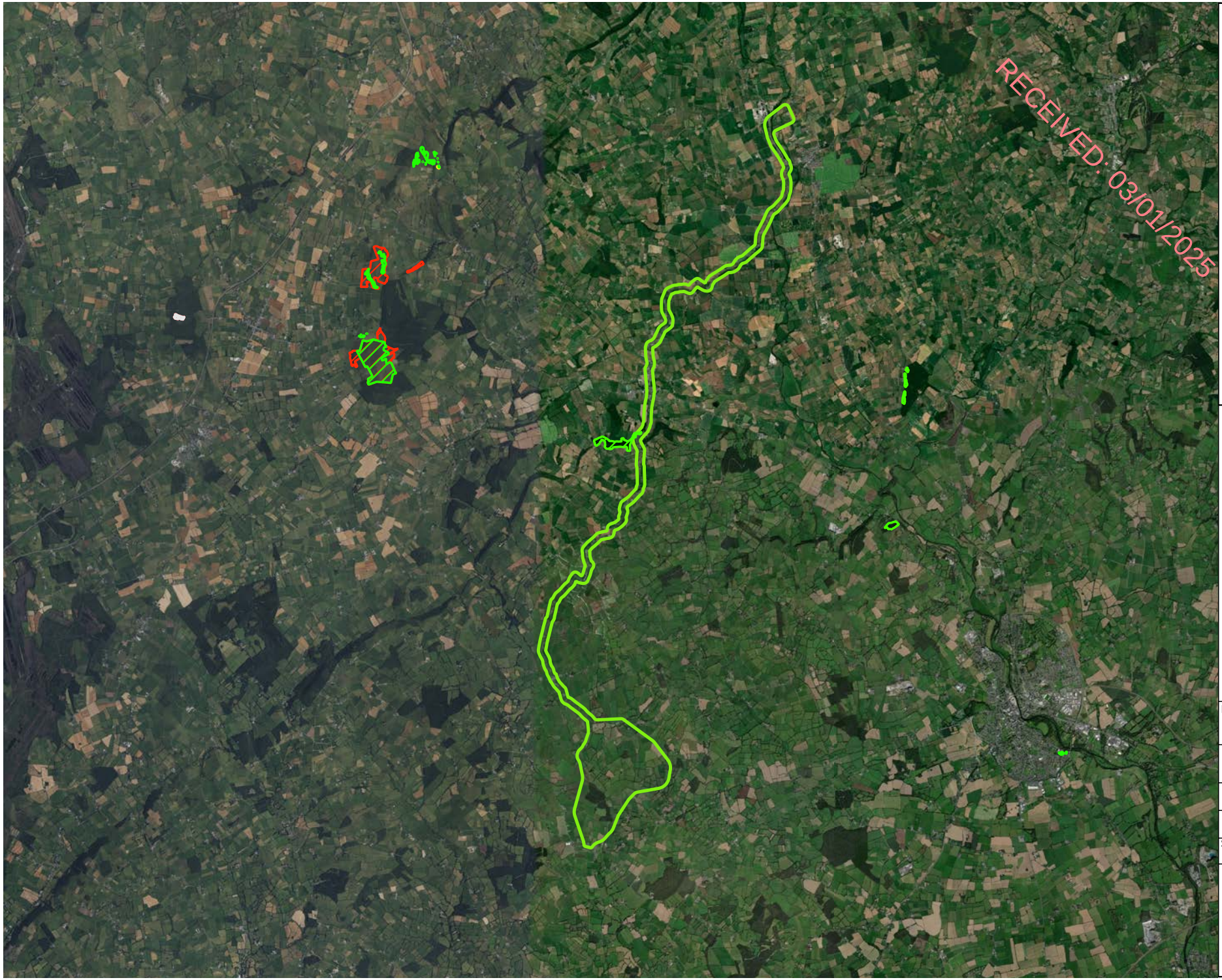
6.5.1.2 NPWS Article 17 Reporting

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

A search of the NPWS Article 17 datasets was undertaken as part of the desk study. The most recent National Parks and Wildlife Service (NPWS, 2019) data on the recorded distribution of EU Habitats Directive Annex I listed habitats was reviewed in relation to the subject lands. This data is available in the form of the NPWS (2019) Article 17 reporting, and associated GIS data, on '*The Status of EU Protected Habitats and Species in Ireland*' (NPWS, 2019).

No article 17 habitats were recorded within the Proposed Wind Farm. A section of [91A0] Old sessile oak woods with Ilex and Blechnum in the British Isles was mapped adjacent to the Freshford local road (L-1002), south of Freshford Town This habitat occurs within Browns Wood. However, the works associated with the Proposed Grid Connection Route will not impact on this habitat, as all works will be carried out within the existing road infrastructure. No article 17 habitat will be lost due to the construction or operation of the Proposed Project.

Figure 6-4 below details the mapped Article 17 habitats in relation to the Site.



Map Legend

- EIAR Site Boundary
- 4030 Dry Heath
- 6510 Lowland Hay Meadows
- 01A0 Old Oak Woodlands
- 6210 Orchid Rich Calcareous Grassland

N

Drawing Title
Article 17 Habitats

Project Title
Enerco Briskalagh Wind Farm

Drawn By	Checked By
FK	CM
Project No.	Drawing No.
230502	Figure 6-4
Scale	Date
1:134,323	08.10.2024

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6.5.1.3 Vascular plants

A search was made in the New Atlas of the British and Irish Flora (Preston *et al*, 2002) to investigate whether any rare or unusual plant species listed under Annex I of the EU Habitats Directive, The Irish Red Data Book, 1, Vascular Plants (Curtis, 1988) or the Flora (Protection) Order (FPO) 2022 (SI 235 of 2022)) had been recorded in the relevant 10km squares in which the Site is situated (S35, S45). Each hectad contains 100 whole 1km squares containing terrestrial habitats. Species of conservation concern are given in Table 6-5. No FPO plant species were recorded within Site according to the FPO map viewer.

Table 6-5 Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectad S35, S45

Common Name	Scientific Name	Status
Meadow Saxifrage	*Saxifraga granulata*	Red List
Nettle-leaved Bellflower	*Campanula trachelium*	Red List
Blue Fleabane	*Erigeron acer*	Red List
Green-winged orchid	*Orchis morio*	Red List
Common hedgenettle	*Stachys officinalis*	Red List

6.5.1.4 Bryophytes

A search of the NPWS online database for bryophytes (non-vascular land plants comprising of mosses, hornworts and liverworts) was also undertaken on the 9th July 2024. No protected bryophytes were shown to occur within or directly adjacent to the Site based on desk-based review.

6.5.1.5 National Biodiversity Data Centre (NBDC) Records

A search of the NBDC records for the relevant hectads, S35 & S45, provided records on a number of fauna species of conservation concern, excluding marine species and bird species. These are provided in the tables below. Records on bird species of conservational concern are described in Chapter 7: Ornithology.

Table 6-6 NBDC Records for Species of Conservation Interest in hectad S35, S45

Species	Scientific Name	Red List Status	Habitats Directive
Smooth Newt	*Lissotriton vulgaris*	LC	WA
Daubenton's Bat	*Myotis daubentonii*	LC	Annex IV, WA
Eurasian Badger	*Meles meles*	LC	WA
Eurasian Red Squirrel	*Sciurus vulgaris*	LC	WA
European Otter	*Lutra lutra*	LC	Annex II, IV, WA
Lesser Noctule	*Nyctalus leisleri*	-	Annex IV, WA

Species	Scientific Name	Red List Status	Habitats Directive
Pine Marten	*Martes martes*	LC	Annex V, WA
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	LC	Annex IV, WA
Soprano Pipistrelle	*Pipistrellus pygmaeus*	LC	Annex IV, WA
West European Hedgehog	*Erinaceus europaeus*	LC	WA
Eurasian Pygmy Shrew	*Sorex minutus*	LC	WA

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

Table 6-7 NBDC records for Invasive Species in hectad S35, S45

Common Name	Scientific Name
Three-cornered Garlic	*Allium triquetrum*
Japanese knotweed	*Fallopia japonica*
Eastern Grey Squirrel	*Sciurus carolinensis*
Rhododendron	*Rhododendron ponticum*
Brown Rat	*Rattus norvegicus*
American Mink	*Mustela vison*

6.5.1.6 NPWS

National Parks and Wildlife Service (NPWS) online records were searched to see if any rare or protected species of flora or fauna have been recorded from hectads S35 and S45. An information request was also sent to the NPWS requesting records from the Rare and Protected Species Database. Table 6-8 lists rare and protected species records obtained from NPWS, as received on the 27th July 2023, as well as those recorded available through the online NPWS map viewer.

Table 6-8 National Parks and Wildlife Service Map Viewer Records for hectad S35 and S45.

Common name	Scientific name	Status & Protection	Hectad
Eurasian Badger	*Meles meles*	WA, Annex V	[redacted]
Eurasian Red Squirrel	*Sciurus vulgaris*	WA, Annex V	S45, S35
Irish Hare	*Lepus timidus subsp. hibernicus*	WA, Annex II	S45, S35
Fallow Deer	*Dama dama*	WA	S45, S35
Kingfisher	*Alcedo atthis*	Annex I, V	S45, S35

Common name	Scientific name	Status & Protection	Hectad
Mute swan	*Cygnus olor*	Annex V	S45, S35
Swallow	*Hirundo rustica*	BoCCI Amber	S45, S35
Green-winged Orchid	Orchis morio	Red List VU	S45, S35
Eurasian Otter	*Lutra lutra*	Annex II, IV, WA-	S45, S35
White-clawed Crayfish	*Austropotamobius pallipes*	Annex II, V, WA	S45, S35
Mallard	*Anas platyrhynchos*	Annex II, III, WA Annex V	S45, S35
Common Frog	*Rana temporaria*	Annex V, WA	S45, S35

WA - Wildlife Act 1976 (as amended)
BoCCI – Birds of Conservation Concern in Ireland
VU – Vulnerable

A full description of the desk study information used to inform the aquatic ecology aspect of this biodiversity chapter is provided in section 3 of the Aquatic Ecology report available in appendix 6-3.

6.5.2 Conclusions of the Desk Study

The desktop study has provided information about the existing environment in hectads S35/S45, within which the Proposed Wind Farm is located. The mammal species recorded within the relevant hectads have widespread range and distributions in Ireland and are likely to be recorded frequently throughout Ireland (Marnell et al, 2009). Bat records within the 10km hectads that the Proposed Wind Farm site is located in, revealed that the wider area has been studied for bats. This suggests that the area offers potential for foraging and commuting bat species.

As part of the desk study, no Habitats Directive Annex I habitats have been recorded within or immediately adjacent to the Proposed Wind Farm or Proposed Grid Connection underground cabling route, as per the field surveys undertaken to inform this assessment, the NPWS records consulted, and other ecology survey reports reviewed.

The Proposed Wind Farm site is hydrologically connected to the River Barrow and River Nore SAC via the Tullaroan Stream and the Munster River. The length of this hydrological connection is approximately 5.7km. The Proposed Grid Connection underground cabling route crosses the River Barrow and Nore SAC.

The Proposed Wind Farm site is hydrologically connected to the River Nore SPA via the Tullaroan Stream, the Munster River and the King's River. The length of the hydrological connection is approximately 8.4km. The Proposed Grid Connection crosses this SPA. All watercourses draining the Proposed Grid Connection route discharge to the River Nore. This is further described below in Section 6.7.5 of this Chapter.

Pathways for effect were identified for the following sites which are further considered in the NIS prepared for the Proposed Project:

- River Barrow and River Nore SAC [002162]
- River Nore SPA [004233]

Pathways for effect were identified for the River Nore/Abbeyleix Woods Complex pNHA [002076] and Inchbeg pNHA [000836] which are located within the River Barrow and River Nore SAC and the potential for effects are also assessed as part of the assessment of this SAC.

The desk study identified that a variety of protected faunal species are known to occur within the Site boundary, including bats, otter, common frog, Irish hare, badger and red squirrel. The mammal species recorded during the desk study informed the survey methodologies undertaken during the site visits. The desk study also provided useful information to inform the ecological surveys undertaken on site as well as the identification of pathways for potential impact on sensitive ecological receptors.

6.6 Description of the Existing Environment

6.6.1 Description of Habitats within the Site

The habitat classifications and codes correspond to those described in '*A Guide to Habitats in Ireland*' (Fossitt 2000). A total of 16 habitats were recorded within the EIAR Site Boundary (Table 6-9). A habitat map of the Site is provided in Figure 6-5. Relevé data is detailed in Appendix 6-1. The Site covers a total of approximately 1,000 hectares.

The habitats occurring at the proposed turbine locations and throughout the Proposed Wind Farm site are detailed in Section 6.6.1.1.1 to Section 6.6.1.1.8. The habitats occurring at proposed works areas including the proposed met mat, spoil management and borrow pit locations are discussed in Sections 6.6.1.1.9 to Section 6.6.1.1.10.

The habitats recorded along the Proposed Grid Connection underground cabling route are detailed in Section 6.6.1.2. The habitats occurring at the proposed substation location are described in Section 6.6.1.3.

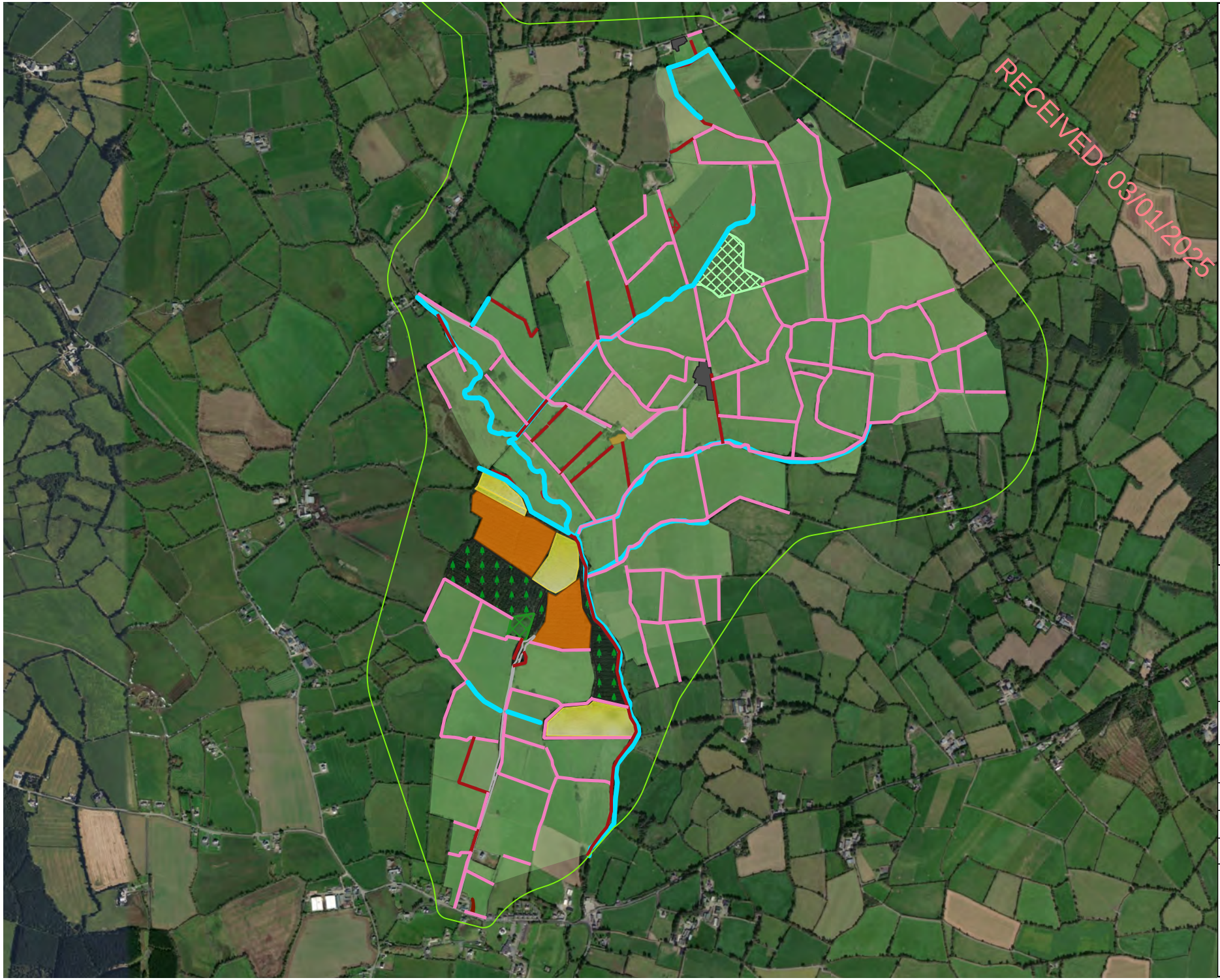
A habitat map is also provided with the Proposed Project footprint overlain in Figure 6-6. Habitat mapping focused on areas in and around the Proposed Project infrastructure within the Proposed Wind Farm site. Habitats in the periphery are a continuation of habitats recorded during the surveys carried out. Habitats along the Proposed Grid Connection were not mapped due to their small size and mosaic-like occurrence throughout and along the route.

Table 6-9 Habitats recorded in the EIAR Site Boundary

Habitat Name	Fossitt Code
Improved Agricultural Grassland	GA1
Wet grassland	GS4
Conifer Plantation	WD4
Mixed broadleaved/conifer woodland	WD2
Broad-leaved woodland	WD1
Semi-Natural Woodland (Wet Willow-Alder-Ash Woodland)	WN6
Dry meadows and grassy verges*	GS2
Spoil and bare ground	ED2
Treeline	WL2
Recolonising bare ground *	ED3
Hedgerow	WL1
Buildings and Artificial Surfaces	BL3
Drainage Ditches*	FW4
Eroding/Upland rivers	FW1

Depositing/lowland rivers	FW2
Scrub*	WS1*

** these habitats were not fully mapped as they are ubiquitous throughout the Site and largely associated with farm tracks, field margins, road margins and field boundaries*



Map Legend

- EIAR Site Boundary
- Eroding/Upland Rivers (FW1)
- Hedgerows (WL1)
- Treelines (WL2)
- Buildings and artificial surfaces (BL3)
- Spoil and bare ground (ED2)
- Recolonising bare ground (ED3)
- Improved agricultural grassland (GA1)
- Wet grassland (GS4)
- (Mixed) broadleaved woodland (WD1)
- Mixed broadleaved/ conifer woodland (WD2)
- Conifer plantation (WD4)
- Wet willow-alder-ash woodland (WN6)
- Scrub (WS1)

N

Drawing Title

Habitat Map

Project Title

Enerco Briskalagh Wind Farm

Drawn By	Checked By
FK	CM
Project No. 230502	Drawing No. Figure 6-5
Scale 1:19,000	Date 08.10.2024

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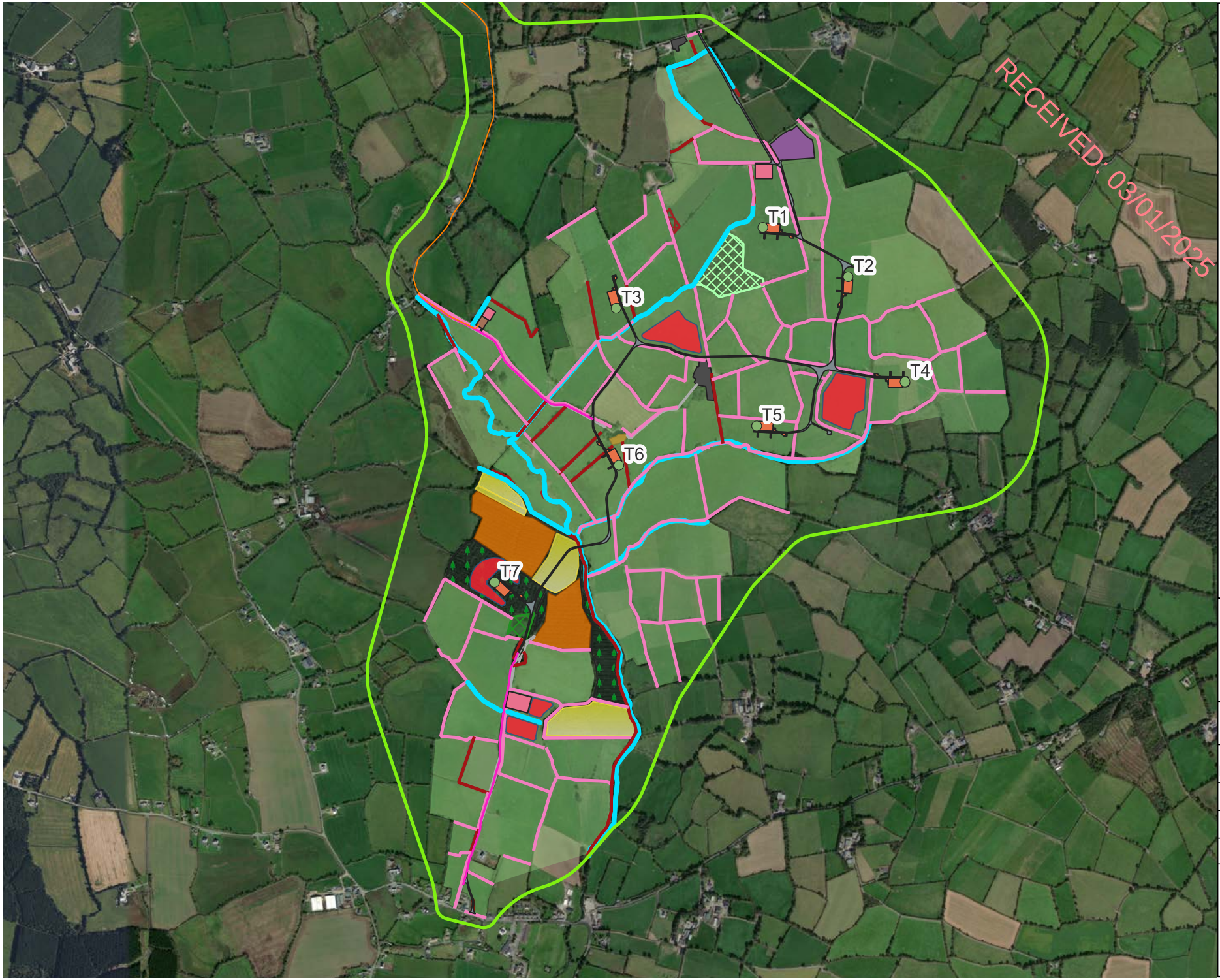

Map Legend

- EIAR Site Boundary
- Eroding/Upland
- Rivers (FW1)
- Hedgerows (WL1)
- Treelines (WL2)
- Buildings and artificial surfaces (BL3)
- Spoil and bare ground (ED2)
- Recolonising bare ground (ED3)
- Improved agricultural grassland (GA1)
- Wet grassland (GS4)
- (Mixed) broadleaved woodland (WD1)
- Mixed broadleaved/conifer woodland (WD2)
- Conifer plantation (WD4)
- Wet willow-alder-ash woodland (WN6)
- Scrub (WS1)
- Proposed Met Mast
- Proposed New Roads
- Proposed Spoil Management Areas
- Proposed Borrow Pit
- Proposed Onsite Substation
- Temporary Construction Compounds
- Existing Roads to be Upgraded
- Proposed Hardstands
- Turbine numbers

N

Drawing Title

Habitat Map with Wind Farm infrastructure overlain

Project Title

Enerco Briskalagh Wind Farm

Drawn By	Checked By
FK	CM
Project No. 230502	Drawing No. Figure 6-6
Scale 1:19,000	Date 08.10.2024

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6.6.1.1 Habitats within the Proposed Wind Farm site

The majority of habitats within the Proposed Wind Farm site consist of homogenous swards of grazed improved agricultural grassland comprising mainly of perennial rye grass along with existing roads and farm roads, hedgerows, watercourses and mixed broad leaved woodland and commercial forestry. Field boundaries comprise mainly very dense managed and unmanaged hedgerow habitat dominated by hawthorn *(Crataegus monogyna)*, elder (*Sambucus nigra*), blackthorn (*Prunus spinosa)* and mature ash *(Fraxinus excelsior)*. The Proposed Wind Farm site is accessible via existing farm tracks in the north, west and south. The Tullaroan Stream bisects the Proposed Wind Farm site east -west and is located in the west of the Proposed Wind Farm site, flowing in a southerly direction.

Drainage ditches recorded throughout the Proposed Wind Farm site discharge to both mapped and unmapped streams classified as upland/eroding rivers and depositing/lowland rivers recorded within the Proposed Wind Farm site. These watercourses are hydrologically connected to European Designated sites located downstream of the Proposed Wind Farm site.

6.6.1.1.1 *Improved Agricultural Grassland (GA1)*

The majority of the Proposed Wind Farm site comprises of extensively managed Improved agricultural grassland (GA1) habitat (Plate 6-1). Turbines 1 to 6 are proposed within GA1 habitat. Similarly, temporary construction compounds, new roads and hardstands are primarily proposed in this habitat throughout the Proposed Wind Farm. This includes grasslands (GA1) of various ages and mixed swards heights including recently harvested fields, actively grazed, tall swards of maturing meadows, along with immature pre-thicket areas of managed grazing rotation. Short homogenous swards with little species diversity resulting from intensive cattle, sheep and horses grazing and poaching were also recorded throughout the Proposed Wind Farm. New roads are proposed throughout the Proposed Wind Farm and will pass through Improved agricultural grassland (GA1) to facilitate the turbine delivery route and site construction and operations.

Perennial Rye Grass (*Lolium perenne*) dominated this habitat type. Other species recorded include creeping-jenny (*Lysimachia nummularia*), daisy (*Bellis perennis*), nettle (*Urtica dioica*), chickweed (*Stellaria media*), White clover (*Trifolium repens*), Red Clover (*Trifolium pratense),* Crested dog's tail (*Cynosurus cristatus*), bent grass (*Agrostis spp.*), yorkshire fog (*Holcus lanatus*), smooth meadow grass (*Poa pratensis*), soft rush (*Juncus effusus*) and mouse ear chickweed (*Cerastium fontanum*), common bent (*Agrostis spp.*), creeping buttercup (*Ranunculus repens*), hard rush (*Juncus inflexus*), silverweed (*Potentilla anserina*), annual meadow grass (*Poa annua*), jointed rush (*Juncus articulates*), creeping thistle (*Cirsium arvense*), short awn foxtail (*Alopecurus aequalis*), red fescue (*Festuca rubra*). Overall, this habitat is of a low biodiversity value.

Plate 6-1. View of managed Improved Agricultural Grassland (GA1) recently harvested. This habitat dominates the Proposed Wind Farm

6.6.1.1.2 Wet grassland (GS4)

A grassland habitat categorised as Wet grassland (GS4) was recorded in the west of the Proposed Wind Farm (Plate 6-2). Wetter pockets of grassland were recorded throughout the Proposed Wind Farm. Intense poaching was recorded in wetter grassland areas throughout the Proposed Wind Farm.

A new road is proposed at T7 through existing wet grassland and treeline habitat. Species recorded in this habitat include foxtail (*Alopecurus pratensis*), curly dock (*Rumex crispus*), cocks' foot (*Dactylis glomerata),* dandelion (*Taraxacum vulgaria*), perennial rye grass (*Lolium perenne*), meadow buttercup (*Ranunculus acris*), creeping buttercup (*Ranunculus repens*), soft rush (*Juncus effusus*).

Plate 6-2. View of grassland habitat categorised as Wet Grassland (GS4) located in the west of the site.

6.6.1.1.3 Woodlands

A variety of woodland habitats including;

- Conifer Plantation (WD4),
- Mixed Broadleaved/Conifer woodland (WD2),
- Broad-leaved woodland (WD1),
- Semi-Natural woodland (Wet willow-alder-ash woodland) (WN6),

Scrub (WS1) habitat was also recorded within the Proposed Wind Farm.

Turbine 7 is proposed within Conifer plantation (WD4) habitat in the west of the Proposed Wind Farm. This habitat is dominated by Japanese larch (*Larix kaempferi*) and Sitka spruce (*Picea sitchensis*) (Plate 6-3). Approximately 3.6ha of this habitat will be removed to facilitate the Proposed Wind Farm. The felled commercial forestry will be replaced on a hectare for hectare basis.

The remaining plantation in the western parcel of the Proposed Wind Farm consists mainly of ash (*Fraxinus excelsior*) with smaller pockets of alder (*Alnus glutinosa*), Norway Spruce (*Picea abies*) and Sitka spruce (*Picea sitchensis*), classified as Mixed broadleaved/conifer woodland (WD2) habitat. Approximately 0.722 ha of this woodland habitat will be removed to the footprint of the Proposed Wind Farm.

Broad-leaved woodland (WD1) dominated by ash and alder was recorded adjacent to T7, in the south-west of the Proposed Wind Farm (Plate 6-4). An ash plantation was recorded in the west of the Proposed Wind Farm (Plate 6-5). A small pocket of this habitat was also recorded adjacent to T6. The ash trees in this woodland contain extensive ash die back disease, *Hymenoscyphus fraxineus*.

Plate 6-3. View of firebreak within the conifer plantation at the location of T7.

Plate 6-4. View of broadleaved woodland (WD1) located west of the Tullaroan stream, adjacent to agricultural grassland (GA1) habitat.

Plate 6-5. View of ash and alder plantation classified as broad-leaved woodland (WD1) located adjacent T7 proposed location. Bramble and Juncus spp. dominated the ground flora.

In addition to the planted woodland described above, a small pocket of natural colonised woodland was recorded in the north of the Proposed Wind Farm (Plate 6-6 & Plate 6-7). This woodland is located entirely outside of proposed infrastructure footprint areas and this habitat will not be impacted by the Proposed Project. The ground conditions within this habitat were wet underfoot. This habitat covers approximately 3.3 hectares and is located approximately 125m southwest of T1 and has been classified as a mosaic between Wet willow-alder-ash woodland (WN6) and Scrub (WS1).

Species recorded within this pocket of semi-native woodland include hazel (*Corylus avellana*), mature holly (*Ilex aquifolium*), grey willow (*Salix cinerea*), goat willow (*Salix caprea*), elder (*Sambucus nigra*), blackthorn (*Prunus spinosa)*, speedwell (*Veronica chamaedrys*), nettle (*Urtica dioica*), honey suckle (*Lonicera periclymenum*), remote sedge (*Carex remota*), wood sorrel (*Oxalis acetosella*), ash (*Fraxinus excelsior)*, nipplewort (*Lapsana communis*), spindle (*Euonymus europaeus*), opposite leaved golden saxifrage (*Chrysosplenium oppositifolium*), creeping buttercup (*Ranunculus repens*), hard shield-fern *(Polystichum aculeatum),* wood avens *(Geum urbanum),* fox glove *(Digitalis purpurea),* bluebell *(Hyacinthoides nonscripta),* hairy willowherb *(Epilobium hirsutum), Plagiomnium undulatum, Eurynchium striatum* and *Hypnum cuppressiforme.* Gorse (*Ulex europaeus*) was recorded by the western boundary of the woodland habitat. This woodland does not conform to an Annex I habitat. A spring was recorded in the northern section of the woodland. The western parcel of this woodland habitat is grazed by sheep.

Plate 6-6. View of semi-natural woodland (WN6)/scrub (WS1) mosaic located in the north of the Proposed Wind Farm dominated in this section by hawthorn and blackthorn.

Plate 6-7. Semi-native woodland habitat located by T1. Tree species recorded in this area consist of willow, holly, ash and hawthorn.

6.6.1.1.4 Dry meadows and Grassy verges (GS2), Spoil and Bare Ground (ED2), Treeline (WL2), Recolonising Bare Ground (ED3)

Dry meadows and grassy verges (GS2) were recorded bordering the existing farm tracks throughout the Proposed Wind Farm (Plate 6-8). This habitat was also recorded along the public road on the Proposed Grid Connection underground cabling route. A mature, dense hedgerow (WL1) with individual mature ash trees classified as treeline (WL2) border the fields located adjacent the existing farm tracks in the west of the Proposed Wind Farm. Species recorded include cow parsley (*Anthriscus sylvestris*), cocksfoot (*Dactylis glomerata*), cleavers (*Galium spp.*), herb Robert (*Geranium robertianum*), red fescue (*Festuca rubra*), buttercup (*Ranunclulus spp.*).

Existing roads and farm tracks classified as *Spoil and bare ground (ED2)* were recorded in the north, south and west of the Proposed Wind Farm (Plate 6-8), with some adjacent areas categorised as Recolonising bare ground (ED3) (Plate 6-9).

Plate 6-8. View of existing farm access track classified as spoil and bare ground (ED2) located in the centre of the Proposed Wind Farm and access via the west. A managed hedgerow (WL1) habitat and mature ash trees classified as treeline (WL2) were also

recorded in this area of the Proposed Wind Farm.

Plate 6-9. View of recolonising bare ground (ED3) recorded in the south-west of the Proposed Wind Farm.

6.6.1.1.5 Hedgerow (WL1)

Field boundaries and margins within the Proposed Wind Farm were delineated by unmanaged and managed *Hedgerow (WL1)* habitat (Plate 6-10 - Plate 6-12). Species recorded include hawthorn *(Crataegus monogyna)*, elder (*Sambucus nigra*), blackthorn (*Prunus spinosa),* nettle *(Urtica dioica),* and bramble *(Rubus fruticosus agg.).* Individual mature oak (*Quercus robur*), sycamore (*Acer pseudoplatanus*) and ash (*Fraxinus excelsior*) trees were identified throughout the hedgerow habitats within the Proposed Wind Farm. Other species recorded throughout hedgerows within the Proposed Wind Farm include grey willow, alder, guelder rose, field maple, bracken, bent grass, cocksfoot, creeping buttercup, spear thistle. Rich ground flora was recorded by hedgerow habitat in the west of the Proposed Wind Farm. Species recorded include wood anemone (*Anemone nemorosa)*, bluebells (*Hyacinthoides non-scripta*), ground ivy (*Glechoma hederacea*), barren strawberry (*Potentilla sterilis*), primrose (*Primula vulgaris)* and early-purple orchid (*Orchis mascula).*

Plate 6-10. View of unmanaged, dense hedgerow (WL1) habitat recorded in the north-east of the Proposed Wind Farm. This section of the habitat was dominated by hawthorn with a dense understory dominated by nettle and bramble.

Plate 6-11. View of hedgerow (WL1) habitat in the west of the Proposed Wind Farm adjacent the existing farm track. Species recorded here include cherry, hawthorn, elder, ash.

Plate 6-12. View of managed hawthorn and blackthorn hedgerow (WL1) habitat recorded in the centre of the Proposed Wind Farm.

6.6.1.1.6 Buildings and artificial surfaces (BL3)

Farm buildings, cattle sheds and feed stores were recorded within the centre of the Proposed Wind Farm classified as Buildings and artificial surfaces (BL3) habitat. Additionally, old stone buildings classified as buildings and artificial surfaces (BL3) were recorded within the centre of the Proposed Wind Farm also (Plate 6-13).

Plate 6-13. View of Buildings and artificial surfaces (BL3) located within the Proposed Wind Farm.

6.6.1.1.7 Drainage Ditches (FW4)

The majority of field margins within the Proposed Wind Farm were delineated by Drainage ditches (FW4) (Plate 6-14 & Plate 6-15). Several of these drainage features had flowing water present during the surveys undertaken. Drainage ditches within the Proposed Wind Farm are likely to connect to the Tullaroan Stream or associated tributaries.

Plate 6-14. View of heavily vegetated drainage ditch with stagnant water present located within the Proposed Wind Farm.

Plate 6-15. A drainage ditch (FW4) was recorded in the north of the Proposed Wind Farm flowing south.

6.6.1.1.8 Eroding/Upland Rivers (FW1)/Depositing/lowland River (FW2)

The Tullaroan Stream classified is mostly categorised as Eroding/Upland river (FW1)/Depositing/lowland river (FW2) and is located within the centre and west of the Proposed Wind Farm flowing in a southeastern direction (Plate 6-16). Small meandering sections of the Tullaroan stream are categorised as Depositing Lowland River (FW2). The habitats recorded adjacent the Tullaroan Stream mainly include improved agricultural grassland (GA1) that is actively used by grazing livestock. There are three tributaries that flow into it. Ripples and glides were recorded as the watercourse meanders and pools in areas.

Within the Proposed Wind Farm, there are a total of 6 no. watercourse crossing locations over natural watercourses (rivers and streams), 2 of which involved upgrades to existing structures. The crossing locations are outlined below:

- An existing crossing along a road which is proposed for upgrade over a small stream immediately to the west of the proposed onsite substation location. This crossing is over a watercourse which is not mapped by the EPA but was encountered during the Site walkover surveys;
- An existing crossing along a road which is proposed for upgrade over a small stream ~315m to the southeast of the proposed substation location. This crossing is over a watercourse which is not mapped by the EPA but was encountered during the Site walkover surveys;
- A new proposed crossing over a tributary of the Tullaroan Stream, referred to by the EPA as the Briskalagh Stream (EPA Code: 15B98) ~200m south of T6;
- A new proposed crossing over a tributary of the Tullaroan Stream, which is not mapped by the EPA but was encountered during Site walkover surveys, ~95m to the southeast of T3;

- A new proposed crossing over the Tullaroan Stream ~350m northeast of T7; and,
- A new proposed crossing over the EPA mapped Remeen Stream (EPA Code: 15R27) ~440m northwest of the proposed onsite borrow pit.

The proposed new watercourse crossings will be bottomless or clear span culverts, ensuring no instream works are necessary. These watercourses are all tributaries to the Tullaroan Stream. In areas throughout the Proposed Wind Farm, these watercourses were accessible by grazing livestock with evidence of river crossing and poaching present. All EPA mapped and unmapped watercourses primarily correspond to Eroding/Upland rivers (FW1).

A full description of watercourses is attached in the Aquatic Baseline Report attached as Appendix 6-3.

Plate 6-16. View of the Tullaroan Stream located in the west of the Proposed Wind Farm, flowing south. This watercourse is located adjacent improved agricultural grassland (GA1).

Plate 6-17. View of EPA mapped watercourse, Briskalagh located in the centre of the Proposed Wind Farm.

6.6.1.1.9 Habitats within Turbine Hardstand Locations

Turbines 1 to 6 are proposed within Improved Agricultural Grassland GA1 habitat and Turbine 7 is proposed within Conifer Woodland WD4 habitat in the west of the Proposed Wind Farm site, as described in Sections 6.6.1.1.1 and 6.6.1.1.3.

6.6.1.1.10 Habitats at the Met Mast

The proposed met mast is proposed in the east of the Proposed Wind Farm within Improved agricultural grassland (GA1) habitat and adjacent Hedgerow (WL1) habitat. Species recorded in the grassland include dandelion, buttercup, daisy, perennial rye grass, curly dock.

The hedgerow (WL1) habitat is dominated by hawthorn (*Crataegus monogyna*) and understory dominated by unmanaged bramble encroaching on the grassland habitat (Plate 6-18). Mature ash trees were recorded also. Other species identified in this location include gorse, hawthorn, blackthorn, ivy nettle, herb robert. A new road is proposed west of the proposed met mast location. This new road will pass through existing hedgerow habitat consisting of grey willow, hawthorn, blackthorn, dense bramble and a drainage ditch (FW4).

Plate 6-18. View of hedgerow (WL1) habitat with dense bramble dominated understory located at the edge of grassland (GA1).

6.6.1.1.11 Habitats recorded within Spoil Management Areas and Borrow Pit

The proposed borrow pit is located in existing grazed and heavily poached grassland habitat categorised Improved agricultural grassland (GA1) located in the north of the Proposed Wind Farm.

Spoil management areas are proposed in 5 no. locations throughout the Proposed Wind Farm. The habitats recorded in these areas consist entirely of improved agricultural grassland (GA1).

In order to accommodate the main construction and operational entrance, excavations and soil management to facilitate the Proposed Project, a new road is proposed on a north facing slope, in the north of the Proposed Wind Farm. The new road will join the Huntstown road (L-5024). The habitats recorded within this section of the site include eroding/upland river (FW1), treeline (WL2), hedgerow (WL1), eroding/upland river (FW1) and improved agricultural grassland (GA1) habitat (Plate 6-19 & Plate 6-20). Species recorded adjacent the watercourse (Remeen) include cow parsley, lesser celandine, meadow buttercup, creeping buttercup, cleavers (*Galium spp.*), creeping bent grass, bramble, perennial rye grass, harts tongue fern, scaley male fern, opposite leaved golden saxifrage, *brachium rivulare*, pignut, thisidens moss, ground ivy and wood sorrel. Other species recorded in this section of the Site include blackthorn, alder, gorse, hawthorn, bracken, bent grass, cocks foot, creeping buttercup and spear thistle.

Plate 6-19. View of Improved agricultural grassland and gorse scrub habitat identified along the proposed new road located north of the Proposed Wind Farm to facilitate the main construction and operational entrance, soil management area in this locality.

Plate 6-20. View of eroding/upland river (FW1), located north of the Proposed Wind Farm. The proposed new road will cross this watercourse to reach to public road located north.

6.6.1.1.12 Habitats at the Proposed Substation and Construction Compound

A substation with associated temporary construction compound is proposed in the west of the Proposed Wind Farm by the existing farm track. Habitats recorded in this vicinity include grazed grassland categorised as Improved Agricultural grassland (GA1) and Treeline (WL2) (Plate 6-24). Mature ivy-covered ash trees dominate the treeline habitat while the understory is managed and comprises hawthorn, blackthorn, gorse and grey willow. A Drainage ditch (FW4) was recorded at the treeline north of the proposed substation and water was present at the time of surveying. Additionally, an unmapped watercourse described as a small stream categorised as eroding/upland watercourse (FW1) was recorded west of the proposed substation.

Plate 6-21. View of Improved Agricultural Grassland (GA1) and treeline (WL2) dominated by mature ash trees. Understory comprises of gorse, willow, hawthorn and blackthorn. A drainage ditch (FW4) was recorded at this treeline.

6.6.1.2 Habitats on the Proposed Grid Connection underground cabling route and Turbine Delivery Route

The Proposed Grid Connection underground cabling route has an approximate length of 23km. It will leave the on-site substation and travel north-west for 250m following an existing farm track proposed for upgrade to facilitate the Proposed Grid Connection. The Proposed Grid Connection underground cabling route will then join the public road classified as Buildings and artificial surfaces (BL3). The cable will pass beneath the River Nore via HDD.

Improved agricultural grassland (GA1) habitat was also recorded along the Proposed Grid Connection underground cabling route.

Hedgerow (WL1) and treeline (WL2) habitats exist along Proposed Grid Connection underground cabling route. The grassy verges across much of the Proposed Grid Connection underground cabling

route contained species typical of Dry meadows and grassy verges (GS4) which were not mapped due to their small size and mosaic-like occurrence throughout and along the route.

Several Drainage ditches (FW4) with and without water present were recorded along the Proposed Grid Connection underground cabling route during the surveys undertaken. Several watercourses are culverted, box culverted, or bridges created to allow watercourses to pass beneath the roads along the Proposed Grid Connection underground cabling route.

Other habitats recorded by the River Nore along the Proposed Grid Connection underground cabling route include Improved agricultural grassland (GA1) and Hedgerow (WL1).

There are a total of 10 no crossings over EPA mapped watercourses along the Proposed Grid Connection underground cabling route, comprising of 7 no. existing bridge crossings, 2. no existing culvert crossings and 1 no. new proposed crossing. These crossings are detailed below:

- An existing bridge crossing along a local road in the townland of Oldtown over the EPA mapped Tullaroan watercourse (EPA Code: 15T22);
- 2 no. existing bridge crossings along a local road in the townland of Brittas (to the north and south of Brittas crossroads) over the EPA mapped Blackbottom stream (EPA Code: 15B83);
- An existing crossing (concrete pipe) along a local road in the townland of Picketstown over the EPA mapped Arigna River (EPA Code: 15A01);
- An existing bridge crossing over a local road between the townlands of Ballyroa (Grace) and Ballyroe over the EPA mapped Ballylarkin Stream (EPA Code: 15B85);
- An existing bridge crossing over the Monabrika Stream (EPA Code: 15M30) to the south of Freshford;
- An existing bridge crossing along New Bridge Street (R694) in Freshford over the Nuenna River;
- An existing culvert crossing along the R694 over the Lismaine Stream (EPA Code: 15L16) between the townlands of Sweethill and Clone;
- An existing crossing along the R694 over the Lisdowney Stream (EPA Code: 15L02) at Grange Bridge; and,
- A new proposed crossing under the Nore River to the south of Ballyragget 110kV substation.

An additional 3 no. crossings along the Proposed Grid Connection underground cabling route which are over watercourses which are not included in the EPA blueline database. These are at existing bridge and culvert crossings. Watercourses and crossings recorded along the Proposed Grid Connection underground cabling route are shown in Plate 6-21 to Plate 6-23 below.

There will be a total of 8 culverts,1 standard trefoil formation and 4 crossings requiring horizontal directional drilling for the underground cable, including traversing the River Nore categorised as Depositing/lowland river (FW2)/Eroding/upland river (FW1) (see Appendix 4-1 and Table 4-6 of Chapter 4 of the EIAR for detail) to reduce risk of impacts and due to the insufficient deck cover within the bridge. No instream works are proposed.

It is proposed that the large wind turbine components will be delivered from Belview Port, Waterford to the Site via the M9, exiting at Junction 9 onto the N10 heading north, joining the N76, a combined stretch of 22.4km along the national road network. The turbine components will then turn on to the R695 north of Callan, travelling along the regional road for approx. 9.2km, before turning onto the L1009 in Kilmanagh for approx. 150m before reach the proposed new turbine component entrance at the south of the Site. Habitats recorded along the Proposed turbine delivery route include Dry meadows and grassy verges (GS2), Drainage ditches (FW4), Stone walls and other stonework (BL1), Hedgerow (WL1) and Treeline (WL2). There will be no loss of road fringe habitats (such as treeline, hedgerow) to facilitate the delivery of the turbines. However, minor works and vegetative pruning may be necessary to facilitate the delivery of the turbines.

Plate 6-22. View of Improved Agricultural Grassland (GA1) and treeline (WL2) dominated by mature ash trees. Understory comprises of gorse, willow, hawthorn and blackthorn. A drainage ditch (FW4) was recorded at this treeline, north of the proposed substation location.

Plate 6-23. View of the River Nore where the HDD works are proposed to pass beneath.

Plate 6-24. View of culvert beneath the road along the Proposed Grid Connection underground cabling route.

Plate 6-25. View of stone arched bridge crossing an EPA mapped watercourse classified as Eroding/upland river (FW1) along the Proposed Grid Connection underground cabling route.

6.6.2 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. No Third Schedule Alien Invasive species listed on the Third Schedule of the European Communities (Birds and natural Habitats) Regulations, 2011 were recorded within the footprint of the Proposed Wind Farm or Proposed Grid Connection during the survey conducted.

A Third Schedule Invasive Alien plant species, Japanese knotweed (*Fallopia japonica*) was recorded along the proposed turbine delivery route (Plate 6-25), however, the delivery of turbines will not interact with this stand of Japanese knotweed.

Plate 6-26. View of Japanese knotweed located adjacent to the public road along the proposed turbine delivery route.

6.6.3 Protected Flora

No botanical species listed under the Flora (Protection) Order 2022 (SI 235 of 2022), listed in the EU Habitats Directive (92/43/EEC) or listed in the Irish Red Data Books were recorded within the Site. All species recorded are common in the Irish landscape. No rare and protected plant species were recorded in the desk study, including those obtained from NPWS data request (see Table 6-5), were recorded within the Site.

6.6.4 Fauna in the Existing Environment

The following subsections provide a breakdown of the species recorded within the Site during the site visits and assessments. A map showing locations of protected faunal signs and sightings recorded within the Proposed Wind Farm is shown below as Figure 6-7. Survey dates are provided in Table 6-2 above.

Map Legend

- EIAR Site Boundary
- Fox sighted
- Mammal burrows
- Irish hare sighted
- Badger print/ latrine/ snuffle hole
- Kingfisher
- Bat roost
- Mammal droppings

N

Drawing Title
Faunal signs and sightings

Project Title
Enerco Briskalagh Wind Farm

Drawn By	Checked By
FK	CM
Project No.	Drawing No.
230502	Figure 6-7
Scale	Date
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6.6.4.1 Bats

The results of the bat survey effort are fully described in Section 4.3 of the Bat Survey Report included as Appendix 6-2 and are not repeated in full here. Habitats recorded within the Proposed Wind Farm and along the Proposed Grid Connection underground cabling route are described in Section 6.6.1 above. The bat survey results are summarized below.

6.6.4.1.1 *Bat Habitat Suitability Appraisal*

Proposed Wind Farm Infrastructure

With regard to foraging and commuting bats, exposed areas of grassland and farmland (tilled and arable) habitats outlined above, as well as spoil and bare ground and recolonising bare ground, were considered *Low* suitability, i.e. habitat that could be used by small numbers of commuting bats such as gappy hedgerow or unvegetated stream but isolated (Collins, 2016). Areas of scrub, conifer plantation and drainage ditches provide connectivity via linear features to the surrounding landscape. As such, they were assessed as having *Moderate* suitability i.e. habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water (Collins, 2016). Due to their varying levels of maturity and connectivity, treelines and hedgerows were assessed as having *Moderate* to *High* suitability. While mature mixed broadleaf woodland and depositing lowland rivers were assessed as having *High* suitability, i.e. continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. (Collins, 2016).

Trees present on the Proposed Wind Farm comprise a mixture of mature and immature conifer and broadleaved species. With regards to roosting bats, a number of mature broadleaf trees were identified within the bat felling buffers which present *Negligible* to *Moderate* roosting potential. In relation to bat felling buffers, a minimum 50m buffer between turbine blade tip and nearest woodland (or other key habitat features) used by bats (e.g., hedgerows, treelines etc.) is recommended at all wind turbines (NatureScot, 2021). Further detail on bat felling buffers is outlined in in Section 6.1.3 of the Bat Report.

The trees assessed varied in characteristics with some containing extensive ivy cover as well as branch damage and wounds providing potential roosting features suitable for opportunistic and/or regular roosting. Habitat suitability assessment for trees with potential for roosting bats are outlined in further detail in Section 6.6.4.1.2 below. Additionally, four structures and their associated outbuildings (*buildings and artificial surfaces*) are also further assessed for roosting potential in Section 6.6.4.1.2 below. All other habitats present were assigned a *Negligible* value for roosting bats.

Proposed Grid Connection

The habitat at the proposed 38kV on-site substation and adjacent temporary construction compound consists primarily of improved agricultural grassland (GA1). Mature ivy-covered ash trees dominate the treeline habitat (WL2), located adjacent to the proposed on-site substation compound, while the understory is managed and comprises hawthorn, blackthorn, gorse and grey willow. The treeline was assessed as having *Moderate* suitability to support commuting bats. A drainage ditch (FW4) was also recorded at the treeline north of the proposed on-site substation. Two of the trees present within this treeline contain PRF's and were assessed as having *Moderate* suitability to support roosting bats while an additional two were assessed as *Low* due to the presence of dense ivy cover. These trees will be retained and avoided as part of the Proposed Project.

With regard to commuting and foraging bats, features along the Proposed Grid Connection underground cabling route such as stone walls, grassland habitats, drainage ditches, hedgerows and treelines were

assessed as having *Low* to *Moderate* suitability i.e. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water (Collins, 2016).

With regard to roosting bats, habitat features along the Proposed Grid Connection underground cabling route, including grassland habitats, hedgerows and drainage ditches were assessed as having *Negligible* suitability i.e. Negligible habitat features likely to be used by roosting bats/trees of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential (Collins, 2016). Mature trees containing PRFs and stone walls were classified as having *Low* to *Moderate* suitability i.e. A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.

Twelve existing watercourse crossing structures were recorded along the Proposed Grid Connection underground cabling route to the Ballyragget substation, excluding the crossing at the River Nore (WC1) where there is no structure present that could be used by roosting bats. A total of 9no. bridge crossings, 2no. culverts and 1 no. concrete pipe will be traversed for the underground cabling route. Four crossings will require horizontal directional drilling including beneath the River Nore and all other works will be confined to the road structure.

The structures at the existing 12 no. watercourse crossings were inspected for signs of bat roosts and were assessed for bat roost potential on the 21st and 22nd of March 2024. No evidence of bat roosts was found at any of the structures. The findings are summarized in Table 4-5 below. The locations of the watercourse crossings are shown on Chapter 4, Figure 4-15.

In addition to the features listed in Table 4-5 of the Bat Report attached as Appendix 6-2, several potential roost features in trees were identified along the underground cabling route. However, no trees are designated for removal as part of the Proposed Grid Connection underground cabling works. Further details on the Proposed Grid Connection can be found in Chapter 4, Section 4.3.2.4.

6.6.4.1.2 Roost Surveys

Daytime Roost Inspections

Four structures and their associated outbuildings containing potential suitable bat roost features were identified within the Proposed Wind Farm. The results are further described in Section 4.3.2 of the Bat Survey Report attached as Appendix 6-2.

Farm Complex 1

A farm consisting of several corrugated iron hay sheds, and two stone sheds were identified on agricultural lands in the centre of the Proposed Wind Farm (Grid Ref: S 39927 54413). The farm is approximately 275 m from the nearest proposed turbine (T05). The corrugated iron hay sheds (Grid Ref: S 39927 54393, S 39939 54325, S 39940 54320, S 39915 54376, S 39887 54397 and S 39905 54420) were open-facing and exposed to the elements. No evidence of bats was found in these sheds, and they were assessed as having *Negligible* potential to house roosting bats i.e. Negligible habitat features on site likely to be used by roosting bats (Collins, 2016).

The two stone sheds were of stone block construction with corrugated iron roof structures. The eastern single-story shed (Grid Ref: S 39940 54421) consisted of two internal rooms with two open facing segments to the north of the structure and had no felt underlining. Both rooms had an open doorway with small windows at the front and rear allowing potential access for bats. Within the northern room, there were seed sacks draped from the rafters that could provide roosting potential for a significant number of bats.

During the summer inspection 2no. brown long-eared bats were observed roosting within the seed sacks. Butterfly and moth wings in addition to bat droppings were found dispersed around the building. Small accumulations of droppings were discovered beneath the seed sacks. The building was assessed as having *Moderate* roosting potential i.e. A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (Collins, 2016).

The second stone building (Grid Ref: S 39920 54421) was also made up of two separate rooms with open doorways. The northern room included an attic space in which an unidentified bat carcass, accumulations of bat droppings and several butterfly wings were found. The southern room, with felt underlining in the roof, exhibited sparsely scattered bat droppings around the area. This structure was also assessed as having *Moderate* potential to house roosting bats.

Derelict Buildings

Located approximately 425 meters to the south-west of Farm Complex 1 are two derelict stone block structures, positioned 125 meters north of the nearest proposed turbine (T06). Both structures exhibit compromised slate roofs, with cracks in their blockwork, offering potential access and roosting opportunities for bats. Additionally, dense ivy covers portions of both buildings.

The larger building to the east (Grid Ref: S 39588 54176), serves primarily as a hay storage facility. Scaffolding is evident both internally and externally, seemingly erected for the installation of a corrugated iron sheet integrated into the damaged roof structure. Although no underlining is present beneath the remaining slates, the observed damage to rafters and joists creates potential roosting opportunities for bats. Despite no evidence of bats found during the 2023 inspections, this structure was assessed as having *Moderate* suitability for roosting bats.

The western building (Grid Ref: S 39562 54194), consists of a main building with an adjoining lean-to extension featuring a corrugated iron roof. Similar to the larger building, the damaged roof structure and blockwork offer potential access and roosting opportunities for bats. Although no evidence of bats was discovered within this structure, it was also evaluated as having *Moderate* suitability for roosting bats.

Farm Complex 2

A second farm complex is situated in the south-east of the Proposed Wind Farm (Grid Ref: S 40863 53902). It is located approximately 500m south of the nearest proposed turbine (T4). It consists of an inhabited dwelling to the south connected to a small storage building (Grid Ref: S 40863 53889), a hay storage shed to the west (Grid Ref: S 40839 53904), several sheds used for dairy farming and hay storage to the north (Grid Ref: S 40842 53927, S 40863 53937, S 40824 53937) and a derelict structure to the east (Grid Ref: S 40864 53911).

The inhabited dwelling is modern and well-sealed with no obvious access points for bats. An internal inspection of the dwelling was not deemed necessary. The connected shed is open-faced with an open window frame. However, it is cluttered with limited space for bats to fly within. Both structures were assessed as having *Low* roosting suitability i.e. A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (Collins, 2016).

The open-fronted hay storage shed to the west consists of two adjoining rooms, one stocked with hay bales, while the other is spacious with some miscellaneous items spread around the room. The shed has a Perspex roof with a felt underlining with several tears offering potential roosting opportunity for bats. No evidence of bats was found in this building, but the lack of flat surfaces and the hay covered floor could be obscuring any accumulations of droppings. This structure was assessed as having *Moderate* suitability for roosting bats due to the presence of the felt underlining.

The hay storage and dairy sheds to the north are constructed with galvanised metal with corrugated iron roof structures. These lacked the necessary protection and appropriate conditions that could be used by bats and were universally assessed as having *Negligible* suitability for roosting bats.

The derelict building is of stone block construction with an open doorway and window frame providing access for bats. There is also damage to the slate roof that also provides potential access for bats. No evidence of roosting bats was found within the structure. However, the structure was assessed as having *Moderate* suitability for roosting bats.

Farm Complex 3

A third farm is present adjacent to Farm Complex 2. This farm is not contained within the Proposed Wind Farm and is situated approximately 600m from the nearest proposed turbine location (T4). It is comprised of eight structures that include an inhabited dwelling to the north (Grid Ref: S 40932 53842) a stone shed to the south (Grid Ref: S 40958 53830) and six sheds constructed either entirely of galvanized metal or with a stone block construction and a galvanized metal roof to the east (Grid Ref: S 40969 53866, S 41006 53868, S 40991 53852, S 41018 53837, S 40977 53838, S 40945 53818).

The inhabited dwelling is modern and displayed no obvious access points for bats. An internal inspection of the dwelling was not deemed necessary. The structure was precautionarily assessed as having *Low* suitability to support roosting bats.

The stone shed is of stone block construction with a pebble dash finish. The slated roof exhibits small sections of damage around the ridge tiles and above the guttering, providing permanent access for bats. An open door was noted during inspection, and the presence of felt underlining further offers a potential roosting site for bats. The damage to the roof is further detailed in Plate 4-24 of the Bat Report where daylight is visible from within the structure. The structure was assessed as having *Moderate* suitability to support roosting bats.

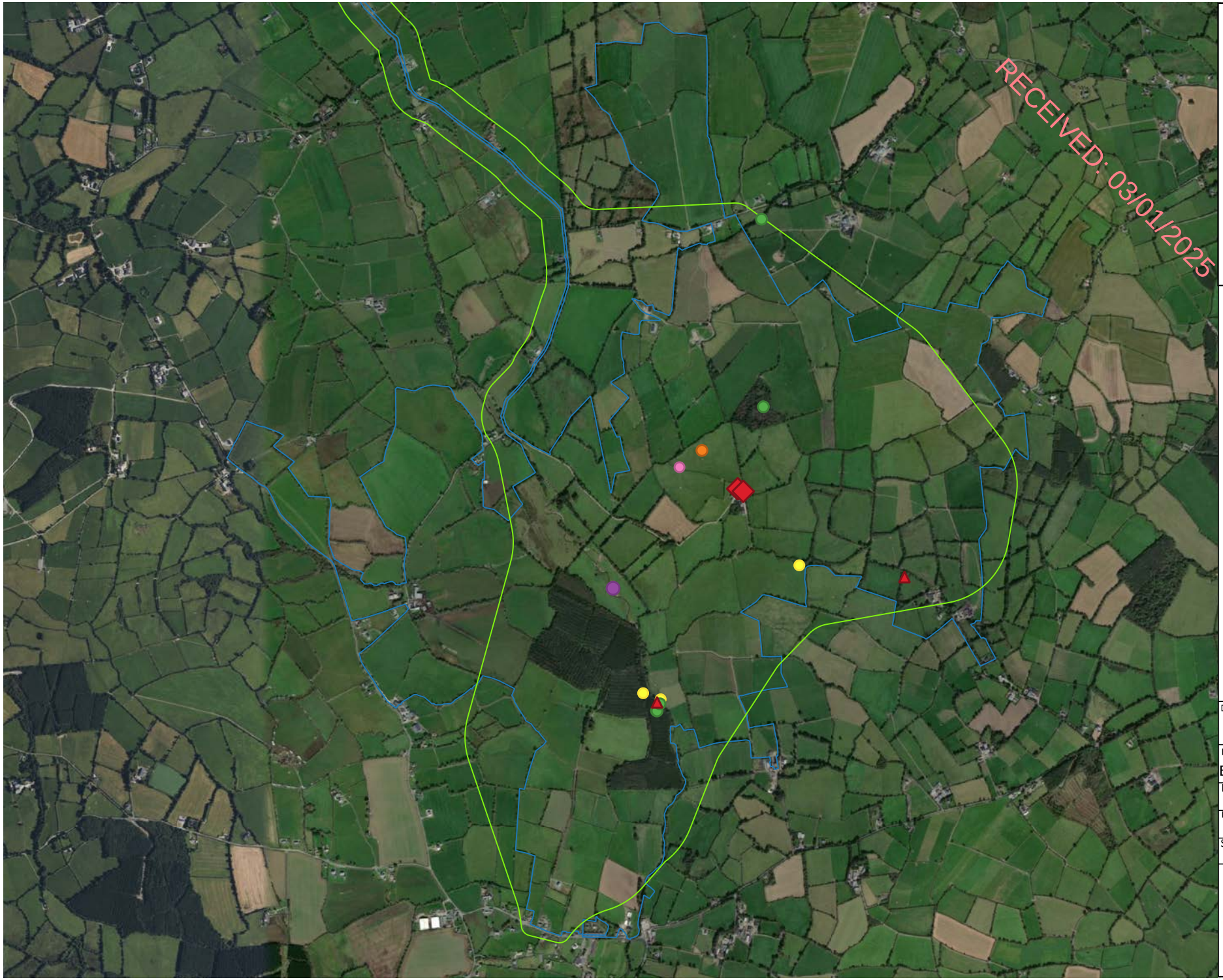
All galvanized metal sheds on the farm are open-faced and exposed to the elements with no identified potential roosting features. The stone block sheds also lacked features such as cracks in the blockwork that could support roosting bats. Consequently, all these structures were assessed as having *Negligible* roosting suitability.

Tree Inspections

Mature broadleaf tree species forming field boundaries consisted primarily of ash, sycamore, willow, oak, beech and birch. The majority of trees within the Proposed Wind Farm will be retained as part of the Proposed Project; however, there will be some requirement to remove trees to facilitate the required bat buffers (outlined in Section 6.1.3 of the Bat Report, attached as Appendix 6-2). A summary of trees/tree groups of note within an 87m radius (requiring removal) of the proposed turbine locations. Their general location, PRFs and respective suitability for bat roosting, are outlined in Table 4-6 and further details are included in the Tree Inspection map (Figure 4-1) in the Bat Report.

Of these trees, a small number contained *Moderate* roosting potential, i.e. a tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (Collins, 2016).

The majority of trees assessed were classified as having *Low* roosting potential i.e. a tree of sufficient size and age to contain potential roost features but with none seen from the ground or with features seen with only very limited roosting potential (Collins, 2016).



Map Legend

- EIAR Site Boundary
- Blue Line Boundary
- Badger print/latrine/snuffle
- Fox sighted
- Hare sighted
- Kingfisher sighted
- Mammal burrows
- Mammal droppings
- Bat Roosts Identified

N

Drawing Title

Mammal sighns and sightings

Project Title

Enerco Briskalagh Wind Farm

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FK	CM
Project No.	Drawing No.
230502	Figure 6-7
Scale	Date
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Conifer plantation to the southwest of the Proposed Wind Farm does not provide potential roosting habitat of significance for bats and as such trees were assessed as having *Negligible* roosting potential i.e. negligible habitat features to be used by roosting bats, due to their size and lack of suitable PRFs.

The trees assessed along the Proposed Grid Connection underground cabling route varied in their suitability to support roosting bats, with the majority being assessed as *Negligible*, and a small number as having *Low* to *Moderate* suitability. None of the trees assessed are designated for removal to facilitate the Proposed Grid Connection.

A hedgerow, primarily consisting of hawthorn with brambles and individual ash trees, is located adjacent the site of the proposed met mast. The ash trees were evaluated as having *Negligible* potential for supporting roosting bats, and none are designated for removal to accommodate the installation of the mast.

Overall, the Proposed Wind Farm contains a number of mature trees, hedgerows and treelines. Some of these features will require removal to facilitate the bat felling buffer. Several trees proposed for removal provide potential suitable habitat for roosting bats. However, no evidence of roosting bats was identified during the ground level assessment.

Emergence Surveys

Emergence surveys were carried out in spring, summer and autumn of 2023. The spring dusk emergence survey was conducted by two surveyors on the 31st May at Farm Complex 1 with particular focus on the shed containing hanging seed sacks. This specific structure was confirmed as a roost, prompting a subsequent survey in summer on July 27th by two surveyors. Bats were again observed emerging from the roost during this follow-up survey. Concurrently, on the same date, another team of surveyors examined derelict buildings located approximately 400 meters southwest of Farm Complex 1. While no bats were observed emerging from these structures, a number of bats were seen foraging around the treeline and other structures.

An emergence survey was also conducted on 12th October during the autumn period at Farm Complex 2 in which two pipistrelles were observed emerging from the open-fronted hay shed, with two other species recorded foraging around the farm. Table 4-8 of the Bat Report summarises the findings of the bat activity surveys carried out on the structures.

6.6.4.1.3 Manual Transects

Manual transects were undertaken in spring, summer and autumn 2023. Bat activity was recorded in all seasons. A total of 2,049 bat passes were recorded, including emergence survey activity. In general, soprano pipistrelle (n=940) was recorded most frequently, followed by common pipistrelle (n=885). Leisler's bat (n=159), *Myotis spp.* (n=53) and brown long-eared bat (n=12) were less frequent.

Species composition and activity levels varied between surveys. Transect survey results were calculated as bat passes per km surveyed (to account for differences in survey effort). Bat activity was concentrated along treelines, hedgerows, and linear (road/track) habitats. Soprano pipistrelle occurred more frequently in spring and autumn of 2023, while common pipistrelle occurred most often in summer. Leisler's bat was more prominently present in the spring, particularly within the conifer plantation at T07.

6.6.4.1.4 Ground-level Static Surveys

In total, 64,224 bat passes were recorded across all deployments. In general, common pipistrelle (n=23,217) occurred most frequently, followed by soprano pipistrelle (n=21,410) and Leisler's bat

(n=14,362). Instances of *Myotis spp.* (n=4,484), Brown long-eared bat (n=673) and Nathusius' pipistrelle (n=78) were recorded less frequently during the 2023 survey period.

Bat activity was calculated as total bat passes per hour (bpph) per season to account for any bias in survey effort, resulting from varying night lengths between seasons. Spring activity was dominated by Leisler's bat and common pipistrelle. During the summer and autumn, activity was more evenly distributed between common and soprano pipistrelle, with significant representation from Leisler's bat and Myotis spp. Instances of brown long-eared bat and Nathusius' pipistrelle were relatively rare throughout the survey periods.

The Median Bat Pass Rate, Per Detector, Per Survey period is shown in Plates 4-47 and 4-48 of the Bat Report (varied axis scale). Bat activity varied across seasons and detector locations. Activity at D07 in spring was significantly higher than all other detector locations and largely dominated by Leisler's bat activity. This detector was located within dense conifer plantation. Activity in summer was substantially reduced, and species composition shifted to being common pipistrelle, soprano pipistrelle and *Myotis spp.* dominant, particularly at D05, D06 and D07. In autumn, D03 and D05 had the highest activity compared with other detector locations, with soprano and common pipistrelle dominating, respectively. The remaining detectors exhibited very low activity across the season.

The Median Nightly Pass Rate (i.e. total bat passes per hour, per night) was used to determine typical bat activity at the Proposed Wind Farm. Activity was often variable between survey nights. Therefore, the Median Nightly Pass Rate was used as the most appropriate measure of bat activity (Lintott & Mathews, 2018). Zero data, when a species was not detected on a night, was also included.

6.6.4.2 Otter

Potential otter trails (depressed grass) were recorded along several areas adjacent to the Tullaroan stream. Spraints and slides were recorded within the Proposed Wind Farm along the southern section of the Tullaroan stream (Plate 6-28). Habitat suitability for otter within the Proposed Wind Farm and Proposed Grid Connection underground cabling route was typically good, given the presence of multiple watercourses, suitable food source and suitable supporting habitat such as riparian trees and riverbanks. Tree species *Salix spp.* and black poplar (*Populus nigra*) were recorded by the riverbanks in the Proposed Wind Farm.

A potential otter holt was recorded by the banks of the Tullaroan river within the Proposed Wind Farm on the 26th February 2024. A camera trap was deployed on the 12th March 2024 for 3 weeks to investigate if this area was being utilised by otters (Plate 6-29). The camera trap was collected on the 2nd April 2024. No evidence of otters using this location was recorded during the 3-week period.

A camera trap was placed on a second potential otter holt which was recorded in the south of the Proposed Wind Farm on the banks of the Tullaroan stream on the 12th March 2024 (Plate 6-30). No footage of the otter was recorded utilizing the holt. One audio recording of a potential otter was recorded over a three week period. Taking a precautionary approach, the audio recording would suggest that otter are likely to be active within the area and may use this holt on occasion. However, the closest infrastructure associated with the Proposed Wind Farm is located over 300m from the potential holt and is buffered by woodland habitat. The location of this is shown in confidential Appendix 6-5.

A potential otter couch was recorded on the banks of the River Nore approximately 240m south the proposed drilling pit location of Watercourse Crossing no. 13 on the Proposed Grid Connection underground cabling route. An otter spraint and prints were recorded by the River Nore approximately 185m north of the drilling pit location. No potential otter holts or evidence of otter were recorded directly adjacent to the proposed works areas.

No other signs of otter, including resting or breeding sites were recorded within the Site. However, the watercourses within and downstream of the Site were assessed as providing suitable commuting and foraging habitat for the species and are likely to be utilised by otter, at least on occasion. There is potential for otter to utilise all watercourses within and downstream of the Site for foraging and commuting. The Proposed Project will not result in a loss of any habitat for otter.

Plate 6-27. View of otter spraint recorded by the banks of the Tullaroan Stream within the Proposed Wind Farm.

Plate 6-28. View of camera trap at potential otter couch and holt adjacent the Tullaroan Stream within the Proposed Wind Farm.

Plate 6-29. View of potential active otter holt used on occasion recorded along the Tullaroan stream in the south of the Proposed Wind Farm.

6.6.4.3 Badger

Signs of badger were recorded throughout the wooded area in the west of the Proposed Wind Farm including latrines, snuffle holes and paths (Plate 6-29 – Plate 6-30). A potential badger sett was recorded in the south-west of the Proposed Wind Farm adjacent (within 50m) the existing farm track to be upgraded. The sett is located over 50m from the proposed new road. The sett showed little signs of recent activity. A camera trap was placed at an entrance for a period of two weeks. One badger was recorded exiting the potential sett over the 2-week period (Plate 6-31). It is unlikely this sett is actively used but may be used on occasion by individual local badgers. The location of this sett is available in the confidential Appendix 6-5. Additionally, badger prints were recorded in agricultural grasslands in the east of the Proposed Wind Farm (Plate 6-32). No signs of badger activity was recorded along the Proposed Grid Connection underground cabling route, however, it is likely that badgers use the adjoining agricultural grasslands for foraging at least on occasion.

Snuffle holes were recorded adjacent the River Nore approx. 100m north of the Proposed Grid Connection underground cabling route. No other signs of badger were recorded along the Proposed Grid Connection underground cabling route.

Plate 6-30. View of snuffle hole recorded in the woodland habitats located in the west of the Proposed Wind Farm. The snuffle hole was recorded outside the footprint of the proposed infrastructure.

Plate 6-31.View of latrine recorded in the west of the Proposed Wind Farm.

Plate 6-32. View of badger captured exiting a single burrow located in the south of the Proposed Wind Farm at a field boundary.

Plate -6-33. View of badger print in the east of the Proposed Wind Farm.

6.6.5 Amphibians & Reptiles

No amphibians or reptiles were identified during the surveys conducted. However, given that several watercourses and drainage ditches exist within the Site, it is likely the Site supports amphibians and reptile species at some local level. Therefore, given these habitats are widespread in the common surrounding areas, the Proposed Project will not result in a significant loss to habitat for amphibians or reptiles.

6.6.6 Other Fauna

Mammal scat likely to relate to fox, pine marten and mink were recorded on multiple occasions throughout the Proposed Wind Farm. A large fox den was recorded approx. 140m from the Proposed Grid Connection underground cabling route, adjacent Ballyragget 110kV substation. A potential small mammal burrow was recorded in the north of the Proposed Wind Farm, located approximately 60m from a proposed new site access road (Plate 6-36). Droppings likely to be pine marten (*Martes martes*) were recorded by the watercourse in the centre of the Proposed Wind Farm. A single fox was seen in the centre of the Proposed Wind Farm during the surveys carried out. Camera trap footage deployed within the Proposed Wind Farm captured images of fox, pine marten and mink (*Mustela vison*). Small burrows recorded in the woodland areas in the north and west of the Proposed Wind Farm are likely to be used by smaller mustelids (Plate 6-33 -Plate 6-35). No signs of red squirrel were identified during the surveys conducted. The woodland habitat within the Proposed Wind farm provides suitable habitat for pine marten and red squirrel and as such, red squirrel and pine marten boxes will be utilised to create suitable habitat for these protected species. This is fully described in the BMEP available in appendix 6-4.

A high density of flowering thistles (*Cirsium vulgare)* were recorded with >50 Small Tortoiseshell (*Aglais urticae*) butterflies foraging and utilising the spear thistle in the east of the Proposed Wind Farm, north of T3. Given this plant is widespread and common in the surrounding area, and this area is

located outside the footprint of the proposed infrastructure the Proposed Project will not result in a significant loss to suitable supporting habitat for invertebrates such as butterflies (Plate 6-37).

Irish hare (*Lepus timidus ssp. hibernicus*) and rabbit (*Oryctolagus cuniculus*) were observed on occasion within the Proposed Wind Farm. Rabbit burrows were recorded in the north of the Proposed Wind Farm (Plate 6-38 & Plate 6-39) and in the boundary hedgerows delineating agricultural fields along the Proposed Grid Connection underground cabling route, north of the River Nore. A fox den was recorded approximately 135m from the proposed Grid Connection underground cabling route.

No significant area of suitable habitat for other taxa, species listed in Annex II or IV of the EU Habitats Directive, or other species of conservation concern was identified within the boundaries of the Site.

Plate 6-34. View of small burrow recorded within the conifer forestry adjacent the Tullaroan stream in the west of the Proposed Wind Farm.

Plate 6-35. View of potential mustelid burrow recorded within the semi-natural woodland in the north of the Proposed Wind Farm.

Plate 6-36. View of mammal scat recorded within the woodland habitat in the west of the Proposed Wind Farm.

Plate 6-37.View of potential small mammal burrow recorded approximately 60m from the proposed new access road in the north of the Proposed Wind Farm.

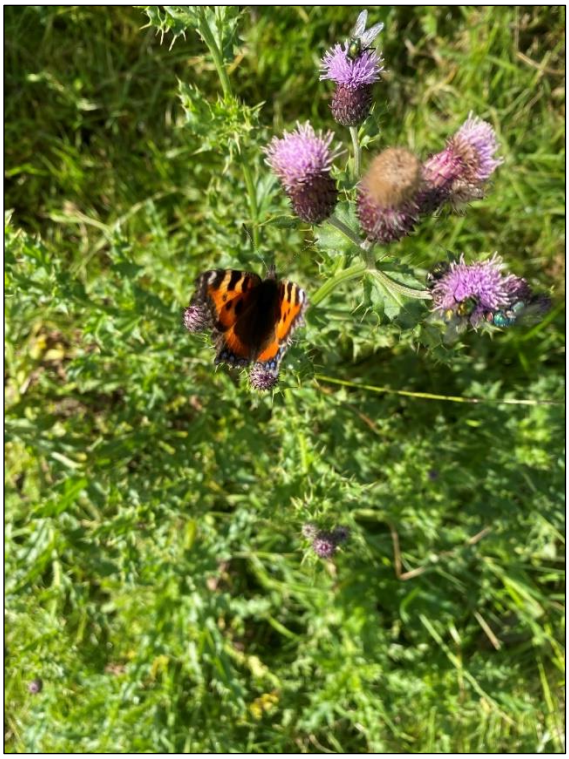

Plate 6-38. View of Small tortoise (Aglais urticae) butterfly feeding on flowering marsh thistle. Diptera spp. can also be seen utilising the flowing heads of the thistle plant.

Plate 6-39. View of rabbit droppings recorded in the northern parcel of the Proposed Wind Farm.

Plate 6-40. View of rabbit burrow recorded in the north of Proposed Wind Farm.

6.6.6.1 Fisheries and Aquatic Fauna

In order to collate baseline fisheries information, MKO conducted catchment-wide surveys of aquatic habitats in relation to fisheries potential, freshwater pearl mussel (eDNA only), macro-invertebrates (biological water quality), macrophytes and aquatic bryophytes, aquatic invasive species, and fish of conservation value. A detailed Aquatic Baseline Report has been prepared for the project and is provided in Appendix 6-3 of the EIAR.

The conclusions of the Aquatic Baseline Assessment conditions are shown below.

Proposed Wind Farm:

'Both eroding/ upland rivers (FW1) and depositing/ lowland rivers (FW2) were present within and in the vicinity of the Proposed Wind Farm site. Watercourses were historically and recently modified, and displayed issues with excess siltation. Q-values recorded within and in the vicinity of the Proposed Wind Farm site were predominantly Q3 Poor with one sample location assigned Q3-4 Moderate. At present, watercourses within the Proposed Wind Farm site are not satisfying the objectives of the Water Framework Directive (WFD) which is to achieve at least Q4 Good Status by 2027. Salmonid, lamprey and European eel habitat was predominantly poor and moderate across the study area for the Proposed Wind Farm site with one location displaying good habitat for salmonid spawning, nursery and holding as well as good spawning habitat for lamprey. Atlantic salmon was found within surveys on the Tullaroan stream which flows through the Proposed Wind Farm site while brown trout was found at all survey locations, lamprey were not found, and European eel was present in one survey location. There was no positive eDNA results for freshwater pearl mussel or white-clawed crayfish at any survey location. There were however strong positive results for crayfish plague. No otter holts were recorded during surveys however otter spraint and prints were recorded showing use of the area by otter. A kingfisher was observed flying upstream on the Tullaroan Stream watercourse however no kingfisher burrows were noted within the vicinity of any survey point.'

Proposed Grid Connection:

'Both eroding/ upland rivers (FW1) and depositing/ lowland rivers (FW2) were present along the Proposed Grid Connection underground cabling route. Watercourses were historically modified and commonly displayed issues with excess siltation. Q-values recorded within and in the vicinity of the Proposed Grid Connection underground cabling route ranged from Q3 Poor to Q4 Good. Seven of the watercourses sampled received Q3-4 Moderate and Q3 Poor and at present, these watercourses along the proposed grid route are not satisfying the objectives of the Water Framework Directive (WFD) which is to achieve at least Q4 Good Status by 2027. Six of the watercourses along the Proposed Grid Connection underground cabling route achieved a Q4 Good status and are therefore currently meeting the objectives of the Water Framework Directive (WFD) to achieve at least Q4 Good Status by 2027 at the latest. Salmonid, lamprey and European eel habitat ranged from poor to moderate to good along the Proposed Grid Connection underground cabling route. A number of locations (e.g. GC-1, GC-9, GC-12) displaying moderate to good habitat for salmonid spawning, nursery and holding as well as moderate to good spawning and nursery habitat for lamprey and locations GC-12 and GC-13 provided good habitat for European eel. A dead salmonid parr was found at sample location GC-2, salmonid alevins were recorded at sample site GC-8 and a brook lamprey was recorded at sample location GC-1. No otter holts were recorded during surveys however otter prints and old spraint were recorded approximately 170m upstream of sample location GC-13 showing use of the wider area by otter. A kingfisher was observed flying upstream on the River Nore however no kingfisher burrows were noted within the vicinity of any survey point.'

6.6.7 Importance of Ecological Receptors

Table 6-10 lists all identified receptors and assigns them an ecological importance in accordance with the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009a). This table also provides the rationale for this determination and identifies the habitats that are KERs. These ecological receptors are considered in Section 6.7 of this report and mitigation/measures will be incorporated into the Proposed Project where required, to avoid potential significant impacts on the features.

Table 6-10 Key Ecological Receptors identified during the assessment

Ecological feature or species	Rationale	KER
Designated Sites		
European Designated Sites	The Site is hydrologically linked to downstream European sites: • River Barrow and River Nore SAC [002162] • River Nore SPA [004233] Potential for Likely Significant Effects (LSEs) on these European sites was identified within the AA screening for the Proposed Project. Potential impacts on these European sites are assessed fully in the NIS for the Proposed Project. In the context of this Biodiversity Chapter these sites have been assigned International Importance and included as a KER as there is potential for indirect effects on these European sites via water pollution.	Yes
Nationally Designated Sites	The Proposed Wind Farm and Proposed Grid Connection underground cabling route is hydrologically linked to downstream Nationally designated sites, namely the: • Inchbeg pNHA [000836] • River Nore/Abbeyleix Woods Complex pNHA [002076] In the context of this Biodiversity Chapter these sites have been assigned National Importance and included as a KER as there is potential for indirect effects on these National sites via water pollution.	Yes
Terrestrial habitats		

Local Importance (lower value) ○ Improved agricultural grassland (GA1) ○ Dry meadows and grassy verges (GS2) ○ Soil and bare ground (ED2) ○ Recolonising bare ground (ED3) ○ Wet grassland (GS4)	The extent of the habitats listed below will be lost to facilitate the Proposed Project Conifer plantation (WD4) 3.57ha Improved Agricultural Grassland (GA1) 14.15 ha Wet grassland (GS4) 0.064 ha The loss of these habitats to facilitate the construction of the Proposed Project has been considered. These are highly modified habitats, common throughout the wider landscape and of relatively low biodiversity value. As such, these habitats have been classified as Local Importance (Lower Value and their loss is not considered significant at any geographical scale. For these reasons, these habitats have not been identified as a KERs.	No
Local Importance (higher value) • Buildings and artificial surfaces (BL3)	This habitat has been assigned Local Importance (Higher Value) given bats were recorded roosting within some existing buildings within the Proposed Wind Farm. All existing buildings will be fully retained, and therefore, these buildings are not included as KERs.	No
Local Importance (higher value) ○ Semi-natural woodland-Wet willow-alder-ash woodland (WN6) ○ Broadleaved woodland (WD1)	These habitats are classified as habitats of Local Importance (higher value) as they provide suitable supporting habitat for a wide variety of faunal species. Given these habitats are located entirely outside the footprint of the proposed works and there will be no loss of these habitats as result of the Proposed Project, no impacts on these habitats are anticipated at any scale during the construction, operational or decommissioning phase of the Proposed Project. Therefore, these habitats are not included as KERs.	No

Local Importance (higher value) ○ Scrub (WS1) ○ Hedgerow (WL1) ○ Treeline (WL2) ○ Mixed broadleaved/conifer woodland (WD2)	Gorse scrub, hedgerow, treeline and woodland habitats identified within the Site have been classified as a habitat of *Local Importance (higher value)* as it provides nesting/ roosting habitat, cover, commuting corridors, foraging habitat and serve in maintaining connectivity to the wider landscape for a variety of local and protected fauna. There will be some loss of these habitats to facilitate the construction and as such they are included as KERs.	Yes
Aquatic habitats and related species		
Eroding/upland rivers (FW1)	Eroding/upland rivers (FW1) 6 no. EPA mapped watercourses occur within the Proposed Wind Farm. One unmapped watercourse was identified by T3 and one unmapped watercourse was identified by the proposed substation location. These Rivers and Streams have been assigned Local importance (Higher Value) as they connect to downstream waterbodies, including the Munster River which forms part of the River Barrow and River Nore SAC River, which is of international importance.	Yes
Drainage ditches (FW4)	Drainage ditches (FW4) Drainage ditches are found throughout the Proposed Wind Farm along field boundaries and particularly throughout felled conifer woodland. They are highly modified and species poor where they occur but do provide some connectivity with natural watercourses within the Proposed Wind Farm. As such they are assessed as being local importance (lower value) but are considered further as a KER due to potential for conductivity with higher value watercourses.	Yes
Depositing lowland rivers (FW2)	Meandering sections of the Tullaroan River within the Proposed Wind Farm and the River Nore along the Proposed Grid Connection underground cabling route would categorise as Depositing Lowland River (FW2). The River Nore is designated as part of the River Barrow and River Nore SAC and River Nore SPA which is of international importance.	Yes
Fauna		
Otter	Multiple EPA mapped watercourses were recorded within the Site. Evidence of otter such as couches, spraints and a potential otter holt was recorded within the Proposed Wind Farm adjacent to the Tullaroan Stream. The site provides suitable supporting habitat for local otter. Otter are protected under the Wildlife Act 1976 (as amended). No evidence of otter was recorded within the footprint of the Proposed Wind Farm infrastructure.	Yes

	At the northern end of the Proposed Grid Connection underground cabling route, evidence of otter was recorded by the River Nore in the form of print, slides, spraint and a potential couch. The River Nore is likely to provide suitable supporting habitat for otter. Although no evidence of otter was recorded along the remaining watercourse crossings along the Proposed Grid Connection underground cabling route, the watercourses identified along the underground cabling route are likely to provide suitable supporting habitats for otter. Two new roads are proposed to cross the Tullaroan Stream and an unmapped watercourse within the Proposed Wind Farm. Therefore, the Proposed Project has the potential to result in indirect effects on the receptor (as a result of deterioration in habitat or disturbance during construction/ decommissioning) and otter is therefore included as a KER and requires further assessment.	
Badger	The habitats within the Proposed Wind Farm have the potential to provide suitable supporting habitat for local badgers. Signs of badger such as snuffle holes and latrines were recorded in the woodland habitats in the south of the Proposed Wind Farm. A badger sett was recorded within the Proposed Wind Farm, see confidential Appendix 6-5. Therefore, badgers utilise the Proposed Wind Farm to some degree. Badgers are protected under the Wildlife Act 1976 (as amended) and are therefore considered as KERs.	Yes
Pine Marten	No signs or significant suitable supporting habitat for pine marten was identified along the Proposed Grid Connection underground cabling route. The Proposed Wind Farm provides suitable foraging and breeding habitat for pine marten. Potential Pine Marten scat was also recorded within the study area and Pine marten as an ecological receptor has been assigned Local Importance (Higher value) on the basis that a locally occurring population of Local Importance is likely utilising the Proposed Wind Farm. Given that the species is known to inhabit the area, potential for direct and indirect impacts on pine marten are therefore considered further in this assessment and the species has been included as a KER for further assessment.	Yes
Red squirrel	No signs or significant suitable supporting habitat for pine marten was identified along the Proposed Grid Connection underground cabling route. The Proposed Wind Farm provides suitable foraging and breeding habitat for red squirrel. Woodland habitat adjoining the Proposed Grid Connection route may also provide suitable habitat. Red squirrel as an ecological receptor has been assigned Local Importance (Higher value) on the basis that a locally occurring population is likely utilising the Proposed Wind Farm. Given that the species is known to inhabit the area, potential for direct and indirect impacts on red squirrel are therefore considered further in this assessment and the species has been included as a KER for further assessment.	Yes
Bats	Two bat roosts were recorded within the existing farm buildings located in the centre of the Proposed Wind Farm. The linear vegetative habitats within and surrounding the Proposed Wind Farm are likely to be utilised by a bat population of *Local Importance (higher value)*. As such, the site has the potential to	Yes

	provide suitable supporting habitat for roosting, foraging and commuting bats. All bat species in Ireland are protected under both national legislation – (Wildlife Act, 1976 -2021 as amended) and European legislation – (Habitats Directive (92/43/EEC). Bats are likely to forage and commute within the vicinity of the Proposed Project. The Proposed Project has the potential to result in direct and indirect effects on the receptor. Therefore, bats are included as a KER for further assessment.	
Reptiles and Amphibians	It is considered that the Proposed Project will not result in a significant loss of suitable habitat (watercourses and drainage ditches) for reptiles and amphibians. No evidence of populations of reptiles and amphibians being significant at more than a local level was recorded. No likely significant effects on these species are anticipated and therefore further survey/ assessment was not deemed necessary. Based on the low number of reptile and amphibian records for the Site reptiles and amphibians have not been included as KERs.	No
Invasive species	No Third Schedule invasive plant species were recorded within the Proposed Wind Farm or along the Proposed Grid Connection underground cabling route. Japanese knotweed (*Fallopia japonica*) was recorded along the proposed turbine delivery route (TDR). Minor works and vegetative pruning will be required to facilitate the turbine delivery. However, no significant works are proposed along the TDR. Therefore, third schedule invasive species are included as a KER for further assessment.	No
Additional protected fauna (e.g. Irish hare etc.).	The recorded evidence suggests that the Site is not utilised by populations of higher than local significance and no potential for significant effects have been identified at the population level. Due to the small footprint and nature of the Proposed Project, they are unlikely to be significantly affected by the Proposed Project. For this reason, other faunal species are not considered further in this EIAR. Significant effects are not anticipated.	No
Aquatic and Fisheries Species		
Aquatic and Fisheries Species	Watercourses downstream of the Proposed Wind Farm and along the Proposed Grid Connection underground cabling route are known to support a number of aquatic species (see Section 6.4.3.4 and Appendix 6-3 Aquatic Baseline Report for further detail). No fish were recorded within the watercourses within the Proposed Wind Farm (e.g. survey locations A1, A2 and A5). However, watercourses within the site are hydrologically linked to downstream watercourses (and aquatic fauna within them) which have been assigned as of International Importance due to their designation as an SAC or as QI's of the SAC (e.g. otter, Freshwater Pearl Mussel, white-clawed crayfish, lamprey spp.). Known populations of salmon and eel downstream would also be considered of Local Importance (Higher Value). There is potential for indirect effect on these features as a result of impacts on water quality. Fish and other aquatic species are therefore included as a KER for further assessment.	Yes

6.7 Ecological Impact Assessment

6.7.1 Do-Nothing Effect

If the Proposed Project were not to proceed, the lands within the Site would continue to be managed as commercial forestry and as heavily managed improved agricultural grassland with associated grazing. Timber in the woodland habitats would likely be harvested as it matures, followed by the subsequent afforestation. The other habitats identified within the Site including hedgerow, watercourses and associated habitats, would likely remain in a similar condition. 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.

If the Proposed Project were not to proceed, the opportunity to capture part of Kilkenny's valuable renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions.

If the Proposed Project were not to proceed, the opportunity to provide an area of hedgerow enhancement and creation, riparian planting along a section of the Tullaroan Stream and implementation of pine marten and red squirrel nest boxes would be lost (please see Appendix 6-4, Biodiversity Management and Enhancement Plan, for details).

6.7.2 Likely Significant Effects During Construction Phase

6.7.2.1 Effects on Habitats During Construction Phase

The effects on habitats that are identified as KERs are described in the below tables.

6.7.2.1.1 *Assessment of Potential Effects on Groundwater, Surface Watercourses and Sensitive Aquatic Faunal Species during the Construction Phase*

Table 6-11 Construction phase impact assessment for rivers, streams and sensitive aquatic species

Description of Effect	The effects on water quality are fully described in Chapter 9 'Hydrology and Hydrogeology' of this EIAR and are described here in relation specifically to ecology. This section assesses the potential for likely significant effects on groundwater/surface watercourses and associated aquatic faunal species, including, lamprey, white-clawed crayfish, European eel, salmonids, coarse fish, and other aquatic species identified during the desk study and dedicated aquatic surveys and likely to occur within or downstream of the Site. Surface Watercourses (and associated aquatic species) *Direct impacts (mortality)* Within the Proposed Wind Farm site, there are a total of 6 no. watercourse crossing locations over natural watercourses (rivers and streams), 2 of which involved upgrades to existing structures. Drains/ditches with connectivity to the watercourses were recorded within the Proposed Wind Farm. The Proposed Wind Farm will require Clear Span or Box Culvert crossings at two smaller natural watercourse crossings. Construction methodologies associated with clear span watercourse crossings and culvert crossings are described in Section 4.8.1.3 and 4.8.1.4. The construction methodology for these crossings have been designed to

eliminate the requirement for in-stream works at these locations. However, the proposed internal road network and Proposed Grid Connection underground cabling route cross a number of watercourses. In some locations, site access tracks will utilise existing bridges with no instream works proposed.

A general description of the various construction methods employed at watercourse crossings along the Proposed Grid Connection underground cabling route are described in Table 4-6 in Chapter 4 of the EIAR. The construction methodologies include HDD, flatbed formation over bridges/culverts, flat bed formation under culverts and standard trefoil formation. These methodologies are fully described in section 4.8.2.8. No instream works are proposed. Therefore, there is no potential for direct impacts on any aquatic receptors associated with the Proposed Grid Connection.

Indirect impacts (water quality)

A surface water pathway exists between the Proposed Wind Farm and downgradient watercourses. Within the Proposed Wind Farm, there are multiple watercourses and drainage ditches across the site which flow into these downgradient watercourses. Apart from the proposed substation, a hydrological buffer zone of 50m will be maintained from watercourses as a preventative measure associated with surface water drainage and pollution control. There is a risk that pollutants and sediment laden surface water run-off could discharge to surrounding ditches and watercourses impacting on sensitive watercourses and aquatic species downstream. Mitigations are detailed in Section 9.5.2.2 & 9.5.2.3 of the Hydrology Chapter.

Potential sources of pollution to surface waters within the Proposed Wind Farm and along the Proposed Grid Connection underground cabling route:

- Slit laden surface water run-off;
- Release of chemicals, including hydrocarbons, from onsite machinery, concrete and other cement-based products.
- Drainage and seepage water resulting from infrastructure excavations;
- Stockpiled excavated material providing a point source of exposed sediment;
- Construction of the cabling trench, resulting in entrainment of sediment from the excavations during construction; and,
- Erosion of sediment from emplaced site drainage channels.

The main elements of interaction with existing drains will be as follows:

- Apart from interceptor drains, which will convey clean runoff water to the downstream drainage system, there will be no direct discharge (without treatment for sediment reduction, and attenuation for flow management) of runoff from the Proposed Wind Farm drainage into the existing site drainage network. This will reduce the potential for any increased risk of downstream flooding or sediment transport/erosion;
- Silt traps will be placed in the existing drains upstream of any streams where construction works / tree felling is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area;
- Runoff from individual turbine hardstanding areas will be not discharged into the existing drain network but discharged locally at each turbine location through settlement ponds and buffered outfalls onto vegetated surfaces;
- Buffered outfalls which will be numerous over the Site will promote percolation of drainage waters across vegetation and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the Proposed Wind Farm; and,
- Drains running parallel to the existing roads requiring widening will be upgraded, widening will be targeted to the opposite side of the road. Velocity and silt control measures such as check dams, sand bags, oyster bags, flow limiters, weirs, baffles, silt fences will be used during the upgrade construction works. Regular buffered outfalls will also be added to these drains to protect downstream surface waters.

	Groundwater There are no karst features in the area of the Proposed Wind Farm or along the TDR. However, a section of the Proposed Grid Connection underground cabling route is underlain by a Regionally Important Karst Aquifer. A small number of karst features were mapped over 400m from the Proposed Grid Connection underground cabling route which are outside the ZoI of the Proposed Project. No groundwater level impacts are predicted from the construction of the Proposed Grid Connection underground cabling route, access roads, substation compound, or met mast due to the shallow nature of the excavations proposed (i.e. 0 -~1.2m). Significant impacts on groundwater are not predicted to occur given the low permeability nature of the underlying bedrock aquifers within the Proposed Wind Farm and the low potential for groundwater dispersion and movement within the underlying aquifer.
Assessment of Significance prior to mitigation	In the absence of mitigation and following the precautionary principle, there is potential for works associated with the Proposed Wind Farm and Proposed Grid Connection to result in a significant indirect effect on the identified aquatic habitats and species at a local geographic scale in the form of pollution during the construction phase. This effect will be temporary in duration. This would also result in impacts on aquatic receptors ranging from Local Importance (Higher Value) to a receptor of International Importance (i.e. the River Barrow and River Nore SAC and associated QI species).
Mitigation	Detailed mitigation measures in relation to the protection of surface water during construction is detailed in Chapter 9 (Hydrology and Hydrogeology). In summary the key mitigation measure during the construction phase is the avoidance of sensitive hydrological features, by application of suitable buffer zones. A self-imposed buffer zone of 50m has been put in place for on-site streams and rivers. In addition, a 10m buffer was applied to the main manmade agricultural and forestry drains within the Proposed Wind Farm. All of the key infrastructure areas are located significantly far away from the delineated 50m watercourse buffer zones with the exception of the upgrading of the existing watercourse crossing, new watercourse crossing, upgrades to existing site access tracks, and the proposed substation. Detailed control measures in relation to the protection of surface waters during construction are detailed in Section 9.5.2.2 of Chapter 9. Mitigation measures in relation to the 4 no. new proposed watercourse crossings within the Proposed Wind Farm are detailed in Section 9.5.2.9 of Chapter 9. A drainage maintenance plan for the Proposed Project is provided in the Construction Environmental Management Plan (CEMP) (Chapter 4 & Appendix 4-3 of this EIAR). This plan provides details of how water quality will be protected during the construction of the Proposed Wind Farm, as outlined in Section 9.5.2.2 the maintenance plan for the on-site construction drainage system will be prepared in advance of commencement of any works with regular inspections of all installed drainage systems undertaken throughout the Proposed Project development (see further detail on monitoring in Section 9.5.2.2 Chapter 9.). Although no significant impacts to groundwater are predicted as part of the development of the Proposed Project, measures to protect groundwater during construction are detailed in Section 9.5.2.5 in Chapter 9. In relation to new watercourse crossings, Inland Fisheries Ireland (IFI) will be consulted a minimum of four weeks in advance of watercourse crossing works. The Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters; and the Scottish Natural Heritage (SNH) Good Practice During Wind Farm Construction (SNH, 2019, 4th Edition) will also be adhered to. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI).

Residual Effect following Mitigation	Following the implementation of mitigation, there will be no significant residual effect on aquatic habitats or species as a result of the Proposed Project. The proposed riparian planting which is described in section 6.7.6 will likely improve water quality due to increased buffering which can result in reducing nutrients and sediment release into the Tullaroan Stream.
Potential for Cumulative Effect	The Proposed Project will not result in any significant effects to water quality. It therefore cannot contribute to any significant cumulative effect in this regard.

6.7.2.1.2 *Assessment of Potential Effects on Hedgerow, Treeline and Woodland habitats during the Construction Phase*

Table 6-12 Construction phase impact assessment for Hedgerow, Treeline and Scrub habitats

Description of Effect	Treeline, and hedgerow habitats form field boundaries and margins throughout the Site. The Proposed Wind Farm will result in the loss of approximately 1,388m of linear habitat will be removed. A small amount of treeline will be lost and the majority of 1,388m to be removed consists of hedgerow habitat. The loss is anticipated to facilitate the construction of the Proposed Project footprint throughout the Site, including bat buffers. Approximately 29ha of woodland habitat was recorded in the south-west of the site and 4.3ha will be removed. Approximately 3.57ha of conifer forestry (WD4) and approximately 0.73ha of mixed broadleaved/conifer woodland (WD2) habitat will be felled as part of the Proposed Wind Farm. The hedgerow habitat present within the Site is mostly unmanaged, dense dominated by bramble with individual native shrub tree species such as hawthorn, blackthorn, elder and mature ash also present. The hedgerow habitat has the potential to provide suitable supporting habitat like foraging, commuting and nesting habitat for biodiversity at a local level.
Assessment of Significance prior to mitigation	The loss of approx. 1,388m of linear habitats (hedgerow) is considered significant at the local geographic scale only. This loss of hedgerow would be classified as a permanent significant effect on a receptor of local importance (higher value). The loss of mixed broadleaved/conifer woodland is considered a permanent moderate impact on a habitat of local importance (higher value). However, removal of the hedgerows at this scale would not cause any significant fragmentation of habitat connectivity within the landscape. The loss of conifer woodland is not considered significant at any geographical scale. The permanent loss of the remaining habitats is not considered to be a significant effect at any greater than the local geographical scale, as these habitats, although not widespread within the Site, are widespread and common within the local farmlands surrounding the Site.
Mitigation	In order to mitigate against the loss of hedgerow, treeline and mixed broad-leaved woodland habitats, approximately 3,640m of heavily managed hedgerow will be enhanced through additional planting with native species. It is proposed to plant some native tree species within the hedgerow habitat to further increase the biodiversity value within the Site. New native hedgerow habitat will be created in the south and north of the Site, approx. 270m. The enhancement of existing hedgerows and hedgerow creation will improve the ecological value and provide benefits for local biodiversity. The proposed planting coppice will consist entirely of native hedgerow species such as Hazel (*Corylus avellana*), Blackthorn (*Prunus spinosa*), Guelder rose (*Viburnum opulus*), Holly (*Ilex aquifolium*), Elder (*Sambucus nigra*), Spindle (*Euonymus*

	europaeus), Wild cherry (*Prunus avium*), Downey birch (*Betula pubescens*), Oak (*Quercus robur*) and Goat Willow (*Salix caprea*). It is proposed to incorporate a native vegetated riparian buffer zone adjacent the Tullaroan stream within the Site. A total of approximately ~1.7ha of riparian planting is proposed to be planted on both banks of the Tullaroan stream. Planting will consist of alder (*Alnus glutinosa*), black poplar (*Populus nigra*), downey birch (*Betula pubescens*), willow spp. (*Salix spp.*), aspen (*Populus tremuus*) and hazel (*Corylus avellana*). The additional planting once established will enhance the watercourse by providing suitable supporting habitat for faunal aquatic species as well as reducing the risk of fluvial erosion. Overall, the proposed planting of new hedgerow, enhancement of existing hedgerow and riparian planting will result in a net gain of the linear landscape features within the Proposed Wind Farm. Planting will be of species indigenous to the local area. Further details are provided in BMEP attached as Appendix 6-4.
Residual Effect following Mitigation	Following implementation of mitigation, no potential for significant effect exists at any geographic scale. The planting of additional linear habitats as outlined above will result in a net gain of linear habitats within the Site. The proposed enhancements will result in an increase in available riparian habitat and improve the condition of existing linear habitats onsite.

6.7.2.2 Effects on Protected Fauna During Construction Phase

The Proposed Project has the potential to result in habitat loss and disturbance impacts on faunal species included as KERs, see Table 6-11. Therefore, these species were taken forward for further assessment. The following species have been brought forward for further assessment, as identified in Table 6-10:

- Badger
- Otter
- Pine marten
- Red squirrel
- Bats

The potential for significant effects on aquatic species is restricted to indirect effects on their habitat resulting from water pollution. This has been assessed in Section 6.7.2.1.1 above and is not repeated below.

6.7.2.2.1 *Assessment of Potential Effects on Badger during the Construction Phase*

Table 6-13. Construction phase impact assessment for badger

Description of Effect	A potential badger sett was recorded within the Proposed Wind Farm as shown in confidential appendix 6-5. The sett showed little signs of recent activity. A camera trap was placed at an entrance for a period of two weeks. One badger was recorded exiting the sett over the 2-week period. It is unlikely this sett is actively used but may be used on occasion by individual local badgers. Works in the form of the upgrade of an existing road are proposed within 50m of this identified sett. Taking a precautionary approach a potential for significant effect to badger was identified due to direct mortality as a result of the Proposed Project. A potential badger sett was recorded approximately 180m from the Proposed Grid Connection underground cabling route, west of the Ballyragget substation. Given the

	distance between the potential badger sett and the Proposed Grid Connection undergrouns cabling route, there is no potential for significant effect on badgers in this location. Additional evidence of badger within the Proposed Wind Farm such as snuffle holes and a latrine was recorded in the woodland habitat in the south -west of the Proposed Wind Farm. Badger are clearly present within the Proposed Wind Farm and there is some potential for small scale loss of foraging habitat to facilitate the Proposed Project footprint and potential of disturbance and displacement during the construction, and decommissioning phases.
Assessment of Significance prior to mitigation	**Habitat Loss/Fragmentation** No significant overall loss or fragmentation of badger foraging habitat is anticipated at any geographic scale. **Direct Mortality/Disturbance** In the absence of mitigation, the Proposed Wind Farm construction works proposed in close proximity to the potential active sett, while may not cause direct destruction of the sett, has the potential to cause tunnel collapse as well as disturbance to badgers within the sett. Although, the active badger sett located in the south- of the Proposed Wind Farm is likely to be an outlier sett to some local badgers, there is potential this sett could become increasingly active in the future. The risk of tunnel collapse also carries a risk of mortality to badgers. The risk of tunnel collapse also carries a risk of loss of sett habitat for the local population of badgers. This would be considered significant at the local geographic scale in the absence of mitigation.
Mitigation	The following measures will be undertaken for the avoidance of disturbance/displacement and direct mortality and will be implemented during the construction phase of the Proposed Project. • A pre-construction badger survey will be undertaken at the location of the identified sett by a qualified ecologist prior to the commencement of any works to determine if the sett is in use and to identify any additional sett entrances that may have been excavated in the intervening period. In addition, a pre-construction badger survey will be carried out at all proposed infrastructure locations. • The identified sett will be monitored for a minimum least 2 weeks prior to construction using a camera trap to determine if it is in use. • If the sett is found to be in use exclusion measures will be put in place prior to construction in line with NRA (2005b) Guidelines to ensure that the sett is evacuated. • As per NRA guidelines exclusion from an active sett will only be carried out during the period of July to November inclusive in order to avoid the badger breeding season. • During the breeding season (December to June inclusive) no works will be undertaken within 50m of active setts nor blasting or pile driving within 150m of active setts. Exclusion zone fencing and appropriate signage will be put in place around the main sett to the south of the Proposed Wind Farm which lies outside the construction footprint. This will ensure that there will be no vehicles tracking in the area and no temporary storage of construction materials that could impact the sett.
Residual Effect following Mitigation	Following the implementation of the mitigation as described above, there is no potential for any significant residual effect on badger at any geographic scale.

Cumulative Impacts	

6.7.2.2.2 Assessment of Potential Effects on Otter during the Construction Phase

Table 6-14 Construction phase impact assessment for otter

Description of Effect	As described above in relation to aquatic habitats and species, the Proposed Project has been appropriately designed such that all major infrastructure, i.e. turbine bases and hardstands, avoid significant watercourses and drainage ditches habitats. No instream works are proposed. Potential trails, otter spraint and active and inactive holts were recorded within the Proposed Wind Farm. Camera trap footage within the Proposed Wind Farm indicates that otters potentially utilise a holt approximately 250m from proposed infrastructure associated with this Proposed Wind Farm. However, mature Woodland plantation will act as a buffering shelter belt from machinery activity in this area. A potential otter couch was recorded approximately 240m from the proposed receptor pit location on the Proposed Grid Connection underground cabling route. As such, it is considered likely that otter are traversing the River Nore to some degree. Apart from the potential couch recorded 240m away, no other evidence of otter were recorded along the Proposed Grid Connection underground cabling route however it is likely otter traverse these watercourses given their nature. Given the lack of instream works proposed and the abundance of suitable supporting habitat for otter both upstream and downstream of the Site, there is no potential for direct effects on otter. The construction of newwatercourse crossings has the potential for indirect effects in the form of disturbance to otter and deterioration to water quality. The Proposed Project 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 6.7.2.1.1 above.
Assessment of Significance prior to mitigation	**Habitat Loss/Fragmentation, Disturbance, Mortality** Significant effects regarding habitat destruction, barrier effect, disturbance and mortality are not anticipated as a result of the Proposed Project. **Habitat Degradation (impacts on water quality)** Otter, as a KER, has been assigned a value of International Importance as this species is a qualifying interest of the nearby River Barrow and River Nore SAC. However, as any direct or indirect impacts would only affect the local population, they would be considered significant only at the local geographical scale. There is no potential for direct loss or fragmentation of significant otter habitat. A new clear span bridge is proposed to cross the Tullaroan stream in the west of the Proposed Wind Farm. Given that the Proposed Wind Farm is at present an active grazing and intensively farmed grassland and all major turbine proposed infrastructure is located over 50 metres from any significant watercourse, any potential disturbance to otter will be a short-term, slight negative effect associated with the installation of the proposed watercourse crossings. In the absence of mitigation, the indirect effect of water pollution on otter during construction has the potential to be a short-term impact. The magnitude of any such impact is likely to be moderate as apart from the substation, all major infrastructure such as turbine bases and construction compounds are located over 50 metres from any natural

	watercourse and the proposed new crossing of the Tullaroan stream will be a clear span structure. . In the absence of mitigation and following the precautionary principle, there is potential for the Proposed Project to result in significant indirect effects on otter at a local geographic scale in the form of habitat deterioration resulting from pollution.
Mitigation	This plan provides details of how water quality will be protected during the construction of the Proposed Project. In addition to this, specific mitigation is provided in relation to water quality in Chapter 9: 'Hydrology and Hydrogeology' of this EIAR. In addition, the Construction Environmental Management Plan (CEMP) that is provided as Appendix 4-3 of the EIAR provides the details of exactly how the measures will be implemented during construction. Whilst no camera footage of otter were recorded within 150m of the proposed works during the surveys undertaken, it is noted that this is a mobile species and could potentially migrate within the Site. As such, prior to the commencement of construction works associated with the installation of watercourse crossings, 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, 2008b): • 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. Should the surveys identify the presence of an otter holt, the following measures will be undertaken. A National Parks and Wildlife Service and a derogation licence will be applied for (although compliance with such a licence has not been relied on in this assessment). • No works will be undertaken within 150m of any holts at which breeding females or cubs are present. • 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 (TII, 2008b). All of the above works will be undertaken or supervised by an appropriately qualified ecologist. Further, the proposed riparian planting and associated roost systems once established, have the potential to additional potentially suitable habitat for otter holts, couches and burrows along the banks of the Tullaroan stream within the Proposed Wind Farm.
Residual Effect following Mitigation	Following the implementation of mitigation, there will be no significant residual effect on otter as a result of the Proposed Project. The riparian planting will have potential to create additional otter habitat within the Proposed Wind Farm.

6.7.2.2.3 Assessment of Potential Effects on Bats during the Construction Phase

Table 6-15 Construction phase impact assessment on bats

Description of Effect	<u>Loss or damage to commuting and foraging habitat</u> In absence of appropriate design, the loss or degradation of commuting/foraging habitat has potential to reduce feeding opportunities and/or displace bat populations. The Proposed Project is predominantly located within agricultural land with extensive linear features such as treelines and hedgerows, as well as conifer forestry. Loss of foraging and commuting habitat will result from the implementation of felling buffers, as detailed in Section 6.1.3 of the Bat Report (see Appendix 6-2), as well as road widening, and construction works. As part of the Proposed Project, tree felling and hedgerow removal will be required within and around the development footprint to allow for the construction of the turbine bases, access roads, underground cabling, and the other ancillary infrastructure. A small section of the Proposed Wind Farm is located on commercial forestry, namely Turbine no. 7 and its associated infrastructure. A total of 3.57 hectares of commercial forestry will be permanently felled within and around Turbine No. 7. To facilitate the new road to link T6 & T7, approximately 0.73ha of mixed broadleaved/conifer woodland will be removed as detailed in Section 6 of the Bat Report (see Appendix 6-2). The felling of linear landscape features is proposed to achieve the required buffer distance for the protection of bats, from the turbines to the canopy of the nearest habitat feature, as recommended by Natural England (2014) and NatureScot (2021). Further details on buffer calculations can be found in Section 6.1.3 of the Bat Report (see Appendix 6-2). In addition, approximately 1,388m of linear features, including treelines and hedgerows (excluding felled forestry) are proposed to be removed as a result of these buffers and road construction works. The Proposed Wind Farm site is ecologically connected to the wider landscape via linear habitats. The resulting loss of foraging habitat and linear commuting habitat represents a potential long-term impact on bats at the local level. <u>Loss of, or Damage to Roosts</u> Structures The Proposed Wind Farm is predominantly located within agricultural grassland surrounded by treelines and hedgerows, with smaller areas of conifer plantation. The trees contained within the commercial conifer forestry do not provide the optimal roosting habitat for bats. Four structures, and their associated outbuildings, were identified within the Proposed Wind Farm and were subjected to inspections and dusk activity surveys. Three roosts were identified within two of the farm complexes, each with fewer than 10 observations of emerging bats. These structures and the surrounding linear habitat features will be retained and avoided as part of the Proposed Project. Trees A small number of mature trees will be removed as part of the bat felling buffers and to facilitate new roads. No evidence of bat use was identified during daytime inspection of the trees. However, a potential for indirect effects on bats was identified in the form of loss of roosting habitat resources, as well as direct effects such as temporary disturbance and harm or death as a result of the proposed tree felling. No trees will be removed along the Proposed Grid Connection underground cabling route. Watercourse, Culvert and Drain Crossing Infrastructure Bridges and culvert crossings along the Proposed Grid Connection underground cabling route were assessed as having *Negligible to Moderate* value for roosting bats.

	The water crossing infrastructure along the underground electrical cabling route will not be altered, in any regard, by the Proposed Project as the options for crossing bridges do not require any works to be carried out on the bridge structure itself, i.e. the bridge culvert. No damage to roosting habitat is expected as a result of the proposed works. Some mature trees will be removed to facilitate watercourse crossings within the Proposed Wind Farm. No roosts were recorded in these locations. The proposed works have the potential to cause temporary disturbance to roosting bats. All trees assessed in terms of bat roosts suitability are included in Table 4-6 in Section 4.3.2.1.5 of the Bat Survey Report. <u>Displacement of Individuals or Populations</u> The Proposed Wind Farm is predominantly located within agricultural grasslands, surrounded by a network of linear features, as well as commercial forestry plantation. A number of treelines and hedgerow within the turbine felling buffers to be removed provide potential roosting and foraging/ commuting habitat. Factors such as increased noise and artificial lighting during construction have the potential to lead to displacement effects on bats where working hours coincide with periods of bat activity.
Assessment of Significance prior to mitigation	<u>Loss or damage to commuting and foraging habitat</u> Some loss of foraging and commuting habitat will result within Site to facilitate the construction of infrastructure within the Site and from the implementation of felling buffers, as detailed in 6.1.3 of the Bat Survey Report (see Appendix 6-2), as well as new road construction, and construction works. In the absence of mitigation this loss of commuting and foraging habitat represents a potentially significant effect on bat populations at the local level. <u>Loss of, or damage to, roosts</u> All structures will be avoided as part of the Proposed Project, and thus no significant loss or damage to the identified or potential roosts within buildings/structures is anticipated. Trees A small number of trees identified during the roost surveys as having potential to host roosting bats were located within the tree felling buffers detailed in Section 6.1.3. No evidence of bat use was identified during daytime inspection of the trees. However, a potential for indirect effects on bats was identified in the form of loss of roosting habitat resources, as well as direct effects such as temporary disturbance and harm or death as a result of the proposed tree felling. Loss of tree roosting habitat therefore represents a potentially significant effect on bat populations at the local level. Watercourse, Culvert and Drain Crossing Infrastructure No damage to roosting habitat is expected along the underground electrical cabling route as a result of the proposed works. Construction works have the potential to result in effects considered temporary in nature and are unlikely to represent a significant effect on local populations. <u>Displacement of individuals or populations</u> No significant displacement related effects to bats is anticipated at any geographic scale. Potential displacement as a result of an increase in noise and artificial lighting during the construction phase represents a potential short-term not significant effect on local bat populations. The bat survey report, which is included in Appendix 6-2 provides further detail and analysis with regard to the effects on bat species.

Mitigation	Loss or damage to commuting and foraging habitat Linear vegetation features within the turbine buffer will be removed. A replanting design has been curated to draw bats away from turbine buffers. To comply with NatureScot recommendations in relation to habitat buffering to avoid bat fatalities and including the removal of linear habitat to facilitate new roads, a total of 1,388m hedgerow/tree habitat will be lost. There is an extensive network of existing linear landscape features in the wider area that will be retained, and the loss of hedgerow/trees is not anticipated to have a significant effect on local bat populations. However, it is proposed to plant new linear features and bolster existing habitat features to offset any potential loss in linear habitat features and to provide additional new opportunities for commuting and foraging bats. Approximately 3640m of heavily managed hedgerow will be enhanced through additional planting with native species. It is proposed to plant some native tree species within the hedgerow habitat to further increase the biodiversity value within the Site. New native hedgerow habitat will be created in the south and north of the Site, approx. 270m. The enhancement of existing hedgerows and hedgerow creation will improve the ecological value and provide benefits for local biodiversity. The creation of riparian planting by the Tullaroan Stream is proposed within the Site. A total of ~1.7ha of riparian planting will be added to the existing landscape. The locations in which the proposed planting will take place will be subject to final landowner agreement. However, indicative areas for planting are proposed in Figure 6-1 of the Bat Survey Report (Appendix 6-2) and further details are available in Section 6.7.6 below. Due to connectivity being maintained across the Site by the existing network of linear vegetation bordering agricultural fields, the proposed enhancement and replanting will be located in the south and north sections of the Proposed Wind Farm, bolstering and patching existing hedgerows and treeline distant from the proposed turbine locations, in particular where these treelines offer connectivity to the roosts identified during the bat surveys carried out. Connectivity along the Tullaroan Stream will be reinforced by the creation of riparian planting. Overall, the proposed replanting will result in a net gain of the linear landscape features within the Site. Planting will be of species semi-mature to ensure connectivity gains are immediate, and indigenous to the local area. Further details are provided in Section 6.7.6 below and in Chapter 4. Loss of, or damage to, roosts Structures No specific mitigation proposed. Trees A number of mature trees presenting potential roosting features were identified within turbine felling buffers, in particular in the vicinity of T3 and T6. No bat roosts were identified in these areas during the surveys conducted. Bats comprise mobile species that can move regularly between tree roosts. As such, the trees with potential roosting features have been considered as a “roost resource” and compensation will be provided to cover for the loss of the resource. The following procedures are proposed prior to felling trees with PRFs: • A pre-commencement survey will be carried out by a suitably qualified ecologist on trees with PRFs proposed for felling. • If a bat roost is identified within any of the trees to be removed/pruned, a bat derogation licence will be obtained from the NPWS, prior to removal and the removal activity will be supervised by a qualified ecologist. • On a precautionary basis, works will be undertaken at an appropriate time of year, as determined by a suitably qualified ecologist, to avoid disrupting sensitive life cycle periods for bats. Tree-felling of mature deciduous trees

will be carried out according to the following standard mitigating procedures:

- Trees with suitable potential roost features proposed for felling will be checked for bats by a suitably qualified arborist/ecologist at the time of felling.
- Trees will be nudged two or three times prior to limb removal, with a pause of 30 seconds in between, to allow bats to wake and move.
- Rigged felling shall be used to lower the limbs and trunk carefully to ground level and cavities searched by a qualified ecologist.
- Felled trees will be left in-situ for a minimum of 24 hours prior to sawing or mulching, to allow any bats present to escape (National Roads Authority, 2006).

Compensation for the loss of trees, alternative potential roosting features will be implemented on a like-for-like basis, through the provision of bat boxes:

- A count of all potential roosting features lost will be required to ensure all features are accounted for by compensation measures.

A replanting and enhancement plan is also proposed to compensate for the loss of commuting and foraging habitat. This is detailed in section 6.7.6 below.

Where the potential for indirect effects (i.e. disturbance) on bats potentially roosting within watercourse, drain and culvert crossing infrastructure has been identified, the following mitigating procedures are proposed:

- An inspection survey will be carried out prior to the commencement of the works to ensure no bats are roosting within the infrastructure.
  - If the inspection survey cannot provide sufficient data to exclude the presence of a roost (i.e. due to lack of access), an activity survey will also be conducted prior to commencement.
- Where evidence of bats is identified during the above pre-commencement surveys, a Derogation Licence will be required from NPWS for the continuation of the works.
- The works will be undertaken at an appropriate time of year, as determined by a suitably qualified ecologist, to avoid disrupting sensitive life cycle periods for bats.

Displacement of individuals or populations

No significant displacement effects on bats are anticipated. Nonetheless, the following best practice and site-specific mitigation measures will be employed to avoid and reduce the potential for significant displacement/ disturbance effects on local bat populations (as fully detailed in Section 6 of the Bat Survey Report (Appendix 6-2):

Noise Restrictions

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 2001SI 359/1996).

Lighting Restrictions

Where lighting is required, directional lighting will be used to prevent overspill on to woodland/forestry edges. Exterior lighting, during construction (and post construction), shall be designed to minimize light spillage, thus reducing the effect on areas outside the Site, 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 in line with the following guidance that is provided in the Dark Sky Ireland Lighting Recommendations: • Every light needs to be justifiable, • Limit the use of light to when it is needed, • Direct the light to where it is needed, • Reduce the light intensity to the minimum needed, • Use light spectra adapted to the environment, when using white light, use sources with a "warm" colour temperature (less than 3000K) Additional enhancement planting and hedgerow creation have been proposed to offset the loss of linear commuting and foraging habitat utilised by local bats. In total, 3910m of hedgerow planting and hedgerow creation are proposed within the Site. Species proposed for planting will enhance the existing linear features and create new routes for commuting and foraging bats. The proposed enhancement and creation planting areas within the Site have been carefully selected to reduce any risks of bats collision with operational turbines. Whilst no significant effects on roosting species have been identified; the following potential positive effects are noted. The felling of forestry will have a positive effect by opening up large areas of former closed canopy commercial forestry i.e. there will be more linear forestry edge habitat created. This will have a positive impact on bats as it will provide more commuting and foraging opportunities. Overall, the proposed works will retain areas of linear forestry edge habitats. A full description of the mitigation measures proposed during construction are described in Section 6.1 of the Bat report, available in Appendix 6-2.
Residual Effect following Mitigation	There is no potential for the construction of the Proposed Project 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)

6.7.2.2.4 Assessment of the potential effects on Red Squirrel/Pine Marten during the Construction Phase

Table 6-16. Assessment of Potential Impacts on red squirrel/pine marten

Description of Effect	**Habitat Loss/Fragmentation** Red squirrel and pine marten are known to occur within the Proposed Wind Farm. Woodland habitats provide suitable foraging and breeding habitat for both species. Approximately 29ha of woodland habitat was recorded in the south-west of the site and 4.3ha will be removed. The Proposed Project will result in the loss of approximately 3.57ha of conifer forestry (WD4) and approximately 0.73ha of mixed broadleaved/conifer woodland (WD2). This habitat loss will not be significant in the context of the widespread alternative foraging/breeding habitat available within the Proposed Wind Farm Site and the wider area. There will be no significant fragmentation of red squirrel or pine marten habitat as a result of the Proposed Project. **Disturbance, Mortality**

	The Proposed Wind Farm provides suitable foraging and breeding habitat for both species. No breeding sites (e.g. dreys, dens) were identified for either species during the ecological surveys undertaken of the Proposed Wind Farm, however, there is a potential for breeding sites to be created during the interim between baseline ecological surveying and commencement of construction. Tree felling works associated with the Proposed Wind Farm have the potential to disturb or destroy occupied dreys and or dens during construction. Both species would be particularly vulnerable to the risk of mortality when young are to be found within breeding sites (spring/summer period). In the event that new breeding sites were established within or near the clear-felling footprint there is potential for disturbance/mortality to red squirrel or pine martin through destruction of breeding sites during construction.
Assessment of Significance prior to mitigation	**Habitat Loss/Fragmentation** No significant overall loss or fragmentation of red squirrel or pine marten habitat is anticipated at any geographic scale. **Disturbance/Mortality** Whilst no breeding sites for these species were recorded within the Proposed Wind Farm baseline surveys identified that the Proposed Wind Farm is being utilised by a local red squirrel and pine marten population. Any potential for physical damage or significant disturbance of occupied breeding sites (if established prior to construction) for these species has been identified as significant at the local geographic scale in the absence of mitigation.
Mitigation	**Habitat Loss/Fragmentation** No specific mitigation is required for habitat loss. **Disturbance/Mortality** Due to time that can elapse between the original surveys, any future planning consent and construction, a pre-construction survey for pine marten/red squirrel will be carried out to identify the presence of any new breeding sites. These surveys will focus on areas of conifer plantation to be felled and all suitable habitat within 50m of the felling blocks. Any potential breeding sites should be monitored to ascertain if they are active breeding sites. Surveys will be undertaken in line with NatureScot[12] and NRA[13] guidelines. Should active breeding sites be identified within the blocks to be felled, the following mitigations and best practice procedures will be followed to ensure that no breeding site for either red squirrel or pine marten are impacted: • Felling works to be undertaken outside the main breeding season (1st March- 1st September) when vulnerable young are most likely to be found within breeding sites for both species. • Any breeding sites identified within the 50m buffer of proposed infrastructure that wouldn't be directly affected by felling works, but where disturbance related impacts could occur, should be clearly marked out with an exclusion zone and works/access through these areas avoided as much as possible. • Plant machinery will be turned off when not in use. • Operating machinery will be restricted to the works area within the Proposed Wind Farm (and outside any exclusion zone) Pine marten and Red squirrel boxes will be installed within the Proposed Wind Farm, as described in the BMEP in appendix 6-4.

[12] https://www.nature.scot/sites/default/files/2018-09/Species%20Planning%20Advice%20-%20red%20squirrel.pdf
[13] *NRA guidance (NRA, 2009, Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. Dublin: National Roads Authority).*

Residual Effect following Mitigation	Following the incorporation of the mitigation and enhancement measures described above, no significant negative effects to pine marten and red squirrel is anticipated at any geographic scale.

6.7.3 Likely Significant Effects During Operational Phase

6.7.3.1 Effects on Habitats during Operational Phase

The operation of the Proposed Project will not result in any additional land take or loss of habitats as already discussed above, as such there is no potential for any significant effects in this regard. These habitats are not considered to be a KER in the context of the operation of the Proposed Project. However, the Proposed Project has the potential to result in enhancement of the surrounding areas through management of habitat enhancement and creation (as described in section 4.3.1.6 of this EIAR and in section 6.7.6 below), that will be implemented during the construction phase of the Proposed Project and maintained during the operational phase. Details of the management that will be undertaken are described in section 4.3.1.6 of this EIAR and in the BMEP Appendix 6-4.

Rivers, streams and sensitive aquatic species remain as KERs during the operational phase and are assessed in detail in the following subsections.

6.7.3.1.1 *Effects on Rivers, Streams, and sensitive aquatic faunal species during the Operational Phase*

Table 6-17 Operational phase impact assessment for rivers, streams, open waterbodies and sensitive aquatic faunal species

Description of Effect	The effects on water quality are fully described in Chapter 9 'Hydrology and Hydrogeology' of this EIAR and are described here in relation specifically to ecology. This section assesses the potential for likely significant effects on surface watercourses and associated aquatic faunal species, including, lamprey, white-clawed crayfish, European eel, salmonids, coarse fish, and other aquatic species identified during the desk study and dedicated aquatic surveys and likely to occur within or downstream of the Site. The following impact assessment is summarised from Section 9.5.3.1, chapter 9 'Water' and is summarised here in the context of ecology. **Increased hardstanding/run-off impacts:** <u>Proposed Wind Farm (including Proposed Grid Connection on-site substation)</u> Progressive replacement of the vegetated surface with impermeable surfaces could potentially result in an increase in the proportion of surface water runoff reaching the surface water drainage network. This could potentially increase runoff from the Site and increase flood risk downstream of the Proposed Project. In reality, the access roads will have a higher permeability than the underlying soil. However, it is conservatively assumed in this assessment that the Proposed Wind Farm access roads, turbine hardstands, met mast hardstand and the Proposed Grid Connection on-site substation compound are impermeable. During storm rainfall events, additional runoff coupled with increased velocity of flow could increase hydraulic loading, resulting in erosion of watercourses and impact on aquatic ecosystems. Surface waters in the vicinity and downstream of the Proposed Wind Farm (Tullaroan Stream and associated tributaries) and associated aquatic species could be impacted. <u>Proposed Grid Connection (underground cabling route)</u> There will be no potential increase in runoff along the Proposed Grid Connection underground cabling route. The works are predominantly located in the carriageway of the existing road corridor and no change in surface water runoff rates will result as the trench and road surface will be reinstated.

Assessment of Significance prior to mitigation	Impact on water quality during the operational phase of the Proposed Project has been assessed as a negative, slight, indirect, temporary, likely effect in the absence of mitigation. Apart from the substation, the magnitude of this impact is slight because all other major infrastructure will be located over 50 metres from any significant watercourse (those mapped by the EPA and downloaded to GIS) and the footprint of the Proposed Project will be minimal when compared to the overall size of the Site. The closest turbine to an EPA mapped watercourse is Turbine no. 5, located approx. 90 metres to the north.
Mitigation	Increased hardstanding/run-off The operational phase drainage system of the Proposed Project will be installed and constructed in conjunction with the road and hardstanding construction work as described below and as shown on the Drainage drawings submitted with this planning application (see Appendix 4-3): • Interceptor drains will be installed up-gradient of all Proposed Project infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader; • Swales/roadside drains will be used to collect runoff from access roads and turbine hardstanding areas of the Site, likely to have entrained suspended sediment, and channel it to settlement ponds for sediment settling; • On steep sections of access road transverse drains ('grips') will be constructed in the surface layer of the road to divert any runoff off the road into swales/road side drains; • Check dams will be used along sections of access road drains to intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock; • Settlement ponds, emplaced downstream of road swale sections and at turbine locations, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses; and, • Settlement ponds have been designed in consideration of the greenfield runoff rate. The construction drainage is in place for the operational phase. As the operational phase evolves the natural drainage regime will re-establish itself i.e. the manufactured drainage would not need to be maintained for the entire lifespan. As described in Chapter 9 the proposed integration of the Proposed Wind Farm drainage with the existing forestry drainage is a key component of the proposed drainage management within the Proposed Project. In this context, integration means maintaining surface water flow paths where they already exist, avoid creation of new or altered surface water flow paths, and maintaining the drainage regime (i.e. normal flow). Critically, there will be no alteration of the catchment size contributing to each of the main downstream watercourses. All Proposed Project drainage water captured within individual site sub-catchments will be attenuated and released within the same sub-catchments that it was captured.
Residual Effect following Mitigation	Following the implementation of the mitigation measures outlined above, no potential for significant effect has been identified at any geographic scale as a result of the Proposed Project.

6.7.3.2 Effects on Fauna during Operation Phase

The operation of the Proposed Project will not result in any additional habitat loss or deterioration, nor will it result in a significant increase in anthropogenic activity.

There is no potential for significant negative effects in terms of disturbance on non-volant terrestrial fauna including badger and otter that were identified as KERs during the operational phase of the development.

The potential for significant effects on otter is restricted to indirect effects on their habitat resulting from water pollution and disturbance during the construction phase, as described Section. The potential for significant effects on badger is restricted to indirect effects through disturbance during the construction phase. This has been assessed in Section 6.7.2.2.1 above and is not repeated below.

Potential for significant effects on bat species resulting from the operation of the Proposed Project were identified and therefore, these are identified as KERs during the operational phase.

6.7.3.2.1 *Assessment of Potential Effects on Bats during the Operational Phase*

Table 6-18 Operational phase impact assessment on bats

Description of Effect	There is no potential for loss or fragmentation of foraging or roosting habitat for bat species during the operational phase of the Proposed Project as there will be no additional loss of any habitats following construction. The bat survey report that is provided in Appendix 6-2, found bat species composition and abundance to be typical of the geographic location of the Site. This information is summarised below. Collision Risk Activity levels for low-risk species at the Site including Myotis species and brown long eared bat (lesser horseshoe bat were not recorded during dedicated bat surveys) were low. As per SNH guidance, these species are not identified as being particularly vulnerable to collision mortality. Given the low levels of activity recorded, no significant effects on these species are anticipated. The following high-risk species were recorded during the dedicated surveys: • Leisler's bat • Nathusius' pipistrelle • Common pipistrelle • Soprano pipistrelle Overall Risk for each high-risk species was determined, in accordance with Table 3b of NatureScot guidance (Tables 5-2 – 5-4, 'Bat Report', Appendix 6-2), by a cross-tablature of the site risk level (i.e., Medium) and Ecobat bat activity outputs for each species (see Section 5.1.2 of Appendix 6.2 - Bat Report). Overall risk levels for these high collision risk bat species was assigned as Low-Medium, with High seasonal peaks recorded for some species. Site-level collision risk for high collision risk bat species was typically Low to Medium. Overall bat activity levels were typical of the nature of the Proposed Wind Farm, which is predominantly agricultural grassland, treelines, hedgerows, and small segments of conifer plantation with moderate levels of bat activity recorded during the static detector surveys and the walked transects undertaken. The operation of the Proposed Wind Farm has the potential to result in a long-term effect on Pipistrelle and Leisler's bat species as a result of mortality due to collision. The magnitude of this effect in the absence of mitigation is moderate on the basis that no

	significant roosts were identified in the immediate vicinity of the turbines and the median level of activity is considered moderate (on a precautionary basis). It is noted in NatureScot (2021) guidelines that bat activity on windfarm sites is highly liable to change following construction of a wind farm due to the changes in habitat that occur to facilitate construction. Therefore, continued monitoring of operational wind farms for three years' post construction is recommended in the guidelines and will be undertaken at this Site, to determine the actual, post construction effects on the local bat populations.
Assessment of Significance prior to mitigation	No significant collision related effects are anticipated on Myotis spp. and brown long-eared bats, as the species are considered low-risk for collision. A potential for long-term negative effects was identified for Common and Soprano pipistrelles due to the high levels of activity recorded within the Proposed Wind Farm and their classification as high-risk species. The potential unmitigated effects on these high-risk species as a result of their potential interaction with wind turbines are considered significant at a local geographic scale. No significant effects are anticipated at any other geographic scale.
Mitigation	In accordance with NatureScot and NIEA Guidance, a minimum 50m buffer to all habitat features used by bats (e.g., hedgerows, tree lines etc.). A full description of the mitigation measures proposed during operational phase are described in Section 6.1 of the Bat Report. Details of this mitigation and how it is calculated is provided in Appendix 6-2. Blade Feathering On a precautionary basis, and in addition to buffers applied to habitat features, it is proposed that 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). Bat Mitigation and Monitoring Plan Full details of the proposed operational bat monitoring programme for the Proposed Project are provided in Section 6.2.1 of the Bat Report (Appendix 6-2). • The post-construction surveys will be carried out as per the pre-construction survey effort. Post-construction monitoring will include static detector surveys, walked survey transects and corpse searching to record any bat fatalities resulting from collision. • Static monitoring shall take place at each turbine during the bat activity season (between April and October) (NatureScot, 2021, NIEA, 2021). • Carcass searches, to monitor and record bat fatalities, shall be conducted at each turbine in accordance with 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. • Monitoring surveys shall continue in Year 2 and 3, and where a curtailment requirement has been identified, the success of the curtailment strategy shall be assessed in line with the baseline data collected in the preceding year(s). Lighting With regard to the potential for lighting to increase collision risk, it is noted that there will be limited illumination of the turbines in the form of aviation lighting. Post construction monitoring will be carried out (as outlined below) to assess any potential changes in bat activity patterns and collision risk. Significant effects as a result of lighting are not anticipated; however, if in the course of this monitoring, any potential

	for significant effects on bats is identified, the site-specific mitigation measures will be reviewed and any changes necessary will be implemented to avoid any such impacts.
Residual Effect following Mitigation	Following the implementation of the monitoring and mitigation described above, there is no potential for significant residual effects on bat species.

6.7.4 Likely Significant Effects During Decommissioning phase

The decommissioning of the Proposed Wind Farm is described in Chapter 4, Section 4.11 of this EIAR. There will be no additional habitat loss associated with the decommissioning phase of the Proposed Wind Farm and therefore, there will be no significant effects in this regard. No large-scale excavations or earthworks will be required as the development footprint (roads, turbine hardstands and foundations etc.) will be left in situ. There would be no additional or ancillary impacts associated with the decommissioning phase.

The Proposed Grid Connection infrastructure, including the onsite 38kV electricity substation, will remain in place as it will be part of the Electricity Grid under the ownership and control of the ESBN.

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. An outline Decommissioning Plan is attached in Appendix 4-4 of the EIAR. The CEMP for the Proposed Project provides the details of the mitigation and best practice that will be employed to avoid any potential for significant residual effects on biodiversity during decommissioning of the Proposed Wind Farm. In addition, the measures incorporated into the construction phase, in Section 4.8 of this EIAR, including specific mitigation provided in relation to water quality in Chapter 9: 'Hydrology and Hydrogeology', will be implemented during decommissioning.

6.7.5 Effects on Designated Sites

6.7.5.1 European Designated Sites

The Proposed Project has no potential for direct effects to the QI habitats and species of any European Designated site. The Proposed Grid Connection underground cabling route runs adjacent to the River Barrow and River Nore SAC, while watercourses within the Proposed Wind Farm have a direct hydrological link to the River Barrow and River Nore SAC. The HDD launch pit is located within the River Barrow and Rover Nore SAC and thus a potential for likely significant effect was therefore identified on the following European Designated sites:

- River Barrow and River Nore SAC
- River Nore SPA

In relation to European sites, an AASR and NIS have been prepared to provide the competent authorities with the information necessary to complete an Appropriate Assessment for the Proposed Project 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 potential impacts on European sites.

The Stage 1 Screening 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 Project, individually or in combination with other plans and projects, would be likely to have a significant effect on the following European Sites:

- River Barrow and River Nore SAC
- River Nore SPA

As a result, an Appropriate Assessment is required and a Natura Impact Statement shall be prepared in respect of the Proposed Project.'

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 Project does not adversely affect the integrity of European sites.

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

6.7.5.2 Nationally designated Sites

The following pNHAs were identified to be within the Likely Zone of Influence of the Proposed Project

- Inchbeg pNHA
- River Nore/Abbeyleix Woods Complex pNHA

The Proposed Grid Connection underground cabling route is hydrologically connected to Inchbeg Woods pNHA and the River Nore/Abbeyleix Woods Complex pNHA (as described in section 6.5.1.1). The Proposed Wind Farm is not hydrologically connected to these sites.

The Inchbeg Woods pNHA is comprised of a mosaic of riparian woodland, mixed woodland, reed swamp and wet grassland habitat. The River Nore/Abbeyleix Woods Complex pNHA comprises woodland habitats. Both of these items are also designated as part of the River Barrow and River Nore SAC/River Nore SPA and as such, have already been afforded a conservation status of international importance. Any potential for impacts on the above listed nationally designated sites via the deterioration of water quality have been robustly blocked through the implementation of the mitigation measures outlined in 6.7.2.1.1, 6.7.3.1.1 and Section 9.5.2.18 of Chapter 9 (Hydrology) concluded that following the implementation of the mitigation will protect any downstream nationally designated sites and no significant effects will occur.

6.8 Biodiversity Management and Enhancement Plan

A Biodiversity Management and Enhancement Plan (BMEP) has been prepared in support of the Environmental Impact Assessment Report (EIAR) produced for the Proposed Project and is attached as Appendix 6-4. A BMEP has been prepared in order to outline the proposed biodiversity enhancement measures associated with the Proposed Project. This BMEP also outlines how the Proposed Project has been designed to offset any loss of habitat or loss of faunal supporting habitat.

The objectives of this BMEP are as follows:

- To mitigate the loss of linear habitats and woodland required for the construction of the Proposed Project by replanting of native hedgerows within the Proposed Wind Farm site and creation of a new riparian buffer zone along the Tullaroan Stream.
- To provide Biodiversity Enhancement within the Proposed Wind Farm site, establishing new native hedgerow planting and managing these to enhance their potential for pollinator species.
- To provide additional foraging areas and nesting opportunities for pollinator species, nesting birds, small mammals etc.
- To provide additional breeding sites for protected mammals known to occur within the Proposed Wind Farm e.g. pine marten, red squirrel and bats.
- To provide a management and monitoring plan to ensure the success of the proposed measures.

6.9 Cumulative Impact On Biodiversity

The Proposed Project was considered in combination with other plans and projects in the area that could result in cumulative impacts on biodiversity, , 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 Project and provided in full in Appendix 2-3 of this EIAR.

The main likelihood for cumulative effect associated with the Proposed Project and other developments is assessed to be associated with KERs, identified in Section 6.6.7. The likelihood for cumulative non-KER habitat and species has also been considered. In relation to terrestrial habitats and species, a cumulative study area of 1km for the Proposed Wind farm and 200m for the Proposed Grid Connection was chosen. All projects within these buffers were considered when completing the cumulative. The geographical boundaries were chosen because of the common nature of the habitats recorded within the Proposed Wind Farm site and along the Proposed Grid Connection underground cabling route, which mostly comprises managed agricultural grassland, hedgerows and commercial forestry. The cumulative study area considered in relation to aquatic habitats and species follows the rationale that is set out in section 9.57 of Chapter 9: Hydrology and Hydrogeology and is summarized below:

- The mapped extent of the Kilmanagh Gravels GWB;
- A quantitative assessment based on flow volumes obtained from the EPA HydroTool Nodes downstream of the Proposed Wind Farm site. This assessment concludes that the due to dilution no hydrological cumulative effects will occur beyond EPA Hydrotool Node 15_1733 on the King's River immediately upstream of Callan. At this location the King's River has a total upstream catchment area of 20,000ha. There will be no potential for cumulative effects beyond this cumulative study area due to increases in flow volumes (as the catchment area increases) and increasing distance from the Proposed Wind Farm site.
- A further assessment has been completed within a 200m zone of the Proposed Grid Connection. Due to the shallow nature of the underground cabling connection trench, a 200m buffer zones is an appropriate scale when considering potential cumulative effects on the water environment.

6.9.1 Assessment of Plans

The following development plans have been reviewed and taken into consideration as part of this assessment. The plans were chosen due to the geographical location of the Proposed Project Site and the policies and objectives related to biodiversity that are contained within them.

- Kilkenny County Development Plan 2021 – 2027
- National Biodiversity Action Plan 2023-2030
- The Regional Planning Guidelines for the South- East 2010-2022
- Southern Regional Assembly Regional Spatial and Economic 2020-2040 Strategy (RSES)

The review focused on policies and objectives within the plans listed above that relate to designated sites for nature conservation, biodiversity and protected species. Policies and objectives relating 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 6-19.

Potential for cumulative impacts on European sites are considered within the NIS that accompanies this application.

The NIS concludes,

'*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 Project does not adversely affect the integrity of European sites.*

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

Table 6-19 Assessment of Plans

Plans	Key Policies and Objectives directly related to Designated Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
Kilkenny City and County Development Plan 2021-2027	Natural Heritage/Biodiversity Objectives 2ATo support and encourage sustainable compact growth and settlement patterns, integrate land use and transportation, and maximise opportunities through development form, layout and design to secure climate resilience and reduce carbon emissions. Objective 2B To support the implementation of the National Climate Action Plan and the National Climate Action Charter for Local Authorities, and to facilitate measures which seek to reduce emissions of greenhouse gases by embedding appropriate policies within the Development Plan. Objective 2C To promote, support and direct effective climate action policies and objectives that seek to improve climate outcomes across the settlement areas and communities of County Kilkenny helping to successfully contribute and deliver on the obligations of the State to transition to low carbon and climate resilient society, Objective 2D To integrate appropriate mitigation and adaptation considerations and measures into all forms of development. Objective 2E To ensure that the Development Plan transposes, supports and implements strategic objectives of the National Planning Framework and the Southern Regional Spatial and Economic Strategy to create an enabling local development framework that: (a) promotes and integrates important climate considerations in local development and the assessment of planning applications and (b) supports the practical implementation of national climate policy and targets to assist in the delivery of the national transition objective. Objective 2F To adopt nature-based approaches and green infrastructural solutions as viable mitigation and adaptation measures to reduce greenhouse gas emissions where feasible. The Council will promote and support physical activity, active recreation and an active lifestyle. Objective 2G To reduce energy related CO2 emissions of Kilkenny County Council.	The Development Plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites. The Proposed Project is inline with all policies within the Kilkenny County Development Plan 2021-2027 relating to biodiversity and has been designed so there is no net loss of biodiversity. The Biodiversity Management and Enhancement Plan, available in appendix 6-4, has been designed to facilitate the improvement of existing and the creation of new linear habitat. The Proposed Project will have no direct effects on QI habitats and species or SCI species of any European Designated site. The indirect impacts of the Proposed Project have been robustly addressed through the mitigation measures, as described in Section 6.7. No potential for negative cumulative impacts when considered in conjunction with the current proposal were identified. No developments or projects identified within the Development Plan were found to occur in the wider area surrounding the Proposed Project.

Plans	Key Policies and Objectives directly related to Designated Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	Objective 2H To achieve the commitment under the European Climate Alliance to the reduction of greenhouse gas emissions by 10 percent every 5 years. To protect and where possible enhance wildlife habitats and landscape features which act as ecological corridors/networks and stepping stones, such as river corridors, hedgerows and road verges, and to minimise the loss of habitats and features of the wider countryside (such as ponds, wetlands, trees) which are not within designated sites. • To ensure that appropriate mitigation and/or compensation measures to conserve biodiversity, landscape character and green infrastructure networks are required in developments where habitats are at risk or lost as part of a development.	
National Biodiversity Action Plan 2023-2030	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. 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. 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. Objective 4: 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	The National Biodiversity Action Plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites. There will be no deterioration of water quality as a result of the Proposed Project. The Proposed Project has been designed in order to avoid any fragmentation of habitats or commuting corridors. The loss of commuting corridors resulting from the Proposed Project has been mitigated through the enhancement of exiting hedgerows and creation of riparian buffer as described in Section 6.7.6.

Plans	Key Policies and Objectives directly related to Designated Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	underpin and strengthen future decision-making. Action will also focus on collaboration to advance ecosystem accounting that will contribute towards natural capital accounts. Objective 5: 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.	No potential for negative cumulative impacts were identified when considered in conjunction with the Proposed Project.
The Regional Planning Guidelines for the South-East 2010-2022	D12 Promoting the co-ordination and protection of biodiversity and enhancement of ecosystem services and green infrastructure	The Proposed Project will not result in significant effects on habitat and features of ecological importance. The Proposed Project has been designed to avoid and minimise impacts on sensitive habitats and species. No potential for negative cumulative impacts were identified when considered in conjunction with the Proposed Project
Southern Regional Assembly Regional Spatial and Economic 2020-2040 Strategy (RSES)	ROP 1 - The RSES seeks to protect, manage, and through enhanced ecological connectivity, improve the coherence of the Natura 2000 Network in the Southern Region. RPO 99 - It is an objective to support the sustainable development of renewable wind energy (on shore and offshore) at appropriate locations and related grid infrastructure in the Region in compliance with national Wind Energy Guidelines. RPO 104 - It is an objective to support investment in initiatives to develop innovation, advances in technology and pilot projects for the sustainable development of energy storage and carbon capture within the Region and to work with key stakeholders in developing sustainable forestry, including initiatives for native tree planting and better management of peatland and soil management to support carbon sequestration and enhancement of biodiversity.	There will be no adverse effects on QI's/SCI's/SSCO's as a result of the Proposed Project and no cumulative impacts in this regard. The Proposed Project has been designed to avoid any effects on water quality and/or designated Natura 2000 sites outside the site as set out in Section 3 of the accompanying NIS. The Proposed Project has been subject to a full environmental assessment i.e. EIAR and NIS.

Plans	Key Policies and Objectives directly related to Designated Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	RPO 117 - It is an objective to avail of opportunities to enhance biodiversity and amenity and to ensure the protection of environmentally sensitive sites and habitats, including where flood risk management measures are planned. Plans and projects that have the potential to negatively impact on Natura 2000 sites are subject to the requirements of the Habitats Directive. RPO 124 - It is an objective to promote the concept of connecting corridors for the movement of wildlife and encourage the retention and creation of features of biodiversity value, ecological corridors and networks that connect areas of high conservation value such as woodlands, hedgerows, earth banks, watercourses and wetlands. The RSES recognises the necessity of protecting such corridors and the necessity to encourage the management of features of the landscape that support the Natura 2000 network;	

6.9.2 Cumulative Assessment of Key Ecological Receptors (KERS)

6.9.2.1 Water quality, aquatic species and habitats

As described in Section 6.7.2.1.1 and 6.7.3.1.1, the Proposed Project will not result in any significant effects on water quality or aquatic habitats and species. Having reviewed surrounding land uses and developments as provided in section 9.5.7 of this Chapter 9, , it is confirmed that the Proposed Project will not contribute to any existing or likely cumulative pressures or threats. Following the careful project design, implementation of the prescribed best practice and mitigation there is no potential for the proposed project to result in any significant cumulative impact on water quality, aquatic habitats and species.

6.9.2.2 Hedgerow, Treeline and Woodland habitat

The Proposed Project will not result in a significant loss of Hedgerow, Treeline or Woodland habitat as described in Section 6.7.2.1.2. The loss of these habitats to facilitate the Proposed Project will be mitigated through the implemented of the BMEP as described in Section 6.8. Following a review of land uses and other developments within the defined biodiversity buffer, it is confirmed that Proposed Project will not contribute to in any significant cumulative impact on treeline, hedgerow or woodland habitat.

6.9.2.3 Badger

The Proposed Project will not result in a significant loss of suitable foraging habitat for badger, which is fully described in Section 6.7.2.2.1. The lands surrounding the Site consist primarily of improved agricultural grasslands delineated by hedgerow and treelines with small pockets of broadleaved woodland and conifer woodland are present throughout. These habitats provide highly suitable habitat for badger and following a review of the proposed projects, no large-scale developments that will result in significant habitat loss are proposed. As such, there is no potential for the Proposed Project to result in any significant cumulative impact on badger.

6.9.2.4 Bats

Following the detailed assessment provided in the preceding sections (6.7.2.2.3 and 6.7.3.2.1) and in Appendix 6-2, it is concluded that, the Proposed Project will not result in any residual adverse effects on bats, when considered on its own. There is one existing and one permitted wind farm located within 5km of the Proposed Wind Farm, and two existing and one permitted wind farm located within 5km to 10km. There are three further EIA projects and one extractive industry within 10km. No potential for the Proposed Project to contribute to any cumulative adverse effects on any bat populations is anticipated when considered in-combination with other plans and projects as fully described in Section 6.

6.9.2.5 Otter

As detailed in Section 6.7.2.2.2, the Proposed Project will not result in a significant effect on Otter. The Proposed Project will not result in a direct loss in habitat for otter and as described in Section 6.9.2.1, the Proposed Project will not result in any significant effects on water quality that may provide supporting feeding opportunities for otter (i.e fish stock). Having reviewed other land uses and developments within the defined biodiversity buffer, it is confirmed that the Proposed Project will not contribute to any existing or likely cumulative impacts on otter.

6.9.2.6 Pine Marten and Red Squirrel

The Proposed Project will not result in a significant loss of foraging and or nesting habitat for pine marten or red squirrel, as described in section 6.7.2.2.4. The implementation off the BMEP will also provide for additional riparian woodland planting and the installation of pine martin and red squirrel nesting boxes, to increase breeding opportunities for both species. After a detailed review of the other developments in the cumulative study area for habitats and species the Proposed Project Site, no developments resulting in significant woodland loss are proposed. As such, there is no potential for the proposed project to result in any significant cumulative impact on Pine Marten and Red squirrel.

6.9.2.7 Non-KER Habitats and Species

In addition to the KER habitats identified in section 6.6.7, non KER habitats and species were considered in the cumulative assessment. Such habitats and species included Conifer Plantation, Improved Agricultural Grassland (GA1), replies and amphibians. No pathway for significant, individual or cumulative effects were identified.

An assessment of the cumulative effects on Kingfisher has been fully detailed in section 7.10.2 of Chapter 7: Ornithology. No significant individual or cumulative effects on Kingfisher or any other ornithological receptor are anticipated.

6.9.3 Conclusion of Cumulative Effects Assessment

The Proposed Project has been considered with other plans and projects as described in Section 6.9.1 and 6.9.2. Particular focus has been placed on those plans that are within the biodiversity and hydrological study areas as described in section 6.9.1. The assessment focused on the potential for cumulative impacts on the biodiversity, including the KERs identified in Section 6.6.7, and is fully described in the above sections.

Following the detailed surveys undertaken and impact assessment provided in Section 6.7, it is concluded that there will be no significant residual disturbance, deterioration of water quality or faunal habitat loss associated with the Proposed Project and no significant residual effects were identified individually and following an assessment of the potential for significant effects when considered in combination with other plans and project, no potential for significant cumulative effects were identified

6.10 Conclusion

Following consideration of the residual effects (post mitigation) it is concluded that the Proposed Project will not result in any significant effects on any of the identified KERs. No significant effects on receptors of International, National or County Importance were identified.

The potential for effects on the European Designated Sites is fully described in the NIS that accompanies this application. The NIS concludes that in view of best scientific knowledge and on the basis of objective information, the Proposed Project either individually or in combination with other plans or projects, is not likely to have significant effects on any European Sites.

Following the implementation of mitigation, no potential for significant effects on Nationally designated sites downstream of the site were identified.

The mitigation described in this chapter will be implemented in full and it is therefore predicted that there will be no significant individual or cumulative effects on ecology at the international, national or county scales or on any of the identified KERs.