Planning and Environmental Consultants

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Environmental Impact Assessment Report (EIAR)

Seskin Wind Farm, Co. Carlow

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 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), 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 Valuation is then provided.
- This is followed by an Assessment of Effects which are described with regard to each phase of the Proposed Project: construction phase, operational phase and decommissioning phase. Potential Cumulative effects in combination with other projects are fully assessed.
- Proposed mitigation and best practice measures to avoid, reduce or offset the identified effects 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.

For the purposes of this EIAR:

- 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 hardstanding areas, including access roads, underground cabling, permanent meteorological mast, temporary construction compounds, carriageway strengthening works, junction accommodation works, peat and spoil management, tree felling, site drainage, operational stage signage, battery energy storage system, 38kV onsite substation, 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 Route' is referred to, this refers to underground 38kV cabling connecting to the existing Kilkenny 110kV substation, and all ancillary works and apparatus. The Grid Connection Route 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.

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In addition:

- The 'EIAR Site Boundary' comprises the entire area shown in Figures 6-1 and 6-2 and is also referred to as the 'study area' in this Chapter.
- 'Key Ecological Receptor" (KER) is defined as a species or habitat occurring within the zone of influence of the Proposed Project upon which likely significant effects are anticipated.
- Zones of Influence" (ZoI) for individual ecological receptors refers to the zone within which potential effects are anticipated. ZoIs differ depending on the sensitivities of particular habitats and species and were assigned in accordance with best available guidance and through adoption of a precautionary approach.

6.1.1 Requirements for Ecological Impact Assessment

National Legislation

The Wildlife Act, 1976 (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 animals 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**"). 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

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

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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 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. Pollinator friendly measures have been incorporated into the Proposed Project and these are detailed within the Biodiversity Mitigation and Enhancement Plan (BMEP) (see Appendix 6-4).

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

[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.*

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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 on 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 EIAR.

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 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 (AA) Screening Report and Natura Impact Statement. 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).

6.1.2 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.

[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.*

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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, 2018).

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:

- Carlow County Development Plan 2022-2028.
- Kilkenny City and County Development Plan 2021-2027
- Regional Spatial and Economic Strategy for the Southern Region.
- National Planning Framework. Ireland 2040 Our Plan.
- National Development Plan 2021-2030.

6.1.3 Statement of Authority

This EIAR chapter has been prepared by Corey Cannon. Corey is a Senior Ecologist at MKO and holds a BSc in Zoology and an MSc in Biodiversity Survey. Corey is also a Chartered Ecologist and Full Member of CIEEM. Corey has over ten years' consultancy experience. She is an experienced ecologist with skills covering habitat and botanic assessments and specialist mammal (including all bat species) surveys. Corey has undertaken numerous Ecological Impact Assessment and AA assessments for public and private sector clients. This report has been reviewed by Pat Roberts (B.Sc., M.Sc., MCIEEM). Pat has 18 years' experience in ecological management and assessment.

The baseline ecological surveys including bat habitat assessment and activity surveys were conducted by MKO ecologists; Sara Fissolo (BSc), Stephanie Corkery (BSc, MSc), Valerie Kendall (B.Sc(H)., M.Env.Sc.), Cathal Bergin (BSc), Cora Twomey (BSc), Brónagh Boylan (BSc Env), Corey Cannon and Ciara Hackett (BSc). All surveyors have relevant academic qualifications and are competent in undertaking habitat and ecological assessments. Bat survey scope development and project management was overseen by Aoife Joyce (BSc., MSc.).

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6.2 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, 2018).

6.2.1 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].
- 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 6.7 of this Chapter. This was informed by a review of the EIARs/NISs prepared for other plans and projects occurring in the wider area.

6.2.1.1 Designated Sites

6.2.1.1.1 *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 AA Screening Report and Natura Impact Statement that accompanies this application. As per EPA Guidance 2022, *"a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement"* but should *"incorporate their key findings as available and appropriate"*. Section 6.6.5 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

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Natural Heritage Areas (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.

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

6.2.1.2 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.

6.2.2 Scoping and Consultation

MKO undertook a scoping exercise during preparation of this EIAR, as described in Chapter 2, Section 2.7 of this EIAR.

Copies of all scoping responses are included in Appendix 2-1 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Table 2-12 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 provides a list of the organisations consulted with regard to biodiversity during the scoping process, and notes where scoping responses were received.

Table 6-1 Organisations consulted with regard to biodiversity.

Consultee	Response	
Department of Agriculture, Food and the Marine (DAFM)	21/12/2022	Response from the felling division: *"If the Proposed Development will involve the felling or removal of any trees, the developer must obtain a felling licence from this department before trees are felled or removed"*
An Taisce	21/12/2022	Large volume of correspondence and limited resources. Unable to respond to query.
Bat Conservation Ireland	-	No response received to date
Birdwatch Ireland	-	No response received to date
Carlow County Council (Heritage	21/12/2022	Consider R. Barrow SAC and how its hydrologically connected to the site. General guidance of biodiversity assessment. Provides general guidelines on

and Environment Department		EIAR chapters. Includes details on ecological survey requirements. Recommended authoritative bodies to contact about the development.
Kilkenny County Council (Heritage Officer)	22/12/2022	Heritage officer has taken up a new position within the council and we are awaiting the appointment of a new heritage officer which we expect to take place in January 2023. In the meantime, I have passed on your request to our conservation officer. No response received from heritage officer to date.
Kilkenny County Council – Environment Department	22/12/2022	Provided Surface water management guidance for the construction, operation and decommissioning stages, within the curtilage of the site. Advised on waste management guidance. Provide recommendations on material storage and safe disposal of materials. During the construction, operation & decommissioning stages, the applicant should ensure that all operations on site are carried out in a manner such that noise, dust, reflectance, shadow flicker, air emissions and/or odours do not result in significant impairment of, or significant interference with, amenities or the environment beyond the site. Provided relevant suggestions to the items flagged above. Applicant should submit proposals for an on-site Wastewater Storage System. The applicant should design a Site Works Plan at appropriate stages for both the construction & the decommissioning phases to include a programme, which shall confirm the site practices to deal with the excavation of soil / peat, excavation of rock (hydraulic hammering / blasting), crushing of rock, stock piling of materials, sediment control, soil erosion / stability, reinstatement, borrow pits, emergencies and the phasing of the works. The applicant shall confirm if any blasting or crushing will take place on site during the construction of the project. The applicant should design a Vehicle Inspection & Maintenance Plan for the construction, operation & decommissioning stages, which shall confirm the site practices to deal with the parking compound, storage of fuels, refuelling of vehicles, fuel spillages, inspection and maintenance of vehicles, emergencies and the training of personnel. The applicant should appoint a Complaint Liaison Officer who shall be responsible for dealing directly with members of the public and officials from the Planning and local Authority in relation to any potential complaints arising during the construction, operation or decommissioning stages of the development. The Construction Environmental Management Plan (CEMP) and all other Plans developed for this application should be considered to be live documents, and shall be updated as required to reflect any changes in work practices or procedures, which should be inducted to all personnel working on the site.
Department of Communications, Climate Action and the Environment	21/12/2022	Acknowledgement of receipt. Awaiting response.
Department of Culture, Heritage and the Gaeltacht	27/01/2023	The Department is not in a position to make specific comment on 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. Please note that if you have any queries in relation to preplanning consultations with the Department they should be sent directly to DAU by emailing Manager.DAU@npws.gov.ie to ensure prompt receipt of same. If you send them to other sections such as Customer Service or Nature Conservation they are forwarded to DAU so there is no need to email these sections if you have emailed DAU directly.
National Parks and Wildlife Service	27/01/2023	Don't have capacity to respond to scoping request.

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<table>
<tr><td>Inland Fisheries Ireland</td><td>12/01/2023</td><td>The proposed development is located on the boundary of the Nore and Barrow Catchments, in particular in the catchment areas of the following surface water bodies.

<table><tr><th>Surface water Body</th><th>WFD Status</th><th>Risk Status</th></tr><tr><td>Rathnornan_010</td><td>Moderate</td><td>Under Review</td></tr><tr><td>Old Leighlin Stream_020</td><td>Moderate</td><td>At Risk</td></tr><tr><td>Dinan (South)_010.</td><td>Good</td><td>At Risk.</td></tr></table>
All streams connect directly to the Barrow- Nore SAC. The proposed surveys/ reports must demonstrate how this project would cause no deterioration to the above surface water bodies and is consistent with their restoration to good ecological status. Peat soils are extremely sensitive to erosion. Excavations associated with the construction of turbine bases have the potential to mobilise significant quantities of suspended solids and associated nutrients to downstream surface waters. IFI recommends a buffer zone of 50m be provided from turbine base to any wetted channels. Following assessments should be provided: -Baseline ecological assessments, maps of all aquatic habitats potentially affected by the development. Assessment of the potential adverse effects of the proposed works on all relevant aquatic receptors, assessment of cumulative effects of the proposed development along with existing and approved projects, assessment of the impact on the conservation objectives of species listed as qualifying interests- includes Atlantic salmon and Lamprey sp. and proposed mitigation measures to prevent erosion from soil disturbance in excavation areas.</td></tr>
<tr><td>Irish Peatland Conservation Council</td><td>-</td><td>No response received to date</td></tr>
<tr><td>Irish Red Grouse Association</td><td>-</td><td>No response received to date</td></tr>
<tr><td>Irish Raptor Study Group</td><td>-</td><td>No response received to date</td></tr>
<tr><td>Irish Wildlife Trust (IWT)</td><td>22/12/2022</td><td>They do not have the staff capacity to respond to this consultation at the moment, but they endeavour to respond if possible.</td></tr>
<tr><td>Waterways Ireland</td><td>-</td><td>No response received to date</td></tr>
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6.2.3 Field Surveys

A comprehensive survey of the biodiversity within the Proposed Project 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 2022 and October 2023 and are summarised in Table 6-2 below. An assessment of the Proposed Grid Connection Route was also undertaken on the 5th January 2022. Surveys along the route comprised a multi-disciplinary walkover, otter surveys at watercourse crossings as well as an assessment of bat foraging, commuting and roosting habitat. Infrastructure at five of these watercourse crossing points was further assessed for potential to support roosting bats (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)	• 19th and 20th of July, 22nd and 24th August, September 22nd, 29th and 30th November 2022 • 5th January, 15th February, 19th and 20th of July and 24th October 2023	N/A
Detailed Botanical Surveys – Irish Vegetation Classification (IVC)	• 24th of August, 14th September, 29th and 30th November 2022 • 15th February, 19th and 20th of July 2023	Botanical Report, Appendix 6-1
Badger/Mammal survey and camera trap set up	• 29th November 2022, • 5th January, 15th February 2023	N/A
Marsh fritillary survey	• 24th August and 14th Sept 2022	N/A
Bat Surveys	• Various (detailed in Bat Report)	Bat Report, Appendix 6-2
Aquatic surveys (including otter)	• August 2022	Aquatics Report, Appendix 6-3
Survey of Black Bridge	• 20th February 2024 (bats and otter)	Bat Report, Appendix 6-2

6.2.3.1 Multi-disciplinary Walkover Surveys (as per NRA Guidelines, 2009)

Multidisciplinary walkover surveys were undertaken within the Proposed Project 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 Proposed Project 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

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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 Proposed Project site are described in the following subsections.

6.2.3.2 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 2022 to 2023. 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).

6.2.3.2.1 *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 the field maps app. 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 Irish Vegetation Classification (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.

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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 KERs.

6.2.3.3 Terrestrial Fauna Surveys

The results of the desk study, scoping replies, incidental records of protected species during ecological survey work and multidisciplinary walkover surveys were used to inform the scope of targeted ecological surveys required. Dedicated surveys for badger and marsh fritillary were undertaken on the dates set out in Section 6.2.3.1 above, with the methodologies followed also provided in the following sections. Dedicated surveys for bats were undertaken across the site and are detailed in the Bat Report in Appendix 6-2. Dedicated otter surveys within the Proposed Wind Farm site were carried out by Triturus Environmental (see Section 2.8 of the Aquatic Baseline Report, Appendix 6-3) while surveys for otter along the Proposed Grid Connection Route were undertaken by MKO. During the multidisciplinary walkover surveys, where observed incidental records of birds and invertebrates including butterflies, dragonflies, etc. were recorded.

6.2.3.3.1 *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 Project site 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,

[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*
[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*

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outlier) and level of usage (disused, well-used, active). 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 site and the timing of the surveys.

6.2.3.3.2 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 site, and along the Proposed Grid Connection 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.

6.2.3.3.3 Marsh Fritillary Surveys

Taking account of the findings of the desk study, which showed records of marsh fritillary in hectads S56, S66 and S67, and following the identification of suitable habitat for this species (e.g. abundance of devil's-bit scabious) within the Proposed Wind Farm site during baseline ecological walkover surveys, targeted larval web surveys for the species were undertaken. The surveys were undertaken within the optimal period i.e. August – September, on dry days, with no rain and no to little wind. The survey methodology followed best practice guidance (NRA, 2009b). Where suitable marsh fritillary habitat was identified the extent of this habitat was mapped (see Figure 6-5) and a systematic search of the area to locate larval webs were undertaken.

6.2.3.3.4 Bat Surveys

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 2022 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.

6.2.3.4 Aquatic surveys

Dedicated aquatic baseline surveys were undertaken by Triturus Environmental. The baseline assessment focused on aquatic ecology including fisheries and biological water quality, as well as protected aquatic species and habitats in the vicinity of the Proposed Wind Farm. Undertaken on a catchment-wide scale, the baseline surveys focused on the detection of freshwater habitats and species of high conservation value. These included surveys for white-clawed crayfish (*Austropotamobius pallipes*), freshwater pearl mussel (*Margaritifera margaritifera*) (eDNA only), macro-invertebrates (biological water quality) and fish species, inclusive of supporting nursery and spawning habitat. The surveys also documented macrophyte and aquatic bryophyte communities including Annex I habitat associations in the vicinity of the project. This holistic approach informed the overall aquatic ecological evaluation of each site in context of the Proposed Project and ensured that any habitats and species of high conservation value would be detected. Full details of the methodology followed for the aquatic surveys as well as details of the locations of survey sites is provided in the Aquatic Baseline Report, Appendix 6-3.

[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*

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6.2.4 Methodology for Assessment of Impacts and Effects

6.2.4.1 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, 2018).

6.2.4.2 Valuing Ecological Receptors

The importance of the ecological features identified within the study area was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the NRA guidelines. 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 or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna. Specific criteria for assigning each of the other levels of importance are set out in the guidelines and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological 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.

6.2.4.3 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*' (2018). 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.

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- **Extent**. Description of the spatial area over which the effect has the potential to occur.
- **Magnitude** 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.

6.2.4.4 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 (2018).

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

When determining significance, consideration is given to whether:

- Any processes or key characteristics of key ecological 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.

6.2.4.5 Incorporation of Mitigation

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. Section 6.6 of this Biodiversity chapter assesses the potential effects of the Proposed Project to ensure that all effects on sensitive ecological receptors are adequately addressed. Where significant effects on sensitive ecological receptors are predicted, mitigation is incorporated into the project design or layout to address such effects. The implemented mitigation measures avoid or reduce potential significant residual effects, post mitigation.

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6.3 Limitations

The information provided in this document accurately and comprehensively describes the baseline ecological environment; provides an accurate prediction of the likely ecological effects of the Proposed Project; prescribes mitigation as necessary; and describes the residual ecological impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines. No significant limitations in the scope, scale or context of the assessment have been identified.

6.4 Establishing the Ecological Baseline

6.4.1 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 6.2.1.

6.4.1.1 Designated Sites

A map of all the European Sites within the vicinity of the Proposed Project is provided in Figure 6-1 with all Nationally Designated Sites shown in Figure 6-2.

Table 6-4 provides details of all relevant 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 Natura Impact Statement submitted with the EIAR. In summary, only one European site was identified to be within the ZoI of the Proposed Project, namely:

- River Barrow and River Nore SAC [002162]

The River Barrow and River Nore SAC is located approximately 1.3km downstream of the Proposed Wind Farm and is hydrologically linked to it via watercourses which drain the site, while the Proposed Grid Connection Route runs immediately adjacent the SAC. 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 pNHA was identified as being within the likely ZoI of the Proposed Project:

- Mothel Church, Coolcullen pNHA [000408]

Table 6-4 Identification of Nationally designated sites within the Likely ZoI

Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
Natural Heritage Areas (NHA)		
Coan Bogs NHA [002382]	2.9km from the Proposed Wind Farm (3.2km from the Proposed Grid Connection Route)	There will be no direct effects as the Proposed Project is located entirely outside the designated site. The NHA is located 2.9km to the northeast of the site. There is no hydrological link between the NHA and Proposed Project, given this and due to the distance between the Proposed Project and the NHA, and the terrestrial nature of the habitat, there is no

Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
		potential for any direct or indirect effects on this NHA. **The NHA is considered to be outside the ZoI and no further assessment is required.**
Proposed Natural Heritage Area (pNHA)		
Mothel Church, Coolcullen [000408]	1.1km from the Proposed Wind Farm (1.1km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site. This pNHA is known to support a summer roost for Natterer's bat (*Myotis natterer*i). This pNHA is located 1.1km from the Proposed Project which is within the known core foraging range for this species. Core foraging areas are used up to 4 kilometres from day roosts and occasionally bats will forage up to 6 kilometres from their roost (Smith, 2000). A potential pathway for impact via loss of foraging and commuting habitat was identified. Collision risk is considered low for Myotis spp therefore no significant collision related effects are anticipated (see Section 5.1 of the Bat Report). **A pathway for effect on this pNHA was identified. The site is considered to be within the ZoI of the Proposed Project and is therefore considered further in this assessment.**
Ballymoon Esker [000797]	9.6km from the Proposed Wind Farm (10.5km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site. This pNHA is designated for calcareous grassland habitats. Due to the distance between the Proposed Project and the pNHA, and the terrestrial nature of the habitat, there is no potential for indirect effects on the pNHA. **The pNHA is considered to be outside the ZoI for the Proposed Project and no further assessment is required.**
Cloghristick Wood [000806]	5.2km from the Proposed Wind Farm (6.2km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site. This pNHA is designated for woodland habitats. There is no hydrological link between the pNHA and Proposed Project ,given this and due to the distance between the Proposed Project and the pNHA there is

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Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
		no potential for indirect effects on the pNHA. **The pNHA is considered to be outside the ZoI for the Proposed Project and no further assessment is required.**
Archersgrove [002051]	16km from the Proposed Wind Farm (2.8km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site. This pNHA is designated for scrub woodland habitat. Due to the distance between the Proposed Project and the pNHA, and the terrestrial nature of the habitat, there is no potential for indirect effects on the pNHA. **The pNHA is considered to be outside the ZoI for the Proposed Project and no further assessment is required.**
Whitehall Quarries [000855]	5.4km from the Proposed Wind Farm (5.6km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site. This pNHA is a disused quarry. Due to the distance between the Proposed Project and the pNHA, and the terrestrial nature of the habitat, there is no potential for indirect effects on the pNHA. **The pNHA is considered to be outside the ZoI for the Proposed Project and no further assessment is required.**
Newpark Marsh [000845]	6.3km from the Proposed Wind Farm (5.5km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site. This pNHA is designated for marsh habitat. There is no identifiable surface water connection between the Proposed Project and this pNHA. This pNHA is located within the 'Killkenny-Ballynakill Gravels' WFD groundwater body. The Proposed Project is not located within the same groundwater body. Therefore, there is no potential for effects via groundwater quality deterioration to the pNHA. **The pNHA is considered to be outside the ZoI for the Proposed Project and no further assessment is required.**
Dunmore Complex [001859[	6.4km from Proposed Wind Farm (6.4km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site.

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Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
		This pNHA is designated for a series of natural depressions in the gravels and boulder clays of the northern outskirts of Kilkenny city supports an interesting diversity of wetland and woodland and old meadow habitats. This pNHA is located within the 'Killkenny-Ballynakill Gravels' WFD groundwater body. The Proposed Project is not located within the same groundwater body. Therefore, there is no potential for effects via groundwater quality deterioration to the pNHA. **The pNHA is considered to be outside the ZoI for the Proposed Projectand no further assessment is required.**
Red Bog, Dungarvan [000846]	7.0km from the Proposed Wind Farm (6.4km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Projectis located entirely outside of this designated site. This pNHA is designated for wetland habitat. There is no identifiable surface water connection between the Proposed Project and this pNHA. This pNHA is located within the within the Bennettsbridge' WFD groundwater body and the 'Clifden South' groundwater body. The Proposed Project is not located within the same groundwater body. Therefore, there is no potential for effects via groundwater quality deterioration to the pNHA. **The pNHA is considered to be outside the ZoI for the Proposed Projectand no further assessment is required.**
Lough Macask [001914]	7.4km from the Proposed Wind Farm (7.1km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site. This pNHA is designated for wetland habitat. There is no identifiable surface water connection between the Proposed Project and this pNHA. This pNHA is located within the 'Killkenny-Ballynakill Gravels' WFD groundwater body. The Proposed Projectis not located within the same groundwater body. Therefore, there is no potential for effects via groundwater quality deterioration to the pNHA.

Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
		The pNHA is considered to be outside the ZoI for the Proposed Development and no further assessment is required.
Dunmore Cave [000401]	Approx. 13km from the Proposed Wind Farm (7.4km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site. This pNHA is known to support a summer roost for Natterer's bat (*Myotis nattereri*). This pNHA is located over 7km from the Proposed Project which is outside the known core foraging range for this species. Core foraging areas are used up to 4 kilometres from day roosts and occasionally bats will forage up to 6 kilometres from their roost (Smith, 2000). No potential pathway for impact was therefore identified. **The pNHA is considered to be outside the ZoI for the Proposed Projectand no further assessment is required.**
Esker Pits [000832]	9.2km from the Proposed Wind Farm (8.5km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site. This pNHA is designated for calcareous grassland habitat. Due to the distance between the Proposed Projectand the pNHA, and the terrestrial nature of the habitat, there is no potential for indirect effects on the pNHA. **The pNHA is considered to be outside the ZoI for the Proposed Projectand no further assessment is required.**
Ardaloo Fen [000821]	Approx 17km the Proposed Wind Farm (10.1km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site. This pNHA is designated for wetland habitat. There is no identifiable surface water connection between the Proposed Project and this pNHA. This pNHA is located within the 'Killkenny-Ballynakill Gravels' groundwater body and 'Durrow' groundwater body. The Proposed Project is not located within the same groundwater body. Therefore, there is no potential for effects via groundwater quality deterioration to the pNHA.

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Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
		The pNHA is considered to be outside the ZoI for the Proposed Project and no further assessment is required.
Mount Juliet [000843]	12.3km from the Proposed Wind Farm (10.2km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site. This pNHA is designated for woodland habitat. Due to the distance between the Proposed Project and the pNHA, and the terrestrial nature of the habitat, there is no potential for indirect effects on the pNHA. **The pNHA is considered to be outside the ZoI for the Proposed Project and no further assessment is required.**
Inchbeg [000836]	12.3km from the Proposed Wind Farm (12.3km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site. This pNHA is designated for wet grassland habitat. There is no identifiable surface water connection between the Proposed Project and this pNHA. This pNHA is located within the 'Killkenny-Ballynakill Gravels' groundwater body and 'Durrow' groundwater body. The Proposed Project is not located within the same groundwater body. Therefore, there is no potential for effects via groundwater quality deterioration to the pNHA. **The pNHA is considered to be outside the ZoI for the Proposed Project and no further assessment is required.**
Lisbigney Bog [000869]	13.2km from the Proposed Wind Farm (18.8km from the Proposed Grid Connection Route)	There is no potential for direct effects as the Proposed Project is located entirely outside of this designated site. This pNHA is designated for wetland fen habitat and Desmoulin's whorl snail (*Vertigo moulinsiana*). There is no identifiable surface water connection between the Proposed Project and this pNHA. This pNHA is located within the 'Durrow' WFD groundwater. The Proposed Project is not located within the same groundwater body. Therefore, there is no potential for effects via groundwater quality deterioration to the pNHA.

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Designated Site	Distance from Proposed Project (km)	Zone of Likely Impact Determination
		The pNHA is considered to be outside the ZoI for the Proposed Project and no further assessment is required.

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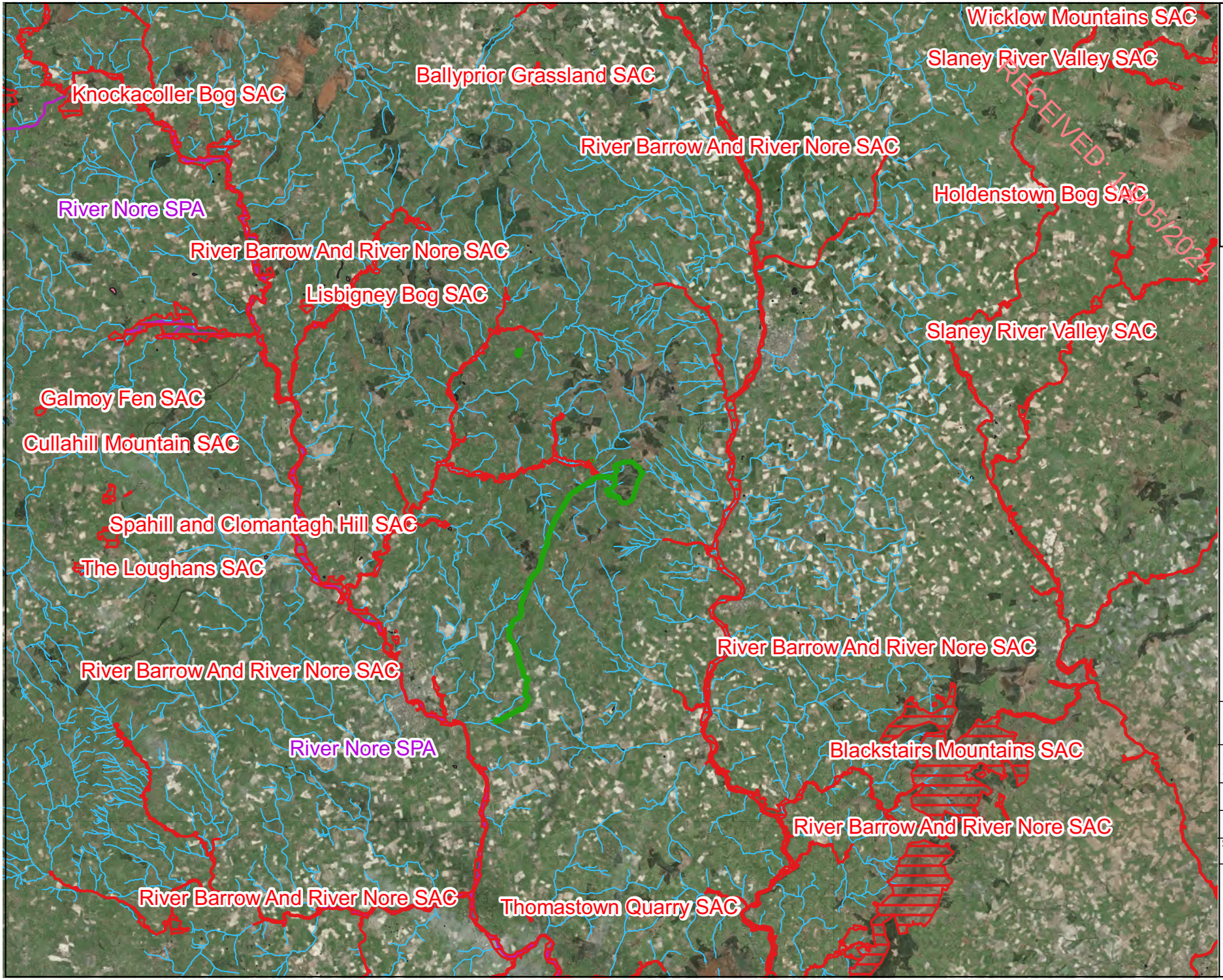

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Map Legend

- EIAR Site Boundary
- Special Area of Conservation
- Special Protection Area
- Watercourses

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Drawing Title

European Sites

Project Title

Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
CH	CC
Project No.	Drawing No.
220246	Figure 6.1
Scale	Date
1:291,932	26/02/2024

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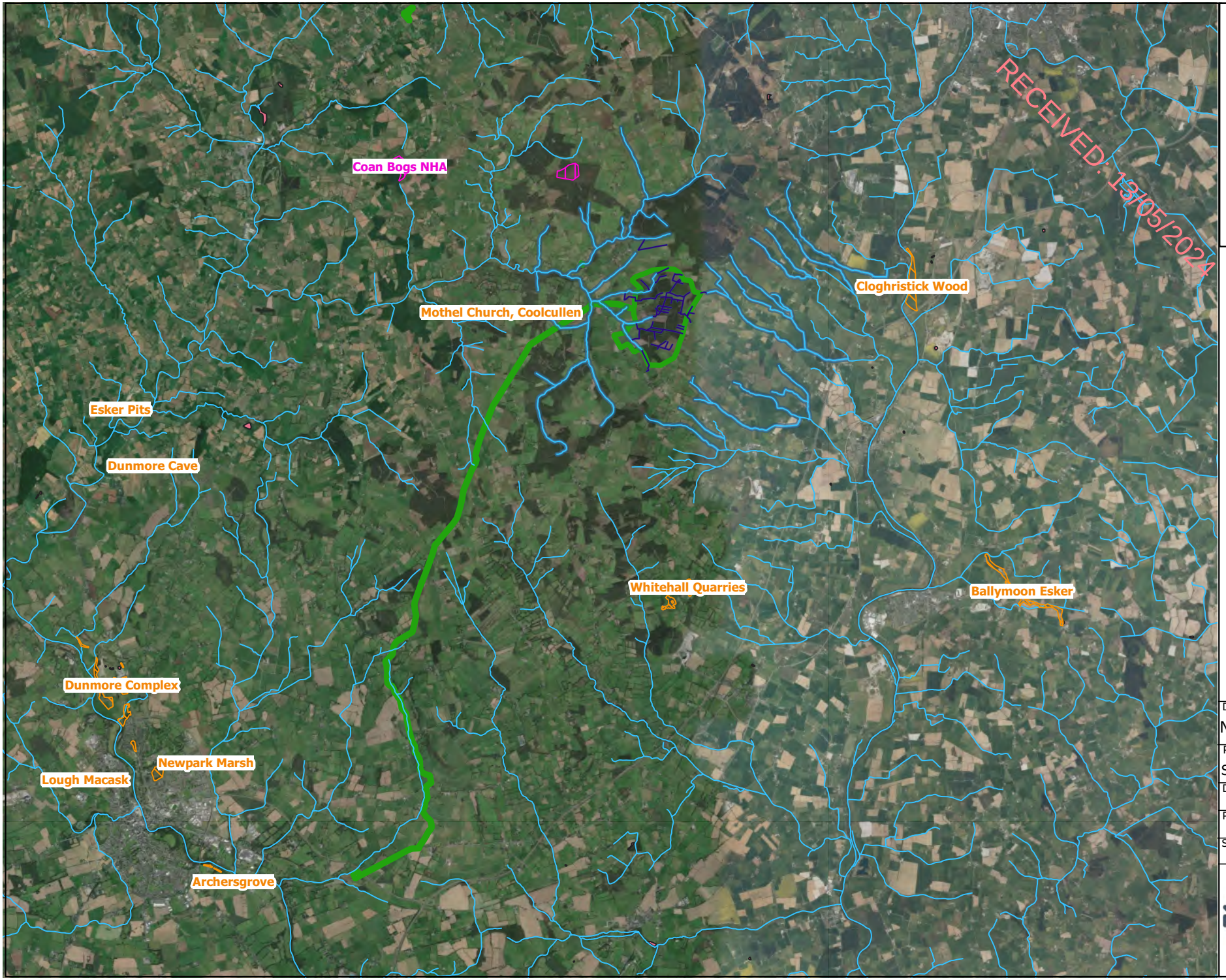

Map Legend

- EIAR Site Boundary
- Natural Heritage Area
- Proposed Natural Heritage Area
- Watercourses

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Drawing Title
Nationally Designated sites

Project Title
Seskin Wind Farm, Co. Carlow

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Project No.	Drawing No.
220246	Figure 6.2
Scale	Date
1:124,717	13/03/2024

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6.4.1.2 NPWS Article 17 Reporting

Available NPWS datasets were downloaded and overlain on the Proposed Project. No polygon or point data contained within datasets was identified within the EIAR Site Boundary. Following a review of the Irish Semi-natural Grasslands Survey (ISGS) no areas of the lands within the EIAR Site Boundary were found to have been surveyed as part of the ISGS.

6.4.1.3 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 II of the EU Habitats Directive, The Irish Red Data Book – 1 Vascular Plants (Curtis, 1988) or the Flora (Protection) Order 2022 had been recorded in the relevant 10km square in which the Proposed Project site is situated (S66, S55, S56 and S57). Each hectad contains 100 whole one kilometre squares containing terrestrial habitats. Species of conservation concern are given in Table 6-5.

Table 6-5: Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectad S66, S55, S56, S57 and S67

Common Name	Scientific Name	Hectad	Status
Meadow Saffron	*Colchicum autumnale*	S55	EN, FPO
Green-winged orchid	*Orchis morio*	S55, S56, S66	VU
Fiddle Dock	*Rumex pulcher*	S55, S56, S66	VU
Bur Chervil	*Anthriscus caucalis*	S55, S56, S66	NT
Slender Thistle	*Carduus tenuiflorus*	S55, S56	NT
Greater Knapweed	*Centaurea scabiosa*	S55, S56, S57, S66, S67	NT
Hound's-tongue	*Cynoglossum officinale*	S55, S56, S57, S66	NT
Henbane	*Hyoscyamus niger*	S55, S56, S57, S66	NT
Pale Flax	*Linum bienne*	S55, S56, S57, S66, S67	NT
Common Gromwell	*Lithospermum officinale*	S55, S56, S57, S66	NT
Dwarf mallow	*Malva neglecta*	S55, S56, S57, S66	NT
Milk thistle	*Silybum marianum*	S55, S56, S57, S66	NT
Autumn Lady's-tresse	*Spiranthes spiralis*	S55, S56, S57, S66, S67	NT
Vervain	*Verbena officinalis*	S55, S56, S57, S66, S67	NT
Green Field-speedwell	*Veronica agrestis*	S55, S56, S56, S66	NT
Basil Thyme	*Clinopodium acinos*	S55, S56, S57	NT

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Fragrant Agrimony	*Agrimonia procera*	S56, S66	NT
Prickly sedge	*Carex spicata*	S56, S57, S66	NT
Corn marigold	*Chrysanthemum segetum*	S56, S57, S66, S67	NT
Shepherd's-needle	*Scandix pecten-veneris*	S66	RE
Common wormwood	*Artemisia absinthium*	S66	VU
Rough chervil	*Chaerophyllum temulum*	S66, S67	VU
Good-King-Henry	*Chenopodium bonus-henricus*	S66	VU
Red Hemp-nettle	*Galeopsis angustifolia*	S66, S67	VU
Narrow-fruited Cornsalad	*Valerianella dentata*	S66	VU
Black Horehound	*Ballota nigra*	S66, S67	NT
Moonwort	*Botrychium lunaria*	S66	NT
Slender Thistle	*Carduus tenuiflorus*	S66, S67	NT
Longbract frog orchid	*Coeloglossum viride*	S66	NT
Autumn gentian	*Gentianella amarella*	S66, S67	NT
Bog Orchid	*Hammarbya paludosa*	S66	NT, FPO
Northern Dead-nettle	*Lamium confertum*	S66	NT
Arctic bur-reed	*Sparganium natans*	S66, S67	NT
Knotted Hedge-parsley	*Torilis nodosa*	S66, S67	NT
Dwarf Spurge	*Euphorbia exigua*	S67	NT

Near Threatened (NT), Vulnerable (VU), Critically Endangered (CR), Regionally Extinct (RE), FPO (Flora Protection Order)

6.4.1.4 Bryophytes

The desktop search (NPWS bryophyte mapper) indicated that no protected bryophytes have been recorded within or adjacent to the Proposed Projectsite.

6.4.1.5 Bats and Birds

Please note the result of desktop studies in relation to bats and birds are detailed in the Bat Report, Appendix 6-2, and Chapter 7 (Ornithology).

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6.4.1.6 National Biodiversity Data Centre (NBDC) Records

6.4.1.6.1 Fauna

A search of the NBDC website was conducted to inform survey effort and provide a baseline of likely species composition in the area. Records of protected fauna recorded from hectads S66, S55, S56 and S57 are provided in in Table 6-6.

Table 6-6: NBDC records for protected species and species of conservation interest (excl. birds) in hectad S66, S55, S56 and S57

Common name	Scientific name	Designation	Hectad
Common Frog	*Rana temporaria*	Wildlife Act, Annex V	S55, S56, S57, S66, S67
Smooth Newt	*Lissotriton vulgaris*	Wildlife Act	S56, S57, S66, S67
Common Lizard	*Zootoca vivipara*	Wildlife Act	S57, S66, S67
Marsh Fritillary	*Euphydryas aurinia*	Annex II,	S56, S57, S66, S67
White-clawed crayfish	*Austropotamobius pallipes*	Wildlife Act, Annex II, Annex V	S55, S57, S66, S67
Fallow Deer	*Dama dama*	Wildlife Act	S57, S66
Hedgehog	*Erinaceus europaeus*	Wildlife Act,	S55, S56, S57, S66, S67
Otter	*Lutra lutra*	Wildlife Act, Annex II, Annex IV	S55, S56, S57, S66, S67
Pine Marten	*Martes martes*	Wildlife Act, Annex V	S55, S56, S57, S66, S67
Badger	*Meles meles*	Wildlife Act	S55, S56, S57, S67
Irish Stoat	*Mustela erminea subsp. hibernica*	Wildlife Act	S56, S57, S66, S67
Irish Hare	*Lepus timidus subsp. hibernicus*	Wildlife Act, Annex V	S55, S56, S57, S66, S67
Daubenton's Bat	*Myotis daubentonii*	Wildlife Act, Annex IV	S55, S56, S57, S66
Whiskered Bat	*Myotis mystacinus*	Wildlife Act, Annex IV	S67
Natterer's Bat	*Myotis nattereri*	Wildlife Act, Annex IV	S56
Leisler's Bat	*Nyctalus leisleri*	Wildlife Act, Annex IV	S55, S56, S57, S66
Nathusius' Pipistrelle	*Pipistrellus nathusii*	Wildlife Act, Annex IV	S67
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Wildlife Act, Annex IV	S55, S56, S57, S66, S67

Brown Long-eared Bat	*Plecotus auritus*	Wildlife Act, Annex IV	S55, S56, S57, S66, S67
Red Squirrel	*Sciurus vulgaris*	Wildlife Act	S55, S56, S57, S66, S67
Pygmy Shrew	*Sorex minutus*	Wildlife Act	S55, S56, S57, S66, S67

Annex II, Annex IV, Annex V – Of EU Habitats Directive, Annex I – Of EU Birds Directive, WA – Irish Wildlife Acts (1976 as amended)

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6.4.1.6.2 Invasive Species

The NBDC database also contains records of invasive species identified within the relevant hectads. A number of species subject to restrictions under Regulations 49 and 50 and included in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 were found to be present in hectads S66, S55, S56 and S57 as shown in Table 6-7 below.

Table 6-7: NBDC records for invasive species (hectads S66, S55, S56 and S57)

Common Name	Scientific Name	Hectad
American skunk-cabbage	*Lysichiton americanus*	S55
Giant hogweed	*Heracleum mantegazzianum*	S55, S67
Giant-rhubarb	*Gunnera tinctoria*	S55, S57
Himalayan balsam	*Impatiens glandulifera*	S55, S56, S57, S66, S67
Japanese knotweed	*Reynoutria japonica*[12]	S55, S57, S66, S67
Three-cornered leek	*Allium triquetrum*	S55, S66
Grey squirrel	*Sciurus carolinensis*	S55, S56, S57, S66, S67
Himalayan knotweed	*Persicaria wallichii*	S56
Harlequin Ladybird	*Harmonia axyridis*	S56
Rhododendron	*Rhododendron ponticum*	S57
Salmonberry	*Rubus spectabilis*	S57
Greylag goose	*Anser anser*	S57
Fallow deer	*Dama dama*	S57
Water fern	*Azolla filiculoides*	S66, S67

[12] Named *Fallopia japonica* in the Regs.

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6.4.1.1 NPWS Protected Species Records

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 S66, S55, S56, S57and S67. An information request was also sent to the NPWS scientific data unit requesting records from the Rare and Protected Species Database on the 6th October 2023. A response was received on the 12th October 2023. Table 6-8 lists rare and protected species records obtained from NPWS.

Table 6-8 NPWS records for rare and protected species

Common name	Scientific name	Designation	Hectad
Common Lizard	*Zootoca vivipara*	Wildlife Act,	S55, S67
Common Frog	*Rana temporaria*	Wildlife Act, Annex V	S55, S56, S57, S66, S67
Sea Lamprey	*Petromyzon marinus*	Annex II	S55
Atlantic Salmon	*Salmo salar*	Annex II, Annex V	S55
Marsh Fritillary	*Euphydryas aurinia*	Annex II	S55
White-clawed Crayfish	*Austropotamobius pallipes*	Wildlife Act, Annex II, Annex V	S55, S56, S57, S66, S67
Sika Deer	*Cervus nippon*	Wildlife Act	S55
Fallow Deer	*Dama dama*	Wildlife Act	S55
Hedgehog	*Erinaceus europaeus*	Wildlife Act	S55, S57, S66, S67
Otter	*Lutra lutra*	Wildlife Act, Annex II, Annex IV	S55, S56, S57, S66, S67
Pine Marten	*Martes martes*	Wildlife Act, Annex V	S55
Badger	*Meles meles*	Wildlife Act	S55, S56, S57, S66, S67
Irish Stoat	*Mustela erminea subsp. hibernica*	Wildlife Act	S55, S67
Irish Hare	*Lepus timidus subsp. hibernicus*	Wildlife Act, Annex V	S67
Daubenton's Bat	*Myotis daubentonii*	Wildlife Act, Annex IV	S55
Leisler's Bat	*Nyctalus leisleri*	Wildlife Act, Annex IV	S55
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Wildlife Act, Annex IV	S55

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Common name	Scientific name	Designation	Hectad
Brown Long-eared Bat	*Plecotus auritus*	Wildlife Act, Annex IV	S55
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	Wildlife Act, Annex II, Annex IV	S55
Red Squirrel	*Sciurus vulgaris*	Wildlife Act	S55, S57, S66, S67
Pygmy Shrew	*Sorex minutus*	Wildlife Act	S55
Meadow Saffron	*Colchicum autumnale*	FPO	S55
Small White Orchid	*Pseudorchis albida*	VU (previously listed on 2015 FPO).	S55
Green-winged Orchid	*Orchis morio*	VU	S55, S66
Red Hemp-nettle	*Galeopsis angustifolia*	VU, FPO	S55, S66, S67
Prickly Poppy	*Papaver argemone*	VU	S55
Fiddle Dock	*Rumex pulcher*	VU	S55
Irish Whitebeam	*Sorbus hibernica*	VU	S55
Common hedgenettle	*Stachys officinalis*	NT	S55
Basil Thyme	*Clinopodium acinos*	NT	S55
Henbane	*Hyoscyamus niger*	NT	S55
Spiked Sedge	*Carex spicata*	NT	S56
Bog Orchid	*Hammarbya paludosa*	FPO, NT	S66
Knotted Hedge-parsley	*Torilis nodosa*	NT	S66

FPO = Flora Protection Order; VU = Vulnerable, NT=Near Threatened, WA = Wildlife Act

6.4.1.2 Inland Fisheries Ireland Data

The IFI online database[13] was reviewed for fish species records within the catchments downstream of the Proposed Wind Farm site and the Proposed Grid Connection Route. The Proposed Wind Farm site is within the South-eastern River Basin District and within hydrometric area 15 (Nore). The aquatic survey sites were located within the Dinin[South]_SC_010 and Barrow_SC_110 river sub-catchments. The Proposed Wind Farm site is drained by the Seskinrea Stream (EPA code: 15S14) and two unnamed tributaries, with downstream connectivity to the Dinin River 15D08), a major tributary of the River Nore. No IFI information was available for rivers within the site as such the nearest river with information available was located and used for the purpose of this assessment. The results are presented in the Table 6-9 below. Further detail with regard to fisheries desk study data is available in the Aquatic Baseline Report (Appendix 6-3).

[13] *https://opendata-ifigis.hub.arcgis.com/datasets/1034e20d4cce499695a5bd020e594331_0/explore?location=52.730463%2C-7.616216%2C8.84*

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Table 6-9: Inland Fisheries Ireland Data

Station Name	Species	Draft Fish Ecological Status	Assessment Year
Philip's Bridge A	Brown trout; Salmon; Stone loach	High	2021
Philip's Bridge A	Bown trout; Salmon; Stone loach	High	2017
Clarabricken_A	Three-spined stickleback	Poor	2021
Kingsland_A	Brown trout; Three-spined stickleback	Moderate	2021
Coolraheen North_B	Brown trout; Minnow; Salmon; Stone loach	Good	2020
Coolraheen North_A	Brown trout; Minnow; Salmon; Stone loach	N/A	2017
Dinin Br._A	Brown trout; European eel; Lamprey sp.; Minnow; Salmon; Stone loach; Three-spined stickleback	Good	2016
Dinin Br._A	Brown trout; European eel; Minnow; Salmon; Stone loach; Three-spined stickleback	Moderate	2021
Dinin Br._A	Brown trout; European eel; Minnow; Salmon; Stone loach	Good	2012
Dinin Br._A	Brown trout; European eel; Minnow; Salmon	Good	2009
Brownsbarn Br._A	Brown trout; Dace; European eel; Flounder; Lamprey sp.; Minnow; Salmon; Sea trout; Stone loach	Good	2014
Brownsbarn Br._A	Brown trout; Dace; European eel; Flounder; Minnow; Salmon; Stone loach	Good	2010
Brownsbarn Br._A	Brown trout; Dace; Flounder; Lamprey sp.; Minnow; Salmon	N/A	2021
Kilmacshane_A	Brown trout; Dace; European eel; Flounder; Minnow; Roach; Salmon; Sea trout	Good	2014

6.4.1.3 Freshwater Pearl Mussel (*Margaritifera margaritifera*)

The Proposed Project located within the Nore Lower *Margaritifera* catchment and the Barrow *Margaritifera* catchment, both of which are classified as 'Catchments with previous records of *Margaritifera*, but current status unknown'. The Proposed Wind Farm site is hydrologically connected to the Nore Lower *Margaritifera* catchment via the Seskinrea River and two unnamed tributaries. The Proposed Grid Connection Route is also hydrologically connected to the Nore Lower *Margaritifera* catchment, via the Kilderry 15 River, which intersects the route, and the Lyrath River, which both intersects and runs in parallel with part of the proposed route. Two records (from 1991 and 2007) were available for freshwater pearl mussel for the River Nore in grid square S46, however, both records were

located upstream of the Dinin River confluence. Therefore there is no hydrological connection between the Proposed Project to any known freshwater pearl mussel point records.

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6.4.1.4 Regional and Local Hydrology and Hydrogeology

6.4.1.4.1 Proposed Wind Farm

A regional hydrology map is shown in Figure 9-1 within Chapter 9 'Water' of this EIAR. On a regional scale, the Proposed Wind Farm is located in both the Dinin [South]_SC_010 and the Nore_SC_100 surface water sub catchments, both of which are located in the Nore WFD catchment, located in Hydrometric Area 15 of the Irish River Basin District (SIRBD). The Proposed Wind Farm site is also located in both the Barrow_SC_110 and Barrow_SC_120 surface water sub catchments, which are located in the Barrow catchment, located in Hydrometric Area 14 of the Irish River Basin District (SIRBD).

Three rivers flow within the western section of the Proposed Wind Farm site. The Seskinrea River, located northwest, and two unnamed tributaries, (EPA RWB Code: IE_SE_15D080600), located centrally and (EPA RWB Code: IE_SE_15D080600), located in the southwestern section. All of these river's flow in a generally westerly direction before merging together outside of the site boundary and discharging to the Knocknabranagh and Knockbaun River which flow within the River Barrow and River Nore SAC. The Knocknabranagh and Knockbaun River then continues in a north westerly direction before it joins the Dinin [South] River, which continues west to join the Dinin [Nore] River also within the River Barrow and River Nore SAC. The Dinin [Nore] River then flows generally south and converges with the Nore River.

A map of the local hydrology in relation to the Proposed Wind Farm site is shown in Figure 9-2, Chapter 9 of the EIAR. On a more local scale, the majority of the Proposed Wind Farm site is located in the Dinin [South]_SC_010 sub-catchment, with the majority of the Proposed Wind Farm site in the DININ (South)_020 river sub basin. There are two small sections in the northeast and the southeast of the Proposed Wind Farm site that fall within the Barrow_SC_110 sub-catchment. The northeastern section lies within the Rathornan_010 river sub-basin, and the southeastern section lies within the Old Leighlin Stream_020 river sub-basin. However, none of the Proposed Wind Farm turbines are mapped in either the Rathornan_010 or Old Leighlin Stream_020 river sub-basins.

As stated above, the majority of the Proposed Wind Farm is located in the DININ (SOUTH)_020 river sub basin. Within this river sub basin, the Seskinrea River (EPA code: 15S14) flows in the northwestern section of the Proposed Wind Farm site, south of T1, then flows west, outside of the site. A second river, an unnamed tributary (EPA RWB Code: IE_SE_15D080600), rises roughly in the centre of the Proposed Wind Farm site, north of T6 and south of T4, before also flowing west, outside of the site. The third tributary, (EPA RWB Code: IE_SE_15D080600) flows briefly along a section of the southern boundary of the Proposed Wind Farm site before flowing north west, west of T7, and also flowing outside of the site and merging with the other unnamed tributary, before continuing to flow north west and join the Seskinrea River. The drainage of this river sub-basin is directed towards the Dinin [South] River via other smaller streams and drains.

The Seskinrea River then joins the Knocknabranagh_and_Knockbaun River (EPA Code: 15K25). The Knocknabranagh_and_Knockbaun River then continues in a north westerly direction before it joins the Dinin [South] River (EPA Code: 15D08), which continues west to join the Dinin [Nore] River (EPA Code: 15D02). The Dinin [Nore] River then flows generally south and eventually converges with the Nore River (EPA Code: 15N01), approx. 16.7km southwest of the Proposed Wind Farm site.

Within the RATHORNAN_010 river sub-basin, the closest aquatic feature to the northeast of the Proposed Wind Farm is the Seskin_Upper River (EPA Code: 14S28) located approx. 168m east of the Proposed Wind Farm site, which drains into the RATHORNAN River (EPA Code: 14R43). Within the OLD LEIGHLIN STREAM_020 river sub-basin, the closest aquatic feature to the southeast of the Proposed Wind Farm site is the Parknakyle Stream (EPA Code: 14P10) located approx. 577m southeast

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of the Proposed Wind Farm site, which drains into the Oldleighlin (Stream) (EPA Code: 14O02) via the Farranacurragh River (EPA Code: 14F19).

6.4.1.4.2 Proposed Grid Connection Route

The Proposed Grid Connection Route is located within the Dinin [South]_SC_010, Barrow_SC_120 and Nore_SC_100 sub catchments. The Dinin [South]_SC_010 and Nore_SC_100 sub catchments generally flow in a westerly direction, towards the Nore Catchment, and the Barrow_SC_120 generally flows southeast towards the Barrow Catchment. The primary watercourse within the Nore Catchment is the Nore River, which the Dinin [South], Kilderry 15, and Lyrath Rivers drain into. A Proposed Grid Connection Route hydrology map is shown in Figure 9-3, Chapter 9 of this EIAR.

6.4.1.4.3 Water Quality

Q-rating status data for EPA monitoring points on the Dinin [South] River and the Dinin [Nore] River are shown on Table 6-10 below. The Q-Rating is a water quality rating system based on both the habitat and the invertebrate community assessment and is divided into status categories ranging from 0-1 (Poor) to 4-5 (Good/High). Q-values are assigned using a combination of habitat characteristics and structure of the macro-invertebrate community within the waterbody. Individual macro-invertebrate families are classified according to their sensitivity to organic pollution and the Q-value is assessed based primarily on their relative abundance within a sample.

Most recent data available (2005 to 2020) show that the Q-rating for the Dinin [South] River upstream of the Proposed Wind Farm site at the Black Bridge is of Good status. Meanwhile, downstream of the Proposed Wind Farm site, the Dinin [South] River is reported to be of Good status in the latest monitoring round (2020). Further downstream, the Dinin [Nore] River is also reported as being of Good status. No Q-rating is available for the Seskinrea River, or the tributaries located in the western section of the Proposed Wind farm site.

Table 6-10: Water quality status of watercourses within or in proximity of the Proposed Wind Farm site

Waterbody	EPA Location Description	Year	Easting	Northing	EPA Q-Rating Status
DININ (SOUTH)_010	Black Bridge	2022	261802.93	170092.56	Good
DININ (SOUTH)_020	Dysart Bridge	2022	253090.78	169833.52	Good
DININ (MAIN CHANNEL) _010	Lisnafunshion	2022	252180	168082	Good

6.4.1.5 Conclusions of the Desktop Study

The desktop study has provided information about the existing environment in hectads S67, S66, S55, S56 and S57, within which the Proposed Project is located. The majority of the Proposed Wind Farm site is located in the Nore catchment and is within the Dinin [South]_SC_010 and Nore_SC_100 sub-catchments.

Watercourses that drain the Proposed Wind Farm site, ultimately discharge to the River Barrow and River Nore SAC approx. 1.3km downstream, while the Proposed Grid Connection Route runs adjacent to this SAC as such this European site is within the ZoI of the Proposed Project. One nationally designated site is also within the ZoI of the Project, namely:

- Mothel Church, Coolcullen pNHA [000408]

The desk study identified that a variety of protected faunal species are known to occur within the wider study area, including bats, otter, badger, red squirrel etc. The mammal species recorded during the desk study informed the survey methodologies undertaken during the site visits. The mammal species recorded within the relevant hectad have widespread range and distributions in Ireland and are likely to be recorded frequently throughout Ireland (Marnell et al, 2009). The Proposed Wind Farm is located within a freshwater pearl mussel 'sensitive area', however it is not hydrologically linked to any known freshwater pearl mussel point records.

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The desk study revealed that there are no known Annex I Article 17 habitats present within or in close proximity to the Proposed Wind Farm, similarly no known records of rare or protected flora have been recorded within the site.

The desk study 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.

6.5 Baseline Ecological Survey Results

6.5.1 Description of Habitats and Flora

Detailed botanical data from relevés recorded at turbine base locations across the Proposed Wind Farm site are provided in Appendix 6-1 of this EIAR. A habitat map of the Proposed Wind Farm site is provided in Figure 6-3. A map showing the development footprint overlaying the Habitat Map is shown in Figure 6-4.

A total of twelve habitats were recorded within the Proposed Wind Farm site including:

- Improved agricultural grassland (GA1)
- Wet grassland (GS4)
- Conifer plantation (WD4)
- Recently felled woodlands (WS5)
- Scrub (WS1)
- Hedgerows (WL1)
- Stonewalls (BL1)
- Earth banks (BL2)
- Treelines (WL2)
- Drainage Ditches (FW4)
- Eroding Upland Rivers/Streams (FW1)
- Buildings and artificial surfaces (BL3)

6.5.1.1 Improved Agricultural Grassland (GA1)

A number of agricultural fields within the Proposed Wind Farm site were characterised as improved agricultural grassland (GA1) pasture. This habitat type (see Plate 6-1) was predominantly recorded along the southwestern section of the Proposed Wind Farm site, as well as in the south and north of the Proposed Wind Farm site. The sward within most fields of this nature was dominated by perennial ryegrass (*Lolium perenne*), Yorkshire fog (*Holcus lanatus*), creeping buttercup (*Ranunculus repens*), red clover (*Trifolium pratense*), white clover (*Trifolium repens*), and occasional soft rush (*Juncus effusus)*. These areas of grassland are under agricultural management, used for silage and grazed by livestock.

Turbine 1 (and associated infrastructure) are proposed to be located on improved agricultural grassland (GA1) habitat.

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Plate 6-1. An example of improved agricultural grassland (GA1) in the vicinity of the proposed location for Turbine 1, in the northwest section of the Proposed Wind Farm site.

6.5.1.2 Wet Grassland (GS4)

Wet grassland was recorded within agricultural fields throughout the Proposed Wind Farm site, with the greatest concentration of this habitat located in the southwestern corner of the Proposed Wind Farm site. This habitat type (see Plate 6-2) within the Proposed Wind Farm site was dominated by grasses and rushes, in particular soft rush, Yorkshire-fog, Common Bent *(Agrostis capillaris)*, and creeping buttercup (*Ranunculus repens*). Other species recorded within this habitat included perennial ryegrass, meadow buttercup and marsh thistle (*Cirsium palustre*). Turbines 3 and 6 (and associated infrastructure) are proposed to be located in areas of wet grassland (GA4) habitat.

Plate 6-2. Wet grassland (GS4) recorded in the vicinity of the proposed location for Turbine 3

6.5.1.3 Conifer Plantation (WD4) & Recently Felled Woodland (WS5)

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Conifer plantation (WD4) and recently felled (conifer) woodland (WS5) were the two dominant habitat types recorded through the Proposed Wind Farm site. Conifer plantation was recorded within the central southern half of the site, extending through the greater central vicinity and spanning the majority of the northern portion of the Proposed Wind Farm site.

These forestry blocks (see Plate 6-3) were dominated by Sitka (Picea sp.) with ground flora dominated by bryophyte species, as well as bramble, rushes, bracken (*Pteridium aquilinum*). There was a greater diversity of flowering plants recorded within areas of recently felled woodland (see Plate 6-4) some additional species recorded in these areas comprised foxglove (*Digitalis purpurea*), heath bedstraw (*Galium saxatile*), tormentil (*Potentilla erecta) and* rosebay willowherb (*Chamaenerion angustifolium).*

Areas of conifer plantation which had been felled but not yet replanted, were classified as recently felled woodland (WS5).

Plate 6-3: Example of receiving habitat (WS5) at Turbine 5

Plate 6-4: Example of bryophyte-dominant woodland floor cover within conifer plantation (WD4) July 19th, 2023.

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6.5.1.4 Scrub (WS1)

This habitat type was only recorded in a small number of areas within the Proposed Wind Farm site and was predominantly associated with areas of previously felled woodland or scrub encroachment around field boundaries. Where scrub habitat had started to develop it was dominated by willow (*Salix spp.*) gorse (*Ulex europaeus*) and bramble, with spruce saplings also present (see Plate 6-5).

Plate 6-5. An area of scrub habitat (WS1) establishing in an area of previously felled woodland.

6.5.1.5 Hedgerow (WL1) and Stonewalls (BL1)

Hedgerow habitat was only occasionally recorded within the Proposed Wind Farm site, the majority of linear habitats forming field boundaries within the site comprised of heavily vegetated stonewalls and/or earth banks (discussed further below). Hedgerow habitat was mainly associated with agricultural fields and an old farmstead in the west of the Proposed Wind Farm site and west of turbine 4. Here the hedgerows were outgrown in nature (see Plate 6-6) and dominated by Hawthorn (*Crataegus monogyna*). As per Fossitt (2000) heavily vegetated, overgrown stone walls should also be considered as hedgerow habitat, heavily vegetated stone walls (see Plate 6-7) were recorded along a farm track which will form the new entrance to the Proposed Wind Farm site. Vegetation on these stone walls was dominated by bramble, gorse and grasses with occasional rosebay willowherb.

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Plate 6-6. Hedgerow (WL1) habitat forming field boundary around old farmstead west of Turbine 4.

Plate 6-7. Heavily vegetated/overgrown stone walls mapped as hedgerow (WL1) along existing farm track which will form the new entrance to the Proposed Wind Farm site.

6.5.1.6 Earth banks (BL2)

Earth banks are a common type of field boundary in many parts of Ireland (Fossitt). Most are completely vegetated when intact as was the case on the Proposed Wind Farm site. This habitat type was recorded around field boundaries in the northeast of the Proposed Wind Farm site in close proximity to the proposed location for Turbine 3 and also in the south of the Proposed Wind Farm site, south of the proposed location for Turbine 7. Vegetated earth banks were very overgrown in parts and were dominated by gorse and hawthorn. These vegetated earth banks are very similar in nature of hedgerows in that they form a linear wildlife corridor within the landscape.

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6.5.1.7 Treeline (WL2)

Where linear 'hedgerow' features were over 5m in height and were made up of semi-mature to mature trees, these were characterised as treelines, with *Picea* species and *Salix* species making up the majority of the treelines on the Proposed Wind Farm site (see Plate 6-8), occasional treelines of native broadleaved species were also recorded comprising of ash (*Fraxinus excelsior),* sycamore *(Acer pseudoplatanus)* and silver birch *(Betula pendula)* (Plate 6-8).

Plate 6-8: Conifer treeline along a field boundary separating an area of scrub (WS1) and an agricultural grassland, located in the southwest of the Proposed Wind Farm site.

Plate 6-9. Treeline of mixed broadleaved native species recorded along field boundary east of the proposed substation/battery storage compound.

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6.5.1.8 Drainage Ditches (FW4)

A number of manmade ditches/drains were recorded across the Proposed Wind Farm site. These drains were associated with areas of coniferous forestry and along sections of the existing forestry access roads (see Plate 6-10). Most were deep and narrow (30-40cm wide) and devoid of any significant aquatic vegetation, pondweed (*Potamogeton spp.*) was recorded on occasion. Overall, these drains were considered to be of relatively low ecological value given their narrow, deep, shaded nature and lack of aquatic vegetation.

Plate 6-10. Example of typical drain recorded throughout the Proposed Wind Farm site (within areas of forestry)

6.5.1.9 Upland Eroding Rivers (FW1)

Three watercourses were recorded within the Proposed Wind Farm site all of which drain to the west side of the Proposed Wind Farm site. All three watercourses within the Proposed Wind Farm site were classed as upland eroding streams (FW1). The Seskinrea stream (see site A5, Figure 2.1 in Aquatics Report, Appendix 6-3), flows through agricultural pasture and conifer plantation. Within the conifer plantation, the stream is a channelised narrow watercourse with steep high banks. Bankside vegetation cover extended along the channel and consisted of moss species cover with dense overhanging vegetation of *Picea saplings*, *bramble,* rosebay willowherb and other herbaceous species (Plate 6-11).

Two further unnamed streams (see site A1 and A2, Figure 2.1 in Aquatics Report, Appendix 6-3) were recorded within the Proposed Wind Farm site. The stream at site A1 (farm access track crossing) comprised a small upland steam which had had been straightened and over-deepened historically. This stream had very low flows at the time of survey and no macrophytes or aquatic bryophytes were recorded. There was also evidence of significant cattle poaching at this location. The stream at site A2 had also been straightened and deepened historically. Macrophytes were limited to bog pondweed (*Potamogeton polygonifolius*), with occasional water mint (*Mentha aquatica*) along the margins. Aquatic bryophytes were not recorded.

Additional details of representative watercourses within the Proposed Wind Farm site are provided in Chapter 9 of the EIAR: Water.

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Plate 6-11. Seskinrea River flowing in a generally west direction through a conifer plantation in the northwest region of the Proposed Project site.

6.5.1.10 Buildings and Artificial Surfaces (BL3)

Existing forestry and farm tracks within the Proposed Wind Farm site were categorised as buildings and artificial surfaces (BL3). Any private dwellings and/or agricultural buildings within the site were also categorised as BL3.

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6.5.1.11 Habitats along the Proposed Grid Connection Route

The underground cabling required to facilitate the Proposed Grid Connection Route will be laid beneath the surface of the internal site road network and public road It is proposed that the Proposed Grid Connection Route will originate at the onsite 38kV substation, which is located within an area of **wet grassland (GS4)** in the north-central vicinity of the Proposed Project site. The cable will run northwest through the site consisting of **conifer plantation (WD4)**, **wet grassland (GS4),** and **improved agricultural grasslands (GA1)** within the Proposed Wind Farm site before meeting the local public road L30372 in the townland of Seskinrea.

It is proposed that the Proposed Grid Connection Route will continue west along local road L30372 before crossing the L3037 and onto the local road L30371, then entering the townland of Coolcullen and Co. Kilkenny. Habitats along this section of the route were assessed as predominantly consisting of **improved agricultural grasslands (GA1)**, with occasional **scrub (WS1)** and **buildings and artificial surfaces (BL3)**.

Beyond the intersection with L3037, the Proposed Grid Connection Route is proposed to continue on the L30371 through the townlands of Reevanagh, Coolgreany, Mount Nugent Upper, Mount Nugent Lower, Ballysallagh, Feathallagh, Kilmagar, and Clara Upper before turning right on the local road L2627. The predominant habitats bordering this section of the route have been assessed as **improved agricultural grasslands (GA1)** and **wet grassland (GS4)**. Less dominant habitats also occurring along this section of the route comprised **scrub (WS1)**, **mixed broadleaved/conifer woodland (WD2)**, **amenity grassland (improved) (GA2)**. Occasional **buildings and artificial surfaces (BL3)**, which mainly consist of residential properties, were also recorded for this area. In the vicinity of Reevanagh, and Mount Nugent Upper, **conifer plantation (WD4)** border and extend beyond sections of the L30371.

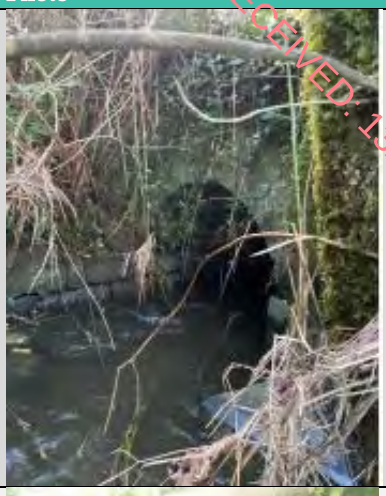
The Proposed Grid Connection Route is proposed to continue south along the L2627 for approximately through the townlands Churchclara and Clarabricken. The proposed route then veers south onto the R712 through the townlands of Rathgarvan, Scart and Highrath, Ballynamona where it enters the Kilkenny substation property and follows the access road to the 110kV Kilkenny substation. Bordering habitat composition south along the remaining section of the proposed route remains similar to that along the preceding sections of the Proposed Grid Connection Route. Predominant habitat was assessed as **improved agricultural grasslands (GA1)** and **wet grassland (GS4)** with occasional areas of **mixed broadleaved/conifer woodland (WD2)**, **amenity grassland (improved) (GA2),** and **buildings and artificial surfaces (BL3)** also occurring.

6.5.1.11.1 *Watercourse/Bridge Crossings*

The Proposed Grid Connection Route will involve 7 No. bridge crossings, all of which will involve Horizonal Directional Drilling (HDD). 3 No. existing culverts crossings will be implemented using open trenching with either an undercrossing or an overcrossing, depending on the depth of the culvert.

No instream works are required along the Proposed Grid Connection Route. Bridge and culvert crossing points are shown in Figure 4-33 in Chapter 4 of this EIAR, and Figure 9-3 in Chapter 9 of this EIAR and listed in the table below. The bridge/watercourse crossings are listed in the Table 6-11 below starting with the water crossing closest to the Kilkenny 110kV Substation (e.g. BC1)

Table 6-11 Bridge/Watercourse crossing infrastructure

Crossing ID	Works Proposed	Photo
BC1	HDD (no instream works).	
BC2	HDD (no instream works)	
BC3	HDD (no instream works)	

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BC4	HDD (no instream works)	
BC5	HDD (no instream works)	
BC6	HDD (no instream works)	
BC7	HDD (no instream works)	

6.5.1.12 Habitats – Turbine Delivery Route

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Accommodation Area

Road and junction widening are sometimes required along proposed turbine transport routes to accommodate the large vehicles used to transport turbine components wind farm sites. The proposed transport route for the Proposed Project has been the subject of a route assessment to determine if any works are required along its length. Full details of the assessment are included as part of the traffic impact assessment set out in Section 15.1.8 of this EIAR and summarised below. The locations of the accommodation areas are shown in Figure 4-24, Chapter 4.

It has been identified that accommodation works at Location 5 – N78/L1834 (see Figure 4-24, Chapter 4) will require the temporary loss of habitat to develop a one-way road in the field east of the N78/L1834. Habitats within this accommodation area comprised of **Improved agricultural grassland (GA1)** and **Hedgerow (WL1)** and **Treeline (WL2)** as described below.

The field located within the boundary for the accommodation area was classified as improved agricultural grassland and was under agricultural management. It was dominated by perennial rye grass (*Lolium perenne*) with occasional soft rush.

The field was bordered on the north and west by a hedgerow comprised of hawthorn and bramble. A short treeline comprised of hawthorn was also recorded along the western boundary of this field and merged with the hedgerow.

Plate 6-12. Photo showing receiving habitat along the turbine delivery route (Accommodation Area)

Black Bridge

Bridge infrastructure works will be required to strengthen the Black Bridge, a masonry bridge located on the Dinin River, between the N78 National road and the M9 motorway, on the Carlow – Kilkenny county border. This bridge was surveyed for bat roost potential and the watercourse and surrounding habitats checked for signs of otter on the 20th February 2024. No signs of otter were identified. In relation to bats an endoscope survey was carried out on the single-arch stone bridge. Under the arch,

several crevices were identified with binoculars but were too high to be inspected from the ground without scaffolding. A vertical crevice at the northwest side between the abutment and buttress was noted. It was the only feature reachable for inspection with the endoscope. No signs of bats were discovered; however the bridge was assessed as having *High* suitability due to the presence of a large number of suitable crevices under the arch, and their uncluttered high locations (see Section 4.3, Bat Report, Appendix 6-2 for further detail).

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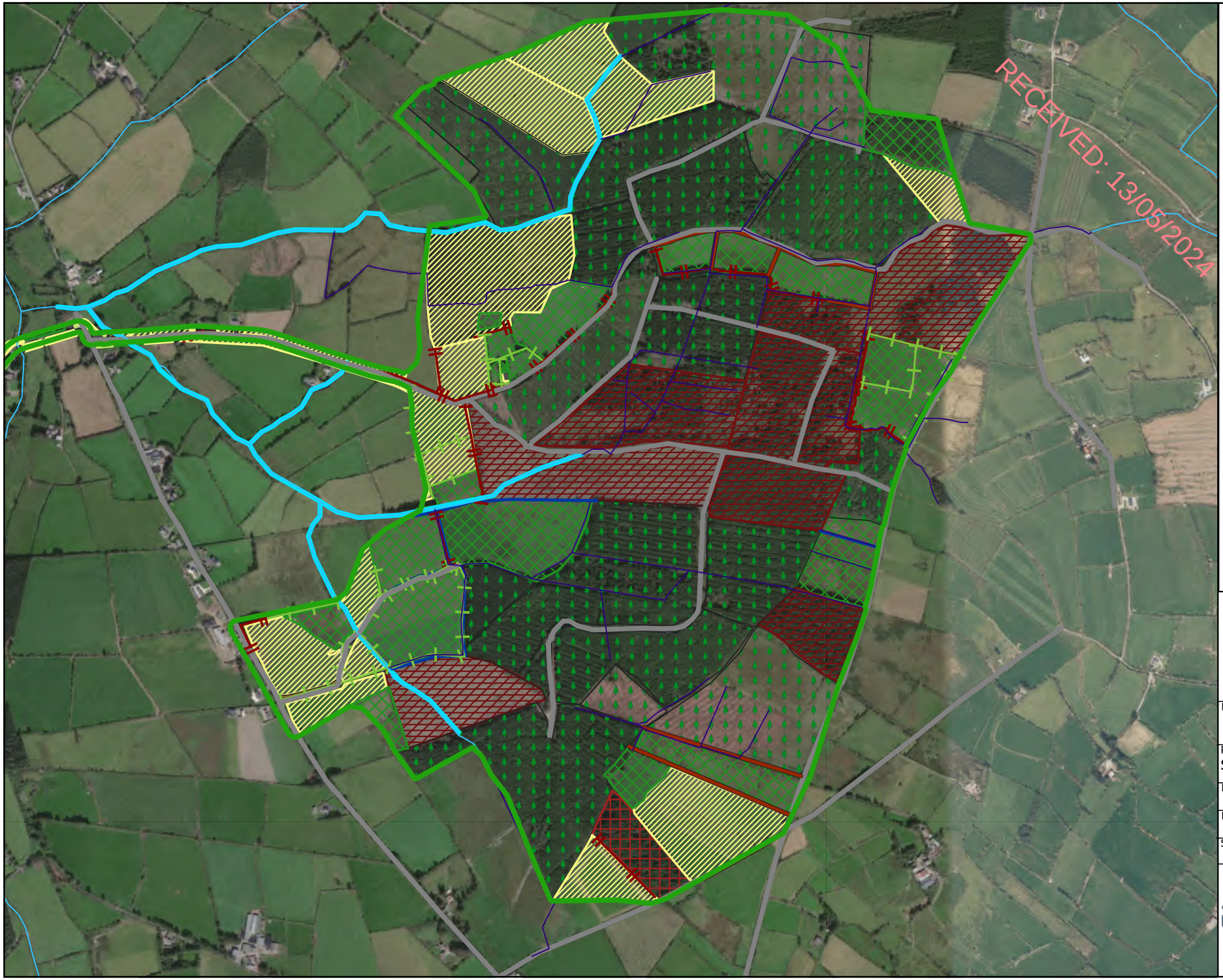

Map Legend

- EIAR Site Boundary
- Earth Banks
- Buildings and Artificial Surfaces
- Eroding/Upland Rivers
- Hedgerows
- Treelines
- Stone walls and other stonework
- Buildings and artificial surfaces
- Improved agricultural grassland
- Wet grassland
- Conifer plantation
- Scrub
- Recently-felled woodland
- Watercourses
- Drains

N

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Drawing Title
Habitat Map

Project Title
Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
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Project No.	Drawing No.
220246	Figure 6.3
Scale	Date
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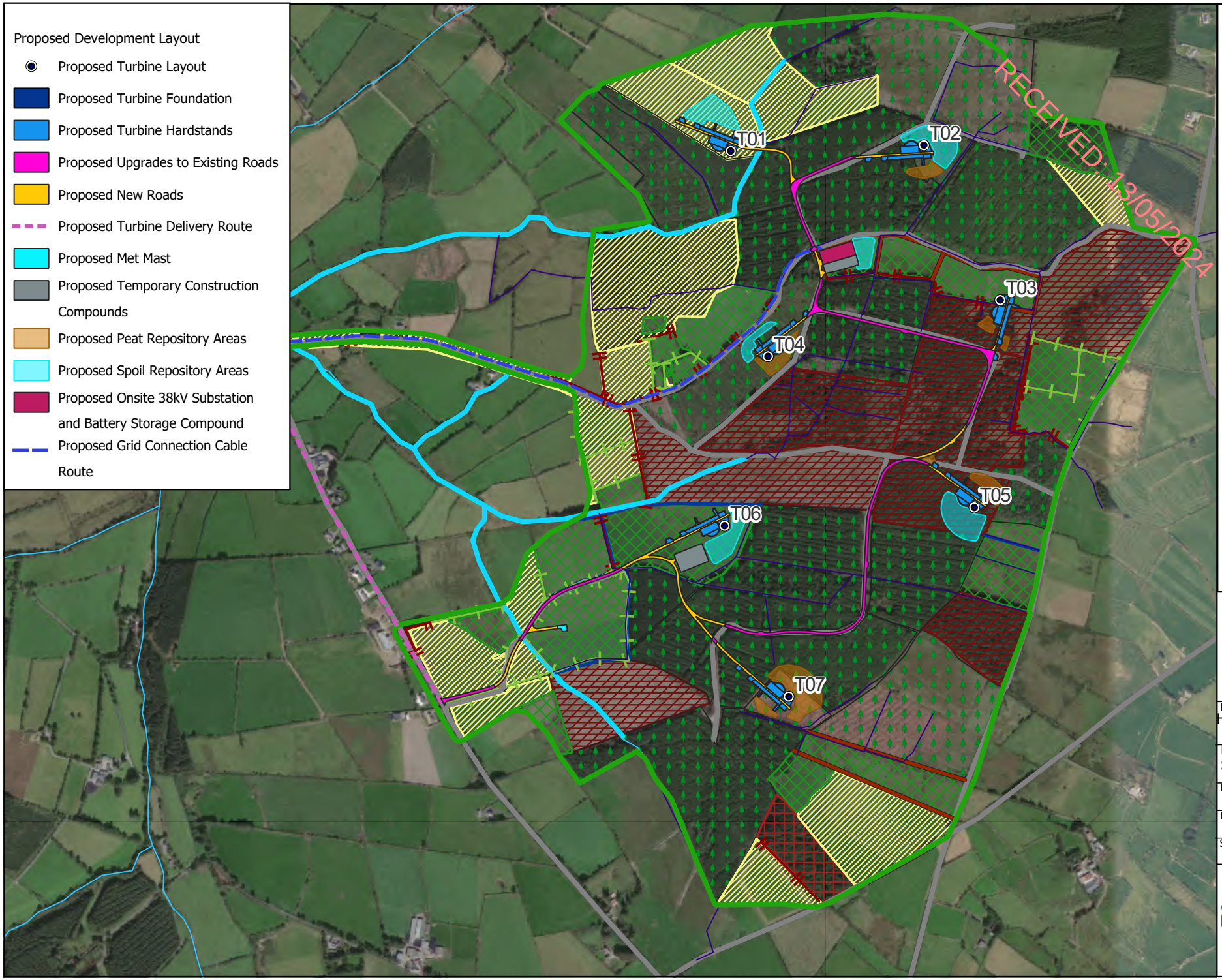
Proposed Development Layout
Proposed Turbine Layout
Proposed Turbine Foundation
Proposed Turbine Hardstands
Proposed Upgrades to Existing Roads
Proposed New Roads
Proposed Turbine Delivery Route
Proposed Met Mast
Proposed Temporary Construction Compounds
Proposed Peat Repository Areas
Proposed Spoil Repository Areas
Proposed Onsite 38kV Substation and Battery Storage Compound
Proposed Grid Connection Cable Route
T01
T02
T03
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Map Legend
EIAR Site Boundary
Earth Banks
Buildings and Artificial Surfaces
Eroding/Upland Rivers
Hedgerows
Treelines
Stone walls and other stonework
Buildings and artificial surfaces
Improved agricultural grassland
Wet grassland
Conifer plantation
Scrub
Recently-felled woodland
Watercourses
Drains
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Drawing Title
Habitat Map with development overlay
Project Title
Seskin Wind Farm, Co. Carlow
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6.5.1.13 Protected Habitats/Flora

In summary, as described in the preceding sections, no Annex I habitats were recorded within the Proposed Project site. Furthermore, no botanical species listed under the Flora (protection) Order or listed in the Irish Red Data Books were recorded on the site. All species recorded are common in the Irish landscape. No rare and protected plant species recorded in the desk study, including those obtained from NPWS data request were recorded within the study area.

6.5.1.14 Invasive species

No invasive species listed on the Third Schedule were recorded within the Proposed Wind Farm site or along the Proposed Grid Connection Route.

6.5.2 Fauna in the Existing Environment

The following subsections provide the results of the faunal surveys undertaken within the Proposed Project site during the site visits and assessments as outlined in Section 6.2.3 (Field Surveys). Evidence of fauna recorded within the site is depicted in Figure 6-5.

6.5.2.1 Badger

Signs of badger activity were recorded within the Proposed Wind Farm site comprising prints, latrines and snuffle holes (See Plate 6-13). Badger activity was mainly concentrated in the northwest of the Proposed Wind Farm site in an area of conifer plantation, south of Turbine 1. Signs of badger were also recorded where the existing farm access track crosses (unnamed stream) in the southwest of the site, south of Turbine 6. No badger setts were recorded within the Proposed Wind Farm site. Two camera traps were deployed (location ITM: 663527, 669588) at potential mammal den/resting sites (see Plate 6-14) and although mammal activity was picked up on camera (discussed further in Sections 6.5.2.3, 6.5.2.4 below), no badger activity was recorded.

Plate 6-13 Badger signs recorded within the Proposed Wind Farm site including latrine (recorded south of Turbine 1) and badger print recorded along existing farm track/stream crossing south of Turbine 6.


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Plate 6-14. Camera trap set up at location of potential mammal resting sites (under fallen tree stump, hollow at base of tree)

6.5.2.2 Otter

Desk based review identified that otter are widespread in wider area surrounding the Proposed Project. Watercourses within the Proposed Wind Farm site and along the Proposed Grid Connection Route provide suitable habitat for otter, as such all watercourses within the Proposed Wind Farm site and along the Proposed Grid Connection Route were surveyed for signs of otter, watercourses in the wider study area were also surveyed to inform the aquatic baseline, including for otter (see Figure 3.1, Aquatic Baseline Report, Appendix 6-3 for survey locations). No otter signs were recorded within the Proposed Wind Farm site or along the Proposed Grid Connection Route. However, otter surveys undertaken in the wider study area identified a single regular sprainting site downstream of the bridge at survey location Site A10 – Dinin River and a single spraint at Site A11, Site A12 – Dinin River and Site B4, Site C4 – River Barrow (see Appendix 6-3 for further detail). All otter spraints were checked for signs of crayfish remains, no crayfish remains were identified. No breeding (holts) or resting (couch) sites were identified either within the site, along the Proposed Grid Connection Route or in the wider study area where otter surveys were conducted.

6.5.2.3 Pine Marten

Pine marten was documented on a single occasion from footage obtained by the camera trap (see Plate 6-15) set up northwest of the Proposed Wind Farm site. The footage showed pine marten are present within the vicinity of Turbine 1, however no den was recorded by surveyors. An additional incidental sighting of this species was made while surveyors were undertaking surveys in the wider locality (Black Bridge, Carlow) on the 20th February 2024.

Plate 6-15. Pine marten recorded on camera footage within conifer plantation south of Turbine 1.

6.5.2.4 Red squirrel

Red squirrel was documented on a single occasion from footage obtained by the camera trap (see Plate 6-16) set up in the northwestern section of the Proposed Wind Farm site. The footage showed red squirrel are present within the vicinity of Turbine 1, however no dreys was recorded by surveyors. An additional incidental sighting of this species was made while surveyors were undertaking surveys within the Proposed Wind Farm site, sighting was made on the 5th May 2023 along the existing forestry access track south of Turbine 1.

Plate 6-16. Red squirrel recorded on camera footage within conifer plantation south of Turbine 1.

6.5.2.5 Marsh Fritillary

Three marsh fritillary larval webs (see Plate 6-17) were recorded during the dedicated larval web survey. The locations of the larval webs are shown in Figure 6-5. Turbine 7 was initially proposed to be located in this field before mitigation by design was applied to the finalised Proposed Wind Farm layout to avoid impacts on this species.

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Plate 6-17 Marsh fritillary larval webs recorded in field southwest of Turbine 7

6.5.2.6 Bats

Full details of results of bat surveys undertaken in Spring, Summer and Autumn 2022 are provided in the Bat Report (Appendix 6-2) and are summarised in this section. All survey and detector locations are shown in Figure 2-1 in the Bat Report.

Bat surveys were undertaken within the Proposed Wind Farm site in Spring, Summer and Autumn of 2022. Seven static detectors were deployed at or near the Proposed Wind Farm turbine locations during each season. In complement, a bat habitat appraisal and manual activity surveys were conducted.

The static surveys revealed that the site was mainly used by common pipistrelles (n=74,430). Soprano pipistrelles bat passes (n=37,020) were the second highest bat species recorded on site followed by Leisler's bat (n=13,677) and *Myotis* spp. (n=8,946). Brown long-eared bat (n=415) and Nathusius' pipistrelle (n=398) were present in lower numbers. The bats species used the site consistently over the deployments. Soprano pipistrelles number of recordings tended to increase from Spring to Autumn, whereas common pipistrelles tended to remain constant and Leisler's bat recordings tended to decrease.

Median activity levels were assessed for each species by detector location. The species utilising areas around the detectors varied by season and by detector location. In Spring, Leisler's bat had a moderate median activity around D01, D02, D03, while common pipistrelles were recorded with a high activity at D01 and D03. In Summer, high activity levels were recorded at D02 for Leisler's, at D01, D03, D04 and D06 for common pipistrelles and at D06 for soprano pipistrelles. In Autumn, high median activity was recorded at D01 for common pipistrelles and at D04 for *Myotis spp.* and common pipistrelles. It is important to be aware that the location of D07 changed (i.e. moved to forest edge) in Autumn and the habitat around D02 and D03 was modified throughout the season (i.e. felling of forestry).

The transect manual activity surveys, carried out during each season, covered tracks near Turbine 2, the central section of the Proposed Wind Farm site and the area near Turbine 6. The species composition recorded throughout the transects was similar to the static results, except for Nathuisus' pipistrelle, which were not recorded during manual surveys. The surveys allowed to identify forest

tracks and edges as foraging habitat and commuting corridors. Leisler's bats were suspected to fly at height above forestry.

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During the bat habitat appraisal, two structures within the Proposed Wind Farm site boundary were inspected for presence of bats. They were assessed as having a Low and Negligible suitability for roosting bats. The structure with low potential was subject to an emergence survey in Spring. No bats were observed emerging from the building. A total of five structures along the Proposed Grid Connection Route were assessed for bat roosting potential, one was assessed as having High Suitability while the remaining structures were assessed as having Low or Negligible Potential. A habitat appraisal was undertaken of Black Bridge and the bridge was assessed as having High Suitability for roosting bats. No suitable features with potential to support roosting bats will be impacted as part of the planned strengthening works on the bridge. None of the trees located within the Proposed Wind Farm site footprint presented features with potential for roosting, while trees along the Proposed Grid Connection and Turbine Delivery Route will not be impacted as part of the Proposed Project.

6.5.2.7 Reptiles and Amphibians

Common frog, smooth newt and common lizard have all be recorded within hectad S66 in which the Proposed Wind Farm site is located. An incidental sighting of common frog was observed by surveyors undertaking surveys across the site. This sighting was in close proximity to the proposed location for Turbine 7. No observations of smooth newt or common lizard were made during the ecological surveys at the site. No significant suitable breeding habitat (ponds) for common frog, smooth newt was identified within the Proposed Wind Farm site, however, smaller ponded areas and ditches across the site may provide some suitable breeding habitat for these species.

In relation to common lizard, although not recorded on site there is suitable habitat for this species in the form of scrub and stone walls. Common lizard hibernate throughout October to March, often in groups[14]. They have a preference for sheltered frost-free spots, under rubble or stones, or old tree roots and in hedge banks[15]. Stone walls in particular can provide suitable hibernation sites for common lizard. Heavily vegetated stone walls were recorded within the Proposed Wind Farm site and as such could provide suitable hibernation sites for this species.

6.5.2.8 Other Fauna

Irish hare was documented on a single occasion from footage obtained by the camera trap. An incidental sighting was also recorded by a surveyor while carrying out dedicated mammal surveys in close proximity to where the camera trap was deployed. Signs of fox were also recorded within the Proposed Wind Farm site.

6.5.2.9 Fisheries and Aquatic Fauna

Full details of results of aquatic surveys undertaken in August 2022 are provided in the Aquatic Baseline Report (Appendix 6-3) and are summarised in this section. All survey locations (n=20) are shown in Figure 2-1 in the Aquatic Baseline report. The following summary has been extracted from the baseline report. In addition, as noted in Section 6.2.3.3.2 otter surveys were also conducted along the Proposed Grid Connection Route.

[14] https://iwt.ie/wp-content/uploads/2017/09/WL42-Lizzards-eng.pdf
[15] https://www.arguk.org/info-advice/id-guides/529-dragons-in-the-hills-the-amphibian-and-reptiles-of-northern-ireland/file

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6.5.2.9.1 Watercourses

With the exception of the Dinin River (a larger semi-natural upland river) and the River Barrow (large lowland river), the watercourses in the vicinity of the Proposed Project site were typically small, modified channels which suffered from reduced summer flows in August 2022. These characteristics resulted in in reduced habitat and water quality, often poor fluvial connectivity, habitat fragmentation and fish passage issues. Low summer flows are a common occurrence in the wider survey area and, in addition to considerable agricultural (eutrophication, siltation) pressures, is a significant threat to aquatic ecology in the vicinity of the Proposed Project site. Approximately half of the survey sites were of international importance by virtue of their location within the River Barrow and River Nore SAC (002162) but these were not always of inherently high aquatic value (e.g. site C3). Broadly speaking, the highest value watercourses within vicinity of the Proposed Project were the Dinin River and its tributary the Knocknabranagh & Knockbaun River (east) and, to the west of the Proposed Wind Farm site, the River Barrow.

6.5.2.9.2 Fish Species

The following paragraphs summarise the fish species that were found during the aquatic baseline surveys. The below paragraphs should be read in conjunction with Figure 2.1 (survey locations) in the Aquatic Baseline Report (Appendix 6-3):

- **Salmonids** were present at 7 no. sites in total, with **Atlantic salmon** present at six of these (i.e. A6, A7, A9, A01, A11 & A12).
- **Lamprey ammocoetes** (Lampetra sp.) were only recorded from a single site (C3 Oldleighlin Stream) during targeted electro-fishing across the 19 no. survey sites in the vicinity of the Proposed Project site.
- Despite widespread suitability, **European eel** were only recorded in low densities from sites A11 & A12 on the Dinin River and C3 on the Oldleighlin Stream.

6.5.2.9.3 White-clawed crayfish & crayfish plague

No white-clawed crayfish were recorded via hand-searching or sweep netting of instream refugia during the survey and no crayfish remains were identified in otter spraint sites recorded during the survey. However, white-clawed crayfish was detected from eDNA surveys as was crayfish plague (discussed further below).

6.5.2.9.4 eDNA analysis

White-clawed crayfish was detected from eDNA in a water sample collected from the Dinin River at site A10. No crayfish eDNA was detected at sites A12 (Dinin River), B3 (Rathornan River), C3 (Old leighlin Stream) or B4 (River Barrow). However, Site A12 on the Dinin River tested positive for crayfish plague (*Aphanomyces astaci*).

No freshwater pearl mussel eDNA was detected in the 5 no. samples. These results were considered as evidence of the species absence within the survey area, in keeping with the known distribution (absence) of the species in the wider survey area.

6.5.2.9.5 Kick-sampling and Q-Value

The following summarise the results of kick-sampling and Q-Value evaluation carried out:

No rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from n=17 wetted riverine sites in August 2022. No rare or protected macrophytes/aquatic bryophytes were recorded at any of the aquatic survey locations.

Site A11 on the Dinin River achieved **Q4 (good status)** water quality and thus met the target good status (≥Q4) requirements of the European Union Environmental Objectives (Surface Waters)(Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC). The remaining 16 no. sites achieved **Q3-4 (moderate status)** or **Q2-3 or Q3 (poor status).** All three watercourses within the Proposed Project site (Sites A1, A2 and A5) all achieved **Q3 (poor status).**

The biological water quality of the survey area was generally poor, with the majority of the water courses in the study area significantly impacted via eutrophication, siltation and or historical modifications (hydromorphology). The widespread low summer flows and water volumes further reduced the water quality within the survey area in August 2022. Abstraction and agricultural eutrophication are among the primary threats to water quality within the survey area (EPA, 2019,2018 cited in Aquatic Report) and this was observed during the site surveys.

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Map Legend

- EIAR Site Boundary
- Turbine Location
- Proposed Turbine Hardstands
- Proposed New Roads
- Proposed Upgrades to Existing Roads
- Temporary Construction Compounds
- Proposed Met Mast
- Proposed Grid Connect
- Devil's Bit Scabious Area
- Camera trap (Red Squirrel & Pine Marten)
- Marsh Fritillary
- Frog
- Snuffle Holes
- Badger print
- Latrine

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Drawing Title
Fauna Signs and Sightings

Project Title
Seskin Wind Farm, Co. Carlow

Drawn By	Checked By
CH	CC
Project No.	Drawing No.
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Scale	Date
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6.5.3 Identification of Key Ecological Receptors

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Table 6-12 below summarises the ecological evaluation of all receptors as outlined in Section 6.2.4. It provides the rationale for the determination and identifies the habitats and fauna that are considered to be KERs and therefore those receptors that are subject to impact assessment and considered in Section 6.6 of this report. Following impact assessment mitigation measures are incorporated into the Proposed Project where required, to avoid potential significant impacts on these KERs.

Table 6-12 Identification of Key Ecological Receptors within the ZoI of the Proposed Project

Ecological feature or species	Reason for inclusion as a KER	KER
Designated Sites		
European Designated Sites	The Proposed Project site is hydrologically linked to downstream European site, namely the: • 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 following Nationally designated sites were identified as being within the ZoI of the Proposed Project: • Mothel Church, Coolcullen pNHA [000408] This site has been assigned **International Importance** as it supports one of the largest Natterer Bat maternity roosts in the country. The site is included as a KER as a potential pathway for indirect effects on this site (and the bat species it supports) was identified via loss of foraging and commuting habitat. Collision risk is considered low for *Myotis* spp therefore no significant collision related effects are anticipated (see Section 5.1 of the Bat Report).	**Yes**
Habitats (Terrestrial)		
Linear Habitats - Treelines (WL2), Hedgerows (WL1), Stone walls (BL1) and Earth banks (BL2)	Hedgerows, treelines, stone walls have all been assessed as being of **Local importance (Higher Value)** as these linear habitats provide connectivity to the wider landscape and provide supporting habitat for a wide variety of faunal species. In order to facilitate construction of the Proposed Project there will be some loss of hedgerow (often associated with stone walls within the site) and treeline habitat within the Proposed Wind Farm site. For this reason, these habitats have been identified for further assessment as a KER. Earth banks within the site provide a similar function to those habitats listed above. However, there will be no loss of this habitat associated with construction of the Proposed Project and as such they are not identified as a KER.	**Yes**

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Scrub (WS1)	Areas of scrub (WS1) are located completely outside of the Proposed Project footprint and are therefore not considered further as KERs.	No
Improved agricultural grassland (GA1)/Wet grassland (GS4)	Much of the Proposed Wind Farm infrastructure is located within either wet grassland (GS4) or Improved agricultural grassland (GA1) e.g. T1, T3, T6, proposed compound and proposed substation. These are highly modified habitats, common throughout the wider landscape and of relatively low biodiversity value. These habitats have been classified as Local Importance (Lower Value). For these reasons, these habitats have not been identified as a KERs.	No
Conifer plantation (WD4) and Recently felled woodland (WS5)	Some of the infrastructure associated with the Proposed Wind Farm is proposed to be located within Conifer Plantation (WD4)/Recently felled woodland (WS5). It should be noted that habitat classified as WS5 within the Proposed Wind Farm site was conifer plantation that had been recently felled, no other woodland type was recorded within the Proposed Wind Farm site. Both habitats are highly modified, as well as being widespread in the wider landscape as such the loss of this habitat type was not considered to be significant. This is classified as Local Importance (Lower Value). For these reasons, this habitat has not been identified as a KER.	No
Buildings and artificial surfaces (BL3)	This habitat type is largely associated with artificial site access tracks throughout the Proposed Wind Farm site and along the Proposed Grid Connection Route, it has little biodiversity value. For these reasons, this habitat has not been identified as a KER.	No
Aquatic habitats		
Eroding/upland rivers (FW1)	**Eroding/upland rivers (FW1)** Three watercourses are located within the Proposed Wind Farm site. These Rivers and Streams have been assigned **Local importance (Higher Value)** as they connect to downstream waterbodies, including the Knocknabranagh and Knockbaun 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 site 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 site. 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**
Fauna		
Badger	Badger as an ecological receptor has been assigned **Local Importance (Higher Value)** on the basis that the habitats within the Proposed Wind Farm site are utilised by a locally occurring badger population of Local Importance. Given that the species is known to inhabit the area, potential for direct and indirect impacts on badger are therefore	**Yes**

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	considered further in this assessment and the species has been included as a KER for further assessment.	
Otter	While no signs of otter were recorded within the Proposed Project site, signs of otter were identified in the wider study area including along the Dinin River which forms part of the River Barrow and River Nore SAC to which the Proposed Project is hydrologically linked. As otter are a QI of the SAC, this population is assigned **International Importance** and as such they are considered as a KER.	**Yes**
Pine marten	The Proposed Wind Farm site provides suitable foraging and breeding habitat for pine marten. 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 site. 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	The Proposed Wind Farm site provides suitable foraging and breeding habitat for red squirrel. Red squirrel 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 site. 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**
Marsh fritillary	Marsh fritillary larval webs were recorded within the Proposed Wind Farm site (see Figure 6-5). Turbine 7 was initially proposed to be located in this field before mitigation by design was applied to the finalised Proposed Wind Farm layout. All suitable marsh fritillary habitat (incl. identified larval webs) are now located completely outside of the Proposed Wind Farm footprint as such no impacts on this species are predicted and therefore this species is not considered further as KERs. **To note:** enhancement measures for this species have been included in the overall BMEP for the Proposed Project.	No
Bats	Bats have been recorded commuting and foraging across the Proposed Wind Farm site. The habitats within and surrounding the Proposed Wind Farm site and Proposed Grid Connection Route are utilised by a bat population of **Local Importance (Higher Value).** The *Myotis* population recorded is considered likely to include bats of **National** and **International Importance**, as the site is located within 1.1km of Mothel Church, Moycullen pNHA (000408). This Natterer bat nursery roost, recorded and proposed for designation in 1993, has been considered of National and International Importance as one of the largest in the country. No roosting bats were identified during the surveys undertaken. Limited roosting potential was recorded within the site, and none of the PRFs identified reside within the bat felling buffers or will be affected by the Proposed Project. The Proposed Project has the potential to result in direct and indirect effects on these receptors in the form of commuting and foraging habitat loss and impacts from turbine interactions. Therefore, bats have been included as a KER for further assessment.	**Yes**

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Amphibians (common frog/smooth newt)	It is considered that the Proposed Project will not result in a significant loss of suitable habitat for amphibians. No evidence of populations of 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 limited observation of amphibians within the Proposed Wind Farm site (one sighting of common frog) and the lack of any significant breeding sites for these species, these species have been assessed as of **Local Importance (Lower Value)** and therefore are not considered to be KERs.	No
Common lizard	Common lizard as an ecological receptor has been assigned **Local Importance (Higher Value)** although it is considered that the Proposed Project will not result in a significant loss of suitable foraging habitat for common lizard, the site does support a number of heavily vegetated stone walls which may be utilised by lizards in brumation (type of dormancy similar to hibernation). The removal of stone walls to facilitate the construction of the Proposed Wind Farm (in particular the proposed widening of the existing farm access track into the site) has the potential to have a direct impact (risk of mortality) on this species if removed in the winter months. Given the potential for this species to inhabit the area (based on desk-based information and habitat suitability), potential for direct impacts on this species are considered further in this assessment and the species has been included as a KER.	**Yes**
Invasive species	No invasive species were recorded within the footprint of the Proposed Project	No
Additional fauna (e.g. Irish hare, Fox, etc).	The recorded evidence suggests that the Proposed Project site is not utilised by populations of higher than **Local Importance (Lower Value)** and no potential for significantly 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 as KERs and as such are not considered further in this assessment.	No
Aquatic and Fisheries Species		
Aquatic and Fisheries Species	Water courses downstream of the Proposed Wind Farm site and along the Proposed Grid Connection Route are known to support a number of aquatic species (see Section 6.4.1.2 and Appendix 6-3 Aquatic baseline report for further detail). No fish were recorded within the watercourses within the Proposed Wind Farm site (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, 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**

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6.6 Ecological Impact Assessment

6.6.1 Do-Nothing Effect

If the Proposed Project were not to proceed, it is unlikely that any changes would be made to the current land use practice. The majority of the lands within the Proposed Project area would continue to be managed as they are now either as forestry or improved agricultural grassland and associated grazing. The other habitats identified within the Proposed Wind Farm site and Grid Connection Route, including stone walls, treelines, hedgerows, watercourses etc. would likely remain in a similar condition.

In some areas where scrub succession is establishing, this scrub may develop if not managed by the landowners and in time, this may undergo succession to small areas of woodland. The general biodiversity on the Proposed Wind Farm site and Grid Connection Route, as described in this chapter, would likely remain similar to its current state as activity levels and land use would not change.

6.6.2 Likely Significant Effects During Construction Phase

6.6.2.1 Effects on Habitats During Construction

Table 6-13 below provides details of the extent of the habitats that will be lost to facilitate the footprint of the Proposed Project. The Proposed Project will result in the loss of approx. 2.1ha of wet grassland (GS4), 0.8ha of improved agricultural grassland (GA1), and 19ha of forestry made up of 6ha of recently felled (conifer) woodland (WS5) and 13ha of conifer plantation (WD4) all of which have been assessed as being of Local Importance (lower value). The loss of these common and widespread habitats is not considered significant at any geographic scale as discussed in Table 6-12 above. The effects on habitats that are identified as KERs (e.g. treelines, hedgerows etc.) are described in the below tables.

Buildings and artificial surfaces (BL3) are present along existing farm/forestry tracks within the footprint but were not mapped in detail and this habitat is therefore not listed below. A map showing the Proposed Project development footprint overlaying the habitat map is provided in Figure 6-4. The area of non KER habitats to be lost is included in the table below for completeness but these habitats are not discussed further in the assessment.

Table 6-13 Habitats occurring within the site.

Habitat (KER	Area to be lost to development footprint (hectares(ha)/meters(m))	KER?
Improved agricultural grassland (GA1)	0.8ha	No
Wet grassland (GS4)	2.1ha	No
Recently felled woodland (WS5)	6ha	No
Conifer plantation (WD4)	13ha	No
Treelines (WL2)	82m	**Yes**
Hedgerows (WL1) and associated stone walls (BL1)	540m	**Yes**

The Proposed Grid Connection Route will not result in the permanent loss of any habitat. The works will be restricted to the existing road categorised as Buildings and Artificial Surfaces (BL3). This is not significant at any geographic scale.

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6.6.2.1.1 Assessment of Potential Effects on Treeline (WL2) Hedgerow (WL1)/Stonewall (BL1)

Table 6-14 Assessment of Potential Effects on Treeline (WL2), Hedgerow (WL1)/Stonewall (BL1)

Description of Effect	The footprint of the Proposed Wind Farm, including new internal roads and road widening will result in the loss of approx. 82meters of treeline (associated with new road access into the proposed substation/battery storage compound) and 364m of hedgerow (and associated stone wall) to enable widening of the existing access track into the Proposed Wind Farm site. Only the northern section of hedgerow/stone wall will be removed. The Proposed Wind Farm will also result in the temporary loss of approximately 175m of hedgerow at the turbine delivery route N78/L1834 junction accommodation works area.
Assessment of Significance prior to mitigation	The permanent loss of these 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 Proposed Project site, are widespread and common within the local farmlands surrounding the Proposed Project site. Removal of the hedgerows/treelines at this scale would not cause any significant fragmentation of habitat connectivity within the landscape. The loss of approx. 622m of linear habitats (treeline and hedgerow) is considered **significant at the local geographic scale only.**
Mitigation	In order to compensate for the loss of linear vegetation, up to 3,350 linear metres of new hedgerow, treeline and shrub planting will be carried out along selected boundaries of fields within the Proposed Wind Farm site and along any new or realigned access tracks. The replanting areas are presented in Figures 3-2, 3-3 and 3-4 of the BMEP (Appendix 6-4), in consultation with the landowners who are supportive of the proposal. This will result in a net gain in this habitat within the site. Species planted in these locations will be of a similar composition to those occurring on site and will be of local provenance. Further details with regard to species, planting location, and management is contained within the BMEP. In addition, stone walls that have to be taken down will be re-instated where possible. Where stone walls are re-instated, they should be left to naturally re-colonise with vegetation.
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 Proposed Project site.

6.6.2.1.2 Assessment of Potential Effects on Groundwater, Surface Watercourses and Sensitive Aquatic Faunal Species

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Table 6-14 Potential for impact on Watercourses and Sensitive Aquatic Species

Description of Effect	The effects on water quality are fully described in Chapter 9 'Water' 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 Proposed Project site. **Surface Watercourses (and associated aquatic species)** *Direct impacts (mortality)* There are 3 no. watercourses located within the Proposed Wind Farm site, and a number of other drains/ditches with connectivity to the watercourses within the Proposed Wind Farm site. The Proposed Wind Farm will require 2 no. clear-span watercourse crossings using clear-span bridge. Clear-Span watercourse Crossing 1, located at X 662895, Y 668307 will include for the removal of an existing degraded culvert and concrete slab. The construction methodology for the removal of the degraded culvert and concrete slab is described in Chapter 4 (see Section 4.8.4). No fish or other sensitive aquatic receptors were recorded within any of the watercourses within the Proposed Wind Farm site during the aquatic baseline surveys, watercourses within the Proposed Wind Farm site were deemed not to have any fisheries value (further detail provided in Aquatic Baseline report Site A1, A2 and A5). Therefore, there is no potential for direct impacts on any aquatic receptors associated with the Proposed Wind Farm. A general description of the various construction methods employed at watercourse crossings along the Proposed Grid Connection Route are described in Chapter 4 of the EIAR. The measures minimise potential for impact on the receiving environment as instream works are completely avoided. Therefore, there is no potential for direct impacts on any aquatic receptors associated with the Proposed Grid Connection Route. *Indirect impacts (water quality)* A direct surface water pathway exists between the Proposed Wind Farm site and downgradient watercourses. Within the Proposed Wind Farm site, there are 3 no. watercourse and a number of drainage ditches across the site which flow into these 3 no. watercourses. 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. Potential sources of pollution to surface waters within the Proposed Wind Farm site and along the Proposed Grid Connection 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;

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	• Stockpiled excavated material providing a point source of exposed sediment; • Construction of the cabling trench including small amounts of peat soils, resulting in entrainment of sediment from the excavations during construction; and, • Erosion of sediment from emplaced site drainage channels. **Groundwater** There are no karst features in the area of the Proposed Wind Farm site or along the TDR. However, a section of the Proposed Grid Connection Route is underlain by a Regionally Important Karst Aquifer. A small number of karst features were mapped over 400m from the Proposed Grid Connection Route which are outside the ZoI of the Proposed Project. No groundwater level impacts are predicted from the construction of the Proposed Grid Connection Route, access roads, substation compound, turbine delivery route works 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 site 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 site and Proposed Grid Connection Route works 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 would also result in impacts on aquatic receptors ranging from **Local (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). 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 site. All of the key infrastructure areas are located significantly away from the delineated 50m watercourse buffer zones with the exception of the upgrading of the existing watercourse crossing, new watercourse crossing and upgrades to existing site access tracks. 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 2 no. new proposed watercourse crossings within the Proposed Wind Farm site is detailed in Section 9.5.2.9 of Chapter 9. A drainage maintenance plan for the Proposed Project is provided in Section 4.7.7 (Chapter 4 of this EIAR). This plan provides details of how water quality will be protected during the construction of the Proposed Wind Farm site, 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.
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.

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6.6.2.2 Effects on Fauna During Construction

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 6-11:

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

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 6.6.2.1.2 above and is not repeated below.

6.6.2.2.1 *Assessment of Potential Effects on Badger*

Table 6-15 Assessment of Potential Impacts on badger

Description of Effect	**Habitat Loss/Fragmentation** Given the nature of the Proposed Project, there will be some minimal loss of suitable badger foraging habitat i.e., agricultural grassland (GA1), conifer plantation (WD4) associated with the footprint of the Proposed Wind Farm infrastructure. However, this habitat loss will not be significant in the context of the widespread alternative foraging habitat available within the site and the wider area surrounding the site. There will be no significant loss/fragmentation of badger habitat as a result of the Proposed Project. **Disturbance/Mortality** No badger setts were identified during the ecological surveys undertaken of the Proposed Project site, however, numerous signs of badger activity within the site (latrines, snuffle holes, prints) in close proximity to the Proposed Wind Farm infrastructure including the new access road to Turbine 1 were identified. There is potential for new badger setts to be created during the interim between baseline ecological surveying and commencement of construction, therefore a potential for impact via disturbance/mortality of badger exists should new setts be created in close proximity to the Proposed Project development works. Noise and earth works during construction have the potential to disturb badgers occupying setts in close proximity to Proposed Wind Farm infrastructure during

	construction. Badger tunnel systems can extend some distance from sett entrances (over 20m in some cases[16]) and therefore any excavation by heavy machinery in close proximity to sett entrances risks causing damage to setts and/or direct harm to badgers in the absence of mitigation. In the event that a new badger sett is established within or near the footprint of the Proposed Wind Farm during the interim between baseline ecological surveys and commencement of construction, there is potential for disturbance/mortality to badger using the setts as a result of noise/tunnel or sett collapse during construction.
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. **Disturbance/Mortality** Whilst no badger setts were recorded within the Proposed Project site baseline surveys identified that the Proposed Wind Farm site is being utilised by a local badger population. Any potential for physical damage or significant disturbance of occupied setts (if established prior to construction) would be considered **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 badger survey will be carried out to identify the presence of any setts that may have been established in the intervening period. Any setts identified within 50m of the Proposed Wind Farm infrastructure will subsequently be monitored for a minimum period of 2 weeks using remote cameras in order to ascertain use by badgers and levels of activity. If an active badger sett is identified and works can be undertaken safely (as to avoid sett collapse) then an exclusion zone will be set up around the sett as follows: • Exclusion zone fencing and appropriate signage will be put in place between working areas and badger sett exclusion zones to ensure that there will be no encroachment of the badger sett exclusion zones by construction activities. If a newly established and active sett was identified within an area where works could not avoid direct impacts on the sett then the sett would likely need to be excluded prior to works commencing. This would need to be undertaken in line with current guidelines by an appropriately qualified ecologist in advance of construction works commencing and in consultation with NPWS.
Residual Effect following Mitigation	Following the incorporation of the mitigation measures described above, no significant negative effects to badger is anticipated at any geographic scale.

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[16] *National Roads Authority (2006) Guidelines for the treatment of badgers prior to the construction of National Road Schemes.*

6.6.2.2.2 Assessment of Potential Effects on Otter

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Table 6-16 Assessment of Potential Impacts on otter

Description of Effect	The Proposed Wind Farm site supports three watercourses two of which will be crossed as noted in Section 6.6.2.1.2 above. No signs of otter were recorded within any of the watercourses within the Proposed Wind Farm site or along the Proposed Grid Connection Route. However, signs of otter were recorded in the wider study area (see Aquatic Baseline Report) including downstream of the Proposed Wind Farm site in watercourses hydrologically linked to the Proposed Wind Farm site. **Habitat Loss/Fragmentation, Disturbance, Mortality** For the Proposed Grid Connection Route, only minor underground cabling installation works are proposed within the public road and all bridge crossings will be by HDD. Given the proposed works and the findings of the baseline surveys for otter, no significant habitat destruction, no loss of breeding or resting places and no direct mortality related impacts on this species are anticipated. Therefore, there is no potential for the Proposed Project to result in any barrier to the movement of otter. In relation to disturbance, otter are predominantly crepuscular in nature and it is anticipated that construction activity associated with the Proposed Wind Farm and Proposed Grid Connection Route will be confined to daytime hours, thus minimising potential disturbance related impacts to the species. Any disturbance impacts would be short-term in nature and not considered to have a significant impact on the local otter population. **Habitat Degradation (impacts on water quality)** Taking a precautionary approach, it is assumed that otter may occur within and near the Proposed Wind Farm site on occasion, particularly the lower reaches of the main watercourses downstream of the Proposed Wind Farm site and Proposed Grid Connection Route. There is potential for construction works to result in the 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 Route. This represents a potential indirect effect on otter in the form of habitat degradation/loss of prey resource through water pollution.
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)** Although otter as a KER has been valued of international importance (due to otter being a qualifying interest species of the nearby SAC) water quality impacts if they did occur in the absence of mitigation would be considered **significant at the local geographic scale only** as impacts would occur on the local population only.

Mitigation	Detailed mitigation measures in relation to the protection of surface water during construction is detailed in Chapter 9 'Water' of this EIAR. In summary, the key mitigation measure during the construction phase is the avoidance of sensitive hydrological features where possible, 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 site. All of the key infrastructure areas are located significantly away from the delineated 50m watercourse buffer zones with the exception of the upgrading of the existing watercourse crossing, new watercourse crossing and upgrades to existing site access tracks. Detailed control measures in relation to the protection of surface waters during construction are detailed in Section 9.5.2.2 of Chapter 9.
Residual Effect following Mitigation	Following the incorporation of the mitigation measures described above, no significant negative effects to otter is anticipated at any geographic scale.

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6.6.2.2.3 Assessment of Potential Effects on Red squirrel/Pine marten

Table 6-17 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 site. Conifer plantation provides suitable foraging and breeding habitat for both species. Approximately 138ha of conifer plantation was recorded within the Proposed Project site/EIAR Site Boundary. The Proposed Project will result in the loss of 19ha of forestry, 13ha of which is conifer plantation. Conifer plantation equates to just 9.5% of the total area for this habitat type within the site. This habitat loss will not be significant in the context of the widespread alternative foraging/breeding habitat available within the site and the wider area surrounding the site. As noted above 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 site 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 site, 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 a 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.

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	Disturbance/Mortality Whilst no breeding sites for these species were recorded within the Proposed Wind Farm site baseline surveys identified that the Proposed Wind Farm site 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 Nature Scot[17] and NRA[18] guidelines. Should active dreys/dens 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 in October–January inclusive, this will avoid the main breeding season (February-September) when vulnerable young are most likely to be found within breeding sites for both species. • Any breeding sites identified within the 50m buffer that wouldn't be directly affected by felling works but disturbance related impacts 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 Proposed Project works site area (and outside any exclusion zone) As part of the biodiversity enhancements for the site and as outlined in the BEMP (see Section 3.4, Appendix 6-4) 2 No. number of pine marten and 2 No. red squirrel boxes will be installed within the site. Indicative locations for installation of the boxes are shown in the BEMP. These have been chosen to avoid areas of forestry where future felling could occur.
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.

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

6.6.2.2.4 Assessment of Potential Effects on Common Lizard

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Table 6-18 Assessment of Potential Impacts on common lizard

Description of Effect	**Habitat Loss** Given the nature of the Proposed Project, there will be some minimal loss of suitable foraging habitat associated with the footprint of the Proposed Wind Farm infrastructure. However, this habitat loss will not be significant in the context of the widespread alternative foraging habitat available within the site and the wider area surrounding the site. There will be no significant fragmentation of common lizard habitat as a result of the Proposed Project. **Disturbance, Mortality** The Proposed Wind Farm site supports a number of heavily vegetated stone walls which may be utilised by lizards in the winter months when they are in brumation. The removal of stone walls to facilitate the construction of the Proposed Wind Farm (in particular the proposed widening of the existing farm access track into the Proposed Wind Farm site) has the potential to have a direct impact (risk of mortality) on this species if works to remove the stone walls are undertaken in the winter months.
Assessment of Significance prior to mitigation	**Habitat Loss/Fragmentation** The loss of foraging habitat for common lizard is not considered to be significant at any geographic scale given the small scale of the habitat loss and the extensive area of available habitat locally. **Disturbance/Mortality** In the absence of mitigation, the potential for a direct effect on common lizard in relation to mortality risk during construction would be considered **significant at the local geographic scale.**
Mitigation	**Habitat Loss/Fragmentation** No specific mitigation is required for habitat loss. **Disturbance/Mortality** Common lizard when in brumation are in a state of sluggishness, inactivity, or torpor which would make them extremely vulnerable to works being undertaken in the winter months when they cannot quickly move out of harms way. As such works to remove stone walls should be undertaken March to September inclusive to avoid any potential impacts to lizard using stone walls as a winter hibernacula. Where removal of the stone walls is required within the core winter period (October – February) these will be taken down by hand under supervision of an ecologist so that any lizards (if found) can be moved to an alternative (preidentified) safe location.
Residual Effect following Mitigation	Following the incorporation of the mitigation measures described above, no significant negative effects to common lizard is anticipated at any geographic scale.

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6.6.2.2.5 Assessment of Potential Effects on Bats

The impact assessment in relation to bats has been undertaken in accordance with NIEA[19] and NatureScot Guidance[20]. As per the NatureScot Guidance, wind farms present five potential risks to bats:

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

For each of these five risks, the detailed knowledge of bat distribution and activity within the site has been utilised to predict the potential effects of the Proposed Project on bats. Potential risk of collision, barotrauma and other injuries relate to the operational phase and are presented in Section 6.6.3.2.1.

Table 6-19 Assessment of Potential Impacts on Bats

Description of Effect	**Loss of, or Damage to, Roosts** No bat roost was identified within the Proposed Project site. One structure with potential roosting features suitability was identified, however it will not be impacted by the Proposed Project. The Proposed Project site consists primarily of conifer plantation which does not provide roosting habitat of significance for bats. There will be no requirement to fell trees/forestry as part of the Proposed Grid Connection Route. Therefore, there will be no loss of potential tree roosting habitat associated with these works. Horizontal Directional Drilling (HDD) is proposed for all bridges along the Proposed Grid Connection Route, no structural works are required for any of the bridges along the Proposed Grid Connection Route and no significant effects on bats potentially roosting within these bridges is anticipated. The Black Bridge, along the turbine component delivery route, was identified as having high potential for roosting bats. Structural works will be required to allow for truck passage, in the form of concrete slabs being laid to support the arch. No works on the Black Bridge's arch are proposed and no loss of roosting habitat is anticipated.
	Loss or Damage to Commuting and Foraging Habitat In absence of appropriate design, the loss or degradation of commuting/foraging habitat has potential to reduce feeding opportunities and/or displace bat populations. Bats were observed and recorded foraging and commuting along forestry edge habitats throughout the Proposed Wind Farm site, which is characterised by forestry plantation habitats at various levels of development. The Proposed Wind Farm will include the construction or widening of access roads and tracks across the forestry, as well as other associated infrastructure, which will require the felling of existing trees.

[19] *Northern Ireland Environment Agency Natural Environment Division (NED) published Guidance on Bat Surveys, Assessment and Mitigation for Onshore Wind Turbine Developments in Northern Ireland (NIEA, 2021).*
[20] *NatureScot published Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation. Version: August 2021 (NatureScot, 2021).*

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	A total of 19 hectares of forestry will be permanently lost within and around the footprint of the Proposed Wind Farm. The felling of trees is provided to allow for the construction of the permanent footprint as well as achieve the required buffer distance for the protection of bats, from the turbines to the canopy of the nearest habitat feature, as recommended by the Natural England (2014) and NatureScot (2021). Further details on buffer calculations can be found in Section 6.1.3 of the Bat Report (Appendix 6-2). The footprint of the Proposed Wind Farm, including new internal roads and road widening will result in the loss of approx. 82meters of treeline (associated with new road access into the proposed substation/battery storage compound) and 364m of hedgerow (and associated stone wall) to enable widening of the existing access track into the Proposed Wind Farm site. Only the northern section of hedgerow/stone wall will be removed. The Proposed Wind Farm will result in the temporary loss of approximately 175m of hedgerow at the turbine delivery route N78/L1834 junction accommodation works area. Bat buffers will be created around turbines as detailed in Section 6.1.3 of the Bat Report (Appendix 6-2). The creation of buffers will not sever existing corridors but has the potential to create additional habitat for foraging and commuting bats along proposed keyholes, where trees are not harvested by ongoing forestry operations.
	Displacement of Individuals or Populations The Proposed Wind Farm is predominantly located within conifer plantation with areas of wet grassland, agricultural grassland and scrub. There will be no net loss of linear landscape features for commuting and foraging bats and there will be no loss of any roosting site of ecological significance. The habitats on the Proposed Wind Farm site will remain suitable for bats and no significant displacement of individuals or populations is anticipated.
	Disturbance No works on the Black Bridge's arch are expected and no loss of roosting habitat is anticipated. However, the works have the potential to affect roosting bats in the form of temporary disturbance during the construction phase of the Proposed Project.
Assessment of Significance prior to mitigation	**Loss of, or Damage to, Roosts** No potential for significant effect with regard to the loss of, or damage to, roosting habitat as a result of the Proposed Project is anticipated. No mitigation is proposed.
	Loss or Damage to Commuting and Foraging Habitat The footprint of the Proposed Wind Farm, including new internal roads and road widening will result in the loss of approx. 82meters of treeline (associated with new road access into the proposed substation/battery storage compound) and 364m of hedgerow (and associated stone wall) to enable widening of the existing access track into the site. Only the northern section of hedgerow/stone wall will be removed. The Proposed Wind Farm will also result in the temporary loss of approximately 175m of hedgerow at the turbine delivery route N78/L1834 junction accommodation works area. Given the extensive

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	area of habitat that will remain undisturbed throughout the Proposed Wind Farm site and the avoidance of the most significant areas of faunal habitat (i.e. natural hedgerows and scrub), no significant negative effects with regard to loss of commuting and foraging habitat for bats are anticipated.
	Displacement of Individuals or Populations The habitats on the Proposed Wind Farm site will remain suitable for bats and no significant displacement of individuals or populations is anticipated from the construction phase of the Proposed Project. Impacts from noise and lighting have the potential to result in temporary negative effects on the bat populations recorded at the site during construction, this would be considered **significant at the local geographic scale only** in the absence of mitigation.
	Disturbance As the Black Bridge was identified as having High potential for roosting bats, a potential for significant negative effects as a result of disturbance was identified, particularly in the event that works are carried out during sensitive periods of the bat lifecycle. During the hibernation period, disturbance could result in a waste of energy and potential starvation, and during the maternity period it could cause abortions or pup abandonment. This would be considered **significant at the local geographic scale only.** Mitigation measures are recommended on a precautionary basis.
Mitigation	**Loss or Damage to Commuting and Foraging Habitat** Significant effects with regard to loss of commuting and foraging habitat are not anticipated. However, mitigation and enhancement measures in relation to habitats as detailed in the BMEP (See Appendix 6-4) will include the planting of up to 3,350 linear metres of new hedgerow, treeline and shrub planting will provide additional foraging and commuting habitat for bats within the Proposed Project site following construction. This will result in a net gain of linear habitat features within the Proposed Wind Farm site.
	Displacement of Individuals or Populations The following construction best practice will be employed to minimise general noise and disturbance potential. During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001). Where lighting is required, directional lighting will be used to prevent overspill on to forestry edges. Exterior lighting during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the Proposed Project, 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

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	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 Proposed Project site shall be designed in accordance with the Institute of Lighting Professionals Guidance Note 08/23 Bats and artificial lighting in the UK. In addition, the applicant commits to the use of lights during construction (such that they are necessary) in line with the following guidance that is provided in the Dark Sky Ireland Lighting Recommendations: • 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).
	Disturbance On a precautionary basis, works at Black Bridge will be undertaken to avoid sensitive life cycle periods for bats, namely deep hibernation (December – February) and the maternity season (May-August), as disturbance at these times can cause mortality. A pre-commencement bat activity survey will be undertaken prior to works to assess bat usage of the Black Bridge. The function of this survey will be to reassess the baseline environment since the time of undertaking the assessment in 2024, and to identify bat presence at the time of works. If a bat roost is identified within the bridge, a bat derogation licence to disturb bats will be obtained from the NPWS, prior to works and the works will be supervised by a qualified ecologist.
Residual Effect following Mitigation	Taking into consideration the sensitive design of the Proposed Project, the proposed best practice and adaptive mitigation measures, significant residual effects on bats as a result of loss or damage to commuting and foraging habitat, loss of, or damage to, roosts, displacement of individuals or populations, and disturbance, are not anticipated.

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6.6.3 Likely Significant Effects During Operational Phase

6.6.3.1 Effects on Habitats during Operation

The operation of the Proposed Project will not result in any additional land take or loss of habitats and as such there is no potential for any significant effects in this regard.

The implementation of the Biodiversity Management and Enhancement Plan (see Appendix 6-4) will ensure that any treeline or hedgerow habitats lost to facilitate the Proposed Project will be replaced within the site.

6.6.3.1.1 *Effects on surface watercourses during operation*

Table 6-20 Assessment of potential effects on surface watercourses during operation

Description of Effect	The effects on water quality are fully described in Chapter 9 'Water' 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 Proposed Project 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:** Proposed Wind Farm Progressive replacement of the peat or 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 peat. However, it is conservatively assumed in this assessment that the Proposed Wind Farm access roads and hardstands are impermeable. The assessed Proposed Project footprint comprises turbine bases and hardstandings, access roads, junction accommodation areas, site entrances, onsite 38 kV substation and battery energy storage system, and temporary construction compounds. 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 site (Seskinrea Stream, Coolcullen and Dinin Rivers) and associated aquatic species could be impacted. Proposed Grid Connection Route There will be no potential increase in runoff along the Proposed Grid Connection Route. The works are 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	In the absence of mitigation and following the precautionary principle, there is potential for the operational stage of the Proposed Project to result in a significant indirect effect on the identified aquatic habitats and species at a **local geographic scale** in the form of sediment laden run-off during storm rainfall events. This would also result in impacts on aquatic receptors ranging from **Local (Higher Value)** to a receptor of **International Importance** (i.e. the River Barrow and River Nore SAC and associated QI species).
Mitigation	**Increased hard-standing/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 9-1) • 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/road side 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. As described in Chapter 9 the proposed integration of the Proposed Wind Farm site 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) within each forestry compartment. 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 mitigation, there will be no significant residual effect on aquatic habitats or species as a result of the Proposed Project.

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6.6.3.2 Effects on Fauna during Operation

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 and discussed further in Section 6.6.3.2.1 below.

There is no potential for significant negative effects on non-volant terrestrial fauna (otter, badger, pine marten, red squirrel) or reptiles during the operational phase of the Proposed Project. Implementation of the BMEP measures during the operational phase of the development will result in a net gain of linear features of value for local faunal species, providing more foraging opportunities for fauna, as well as additional shelter for birds and mammals, and commuting links for bats. Management of habitats to enhance for marsh fritillary will be undertaken throughout the operational life of the Proposed Project having a positive impact on this species as well as other local invertebrate/pollinator species. Finally den/nesting boxes provided for red squirrel and pine marten will provide additional suitable breeding sites for these species within the Proposed Project.

6.6.3.2.1 *Assessment of Potential Effects on Bats during operation*

Potential for significant effects on bat species resulting from the operation of the Proposed Project were identified in the form of collision mortality, barotrauma and other injuries.

Table 6-21 Assessment of Potential Effects on Bats

Description of Effect	The following high-risk species were recorded during the dedicated surveys: • Leisler's bat, • Common pipistrelle • Soprano pipistrelle • Nathusius' pipistrelle Together with the following low risk species: • Myotis spp. • Brown long-eared bat Overall activity levels for brown long-eared bats were low. *Myotis* spp. median levels were low or moderate, with high median activity recorded at one detector (D04) in Summer. Peak activity levels were high in Spring, Summer at three detectors and in Autumn at two detectors. Site-level collision risk for high collision risk bat species was typically Medium, except for Nathusius' pipistrelle, for which was considered Low. However, following per detector analysis, detectors D01, D03, D04 and D06 showed high median activity levels across at least one season, in particular for common and soprano pipistrelles.
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 site 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	Detailed mitigation measures in relation to bats is provided in the Bat Report (see Appendix 6-2) and summarised below. Mitigation measures are proposed together with post-construction monitoring: • Introduce felling buffers around turbines • Implement blade feathering as a standard • Implement curtailment on proposed turbines which recorded high median activity levels, as per Table 6-1 of the Bat Report, in Appendix 6-2. • A minimum of three years operational monitoring to assess changes in bat activity patterns post construction and to monitor the implementation of the mitigation strategy. • Adaptive mitigation strategy based on the results of the post-construction monitoring.
Residual Effect following Mitigation	Taking into consideration the sensitive design of the Proposed Project, the proposed best practice and adaptive mitigation measures, significant residual effects on bats as a result of collision and barotrauma are not anticipated.

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6.6.4 Likely Significant Effects During Decommissioning phase

Decommissioning is fully described in Chapter 4 (Section 4.10). There will be no additional habitat loss associated with the decommissioning of the Proposed Project and therefore there will be no significant effects in this regard.

The wind turbines proposed as part of the Proposed Wind Farm are expected to have a lifespan of approximately 35 years. Following the end of their useful life, the equipment may be replaced with a new technology, subject to planning permission being obtained, or the Proposed Project may be decommissioned fully.

Upon decommissioning of the Proposed Project, the wind turbines will be disassembled in reverse order to how they were erected. The turbines will be disassembled with a similar model of crane that was used for their erection. The turbine will likely be removed from the Proposed Wind Farm site using the same transport methodology adopted for delivery to the Proposed Wind Farm site initially. The turbine materials will be transferred to a suitable recycling or recovery facility.

The underground electrical cabling connecting the turbines to the on-site substation will be removed from the cable ducts. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility.

All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations will remain in place underground and will be covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent

option, as to remove that volume of reinforced concrete from the ground could result in unnecessary environmental emissions such as noise, dust and/or vibration.

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Site roadways will be in use for purposes other than the operation of the Proposed Project by the time the decommissioning of the Proposed Wind Farm site is to be considered, and therefore the Proposed Wind farm site roads will be left in situ for future use. It is envisaged that the roads will serve as agricultural roads for local landowners.

The Proposed Grid Connection Route electrical cabling and onsite substation will remain in place as it will be under the ownership and control of the ESBN/Eirgrid.

A Decommissioning Plan has been prepared (Appendix 4-8) the detail of which will be agreed with the local authority prior to any decommissioning. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will agreed with the competent authority at that time. The potential for effects during the decommissioning phase of the Proposed Project has been fully assessed in the EIAR.

As noted in the Scottish Natural Heritage report (SNH) *Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms* (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the Proposed Project, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore:

"best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm".

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

6.6.5 Effects on Designated Sites

6.6.5.1 European Designated Sites

The Proposed Project is located completely outside of the boundary of any European site. The Proposed Grid Connection Route runs adjacent to the River Barrow and River Nore SAC, while watercourses within the Proposed Wind Farm site have a direct hydrological link to the River Barrow and River Nore SAC. A potential for likely significant effect was therefore identified on the following European site:

- River Barrow and River Nore SAC
- River Nore SPA

In relation to European sites, an Appropriate Assessment Screening Report and Natura Impact Statement (NIS) have been prepared to provide the competent authorities with the information necessary to complete an Appropriate Assessment for the Proposed 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.

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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'.

6.6.5.2 Nationally Designated Sites

The following pNHA was identified to be within the Likely Zone of Influence of the Proposed Project

- Mothel Church, Coolcullen pNHA [000408]

Mothel Church, Coolcullen pNHA is known to support a summer roost for Natterer's bat. This pNHA is located 1.1km from the Proposed Wind Farm site which is within the known core foraging range for this species. A potential pathway for impact via loss of foraging and commuting habitat was identified. Collision risk is considered low for Myotis spp. therefore no significant collision related effects are anticipated (see Section 5.1 of the Bat Report, Appendix 6-2).

Myotis spp. were picked up at lower numbers than expected considering this genus is generally associated with woodland habitats, supporting the conclusions of the habitat appraisal. The species was particularly associated with detectors located at the edges of the Proposed Wind Farm, usually in proximity of less managed agricultural habitats. With the assumption that the Natterer's colony is still present within the proposed NHA, it is likely that bats from this nursery make use of the site. Approximately 7% of all passes recorded were *Myotis* spp., and a regular presence was recorded within the site through the seasons, but particularly in Summer and Autumn.

The Proposed Project will likely provide a positive change with the creation of additional available areas of linear landscape features that may be utilised by bats for commuting or foraging. Given the extensive area of habitat that will remain undisturbed throughout the site and the avoidance of the most significant areas of faunal habitat (i.e. natural woodlands and watercourses), no significant effects with regard to loss of commuting and foraging habitat are anticipated on any bat species, including the population for which the Mothel Church pNHA is designated.

6.7 Cumulative Impact

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The Proposed Project was considered in combination with other plans and projects in the area that could result in cumulative impacts on the KERs identified in Section 6.5.3 of this report, including European Designated 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. The full list of projects has been considered and relevant ones from this list are discussed in this section.

6.7.1 Assessment of Plans

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

- Carlow County Council Development Plan 2022-2028
- Kilkenny City and County Development Plan 2021-2027
- 4th National Biodiversity Action Plan 2023-2027
- Regional Spatial and Economic Strategy for the Southern Region (2020-2032)

The review focused on policies and objectives that relate to designated sites for nature conservation, biodiversity and protected species. Policies and objectives relating to the conservation of Annex I habitats were also reviewed. An overview of the search results with regard to plans is provided in Table 6-20.

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

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Table 6-20 Assessment of Plans

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of Proposed Project compliance with policy
Carlow County Council Development Plan 2022-2028	**NS. P1:** Support the conservation and enhancement of Natura 2000 Sites, and to protect the Natura 2000 network from any plans and projects that are likely to have a significant effect on the coherence or integrity of a Natura 2000 Site, in accordance with relevant EU Environmental Directives and applicable National Legislation, Policies, Plans and Guidelines. NBG 10: To ensure that development proposals, where relevant, improve the ecological coherence of the Natura 2000 Network of European Sites and encourage the retention and management of landscape features as per Article 10 of the Habitats Directive.	The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites. The overall aim of the policies and objectives set out in the County Development plan in relation to Biodiversity aim to protect and enhance biodiversity within the county. No potential for negative cumulative impacts were identified when considered in conjunction with the Proposed Project. No developments or projects identified within the Development Plan were found to occur in the wider area surrounding the Proposed Project. The BEMP for the Proposed Project aims to implement and align with Green Infrastructure policies outlined in the Carlow County Development Plan by enhancing biodiversity within the Proposed Wind Farm site, in particular through providing an overall net gain in linear habitats throughout the Proposed Wind Farm site. The AA Screening for the Carlow County Development Plan identified potential for likely significant effects on the following SACs and SPAs: • River Barrow and River Nore SAC • Blackstairs Mountains SAC • Slaney River Valley SAC • Holdenstwon Bog SAC
	NS. P2: Screening for Appropriate Assessment and if required Appropriate Assessment is undertaken for all plans to be adopted and projects to be granted permission/authorised by the Council. Where likely significant effects have been identified in respect of any plan or project not directly connected with or necessary to the management of a Natura 2000 site, either individually or in combination with other plans or projects, ensure appropriate assessment, in accordance with Article 6(3) of the Habitats Directive. The Council shall only agree to the plan or project after having ascertained that it will not adversely affect the integrity of the site concerned, unless the plan or project is subject to the provisions of Article 6(4) of the Habitats Directive.	
	NS. P3: Consider impacts within a plan or project's zone of influence, which may include Natura 2000 sites outside the County, when assessing whether a plan or project is likely to have significant effects on Natura 2000 sites.	
	NS. P4: Maintain or restore the favourable conservation status of County's Natura 2000 sites qualifying interest habitats and species.	
	ND. P1: Conserve the existing flora, fauna and wildlife habitats in the County, including rare and threatened plant, animal and bird species, through the preservation of ecological corridors and ecological networks.	

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	ND. P2: Ensure that development does not have a significant adverse impact on rare and threatened species, their breeding places, resting places, habitat or environment, as applicable, including those protected under the Wildlife Acts 1976 to 2021, the Birds Directive (2009/147/EC), the Habitats Directive (92/43/EEC) and including plant species listed on the Flora (Protection) Order 2015 (S.I. No. 356 of 2015).	As such the potential for cumulative impacts were identified in-combination with the Proposed Project specifically in relation to the River Barrow and River Nore SAC. However, with the implementation of mitigation measures outlined within this Biodiversity Chapter and the NIS for the Proposed Project and the mitigation measures outlined within the NIS[21] for the Carlow County Development plan **no potential for in-combination effects are identified.** .
	ND. P3: Require the submission of an Ecological Impact Assessment, where deemed necessary, for any development proposal likely to have a significant impact on existing flora, fauna and wildlife habitats, including rare and threatened plant, animal and bird species.	
	ND. P4: Ensure that, where evidence exists of species that are protected under the Wildlife Act 1976 (as amended), the Bird Directive 1979, and the Habitats Directive 1992, appropriate avoidance and mitigation measures are incorporated into development proposals as part of any ecological impact assessment. In the event of a proposed development impact on a site known to be a breeding or resting site of species listed in the Habitats Regulations or the Wildlife Act 1976 (as amended) a derogation licence, issued by the Department of Housing, Local Government and Heritage, may be required.	
	IW. P4: Require the submission of an Ecological Impact Assessment, where deemed necessary (and where necessary an Appropriate Assessment where in relation to Natura 2000 sites), including bat and otter surveys, for development proposals along rivers, streams and canal corridors and areas of ecological importance.	
	NS. O1: Strictly protect areas designated or proposed to be designated as Natura 2000 sites, including any areas that may be proposed for designation or designated during the period of this Plan.	

[21] https://consult.carlow.ie/ga/consultation/draft-carlow-county-development-plan-2022-2028/chapter/ii-natura-impact-report-support-appropriate-assessment

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	NH. O1: Implement relevant actions from the National Biodiversity Action Plan 2017-2021 (and any superseding plan) and to prepare a County Heritage Plan and Biodiversity Action Plan during the lifetime of this County Development Plan in accordance with RPO 126 in the RSES, to ensure the protection and appreciation of heritage and nature at local level including recognition of rich biodiversity of designation of existing special areas of conservation i.e. Blackstairs Mountains, Slaney River Valley and River Barrow and River Nore SAC.	
	Green Infrastructure - Policies **It is the policy of the Council to:** **GI. P1:** Identify, protect, maintain, and enhance existing and planned green infrastructure assets in the County, and recognise the wide range of environmental, social, and economic benefits of green spaces and nature-based solutions by ensuring the integration of green infrastructure planning and development in the planning process. **GI. P2:** Protect and enhance the biodiversity and ecological function of the County's green infrastructure network. **GI. P3:** Protect and preserve landscape features which contribute to green infrastructure in the County, including trees, hedgerows, woodlands, wetlands, watercourses and other habitats. **GI. P4:** Require all new development to contribute to the protection and enhancement of existing green infrastructure and the delivery of new green infrastructure, as appropriate. **GI. P5:** Restrict development that would fragment or prejudice landscape features and ecological corridors which significantly contribute to the County's green infrastructure network.	

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	GI. P6: Require proposals for large scale developments such as road or drainage schemes, wind farms, solar farms, residential schemes, industrial parks or retail schemes, to submit a green infrastructure plan as an integral part of a planning application. **GI. P7:** Promote a network of walking and cycling trails to enhance accessibility to the County's green infrastructure network, and ensure such proposals are subject to feasibility (including alternatives to the use of existing green infrastructure) and route/site selection processes so that impacts to biodiversity and nature conservation interests are avoided. **GI. P8:** Incorporate elements of green infrastructure into existing areas of hard infrastructure, where possible, thereby integrating these areas of the existing urban environment into the overall green infrastructure network. **GI. P9:** Ensure Local Area Plans protect and manage the green infrastructure network in an integrated and coherent manner and add additional green infrastructure where possible. **GI. P10:** Work collaboratively with other neighbouring Local Authorities in facilitating and supporting the development of cross-border green infrastructure networks.	
Kilkenny City and County Development Plan 2021-2027	**It is the Policy of the Council to**: **Objective 1A:** To implement the provisions of Articles 6(3) and 6(4) of the EU Habitats Directive and ensure that any plan or project within the functional area of the Planning Authority is subject to appropriate assessment in accordance with the Guidance Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 20091 or any subsequent version, and is assessed in accordance with Article 6 of the Habitats Directive in order to avoid adverse impacts on the integrity and conservation objectives of the site. **Objective 9A:** Continue to identify and map habitats and green infrastructure of county importance, and raise awareness and understanding of the county's natural heritage and biodiversity identifying green corridors and measures to connect them.	The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites. The overall aim of the policies and objectives set out in the County Development plan in relation to Biodiversity aim to protect and enhance biodiversity within the county. The BEMP for the Proposed Project aligns with Objective 9B of the County Development plan by enhancing the Proposed Development site for local biodiversity including marsh fritillary, red squirrel and pine marten.

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	- To ensure that development proposals, where relevant, improve the ecological coherence of the Natura 2000 network and encourage the retention and management of landscape features that are of major importance for wild fauna and flora as per Article 10 of the Habitats Directive. - 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. **Objective 9B:** To identify and map green infrastructure assets and sites of local biodiversity value over the lifetime of the Plan. - Require all developments in the early pre-planning stage of the planning process to identify, protect and enhance ecological features and habitats, and making provision for local biodiversity (e.g. through protection of existing breeding sites, and provision of appropriate new infrastructure such as swift, bat and barn owl boxes, bat roost sites, green roofs, etc.) and provide links to the wider Green Infrastructure network as an essential part of the design process. **Objective 10B:** To implement the measures of the River Basin Management Plan, including continuing to work with communities through the Local Authority Waters Programmes to restore and improve water quality in the identified areas of action.	No potential for negative cumulative impacts were identified when considered in conjunction with the Proposed Project. No developments or projects identified within the Development Plan were found to occur in the wider area surrounding the Proposed Project. The AA Screening for the Kilkenny City and County Development Plan identified potential for likely significant effects on the following SACs and SPAs: • River Barrow and River Nore SAC • Hugginstown Fen SAC • The Loughans SAC • Cullahill Mountain SAC • Spahill and Clomantagh Hill SAC • Galmoy Fen SAC • Lower River Suir SAC • Thomastown Quarry SAC • River Nore SPA • Lisbigney Bog SAC As such the potential for cumulative impacts were identified in-combination with the Proposed Project specifically in relation to the River Barrow and River Nore SAC. However, with the implementation of mitigation measures outlined within this Biodiversity Chapter and the NIS for the Proposed Project and the mitigation measures outlined within the NIS[22] for the Kilkenny

[22] https://kilkennycoco.ie/eng/services/planning/development-plans/city-and-county-development-plan/adopted-city-and-county-development-plan.html

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		County Development plan. **no potential for in-combination effects are identified.**
4th National Biodiversity Action Plan 2023-2027	Irelands 4th National Biodiversity Action Plan 2023-2030 (Department of Housing, Local Government and Heritage, 2024) (the "**NBAP**"). 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.	The objectives set out in the NBAP aim to protect and enhance and promote biodiversity, nature restoration on the Island of Ireland and also contribute to International biodiversity initiative. Mitigation and enhancement measures as outlined in the EIAR and NIS for the Proposed Project also aim to protect and enhance biodiversity as such no cumulative impacts were identified upon review of the Plan in conjunction with the Proposed Project. The Proposed Project will not contravene the proposed outcomes of the NBAP.
	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 underpin and strengthen future decision-making. Action will also focus on collaboration to advance ecosystem accounting that will contribute towards natural capital accounts.	

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	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.	
Regional Spatial and Economic Strategy for the Southern Region (2020-2032)	**RPO 1.b.** The RSES seeks to protect, manage, and through enhanced ecological connectivity, improve the coherence of the Natura 2000 Network in the Southern Region.	The Regional Spatial and Economic Strategy for the Southern Region was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the Natura 2000 network and other natural heritage interests. No potential for cumulative effects when considered in conjunction with the current proposed development were identified.
	RPO 5. Population Growth and Environmental Criteria Increased population growth should be planned with regard to environmental criteria, including: • Assimilative capacity of the receiving environment; • Proximity of Natura 2000 sites and potential for adverse effects on these sites, and their conservation objectives; • Areas with flood potential.	
	RPO 117 Flood Risk Management and Biodiversity 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 Green Infrastructure a. 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;	

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	b. Green infrastructure will be integrated into the preparation of statutory land-use plans in the Region, which will include identifying Green infrastructure and strengthening this network; c. All Development Plans and Local Area Plans shall protect, enhance, provide and manage Green infrastructure in an integrated and coherent manner addressing the themes of biodiversity protection, water management and climate action; and should also have regard to the required targets in relation to the conservation of European sites, other nature conservation sites, ecological networks, and protected species; d. Any future development of greenways, blueways, peatways, cycleways or walkways will include an assessment by the relevant authorities of any impacts that may arise from increased visitor pressures, in particular, on sensitive European sites and the design of the network will consider the provision of protective measures on sites sensitive to disturbance/visitor pressure.	

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6.7.2 Assessment of Projects

As described in Section 2.9 of the EIAR, relevant projects have been assessed in-combination with the Proposed Project and include planning applications in the vicinity of the Proposed Project site, within the zone of influence of all habitats and species considered in this report, and include other wind energy applications within the wider area. These have not been repeated here to reduce the duplication of information within this EIAR. However, they have been fully considered in the assessment with further detail provided below. In addition, Section 6.7.3 concludes on their potential for impact on biodiversity.

The table below provides the cumulative study areas for individual EIAR topics that are also relevant in relation to ecological receptors i.e., hydrological connectivity is important for assessing potential for effects on designated sites. Potential for cumulative effects in relation to birds is assessed separately within Chapter 7 of this EIAR.

Table 6-21 Cumulative Study Areas in relation to ecological receptors (birds are assessed separately within Chapter 7 of this EIAR)

Individual Topic	Maximum Extent	Justification
Biodiversity (including Bats)	10 km from the Proposed Wind Farm 200 m from Proposed Grid Connection Route. Consideration for the Biodiversity cumulative extent is also given to the Birds and Water Cumulative geographical boundaries.	Using the precautionary approach and given the nature and scale of the Proposed Project, the geographical boundary for terrestrial ecological aspects, i.e. habitats, is 10 km for cumulative assessment for the Proposed Wind Farm and 200 m from the Proposed Grid Connection Route.
Water	**Proposed Wind Farm:** Nore Catchment for large infrastructural developments such as wind farms, energy and public transport developments. River Sub Basins for all smaller proposed, permitted or existing plans or projects (i.e. private and commercial type developments). **Proposed Grid Connection Route:** Within a 200m buffer zone of the Proposed Grid Connection Route.	Regional surface water catchments are used for cumulative impact assessment with regard large infrastructural developments such as wind farms, energy and public transport developments. The potential for cumulative effects for these developments likely exists on a regional catchment scale (i.e. significant works likely existing in several sub-basins). Therefore, other wind-farm developments are considered within the Shannon Catchment for cumulative effects. River Sub Basins are used for smaller developments (i.e. private & commercial type developments). These developments are not likely to present a significant cumulative impact risk on a regional catchment scale as any effects would likely be imperceptible as a result of the setback distances and localised nature of the associated works. Given the nature and

		scale of the proposed works and the lack of hydrological cumulative impact potential beyond the river sub basin scale, the Water cumulative study area is defined by river sub basins in which the Proposed Wind Farm is located. Due to the narrow nature of the Proposed Grid Connection Route trench (~0.6m wide), a 200m buffer zone is an appropriate scale when considering potential cumulative effects on the water environment.

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6.7.2.1 Proposed Grid Connection

A desk-based planning search was undertaken to identify permitted developments within 200m vicinity of the Proposed Grid Connection Route. The projects within this boundary are provided in Appendix 4. A total of 40 projects were identified within this area and consisted predominantly of the construction of individual private dwellings, extensions to existing dwellings, as well as agriculture and energy and telecoms including an application by Eirgrid to undertake an upgrade to the Great Island to Kilkenny 110K line, a solar development at Johnswell village, Co. Kilkenny (Kilderry Solar Farm Ltd.) and a grid connection for Clashwilliam Solar Farm. The Biodiversity Chapter's and NIS's for these projects were reviewed. Potential for in-combination effects in relation to European sites are fully assessed in Section 8.1.2 in the NIS accompanying this application. The biodiversity chapters for these projects all contain mitigations to prevent identified impacts to biodiversity. No additional pathways for cumulative effects were identified in conjunction with the Proposed Project. With the implementation of mitigation measures proposed as part of the above-mentioned project and the Proposed Project no potential for cumulative impacts were identified.

6.7.2.2 Other Wind Farm Projects

For the purposes of this cumulative assessment, wind farms within a 25-kilometre radius of the Proposed Project area were considered in further detail below. Details of wind farm projects within 25km of the Proposed Project are provided in Appendix 2-3 of this EIAR and are summarised below also in the context of terrestrial ecology. Seven wind farms were identified as being within the cumulative study boundary as outline in Table 6-22 below. Potential for in-combination effects in relation to European sites are fully assessed in Section 8.1.3 in the NIS accompanying this application.

Table 6-22 Wind farm projects considered to be within the cumulative study area (Biodiversity) of the Proposed Project

Wind Farm	Planning Status	Number of Turbines	Separation Distance (turbine to turbine)	County
Bilboa Wind Farm	Permitted	5	c.1.3km	Co. Carlow & Co. Kilkenny
White Hills Wind Farm	Permitted	7	c.2.1km	Co. Carlow & Co. Kilkenny
Gortahile Wind Farm	Existing	8	c.3.1km	Co. Laois

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Wind Farm	Planning Status	Number of Turbines	Separation Distance (turbine to turbine)	County
Coolglass Wind Farm	Proposed	6	c.15.6km	Co. Laois
Pinewood Wind Farm	Conditional	11	c.16.6km	Co. Laois
Greenoge Wind Farm	Existing	4	c.24.6km	Co. Carlow
Lisdowney Wind Farm	Existing	4	c.24.9km	Co. Kilkenny

6.7.2.2.1 Bilboa Wind Farm

This wind farm consists of 5 no. turbines and is approx. 1.2km from the Proposed Project site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside Bilboa Wind Farm was considered. The conclusion of the Biodiversity Chapter for Bilboa Wind Farm was that there would be no residual significant effects on biodiversity with the implementation of mitigation measures outlined in the report. Given the lack of residual effects predicted as a result of the Proposed Project, there is no potential for significant cumulative effects.

6.7.2.2.2 White Hills Wind Farm

This wind farm consists of 7 no. turbines and is approx. 2.1km from the Proposed Project site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside White Hills Wind Farm was considered. The conclusion of the Biodiversity Chapter for White Hills Wind Farm was that there would be no residual significant effects on biodiversity with the implementation of mitigation measures outlined in the report. Given the lack of residual effects predicted as a result of the Proposed Project, there is no potential for significant cumulative effects.

6.7.2.2.3 Gortahile Wind Farm

Gortahile Wind Farm is an existing wind farm consisting of 8 no. and is and is approx. 3.1km from the Proposed Project site. Given the lack of residual effects predicted as a result of the Proposed Project, and in light of the fact that Gortahile wind farm has already been constructed there is no potential for significant cumulative effects on biodiversity.

6.7.2.2.4 Coolglass Wind Farm

This wind farm consists of 6 no. turbines and is approx. 15km from the Proposed Project site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside Coolglass Wind Farm was considered. The conclusion of the Biodiversity Chapter for Coolglass Wind Farm was that there would be no residual significant effects on biodiversity with the implementation of mitigation measures outlined in the report. Given the lack of residual effects predicted as a result of the Proposed Project, there is no potential for significant cumulative effects.

6.7.2.2.5 Pinewood Wind Farm

This wind farm consists of 11 no. turbines and is approx. 16km from the Proposed Project site. The potential for the Proposed Project to result in significant cumulative effects when assessed alongside Pinewood Wind Farm was considered. The conclusion of the Biodiversity Chapter for Pinewood Wind Farm was that there would be no residual significant effects on biodiversity with the implementation of

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mitigation measures outlined in the report. Given the lack of residual effects predicted as a result of the Proposed Project, there is no potential for significant cumulative effects.

6.7.2.2.6 *Greenoge Wind Farm*

Greenoge Wind Farm is an existing wind farm consisting of 4 no. and is and is approx. 24km from the Proposed Project site. Given the lack of residual effects predicted as a result of the Proposed Project and in light of the fact that Greenoge Wind Farm has already been constructed there is no potential for significant cumulative effects.

6.7.2.2.7 *Lisdowney Wind Farm*

Lisdowney Wind Farm is an existing wind farm consisting of 4 no. and is and is approx. 24.5km from the Proposed Project site. Given the lack of residual effects predicted as a result of the Proposed Project, and in light of the fact that Lisdowney wind farm has already been constructed there is no potential for significant cumulative effects.

6.7.2.3 Existing Habitats and Land Uses

The potential for the Proposed Project to result in a cumulative loss or deterioration of habitats, or impact on the KER species identified, was considered in relation to the existing land uses in the area.

The Proposed Project is located primarily on improved agricultural grassland (GA1) and forestry (WD4/WS5) habitats. The Proposed Project will result in the loss of some conifer plantation which supports some protected species such as red squirrel and pine marten. However, the loss of this habitat within the Proposed Wind Farm site will be minimal in the context of this habitat in the wider landscape. The loss of this habitat associated with other wind farm developments in the wider area will also be minimal and cumulative loss of this habitat type in the wider landscape is not considered significant. Furthermore, forestry re-planting is ongoing within the Proposed Wind Farm site and wider landscape and a replanting plan will be implemented. The Proposed Wind Farm is also located within agricultural grassland, which generally provides low value habitats for faunal species. The loss of linear habitats including treelines and hedgerow will be mitigated through the replanting measures described in the BEMP. The Proposed Grid Connection Route will not result in the loss of any habitat or change in land use as works are proposed within the existing road corridor. The Proposed Project will not contribute to any overall loss of high value habitat, it has been deliberately designed to be located on habitats of low value for faunal species.

The review of the relevant planning registers documented relevant general development planning applications in the vicinity of the site, the majority of which relate to the provision and/or alteration of one-off housing and the provision of agricultural buildings. The OPW (www.floodinfo.ie) does not record the presence of any Arterial Drainage Schemes or Benefited Lands within the Proposed Wind Farm site or along the Proposed Grid Connection Route.

6.7.3 Assessment of Cumulative Effects

The residual construction, operational and decommissioning impacts of the Proposed Project are considered cumulatively with other plans and projects as described in Sections 6.7.1, and 6.7.2. Particular focus has been placed on those plans and projects that are in closest proximity to the Proposed Project and those that could potentially result in cumulative impacts on designated sites, surface water, habitats and species. A cumulative impact assessment specific to the potential for impacts on bats is provided in Appendix 6-2 and summarised here also.

Following the detailed surveys undertaken and impact assessment provided in Section 6.6 (including mitigation measures), it is concluded that there will be no significant residual habitat loss, disturbance, deterioration of water quality associated with the Proposed Project and therefore it cannot contribute to

any cumulative effect when considered in-combination with other plans and projects. The other wind farms in the area were considered (among other projects) but the Proposed Project has been deliberately designed to minimise the effects on biodiversity through the siting of the Proposed Wind Farm on habitats of low ecological value and an emphasis on protection of surface water features (and associated aquatic fauna) during construction of the Proposed Project. The Proposed Project also includes a Biodiversity Management and Enhancement Plan, which further minimises /mitigates any potential for individual or cumulative negative effects on biodiversity and proposes enhancement measures for habitats and species within the EIAR boundary.

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

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

6.8 Conclusion

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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, County Importance or Local importance (higher value) were identified.

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

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