FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED LITTLETON WIND FARM, CO. TIPPERARY

Volume 2 - Main EIAR

Chapter 6 - Biodiversity

Prepared for:
Littleton Wind Farm DAC

BnM | sse

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6. BIODIVERSITY

6.1 Introduction

This chapter presents a Biodiversity Impact Assessment of the Proposed Development and describes the existing ecological environment of the Proposed Development and examines the potential effects that the Proposed Development (described in Chapter 4) is predicted to have on biodiversity, flora and fauna (excluding ornithology, see Chapter 7). Appropriate mitigation measures are described to avoid, reduce or offset potential significant effect(s) on biodiversity.

This Chapter of the EIAR is supported by Figures in Volume IV, Planning Drawings accompanying the planning application and the following Appendix documents provided in Volume III:

- Appendix 1.1 : Contributor CVs
- Appendix 4.1: Construction Environmental Management Plan (CEMP);
- Appendix 6.1: Biodiversity Enhancement and Management Plan (BEMP) ;
- Appendix 6.2: Aquatic Survey reports;
- Appendix 6.3: Bat Survey Report; and,

Appendix 6.4: Invasive Species Management Plan.

Common terms and acronyms used throughout this EIAR can be found in the glossary included in Volume IV, Appendix 1.3.

The Proposed Development assessed in this EIAR comprises the following elements:

- The 'Proposed Wind Farm' (also referred to in this EIAR as the '**Site'**);
- The 'Proposed Grid Connection' (also referred to in this EIAR as the **'GC'**);
- The 'Turbine Delivery Route' (also referred to in this EIAR as the **'TDR'**); and,
- The 'Biodiversity Enhancement and Management Plan Lands' (also referred to in this EIAR as the **'BEMP Lands'**).

An overview of the location of the Proposed Development is shown in Figure 4.1. The general layout of the Site is presented in Figure 4.2. The GC is presented in Figure 4.3, and the TDR is presented in Figure 4.4. The BEMP Lands are shown in Figure 6.15.

Ornithological impact assessment is described under a separate chapter (Chapter 7 - Ornithology). The assessment of effects on bird species as might be associated with designated sites with ornithological interests is presented in the Chapter 7 - Ornithology.

A Natura Impact Statement has been prepared in support of the consent application for the Proposed Development. As per the 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*". As such the potential for the Proposed Development to have adverse effects on the integrity of any European (Natura 2000) site has been assessed within a Natura Impact Statement (NIS) and summarised herein.

6.2 Statement of Authority

An ecological impact assessment of the proposed development was undertaken by Fehily Timoney and Company (FT) to inform this chapter. The lead author of this chapter is Yumi Mihara (FT Senior Project Ecologist, BSc. Environmental Science; MSc. in Environmental Science); co-author is Ben O'Dwyer (FT Ecologist, BSc. Wildlife Biology). The chapter was reviewed by Rita Mansfield (FT Senior Associate Director Ecology, BSc (Hons) Applied Ecology; H.Dip Environmental Protection and Pollution Control).

Habitat/botanical, mammal, bat, marsh fritillary and ecological walkover surveys were undertaken by FT ecologists. Survey and baseline report contributors are detailed in Table 6-1.

Baseline aquatic ecology assessments were conducted by Triturus Environmental Ltd.

CVs for all surveyors and contributors are included in Appendix 1.1.

Table 6-1: Contributors to Biodiversity Impact Assessment

Contributor	Contribution	Biography
Rita Mansfield	EIAR Biodiversity Chapter Reviewer	Rita holds a BSc. (Hons) in Applied Ecology and a H. Dip Environmental Protection and Pollution Control. Rita is experienced as a technical ecology lead within the environmental and planning services sector. She is a qualified ecologist with responsibility for environmental impact assessment, planning applications (conventional and strategic infrastructure development), Appropriate Assessment, foreshore licensing, and stakeholder engagement for large scale plans and projects in Ireland, including for wind energy developments. Rita has undertaken and managed a wide range of ecological field assessments including mammal, herpetofauna, bird, fishery, invertebrate and habitat assessments. Rita has held numerous licences under the Wildlife Act and Habitats Directive for disturbance to species which included mitigation (e.g. construction of artificial otter holt, bat exclusion). Rita has provided advice on ecological / environmental design to various private and public sector clients. Rita is an experienced Project Manager and Senior Associate Director at FT. With 22 years' experience specialising in statutory consent and environmental assessment for large scale public infrastructure projects in the energy, water (including flood relief schemes) and transport sectors. Rita provides technical advisory services through all stages of project delivery from feasibility assessment, impact assessment, CPO, design, contract administration and construction.

Contributor	Contribution	Biography
Ben O'Dwyer	EIAR Biodiversity Chapter Author Habitat & Botanical Survey Marsh Fritillary Survey Bat Roost Survey Mammal Survey	Ben is a Senior Project Ecologist with Fehily Timoney with over 9 years' experience in ecological assessment and holds a BSc (Hons) in Wildlife Biology from Institute of Technology Tralee (now MTU). He has prepared EcIAs, EIAR Biodiversity chapters, AA Screening reports and Natura Impact Statements for numerous large scale infrastructure projects in the renewable energy, commercial, waste management and transport sectors. He is an experienced and versatile field surveyor and his experience across a broad range of habitats and projects in Ireland has given him an extensive knowledge of protected sites and species across the country.
Yumi Mihara	EIAR Biodiversity Chapter Author Habitat & Botanical Survey	Yumi is a Senior Project Ecologist working as part of the Energy and Environment Team at Fehily Timoney and Company. Yumi has specialised in botany, with over 8 years' experience working in ecological consultancy section across Japan and Ireland. She holds a MSc in Environmental Science from Hokkaido University with a focus on Plant Physiology and a BSc in Environmental Science from Tokyo University of Agriculture with a focus on Habitat Classification via Phytosociological Methods. She has practical field survey skills in botany, including rare/protected/invasive plant survey, habitat classification and mapping and relevé survey. She has also prepared reports on Appropriate Assessment Screening (AA), Natura Impact Statements (NIS), Ecological Impact Assessment (EcIA), Hedgerow Appraisal and Invasive Species Management Plans (ISMP) for telecommunications infrastructure, small to large-scale residential developments and other construction in Ireland. She is a Qualifying membership of CIEEM.
Shannon Burke	Habitat & Botanical Survey Marsh Fritillary Survey Mammal Survey	Shannon is a Project Ecologist on the Energy and Planning team at Fehily Timoney and Company with 3.5 years' experience in ecological research and assessment. She holds a BSc (Hons) in Plant Biology and a PhD in Environmental Biology from University College Dublin. She has researched a variety of environmental topics, including plant physiology, biological invasions, and wetland ecology. Her PhD research focused on the carbon stocks and sequestration rates of Irish coastal wetlands. Shannon has extensive knowledge in terrestrial, coastal, wetland, and freshwater ecology and has completed a wide range of fieldwork nationwide including soil, habitat, macroinvertebrate, and ornithological surveys. Shannon has developed strong skills in mapping, data management, statistical analysis, and report writing through her PhD.

Contributor	Contribution	Biography
		Shannon specialises in plant identification, habitat classification, and freshwater invertebrate ecology, with additional experience in invasive species, ornithology and bats. Since joining FT, she has honed these skills through ecological surveys, Appropriate Assessment Screening reports, Ecological Impact Assessment reports, and Natura Impact Statements.
Orla Commins	Bat Report Habitat & Botanical Survey Marsh Fritillary Survey Static Bat Detector Survey Bat Activity Survey	Orla Commins is a Graduate Ecologist with Fehily Timoney and Company with 1.5 years' experience in ecological assessment. She holds a first-class BSc in Ecology and Environmental Biology from University College Cork. Since joining Fehily Timoney, she has undertaken a wide range of fieldwork, encompassing bat surveys (static detector deployment & activity surveys), marsh fritillary, mammal, habitat and ecological walkover surveys. She has prepared Appropriate Assessment Screening reports, Ecological Impact Assessments and baseline reports including ornithology and bat reports, in addition to analysis of bat survey data, mapping and data management.
Kate O'Regan	Bat activity survey Marsh fritillary survey	Kate O'Regan is a Project Ecologist with Fehily Timoney and Company with 3 years' experience in ecological assessment. She holds a first-class BSc. in Zoology and first-class MSc in Marine Biology from University College Cork. She has completed numerous bat surveys for proposed wind farm developments, and has prepared reports and desktop studies for a number of renewable energy projects since joining Fehily Timoney. She has previous experience in data management, statistical analysis, mapping and technical report writing. Kate has also completed a wide range of surveys including bird, intertidal, subtidal, insect and mammal surveys. She is a Qualifying membership of CIEEM.
Chandra Walter	Bat activity survey Marsh fritillary survey	Chandra Walter, a Project Ecologist with 4 years' experience with Fehily Timoney. Chandra holds a BSc in Ecology from University College Cork and an MSc in Organic Horticulture from University College Cork (both First Class Honours). Her degrees focused on nature conservation and included a wide variety of surveying skills, including habitat surveys, bird surveys and insect surveys, research skills and report writing. She has completed numerous bat surveys for proposed wind farm developments and also completed reporting and assessment for a diverse range of projects.

Contributor	Contribution	Biography
Ross Macklin	Aquatic Surveys, Assessment and Baseline Reporting	Ross is Aquatic/Fisheries Ecologist & Director at Triturus Environmental Ltd. He is currently completing a Ph.D. in Environmental Science from University College Cork and holds a B.Sc. (Hons) in Applied Ecology from University College Cork. Ross is a member of Chartered Institute of Ecology and Environmental Management and a registered member Institute of Fisheries Management. Ross has over 18 years' professional experience in Ireland. He specialises in freshwater fisheries ecology, biology and water quality. He has considerable experience in a wide range of ecological and environmental projects including EIAR, EcIA and AA/NIS reporting, as well as biodiversity, water quality monitoring, invasive species and fisheries management. He also has expert identification skills in macrophytes, freshwater invertebrates, protected aquatic habitats and protected aquatic species including freshwater pearl mussel. His diverse project list includes work on renewable energy developments, flood relief schemes, road schemes, blueways/greenways, biodiversity projects, fisheries management projects and catchment wide water quality management.
Bill Brazier	Aquatic Surveys, Assessment and Baseline Reporting	Bill is an aquatic ecologist with over 13 years' professional experience in Ireland. He specialises in freshwater fisheries ecology, biology and water quality. He has considerable experience in a wide range of ecological and environmental projects including EIAR, EcIA and AA/NIS reporting, as well as biodiversity, invasive species and fisheries management. His diverse project list includes work on wind farm developments, flood relief schemes, road schemes, blueways/greenways and biodiversity projects. He is currently completing his Ph.D. on the genetics, reproductive biology and invasive potential impact of common carp (*Cyprinus carpio*) in Irish waters. Bill holds a B.Sc. (Hons) in Applied Freshwater & Marine Biology from Galway-Mayo IT. Bill completed aquatic surveys and reporting for the Annagh Project.

6.3 Legislation and Policy

All species and habitats likely to be significantly impacted by the Proposed Development, including those provided with National and International protection under the following legislative and policy documents have been considered in this Impact Assessment.

European Legislation

The EU Habitats Directive (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) (as amended) (the 'Habitats Directive') together with the Birds Directive (Council Directive 2009/147/EC on the Conservation of Wild Birds) (as amended) (the 'Birds Directive') are the main legislative instrument for the protection and conservation of biodiversity within the European Union (EU).

The Habitats Directive lists habitats and species that must be protected within Special Areas of Conservation (SAC) within Annexes I and II, respectively. The Habitats Directive also identifies plant and animal species within Annex IV which are subject to strict protection anywhere they occur.

The Birds Directive provides for the identification of a network of Sites in all member states to protect birds at their breeding, feeding, or roosting areas. The Birds Directive identifies in Annex I, species that are rare, in danger of extinction, or vulnerable to changes in habitat and which require special protection and areas for their conservation: Special Protection Areas (SPA).

The Habitats Directive and Birds Directive have been transposed into Irish law, by Part XAB of the Planning and Development Act 2000 (as amended) and by the European Communities (Birds and Natural Habitats) Regulations 2011, as amended.

The EU Water Framework Directive (2000/60/EC) (as amended) requires all Member States to protect and improve water quality in all waters to achieve good ecological status under prescribed deadlines. This was transposed into Irish Law by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003) and by the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended) and European Union Environmental Objectives (Freshwater Pearl Mussel) (Amendment) Regulations 2009 (as amended) and the European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended). The Directive applies to rivers, lakes, groundwater, and transitional coastal waters. The Directive requires management plans to be prepared on a river basin basis and specifies a structured method for developing these plans. Ireland's third cycle River Basin Management Plan 2022-2027 ('The Water Action Plan 2024: A River Basin Management Plan for Ireland') was published on 3rd September 2024.

National Legislation

The primary domestic statute providing for wildlife protection in Ireland is the Wildlife Act of 1976 (as amended) (the 'Wildlife Act') and associated Statutory Instruments.

Currently all bird species are protected under the Wildlife Acts from offences including intentional killing or injury and disturbance during the breeding season (to include eggs, young, and nests which are also protected), although there is a provision under the Third Schedule of the Act to provide exemption to protection. The Act also provides protection to a range of terrestrial and aquatic mammal species including bats, three amphibian species (newt, frog and toad) and one reptile species (lizard) and these are all similarly protected from intentional killing or injury, whilst the breeding or resting sites of these species are also protected. The amendment to the Act in 2000 broadens its scope to allow the Minister to prescribe protection for fish and aquatic invertebrate species through statute, however none has been made to date. The Act also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs). The Act also requires that public bodies, in the performance of their functions, have regard to the National Biodiversity Action Plan.

A number of vascular (i.e. flowering) and non-vascular plant species (i.e. non-flowering) are afforded legal protection under the Flora (Protection) Order, 2022 enacted under Section 21 of the Wildlife Act, 1976. It is an offence to cut, pick, collect, uproot, or otherwise take, injure, damage, or destroy any specimens of the species listed under the Flora Protection Order.

The Third Schedule to the European Communities (Birds and Natural Habitats) Regulations 2011, as amended lists invasive alien plant species. These regulations make it an offence to plant, disperse, allow or cause to disperse, spread, or otherwise cause to grow any of the scheduled species. The more recently published European Union (Invasive Alien Species) Regulations 2024 (S.I. No. 374 of 2024) complements the Third Schedule of the European Union (Birds and Natural Habitats) Regulations 2011 by providing a legal framework for managing invasive alien species, particularly those of Union and National concern.

Beyond the national statutes which transpose the Water Framework Directive into national law, there are several older national Acts which are intended for the protection of fisheries and the aquatic environment as follows:

- Section 171 of the Fisheries (Consolidation) Act 1959 creates the offence of throwing, emptying, permitting or causing to fall onto any waters deleterious matter. Deleterious matter is defined as not only as any substance that is liable to injure fish but is also liable to damage their spawning grounds or the food of any fish or to injure fish in their value as human food or to impair the usefulness of the bed and soil of any waters as spawning grounds or other capacity to produce the food of fish.
- Under Section 3 of the Local Government (Water Pollution) Act, 1977 (as amended by Sections 3 and 24 of the 1990 Act) it is an offence to cause or permit any polluting matter to enter waters.

National Policy

Ireland's fourth National Biodiversity Action Plan (NBAP) was launched in January 2024 and sets the national biodiversity agenda for the period 2023-2030. The Plan includes five strategic objectives as follows:

- Objective 1 Adopt a Whole-of-Government, Whole-of-Society Approach to Biodiversity
- Objective 2 Meet Urgent Conservation and Restoration Needs
- Objective 3 Secure Nature's Contribution to People
- Objective 4 Enhance the Evidence Base for Action on Biodiversity
- Objective 5 Strengthen Ireland's Contribution to International Biodiversity Initiatives

This plan includes targeted actions for public authorities in relation to their obligations for biodiversity. One particularly important policy change in the plan (Objective 1) relates to the mainstreaming of biodiversity into decision-making across all sectors. Specifically, there is an obligation on all Public Authorities to "move towards no net loss of biodiversity through strategies, planning, mitigation measures, appropriate offsetting, and/or investment in Blue-Green infrastructure". This and other relevant policies in the plan have informed the valuation of ecological features, assessment of potential effects, and development of mitigation in this EIAR.

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 National Biodiversity Action Plan.

6.4 Consultation

The full list of the bodies consulted as part of the environmental assessment are presented in Chapter 2 Background to the Proposed Development. Specific to biodiversity, the following responses were received.

6.4.1 Initial Consultation

Development Applications Unit (DAU)/ National Parks and Wildlife Service (NPWS) (consultation reference Pre00244/2021): A response was issued following submission of the scoping report in 2021. The response advised on best-practice assessment approaches and key areas to cover in relation to nature conservation in order to prepare a robust assessment. Specific subjects raised included consideration of existing bog rehabilitation proposals, potential for effects on habitat/species of high biodiversity value, potential conflicts between strategic ecological value and use of site for wind energy, consideration of optimal site use in contributing to reductions in carbon emissions, effects of site/habitat management on how wildlife uses the site during operational the phase, assessment of drainage requirements and associated potential for water quality effects, long term peatland rehabilitation plans following wind farm decommissioning, and potential effects on a known wintering whooper swan flock in the immediate locality.

The response noted that the EIAR should take account of Objective 1 of the National Biodiversity Action Plan which is to mainstream biodiversity into decision-making across all sectors and also referenced guidance which should inform the preparation of the EIAR. The importance of avoidance through design as a first principle was highlighted. The response also noted that thorough and complete descriptions of both the proposed project and baseline environments are required for a robust assessment, with a particular focus on peat management, drainage and hydrological connectivity. The requirement to mitigate habitat loss and the importance of potential Annex I habitats occurring outside the Natura 2000 network were also noted. Potential effects of turbine lighting and consideration of alternatives were also raised.

A section on key survey requirements was included, with ornithology, bats, aquatic ecology, habitats, marsh fritillary butterfly and invasive alien plant species noted as key areas of interest. Guidance and legislation relevant to the impact assessment was listed and discussed, in addition to guidance relevant to Appropriate Assessment.

Assessment of cumulative effects, post-construction monitoring, and derogation licence requirements were also discussed.

6.4.2 Follow-Up Consultation

Based on availability of more detailed project information, requests for updated consultation were issued to the DAU and IFI in on 22 September 2023.

The DAU response to this request referred back to their initial response summarised above in Section 6.4.1.

Inland Fisheries Ireland (IFI) did not respond to a request for consultation (issued to South Eastern district office in Clonmel via email on 22 November 2023).

6.4.3 Final Stage of Consultation

A further request for consultation was issued to the DAU/NPWS on 15 December 2025. A response from NPWS offering a meeting and summarising key ecological considerations was received on 22 January 2026 (reference: G Pre00401/2025). The key items communicated by NPWS in advance of the meeting were :

- Requirement to ensure robustness of collision risk model (CRM) by ensuring adequate visibility of flight activity study area from vantage points (VPs);
- Importance of completing robust survey using suitable methodology for breeding curlew which are known to occur in the locality;

- Importance of contextualising any potential effects on breeding curlew, noting their conservation status and distribution;
- Ensure survey effort and methodology for hen harrier roost surveys are adequate and suitable.

These items and others were discussed during the consultation meeting (14 February 2026). The key items presented for discussion at the meeting were:

- Summary of proposed development and key ecological considerations;
- Use of iterative design informed by surveys to avoid and minimise potential effects;
- Summary of how initial NPWS observations (G Pre00244/2021) have informed project design, survey effort and design;
- Responses to the key ecological considerations communicated by NPWS on 22 January 2026 (reference: G Pre00401/2025).

Following presentation of the above listed items which provided an overview of the project and a starting point for discussion, the key items discussed were:

- Importance of assessing effects on the local curlew population robustly, noting the small size of this population means it is vulnerable, and that potential loss of one breeding pair could also significantly affect the national population due to its small size and localised distribution. NPWS stressed the importance of characterising potential population effects correctly. FT agreed to follow NPWS advice on assessing curlew population dynamics.
- Correct phenological contextualisation of potential collision effects on curlew should be ensured, noting juvenile curlew are likely to be more susceptible to collision risk, resulting in increased risk at certain times of the year.
- NPWS indicated they are receptive to inclusion of measures such as habitat and/or predator management to help offset any potential negative effects on breeding curlew. It was noted that any existing wader management ongoing at the Site cannot be used as mitigation/offset measures; any measures undertaken as part of the proposed development need to be implemented specifically for the proposed development. NPWS noted we could potentially explore collaborating with Breeding Wader EIP, and should also contact them to see if they are already undertaking any actions in the area or have site-specific data.
- Requirement for robust monitoring protocol to monitor potential effects of amenity use on curlew in addition to standard collision monitoring.
- The potential for more widespread adoption of automated turbine curtailment systems in the future should be noted.
- NPWS noted that mitigation should include provisions to temporarily close sections of amenity trails if required at certain times of the year to avoid disturbance to curlew and other breeding waders. Monitoring of both bird and amenity user behaviour should be undertaken to inform any such decisions.
- Monitoring the effects of the amenity trails will also be required to check what other effects they may have, and to confirm the effectiveness of any barriers, screening fencing etc. installed.

- Requirement to identify 'desire lines' i.e. locations where amenity users may potentially stray from paths or cut corners with potential effects on breeding wader/waterbird areas. This would need to be looked at during the planning stage, but behaviour of recreational users during operation would also need to be monitored to allow adaptive responses during operation.
- If feasible, predator control to protect breeding curlew delivered within the ecological enhancement programme (if proven to reduce curlew mortality) could be considered as contributing to offsetting potential collision risk. Noted predator control could also be beneficial to breeding gull colonies.
- In discussing assessment of potential indirect effects on raised bog remnants, it was noted that use of the Acrotelm capacity model could provide more definitive information on links with Annex I habitat than botanical surveys on their own. The model could help to confirm whether the area of raised bog near the proposed northern access track is capable of regeneration (and therefore Annex I type 7120), but is not essential if robust vegetation and hydrogeological data is available to enable alternative routes for assessment.
- NPWS noted FT should refresh their data request (received 12 December 2025) to ensure we have the most up to date information on breeding curlew in the area.

The above DAU/NPWS observations have been addressed through the design process, within the EIAR assessment, and by mitigation prescribed in this Biodiversity Chapter and also within the Hydrology chapter of this EIAR.

6.5 Methodology

6.5.1 Relevant Guidance

The methodology for this appraisal has been devised in compliance with the following guidance:

- 'Guidelines on the information to be contained in Environmental Impact Statements' (EPA, 2022);
- 'Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (DoHPLG, 2018);
- 'PE-ENV-01112 - Guidelines for the Assessment of Ecological Impacts of National Road Schemes' (TII/NRA, 2009)
- 'Guidance document on wind energy developments and EU nature legislation'. Commission Notice C (2020) 7730 final, Brussels 18.11.2020
- 'Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment' (European Commission, 2013)
- Draft Revised Wind Energy Development Guidelines (DoHLGH, 2019)
- Atkinson, S., Magee, M., Moorkens, E.A. & Heavey, M. (2024). Guidance on Assessment and Construction Management in Margaritifera Catchments in Ireland

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

- *CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine* (Version 1.2) published by the Chartered Institute of Ecology and Environmental Management (CIEEM) (2018; last updated September 2024).
- PE-ENV-01113 - Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (TII/NRA, 2008).

6.5.2 Study Area and Zone of Influence

As per CIEEM guidelines (2018), the Study Area for the Proposed Development has been defined having regard to the spatial and temporal scale of potential biophysical changes in the environment which might occur as a result of the development and throughout its lifetime. Consideration is given to the following:

- the characteristics, size and location of the Proposed Development,
- whether there could be landscape[1] or ecological connectivity[2] to any ecological receptor which includes examination of the full extent of surface water catchments and potential for hydrologically connectivity.

[1] Landscape connectivity is a combined product of structural and functional connectivity, i.e. the effect of physical landscape structure and the actual species use of the landscape.
[2] Ecological connectivity is defined as a measure of the functional availability of the habitats needed for a particular species to move through a given area. Examples include the flight lines used by bats to travel between roosts and foraging areas or the corridors of appropriate habitat needed by some slow colonising species if they are to spread.

As such the Study Area extends beyond the footprint of the Proposed Development and associated red line boundary and considers potential for direct and indirect links to ecological receptors and associated ecological structure and function. From this, the key ecological receptors (KER)[3] are identified and are considered further in terms of their Zones of Influence (ZoI) i.e. the pathway for an effect on the KER (as determined through source-pathway-receptor/target model[4]) and the sensitivity of the KER to the effect as informed by best available guidance / data.

Further information on the ZoI and the Study Area for individual KERs is provided in Section 6.5.4.

6.5.3 Desktop Study

6.5.3.1 Designated Nature Conservation Sites

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'.

In relation to European Sites, a source-pathway-receptor approach was adopted, as per OPR (2021a) guidelines[5], and a Natura Impact Statement has been prepared, in accordance with national[6] and European[7] guidelines, to provide the Competent Authority with the information necessary to complete an Appropriate Assessment of the Proposed Development in compliance with Article 6(3) of the Habitats Directive. The potential for significant effects on European Sites and adverse impacts on the integrity of European Sites is fully assessed within the AA Screening Report (AASR) and Natura Impact Statement (NIS), respectively, that accompany this application.

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. Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. Nationally designated Sites that are also designated as European Sites have been assessed as those designations within the Appropriate Assessment Screening Report and NIS, with the relevant conclusions are recorded and referenced in this chapter.

The following methodology was used to establish which protected sites designated for nature conservation are within the Likely Zone of Influence of the Proposed Development and have the potential to be impacted by the Proposed Development:

[3] According to the National Roads Authority guidelines (NRA 2009), key ecological receptors will be features of sufficient value to be material in the decision-making process for which potential effects are likely. According to the NRA Guidelines, key ecological receptors are therefore defined as features of Local (Higher Value), County, National, or International Importance.
[4] Based on the guidance provided in the Office of the Planning Regulator practice notes (OPR, 2021a and 2021b).
[5] OPR (2021) Practice Note PN01 Appropriate Assessment Screening for Development Management
[6] Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin (2009, updated 2010) (Environment Heritage and Local Government, 2009).
[7] Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC. European Commission (2019). Brussels, (2019/C 33/01). OJ C 33, 25.1.2019. AND Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Commission Notice (2021) Brussels, 28.9.2021 C(2021) 6913 final (European Commission, 2021).

- Initially the most up to date GIS spatial datasets for European and Nationally designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) on the 28/11/2025. The datasets were utilised to identify Designated Sites which could feasibly be affected by the Proposed Development. All Designated Sites that could potentially be affected were identified using a source-pathway-receptor model. To provide context for the assessment, Designated Sites surrounding the Proposed Development Site are shown on Figure 6.1 and Figure 6.2 Volume IV.
- Waterbody catchment mapping was used to establish or discount potential hydrological connectivity between the Proposed Development and any designated sites. The hydrological catchments are also shown in Figures 9.2 and Figure 9.3, Volume IV.

6.5.3.2 Flora/Habitats and Fauna

A desk study was carried out to collate and review available information, datasets and documentation sources pertaining to the natural environment in which the Proposed Development is situated.

Records available on the NPWS and the National Biodiversity Data Centre (NBDC) websites were reviewed, in addition to records of rare/sensitive species within the hectads (10km grid squares) overlapping the Site (including the BEMP lands), obtained by request from NPWS (received 12th November 2025). NBDC data for the 1 km grid squares overlapping the GC and TDR provided desktop information for these locations.

Botanical species were assessed in accordance with their occurrence on the Flora Protection Order 2022 and the '*Ireland Red List No. 10: Vascular Plants*' (Wyse *et al*., 2016).

Other sources included:

- Tipperary County Development Plan 2022-2028
- OSI Aerial photography and 1:50000 mapping;
- NPWS website (mapviewer; Article 17 reporting; FPO and Bryophyte viewer) (noting that 2025 Article 17 mapping was not available at the time of this assessment);
- NPWS rare and protected species records obtained by request on 12th December 2025;
- National Biodiversity Data Centre (NBDC) website;
- Teagasc Soil area maps;
- Tailte Éireann National Land Cover Map;
- Bord na Móna habitat mapping and flora and fauna surveys;.
- Map of Irish Wetlands Boundaries 2025 (Wetland Survey Ireland);
- Bat Conservation Ireland records;
- Geological Survey Ireland (GSI) area maps;
- OPW drainage maps;
- EPA website datasets (soil, surface water quality, ground water quality, designated sites);
- Inland Fisheries Ireland (IFI) data hub: https://opendata-ifigeo.hub.arcgis.com/ ;
- Botanical Society of Britain and Ireland online maps and data;
- Collation of data on known caves from the Cave Database for the Republic of Ireland, compiled by Trinity College (http://www.ubss.org.uk/search_irishcaves.php).

6.5.3.3 Peatland Rehabilitation

Following cessation of peat extraction, decommissioning processes were implemented at Littleton, Longfordpass and Lanespark bogs (within the site) to ensure that no environmental liability remains from infrastructure and material associated with former extraction operations and that the bog can be deemed suitable for surrender of the license under Section 95 of the EPA Act. Decommissioning encompassed measures such as:

- Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices;
- Cleaning of Silt Ponds;
- Decommissioning of Peat Stockpiles;
- Decommissioning or Removal of Buildings and Compounds;
- Decommissioning Fuel Tanks and associated facilities;
- Decommissioning/Removal of Bog Pump Sites;
- Decommissioning or Removal of Septic Tanks;
- Removal of Rail Infrastructure.

It is also a requirement of '*Condition 10 Cutaway Bog Rehabilitation'* of the IPC Licence that following the above decommissioning of use of all or part of their bogs, Bord na Móna, prepares (to the satisfaction of the EPA) and implements a Cutaway Bog Rehabilitation Plan. Bord na Móna produced Cutaway Bog Decommissioning and Rehabilitation Plans covering Littleton and Lanespark bogs (Bord na Móna 2026a, 2026b & 2025a).

Phase 1 Rehabilitation works commenced in Littleton, Longfordpass and Lanespark in 2018 with extensive drain-blocking and hydrological management. It is noted that no drain blocking has been carried out in the small area of Longfordpass Bog overlapped by the site. The key objective of peatland rehabilitation is environmental stabilisation. The rehabilitation works that have been completed and commenced in Phase 1 are described in the Cutaway Bog Decommissioning and Rehabilitation Plans (Bord na Móna 2026a, 2026b & 2025a). The measures associated with Phase 1 Rehabilitation works are drain blocking and monitoring.

Drain Blocking

Drains have been blocked using a number of methods depending on the size and type of drain. These methods include the following:

- Peat dams within small drainage channels on the cutover bog; and,
- Removal or blocking of drainage pipes, or modification of drainage levels, where required.

These methods are fully described in the Irish Wildlife Manual, Best Practice in Raised Bog Restoration in Ireland (Mackin et al, 2017).

These Rehabilitation Phase 1 measures at Littleton, Longfordpass and Lanespark were completed between 2018-2021.

Monitoring

As per the Cutaway Bog Decommissioning and Rehabilitation Plans, a programme of monitoring, aftercare and maintenance was implemented to validate the efficacy of the rehabilitation measures in achieving environmental stabilisation. These measures are detailed in the Rehabilitation Plan Review Reports as submitted to the EPA in April 2026 (Bord na Móna 2026a & 2026b). All surface and ground water monitoring has been submitted to the EPA as per licence requirements. Monitoring carried out assessed the general status of the site, the condition of the silt ponds, the condition of the rehabilitation measures, monitoring of any potential impacts on neighbouring lands, general land security, boundary management, dumping and littering. Monitoring visits also considered any requirements for further practical rehabilitation measures.

Rehabilitation Plan for Ballybeg-Lanespark- Derryvella Bogs

An Cutaway Bog Decommissioning and Rehabilitation Plan for Ballybeg, Lanespark and Derryella bogs was prepared in 2025 to include Phase 2 enhanced rehabilitation measures as part of PCAS (Peatlands Climate Action Scheme) for Ballybeg and Derryvella (Bord na Móna 2025a). No enhanced measures are proposed for Lanespark.

6.5.4 Field Study

The field study surveys were designed following the consideration of the findings of the desk study and scoping consultation.

6.5.4.1 Study Areas

The Study Areas used for different disciplines and different survey types within Study Areas relative to specific project elements are detailed below in Table 6-2, with further detail presented below the table.

In addition to these study areas, the connectivity or ecological continuity of the proposed development lands was assessed. This refers to the degree to which different parts of a landscape, ecosystem, or habitat are physically or functionally linked, allowing the movement of organisms, nutrients, energy, or ecological processes across space. Consideration is therefore given to whether there is a landscape[8] or ecological[9] feature which provides connectivity / continuity for habitats and species. As such, the lands within the various zones of impact are assessed for their potential to form part of ecological or landscape continuity.

[8] Landscape connectivity is a combined product of structural and functional connectivity, i.e. the effect of physical landscape structure and the actual species use of the landscape.
[9] Ecological connectivity is defined as a measure of the functional availability of the habitats needed for a particular species to move through a given area. Examples include the flight lines used by bats to travel between roosts and foraging areas or the corridors of appropriate habitat needed by some slow colonising species if they are to spread.

Table 6-2: Study Areas

Discipline/Survey	Project Element		
	Wind Farm, including BEMP lands	GC	TDR
Habitat, Botanical and Invasive Species	The Site boundary (see Figure 4.1) defined the study area for field surveys on a precautionary basis. The study area for the impact assessment is focused on the proposed infrastructure footprint and associated ZoI, defined as a 250m buffer[10] [11] [12]around the proposed infrastructure layout.	GC footprint and adjacent lands	TDR nodes and adjacent lands
General Mammals	150m buffer[13] around proposed infrastructure, associated felling areas and proposed BEMP measures. Additional searches for badger setts outside the ZoI detailed above were also conducted where suitable habitat is present within the Site.	GC footprint and adjacent lands	TDR nodes and adjacent lands

[10] 'Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems', (SEPA, 2024) prescribes the following buffer zones around the proposed infrastructure in order to prevent risks to Groundwater Dependent Terrestrial Ecosystems GWDTE: 10m for all activities, 100m for subsurface activities <1m deep and 250m for subsurface activities >1m depth. As such a ZoI of 250m has been adopted when assessing the potential for impacts on GWDTE.

[11] The Institute of Air Quality Management 'Guidance (Institute of Air Quality Management, Holmen et al, 2024)Guidance on the Assessment of dust from demolition and construction' (Holman et al, 2024) states that for ecological receptors, effects from dust soiling is 'High' to 'Medium' up to 20m from the source (depending on sensitivity of ecological receptor) and reduces to 'Medium' to 'low' over 50m from the source. The guidelines state that ecological receptors should be considered within 50m of the project and within 250m of site entrances where trackout may occur. A such a 50m ZoI for dust has been adopted for the proposed development plus a 250m ZoI associated with the construction compound where trackout may be greater.

[12] Inland Fisheries Ireland (2020) guidelines (Inland Fisheries Ireland, 2020) on the protection of watercourses through the use of buffer zones states that in order to protect waterbodies, "the recommended buffer zone width for larger river channels (>10m) is 35m to 60m and for smaller channels (<10m) is 20m or greater".

[13] A potential disturbance zone for mammals and bats adopted for this assessment is 150m beyond the footprint of onsite activities having regard to TII, (2005, and republished 2025) Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes (CC-ENV-01103) (TII, 2006 republished 2025)(NRA, 2006)

Discipline/Survey	Project Element		
	Wind Farm, including BEMP lands	GC	TDR
Otter	150m up and downstream of proposed internal access track crossings, sections within 150m of the proposed infrastructure, namely, 11 wind turbines, turbine foundations and hardstanding areas, access tracks, underground electrical and communications cabling, drainage, temporary site compounds, onsite substation, biodiversity enhancements, recreational amenity infrastructure and all associated works & felling[14]. Additional searches for otter signs outside the ZoI detailed above were also conducted where suitable habitat is present within the Site. Otter signs also were searched for in conjunction with aquatic surveys in receiving catchments.	150m up and downstream of watercourse crossings.	N/A No works within 150m of water courses proposed for TDR.
Bats	Core Study Area (roost & static detector surveys) was 30m buffers of the access tracks, and 300m buffers of the other proposed infrastructure footprint plus associated felling buffer[15].	Bridges and Trees along GC	Trees at locations where vegetation trimming/clearance is required

[14] TII (2006, and republished 2025) Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (CC-ENV-01104) (TII, 2006 republished 2025).
[15] For bats, a ZoI of 300m has been adopted having regard to the UK Bat Mitigation Guidelines (Reason, P.F. and Wray, S., 2025)(Reason & Wray, 2025) and NatureScot (2021).

Discipline/Survey	Project Element		
	Wind Farm, including BEMP lands	GC	TDR
	Regard was had to Bat Conservation Trust, London (2020)[16] core sustenance zone guidance, and as such an assessment of potential for habitat continuity within a 4 km area was considered within the survey design and interpretation of results.		
Marsh Fritillary	Proposed infrastructure footprint plus 30m buffer, in addition to any proposed felling buffers extending beyond the 30m infrastructure buffer. Habitat continuity/connectivity within 2km of the proposed development footprint informed the survey approach having regard to Ireland's Butterfly Series Marsh Fritillary (National Biodiversity Data Centre, 2021).	N/A	N/A
Aquatic Ecology	Survey points on watercourses in surrounding catchments receiving drainage from the proposed development. Lake/wetland sites on cutover bog within proposed development site.	GC river crossing locations	Within TDR catchment survey area.

[16] Bat Conservation Trust, London. 2020. *Core Sustenance Zones and habitats of importance for designing Biodiversity Net Gain for bats.* 2020.

Discipline/Survey	Project Element		
	Wind Farm, including BEMP lands	GC	TDR
General Ecology	30m buffers of the access tracks, and 300m turbine buffers of the other proposed ; proposed infrastructure footprint plus associated felling buffer..	GC footprint and adjacent lands	TDR nodes and adjacent lands

Note the proposed construction materials haul route is located within existing road infrastructure and will not have an interaction with habitats or species and as such is not discussed further.

The turbine delivery route will affect immature trees at one location: Node 3 (removal of trees). The affected trees are immature specimens originating from roadside landscaping. Grassy verges along road edges and within roundabout islands will be affected by placement of load bearing material. The remainder of the TDR is within the existing road corridor and as such does not have potential for effects on local ecological receptors.

6.5.4.1.1 Designated Sites

In establishing the Study Area to assess the baseline scenario for designated sites regard was had to OPR (2021a) guidelines. In this regard a Source-Pathway-Receptor (S-P-R) model was adopted to identify potential pathways for designated sites and was informed by the following best practice publications:

- Scottish Natural Heritage (2016) 'Guidance on Assessing Connectivity with Special Protection Areas (SPAs)'
- SEPA Land Use Planning System (2017) 'Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems', Guidance Note 31
- BCT (2020) Core Sustenance Zones and habitats of importance for designing Biodiversity Net Gain for bats. Bat Conservation Trust, London.
- Collins J. (ed.) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). The Bat Conservation Trust, London
- TII/NRA (2009a). PE-ENV-01112 - Guideline for the Assessment of Ecological Impacts of National Road Schemes, /Transport Infrastructure Ireland/National Roads Authority

The S-P-R model minimises the risk of overlooking distant or obscure effect pathways, while also avoiding an over reliance on buffer zones (e.g. 15 km), within which all designated sites should be considered. This approach follows the DEHLG (2010) guidance which states that:

"For projects, the distance could be much less than 15 km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects".

Based on utilisation of the S-P-R approach, this chapter does not focus on ornithological interests, which are covered in a dedicated chapter (Chapter 7 Ornithology). As such, European sites which are protected solely for ornithological interests (SPAs) and ornithological interests of National sites (some pNHAs) are noted in this section but not considered in further detail within Chapter 6 Biodiversity.

6.5.4.2 Habitats and Flora

Detailed botanical surveys and habitat classification was undertaken by skilled and appropriately experienced ecologists on the following dates: 21, 24, 29 & 30 July, 21 August, 22, 24, 25, & 30 September, and 09 & 10 October 2025. All habitats within the Proposed Wind Farm (including BEMP sites) and along the Proposed GC/TDR and were initially classified based on desktop assessment and detailed aerial imagery before being ground-truthed during surveys. All lands within the boundaries of the Proposed Wind Farm (including BEMP sites) and GC/TDR were subject to detailed botanical assessment.

The methodology used during botanical surveys was based on the Heritage Council's Best Practice Guidance for Habitat Survey and Mapping (Smith *et al*., 2011) and CIEEM 'Good Practice Guidance for Habitats and Species' Version 3 May 2021.

The classification of habitats recorded during the field survey is based on 'A Guide to Habitats in Ireland', (Fossitt, 2000). The Guide to Habitats in Ireland classifies habitats according to a hierarchical framework with Level 1 habitats representing broad habitat groups, Level 2 representing habitat subgroups and Level 3 representing individual habitat types. The Field Survey focused on identifying habitats to Level 3 of the Guide to Habitats in Ireland. Any other records of interest (e.g., invasive plant species) were also marked on ArcGIS Field Maps.

Vegetation was sampled by taking a total of 14 botanical relevés which were undertaken to analyse potential links with Annex I habitat types following the methodology outlined in Smith & Crowley (2020) and Fernandez et al. (2014). Percentage cover was used to record species abundance within relevés. All species were readily identifiable during the survey. Plant nomenclature for vascular plants follows 'New Flora of the British Isles' Fourth Edition (Stace, 2019), while mosses and liverworts nomenclature follow 'Mosses and Liverworts of Britain and Ireland - a field guide' (Atherton *et al*., , 2010).

Quadrat size ranged from 2m x 2m to 4m x 4m for heath, grassland and bog habitats. Within each relevé, data was collected by recording the existing species list for vascular plants, bryophytes and lichens, %each species, %standing water, %bare soil, %bare rock, %total vegetation, %algal cover, %litter and any other remarks. In addition, firmness of the substrate and microtopography as mentioned below were recorded for bog habitats.

- Firmness: Firm: ground does not sink under the weight of your body; Soft: ground sinks approximately 1 to 3cm but little amount of water is released by the peat or *Sphagnum*; Very soft: ground sinks more than 3cm and a considerable amount of water is released by the peat or *Sphagnum*; Quaking: ground bounces or shakes when the surveyor jumps.
- Microtopography: Pools: depressions on the bog surface where the water table drops below surface level for only very short periods of time. Hollows: shallow depressions on the bog surface where surface water collects, or where the water table reaches ground level or lies just above ground level, depending on seasonal conditions. Hummocks: mounds on the bog surface which can range from a few cm to more than a meter in height (<25cm: low hummock, >25cm: high hummock). They are usually composed with hollows and pools as a complex.

The Interpretation Manual of European Union Habitats [EUR28] and Article 17 reports were used to evaluate whether links with Annex I habitats exist. Survey, classification and assessment of peatland habitats was informed by Smith & Crowley (2020) on cutover bog and Fernandez et al. (2012 & 2014) on raised bog.

In addition to habitat identification, each habitat was assessed for its ecological significance, based on the NRA Guidelines for Ecological Impact Assessment of National Road Projects (NRA, 2009).

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

Habitat boundaries and associated attribute data were mapped using ArcGIS Field Maps and ArcGIS Pro, which was also used to calculate habitat areas and lengths.

Additionally, the habitats within the Proposed Development boundary were evaluated to determine their suitability to support protected species.

Species identification was completed using; Streeter et al. '*Collins Wildflower Guide*' 2nd edition, 2018, Stace's *'New Flora of the British Isles'* 4th edition 2019, Rose and O'Reilly's *'The Wild Flower Key (Revised Edition)'* 2006, Preston's *'Pondweeds of Great Britain and Ireland'* 1995, the British Bryological society's '*Mosses and Liverworts of Britain and Ireland a field guide*' 2010 and Hodgetts' *'Cladonia: a field guide'* 1992. Microscopy work was conducted, where needed.

6.5.4.3 Non-Volant Mammals

Mammal signs were searched for during habitat and general ecology walkover surveys undertaken during summer 2025 (21/07, 24/07, 29/07, 30/07, 21/08/2025) in order to maximise data capture for mammals.

Dedicated mammal surveys which searched for mammal signs, breeding/resting places and examined all potentially suitable habitat features were undertaken on 22/09, 09/10, 10/10, 14/10 and 23/10/2025.

The mammal survey covered the entire development footprint and associated felling buffers, and surrounding suitable habitats within 150m[17] of the development footprint and were undertaken to determine the presence or absence protected mammal species and habitat suitability to support protected mammal species and any change in habitat features during the survey period. Where suitable habitat was present, the search area for badger setts and otter signs/breeding/resting places was extended beyond 150m in order to ensure robust knowledge of local populations.

The badger survey included a search for setts, latrines, foraging signs and any other evidence of badger activity. Setts were classified according to the Mammal Society Guidelines (1989) and Roper (2010).

The focus of the otter survey was on crossing points of drains and watercourses by Proposed Development Infrastructure and locations where infrastructure is proposed within 150m of any drain or watercourse, with survey extending 200m upstream and downstream of these locations. Additionally, observations of Otter activity were also recorded as part of the aquatic ecology surveys carried out in 2025 as described in Section 6.7.5.1.1.2.2.

Sightings, tracks or signs of mammals were recorded using ArcGIS Field Maps.

[17] Study area for mammals was based on NRA (2008) (Guidelines For The Treatment Of Otters Prior To The Construction Of National Road Schemes and NRA (2009) Guidelines For The Treatment Of Badgers Prior To The Construction Of National Road Schemes

Based on the findings of desktop assessment, dedicated survey for the following species was carried out in accordance with best practice methods (in addition to general mammal walkover as per the NRA's (2009) '*Ecological Surveying Techniques for Protected Flora and Fauna During the Planning of National Road Schemes*' and the JNCC's (2004) '*Common Standards Monitoring Guidance for Mammals*':

- Badger survey in accordance with Harris S, Cresswell P and Jefferies D (1989) Surveying Badgers, Mammal Society and Surveying for Badgers: Good Practice Guidelines. Version 1 (Scottish Badgers, 2018).
- Pine marten scat survey O'Mahony D, O'Reilly C and Turner P (2006). National Pine Marten Survey of Ireland 2005.
- Red squirrel drey search in accordance with Gurnell J and Pepper H (1994) Red squirrel conservation: Field study methods. Research Information Note 255. Forestry Commission, Edinburgh.
- Survey for signs of hare in accordance with Reid N, Harrison AT and Robb GN (2009) Northern Ireland Irish hare survey 2009. Northern Ireland Environment Agency Research and Development Series No. 09/04.
- Survey for signs of hedgehog in accordance with Morris PA (2006) The New Hedgehog Book. Whittet Book, Stowmarket.
- Survey for otter in accordance with Chanin P (2003) Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No 10. English Nature, Peterborough, and National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76 (Reid, et al., 2013).

6.5.4.4 Bats

Bat surveys were carried out in accordance with Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation (NatureScot, 2021), Guidance on Bat Surveys, Assessment and Mitigation for Onshore Wind Turbine Developments in Northern Ireland (NIEA, 2021, updated April 2024), and Collins J. (ed) (2023) Bat Surveys for Professional Ecologists: Good Practice Guide (4th edition), The Bat Conservation Trust.

The Bat Conservation Ireland (BCI) (2026) 'Bat Survey, Assessment and Mitigation Guidelines for Onshore Wind Farms in Ireland' were released in March 2026. These guidelines require consistence with NatureScot (2021) and NIEA (2021/2024). The bat surveys carried out to inform the EIAR align with the requirements of the BCI, 2026 guidelines.

6.5.4.4.1 Static Bat Detector Surveys

NatureScot (2021) guidelines require as a minimum three deployments of static detectors aimed at covering spring (April to May), summer (June to mid-August) and autumn (mid-August to October), each with a minimum deployment period of 10 nights (within compliant weather parameters). Compliant weather conditions are defined as: temperatures at ≥ 8°C at dusk, maximum ground-level wind speed of 5 m/s, and no, or only very light, periodic rainfall. For the purposes of this report, Spring is designated as Round 1, Summer as Round 2 and Autumn as Round 3.

Passive Static Bat Surveys involve leaving a static bat detector unit (with ultrasonic microphone) in a specific location and set to record for a specified round of time (i.e., a bat detector is left in the field, there is no observer present and bats which pass the monitoring unit are recorded and their calls are stored for analysis post surveying). Statics were placed about 2m above ground to align with the NIEA (2024) guidelines. This results in a far greater sampling effort over a shorter round of time than can be achieved through manual survey.

Song Meter SM4BAT Full spectrum bat recorders use Real Time recording as a technique to record bat echolocation calls and using specific software, the recorded calls are identified. It is these sonograms (2-d sound pictures) that are digitally stored on the SD card (or micro SD cards depending on the model) and downloaded for analysis. Full spectrum bat recorders were utilised for all the static surveys as recommended in the revised (NatureScot, 2021) guidelines. These results are depicted on a graph showing the number of bat passes per species per hour/night. Each bat pass does not correlate to an individual bat but is representative of bat activity levels. Some species such as the pipistrelles will continuously fly around a habitat and therefore it is likely that a series of bat passes within a similar time frame is one individual bat. On the other hand, Leisler's bats tend to travel through an area quickly and therefore an individual sequence or bat pass is more likely to be indicative of individual bats.

Per NatureScot (2021), static units (Song Meter SM4BAT) were programmed to commence half an hour before sunset and finish half an hour after sunrise to ensure that bat species that emerge early in the evening and return to roosts late are recorded. Detectors were left out for a minimum of 10 consecutive nights across three survey rounds: Round 1 spring (April-May), Round 2 summer (June-mid-August) and Round 3 autumn (mid-August-October) during 2023 & 2025. To account for nights with unsuitable weather conditions, detectors were deployed longer than the minimum required 10 consecutive nights (NatureScot, 2021) to ensure that enough data could be gathered during suitable weather conditions. Table 2 3 and Table 2 4 below highlight deployment dates for 2023 and 2025 static detectors respectively highlighting the number of consecutive nights across the three survey rounds of each year.

NatureScot (2021) guidance states that "Detectors should be placed at all known turbine locations at wind farms containing less than ten proposed turbines. Where developments have more than ten turbines, detectors should be placed within the developable area at ten potential turbine locations plus a third of additional potential turbine sites up to a maximum of 40 detectors for the largest developments".

A total of 11 detectors were deployed to cover all 11 potential turbine locations for all survey rounds in 2023 and 2025. The detectors were placed at or close to proposed turbine locations in analogous habitats (see Figure 6-4 & 6-5 and Tables 2-3 & 2-4 in Appendix 6.3 for distances to turbine locations).

6.5.4.4.1.1 Data Analysis

All recordings were made in full spectrum, retaining all amplitude and harmonic information from the original bat call for subsequent analysis. Bat calls were analysed using Kaleidoscope Pro (5.3.9) Software. All files were split to a maximum duration of 15 seconds and automatically identified to species level, or genus level as appropriate, using auto-ID bat classifiers (Bats of Europe 5.2.1).

Data was manually verified in order to provide an additional layer of quality assurance. All files with auto-ID for Nathusius's pippistrelle and brown long eared bat were manually checked, as they are often misidentified by Kaleidoscope Pro (5.3.9) along with all NoID files and a minimum of 10% of each of the other file types.

Bat activity during static detector surveys was measured by the number of bat passes recorded. Bat passes are commonly used as a metric for bat activity and determine species presence (Kerbiriou et al., 2019). For our analysis, a bat pass is defined as the detection of sound calls from a single bat species within a 15 second sound file. If several species are detected within the same sound file, Kaleidoscope auto-id will choose as label the most predominant species present in the sound file, while during manual verification, the rarest species recorded in the checked file was chosen as label.

6.5.4.4.2 Bat Activity/ Transect Surveys

Under the NatureScot (2021) guidance, the use of transect surveys is discretionary, with survey requirements designed on a site-by-site basis. Transect surveys were undertaken on this proposed wind farm to support the findings of desktop and static deployment data to strengthen the evidence base underpinning the overall assessment. Transects are complementary to data collected from static bat detectors and can aid in identifying commuting and foraging corridors and to help gain understanding of bat abundance within the survey area. Point counts (of a fixed duration) can be incorporated into transects to survey specific features to provide information on comparative density of use.

Transects were completed in each of the three rounds in 2023 with the use of Batlogger M2 bat detector. Survey dates and routes are illustrated in Figure 6-5. Temperature and wind were measured for each transect survey. Batlogger M2 detectors recorded temperature for each transect and weather conditions can be seen in Table 2-1 of Appendix 6.3. Additional walked transects were not undertaken in 2025 due to health and safety constraints arising from the presence of wild horses onsite.

The static detector data collected is considered sufficient to accurately characterise bat activity across the site and as such, transect surveys represent additional survey effort in excess of requirements, providing supplementary information on bat activity. The 2023 transect surveys confirmed the main flightlines and patterns of bat usage within the survey area, which remained consistent with the findings from subsequent static monitoring.

6.5.4.4.3 Roost Assessment Surveys

NatureScot (2021) recommends that “features that could support maternity roosts and significant hibernation and/or swarming sites (both of which may attract bats from numerous colonies from a large catchment) within 200m plus rotor radius of the boundary of the proposed development should be subject to further investigation” (300m radius of proposed turbine locations was surveyed, adhering to NatureScot 2021 guidance).

Surveyors utilised the assessment criteria described in Collins (2023) – Page 35, Table 4.1, which provides guidelines for assessing potential suitability of habitat features as bat roosts and for foraging bats. This allows surveyors to assign features a score of ‘negligible’, ‘low’, ‘moderate’ or ‘high’ status in terms of the presence of Potential Roost Features (PRFs) or quality of habitat for commuting and/or foraging. Where a potential roost feature was determined to have greater than negligible suitability, the PRF was subjected to further assessment. Based on the features present and the location of trees and/or other structures, the potential use of the feature can also be considered, and classified (as in Hundt, 2012 and the Bat Tree Habitat Key, 2023).

Surveyors employed non-invasive assessments of trees from ground level (ground level tree assessment/GLTA). All trees to be felled as part of the development were assessed. Additionally, in accordance with (UK Bat Mitigation Guidelines 2025) we adopted a 200m potential zone of influence from construction activities and assessed all trees and structures for roosting suitability within this zone.

A roost survey encompassing assessment of structures and GLTA surveys was also undertaken along the proposed grid connection. Two bridges at river crossing points along the proposed grid connection route were inspected for the presence of potential roosting features (PRFs) and signs of occupancy by bats such as staining, droppings and feeding remains. These locations can be seen in Figure 6-6 of the Biodiversity Chapter 6 of the EIAR.

The TDR was also assessed for the presence of potential bat roosting features. The turbine delivery route will affect immature trees at one location: Node 3 (removal of trees). The affected trees are immature specimens originating from roadside landscaping with no potential bat roosting features. Detailed description of the habitats along the Turbine Delivery Route can be found in the Biodiversity Chapter 6 of the EIAR.

6.5.4.4.4 Roost Emergence

Within the study area of the wind farm, grid connection route and turbine delivery route, walkover surveys were undertaken to identify potential bat roost features. No potential roost features were observed during these surveys for the wind farm and turbine delivery route, and therefore no roost emergence surveys were required for these elements of the proposed development.

Based on assessment of bridges along the grid connection route for bat roosting potential, two bridges were identified as requiring emergence surveys (assessed as having low suitability, refer to Table 3-3 in Appendix 6.3 for further details). Dusk bat emergence surveys at these locations commenced 15 minutes prior to sunset and concluded 1.5 hours after sunset. Trained observers conducted watches to search for the occurrence of dusk emergences at these potential roosting sites). Surveyors took written notes and used hand-held Batlogger M2 bat detectors, which enabled the collection of geo-referenced records of bat activity. Subsequently, the captured acoustic recordings were subjected to analysis using the BatExplorer software.

Emergence survey dates, times and weather conditions are detailed in Table 2-4 Appendix 6.3.

6.5.4.4.5 Winter Roost Inspections

NatureScot (2021) recommends that winter roost surveys should also be carried out for any potential hibernation roost within 200m plus rotor radius (81m). No potential hibernation roosts were identified within the study area during surveys.

6.5.4.4.6 Bat Survey Analysis

The nightly number of bat passes recorded per species on the static detector units were analysed using the website-based tool Ecobat, in line with NatureScot (2021) guidance. Ecobat (http://www.ecobat.org.uk/) was designed by the University of Exeter, is hosted by the Mammal Society UK.

A site risk assessment and impact assessment for bats was completed based on the Ecobat results in accordance with NatureScot (2021).

A habitat assessment focused on the occurrence of vegetation features, associated connectivity and potential for use as foraging habitats was conducted. This assessment identified the location and value of specific habitat features which could be used by bats, and assessed potential effects arising from loss or alteration associated with the proposed development. The habitat suitability assessment was undertaken in accordance with Bat Conservation Trust (2020) Core Sustenance Zones (CSZ), Collins (2023) and NatureScot (2021) guidance.

6.5.4.5 Marsh Fritillary

Marsh fritillary (*Euphydryas aurinia*) is Ireland's only legally protected insect species. It is afforded protection under Annex II of the EU Habitats Directive. Areas of the marsh fritillary larval foodplant (devil's bit scabious) are widely distributed across Littleton Bog, and to a lesser extent Lanespark Bog. As such there is a large resource of potentially suitable habitat for this species in the locality.

As part of ecological walkover assessments for the Proposed Development, the habitats within the proposed wind farm site were assessed for suitability to support Marsh Fritillary having regard to the National Biodiversity Data Centre Marsh Fritillary Habitat Condition Form: i.e. sites with the presence of the butterfly's foodplant, devil's-bit scabious *Succisa pratensis* (see Appendix IV Figure 6-12 for Marsh Fritillary survey areas).

Habitats which were determined to be potentially suitable or habitats in good condition to support Marsh Fritillary (as per the habitat condition form) were subject to dedicated Marsh Fritillary larval web searches on the following dates, 21/08, 22/09, 25/09, 26/09 and 30/09/2025. The surveys were undertaken within the optimal period for undertaking larval web surveys, i.e. August – September, on dry days, with no rain and little wind. The survey methodology followed that described in the NBDC Marsh Fritillary Larval Web Recording Form and surveys were carried out under dry weather conditions.

6.5.4.6 Other Invertebrates

Additionally, habitats were assessed for their suitability to support rare or threatened invertebrate species identified in the desktop assessment (see Section 6.7.5.4.1.2.2).

6.5.4.7 Other Species

Observations of other species and groups were recorded during ecological walkovers, and any incidental observations of other species made during surveys were recorded.

6.5.4.8 Aquatic Ecology

All freshwater watercourses and cutaway bog lakes which could be affected directly or indirectly by the proposed development and grid connection were considered as part of the aquatic ecology baseline. This included sites in the vicinity of the proposed turbine array, in addition to watercourse crossings of the proposed grid connection (GC). Thus, a total of 35 no. individual sites were selected for detailed aquatic assessment (see Appendix 6.3). The courses and nomenclature for the watercourses surveyed followed Environmental Protection Agency (EPA) mapping.

Aquatic surveys of the watercourses and cutover bog lakes within the vicinity of the proposed development and grid connection were conducted on the 2nd, 3rd, 4th and 19th September 2025. Additional cutover bog lakes were also surveyed in September/October 2023, aquatic surveys were also undertaken in 2021 (see Appendix 6.3). Survey effort focused on both instream and riparian habitats at each aquatic sampling location and included a fisheries habitat appraisal, white-clawed crayfish survey, otter survey (within 150m of the survey site), macrophyte and aquatic bryophyte survey and biological water quality (Q-sampling at riverine sites) or invertebrate sweep sampling (lacustrine sites). Electro-fishing was also undertaken under licence in 2021 and 2023. This holistic approach informed the overall aquatic ecological evaluation of each site in the context of the proposed project and ensured that any habitats and species of high conservation value would be detected to best inform mitigation.

Further detail on individual survey types is available in the aquatic ecology baseline report in Appendix 6.3.

In addition to the ecological characteristics of the Site, a broad aquatic and riparian habitat assessment was conducted utilising elements of the methodology given in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003) and the Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). This broad characterisation helped define the watercourses' conformity or departure from naturalness. All sites were assessed in terms of:

- Physical watercourse/waterbody characteristics (i.e. width, depth, channel form), including associated evidence of historical drainage
- Substrate type, listing substrate fractions in order of dominance (i.e. bedrock, boulder, cobble, gravel, sand, silt, etc.)
- Flow type by proportion of riffle, glide and pool in the sampling area
- An appraisal of the macrophyte and aquatic bryophyte community at each site
- Riparian vegetation composition and bordering land use practices

Survey Limitations

Survey limitations are limited to bat surveys.

Static detector 8 (L8, LT8) was located 232m from Turbine 8 (T8). While the detector was not positioned immediately adjacent to the turbine location, the surrounding habitat within this distance is comparable to that at the turbine comprising similar scrub and woodland features. As such, the detector location is considered representative of bat activity within the wider area of T8 and does not limit the interpretation of bat use of the local habitat.

Static detector 11 (LT11) did not record data for Round 1 in 2025. However, due to the total number of detectors exceeding minimum requirements (detectors at ten turbine locations plus one third of additional turbine locations for projects with over ten turbines), this does not represent a significant limitation.

Static detector 3 (L3) was not deployed for Round 3 in 2023 due to targeted vandalism of detectors in Rounds 1 and 2 in that year. However, as above, due to the total number of detectors exceeding minimum requirements, this does not represent a significant limitation.

Activity transect surveys in 2025 were limited to one round covering the spring window, due to the presence of wild horses onsite restricting nighttime access for health and safety reasons. Considering that transect surveys are discretionary under NatureScot (2021) guidance, and that three rounds of activity surveys providing complementary information in exceedance of requirements were undertaken in 2023, this does not represent a significant limitation.

It is not considered that any of these survey specific constraints represent a significant limitation or data gap to adequately assessing the impacts of the Proposed Development on bat species within and surrounding the site.

6.6 Ecological Resource Evaluation

The value of the ecological resources/receptors was evaluated using the ecological evaluation guidance given in the NRA guidance on assessment of ecological impacts of National Road Schemes (NRA, 2009a).

This guidance provides ratings for resources based primarily on geographic context and allows for resources at International, National, County and Local (higher and lower value) levels. Key ecological receptors (for assessment) are those deemed to be above the 'Local Importance (lower value) evaluation.

6.6.1 Receptor Evaluation

Ecological features are assessed on a scale ranging from international-national-county-local (see Table 6-3).

With regard to aquatic ecology, habitats and species were evaluated following the NRA (2009a) criteria on the basis of a number of characteristics and features defined as follows:

- The fisheries value of a watercourse refers to its suitability for fish, primarily Salmonids (Salmon and Trout), and to the associated value for recreational angling purposes.
- Annex II species are those that are listed under the EU Habitats Directive (92/43/EEC).
- Annex I habitats are those that are listed under the EU Habitats Directive, including Priority Habitats.
- Species protected under the Wildlife Acts 1976-2022 and associated orders.
- The evaluation of water quality uses a five-point biotic index (Q-value) based on the presence and relative abundance of various invertebrates using the Environmental Protection Agency's (EPA) standard technique.

The importance of the ecological receptors identified was assessed using geographic importance levels (e.g., International, National, County, and Local Importance) following the NRA Guidelines (2009b). This ensures that only receptors of significant ecological importance were selected for detailed evaluation (i.e. Local (Higher Importance) or above). A summary of the valuation system extracted from NRA (2009b) is provided below in Table 6-3.

Table 6-3: Valuation of Features (NRA, 2009b)

Scale of Importance	Criteria
International Importance	'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. Proposed Special Protection Area (pSPA). - Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). Features essential to maintaining the coherence of the Natura 2000 Network Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or Species of animal and plants listed in Annex II and/or IV of the Habitats Directive Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). Biosphere Reserve (UNESCO Man & The Biosphere Programme) Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).

Scale of Importance	Criteria
	Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). Biogenetic Reserve under the Council of Europe. European Diploma Site under the Council of Europe. Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	Site designated or proposed as a Natural Heritage Area (NHA). Statutory Nature Reserve. Refuge for Fauna and Flora protected under the Wildlife Acts. National Park. Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive
County Importance	Area of Special Amenity. Area subject to a Tree Preservation Order. Area of High Amenity, or equivalent, designated under the County Development Plan. Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list.

Scale of Importance	Criteria
	Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared. Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (Higher)	Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (Lower)	Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; Sites or features containing non-native species that is of some importance in maintaining habitat links.

6.6.1 Assessing Effect Significance

Once the value of the identified ecological receptors (features and resources) was determined, the next step was to assess the potential effect or impact of the Proposed Development on the identified key ecological receptors, following the EPA evaluation criteria utilised in this appraisal of the Environmental Factor, Biodiversity. The criteria is included in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022).

Assessment of Effect Type and Magnitude

Assessment of effects considers construction, operational and decommissioning effects with reference to the potential for direct, indirect and cumulative effects. The assessment also takes account of any residual effects that may persist following the implementation of any mitigation or best practice design.

The characterisation of effects reflects the ecological structure and function upon which the key ecological receptors depend. Detailed assessment of effects considers the magnitude of effects affecting populations.

This EIAR uses the EPA (2022) classification of effects in order to describe the quality, significance, duration, extent, context and frequency, probability of effect and type of effect. The magnitude of effect refers to the size, amount, intensity and volume of the effect. 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.

A 'significant effect' is one that meets or exceeds a threshold, either supporting or undermining biodiversity conservation objectives for the KERs or biodiversity overall. The objectives can be specific (e.g., for designated sites) or broad (e.g., national/local policies or biodiversity enhancement). Effects may be significant at scales ranging from international to local (CIEEM, 2018) (updated in 2024). Significance is assessed based on consideration of 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.

Table 6-4: Significance of Effects (EPA, 2022)

Significance	Definition
Imperceptible	An effect capable of measurement but without significant consequences
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Significance	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate Significance	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.

Significance	Definition
Significant	An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

Assessment of Cumulative Effects

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

- Additive/incremental – in which multiple activities/projects (each with potentially insignificant effects) add together to contribute to a significant effect due to their proximity in time and space (CIEEM, 2018); and,
- Associated/connected – a development activity 'enables' another development activity e.g. phased development as part of separate planning applications. Associated developments may include different aspects of the project which may be authorised under different consent processes.

6.6.2 Assessment of Emerging Trends

The assessment considers the emerging trends and potential future development of habitats arising from rehabilitation implemented within the Site and the associated ongoing revegetation and rewetting of the cutaway bogs.

6.7 Description of Baseline Environment

The following sections describe the results of the assessment of available material and data received following requests that was carried out as part of the desk study coupled with the findings of ecological field surveys which were conducted to establish the current state of the environment (baseline scenario) and the likely evolution thereof through natural changes.

6.7.1 Peatland Rehabilitation

The Phase 1 peatland rehabilitation completed is represented within the existing baseline, and as such forms an inherent component of the baseline environment and is assessed in detail herein (see assessment of habitat effects in Section 6.9 and ornithological assessments in Chapter 7 Sections 7.8.3 to 7.8.5).

Phase 1 rehabilitation works were completed in Littleton, Longfordpass and Lanespark bogs between 2018-2021. The measures completed included the blocking of drains which has resulted in the presence of areas of standing water within the Site. It is noted that no drain blocking has been carried out in the small area of Longfordpass Bog overlapped by the site.

The current baseline in the peatland areas is variable in terms of progress of rehabilitation/revegetation; areas where peat extraction and ancillary activities ceased earlier are at more advanced stages of revegetation/rehabilitation, while areas where peat extraction ceased later are in the earlier stages of revegetation.

As such, certain parts of the site where more advanced revegetation occurs are likely to be indicative of the habitats which will develop at the more advanced stages of rehabilitation. It is noted that while areas with more advanced stages of revegetation are likely to more closely represent the habitats which will ultimately develop, they are likely to develop further, i.e. wetland habitats are likely to get wetter and continue to expand where suitable conditions exist, and woodland habitats are likely to increase in structural and species diversity as they mature.

As such, the areas with longer-stablished revegetation processes are considered to be indicative of the habitats which will ultimately develop across the cutaway bogs within the site, i.e. a mosaic of wetland areas characterised by lakes and high-sphagnum areas of regenerating bog, woodland, and intermediate habitats with open scrub and grassy heath-type vegetation. While habitat types are likely to stabilise eventually, some level of dynamism is likely to persist even at the stage where habitats have become relatively stable (e.g. mature woodland and regenerating bog).

While a relatively uniform approach to rehabilitation was undertaken. i.e. drain blocking across the site, existing topography and hydrology have also influenced the character and pace of revegetation/rewetting, with some areas having achieved a greater extent and faster pace of re-wetting than others.

In summary, while trends indicative of the future ecological development of the site are well established, the habitats at the site are expected to develop further and increase in extent.

It is noted that ecological and hydrological surveys for the proposed development have been ongoing since 2021, facilitating an in-depth understanding of the existing and emerging baseline based on repeated observations of how revegetation is progressing since implementation of rehabilitation measures.

6.7.2 Designated Sites

6.7.2.1 Sites of International and National Importance

An Appropriate Assessment (AA) Screening Report and Natura Impact Statement (NIS) have been completed to appraise the likely significant effects of the Proposed Development either alone or in combination with other plans or projects on European Sites; these accompany this planning application. Figure 6-1 in Appendix IV indicates the locations of European Sites relative to the Proposed Development, while Figure 6-2 indicates National Sites. The full list of European sites subjected to S-P-R assessment are included in the screening for Appropriate Assessment which accompanies the planning application.

6.7.2.1.1 Special Areas of Conservation (SACs)

SACs are protected under the European Union (EU) 'Habitats Directive' (92/43/EEC), as implemented in Ireland by S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) and Part XAB of the Planning and Development Act 2000 (as amended).

None of the elements of the Proposed Development are located within the boundaries of European designated sites. There will be no direct effects on any designated site as a result of the Proposed Development. On the other hand, there are three SACs with potential Source-Pathway-Receptor (S-P-R) connectivity to the Proposed Development via indirect hydrological pathways: the Lower River Suir SAC (002137), The Loughans SAC (000407) and the River Barrow and River Nore SAC (002162), which are located in the Suir and/or Nore catchments.

There are no European Sites in the vicinity of the site. The Site is located wholly within the Suir catchment; therefore, all watercourses draining the Site ultimately flow into the Lower River Suir SAC (002137).

The Proposed GC runs along the R693 regional road which abuts the Loughans SAC. The Proposed GC runs under the Nore at Ballyragget where it crosses the River Barrow and River Nore SAC via Horizontal Directional Drilling (HDD). The Proposed HDD entry and exit points are located outside the SAC. Due to the close proximity of both the Loughans SAC and the River Barrow and River Nore SAC to the GC, potential for indirect effects via ground and surface water pollution exists (prior to mitigation).

The Proposed Turbine Delivery Route (TDR) uses the road network which crosses a number of minor tributaries of the Nore upstream of the River Barrow and River Nore SAC (the Goul_020, Goul_030 and Ardreagh_010 waterbodies) and one minor tributary of the Suir upstream of the Lower River Suir SAC (Drish_020). However, there are no accommodation works proposed at or near any of the water crossings in either catchment, and as such there is no tangible hydrological connection between these SACs and the TDR.

Haulage of construction materials to and from the site will be along the road network and does not require any accommodation works and as such will not interact with any European site.

There are no other SACs with potential Source-Pathway-Receptor (S-P-R) connectivity to the Proposed Development.

Information on QIs, connectivity and relative distances are included in Table 6-5 and Figure 6-1. The full NPWS Site synopses for designated areas are available on www.NPWS.ie.

6.7.2.1.2 Special Protection Areas (SPAs)

SPAs are designated under the EU Birds Directive (2009/147/EC) ('The Birds Directive').

A number of SPAs (River Nore SPA, Slieve Bloom Mountains SPA, and Slievefelim to Silvermines Mountains SPA) were assessed for S-P-R connectivity to the Proposed Development. These are discussed in detail within Chapter 7 Ornithology.

Table 6-5: European Sites within ZoI of Proposed Development and Grid Connection

Site	Code	Designated Features	Closest Infrastructure
Proposed Wind Farm			
Lower River Suir SAC	002137	- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] - Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] - Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] - Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] - Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] - *Taxus baccata* woods of the British Isles [91J0] - *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] - *Austropotamobius pallipes* (White-clawed Crayfish) [1092] - *Petromyzon marinus* (Sea Lamprey) [1095] - *Lampetra planeri* (Brook Lamprey) [1096] - *Lampetra fluviatilis* (River Lamprey) [1099] - *Alosa fallax fallax* (Twaite Shad) [1103] - *Salmo salar* (Salmon) [1106] - *Lutra lutra* (Otter) [1355]	Proposed access track (9.8 km) Instream distance: 17.2 km
Slievefelim to Silvermines Mountains SPA	004165	- Hen Harrier (*Circus cyaneus*) [A082]	Proposed amenity trail (27 km)
Slieve Bloom Mountains SPA	004160	- Hen Harrier (*Circus cyaneus*) [A082]	Proposed access track (30 km)
Grid Connection			
The Loughans SAC (also a pNHA)	000407	- Turloughs [3180]	1m (grid connection) SAC boundary abuts public road.
River Barrow and River Nore SAC	002162	- Estuaries [1130]	0m (grid connection)

Site	Code	Designated Features	Closest Infrastructure
		- Mudflats and sandflats not covered by seawater at low tide [1140] - Reefs [1170] - *Salicornia* and other annuals colonising mud and sand [1310] - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] - Mediterranean salt meadows (*Juncetalia maritimi*) [1410] - Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] - European dry heaths [4030] - Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] - Petrifying springs with tufa formation (*Cratoneurion*) [7220] - Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] - Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] - *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] - *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] - *Austropotamobius pallipes* (White-clawed Crayfish) [1092] - *Petromyzon marinus* (Sea Lamprey) [1095] - *Lampetra planeri* (Brook Lamprey) [1096] - *Lampetra fluviatilis* (River Lamprey) [1099] - *Alosa fallax fallax* (Twaite Shad) [1103] - *Salmo salar* (Salmon) [1106] - *Lutra lutra* (Otter) [1355] - *Vandenboschia speciosa* (Killarney Fern) [6985]	GC travels under SAC via HDD. No above-ground infrastructure or activities within SAC.
River Nore SPA	004233	- Kingfisher (*Alcedo atthis*) [A229]	0m (grid connection)

Site	Code	Designated Features	Closest Infrastructure
			GC travels under SPA via HDD. No above-ground infrastructure or activities within SPA.
Lower River Suir SAC	002137	- Listed Above	24 km (grid connection)

6.7.2.2 Sites of National Importance

Sites of National Importance in Ireland are termed Natural Heritage Areas (NHA) and Proposed natural Heritage Areas (pNHA).

None of the elements of the Proposed Development are located within the boundaries of any nationally designated sites. There will be no direct effects on any nationally designated site as a result of the Proposed Development.

Identification of national sites potentially subject to effects was made on the basis of S-P-R assessment.

The Proposed Development are not located within the boundaries of any nationally designated sites. There will be no direct effects on any nationally designated site as a result of the Proposed Development.

A total of two pNHAs were determined to be within the ZoI of the proposed wind farm, namely Kilcooly Abbey Lake pNHA (000958) and Cabragh Wetlands pNHA (001934). Both of these sites are of ornithological interest and as such their ornithological features are assessed in detail within Chapter 7 Ornithology. Cabragh Wetlands pNHA is also of interest for wetland habitats, and as such, these interests are assessed within the current chapter.

Cabragh Wetlands pNHA is within the ZoI due to potential for indirect effects on habitats at the pNHA via a downstream hydrological link.

There is no tangible hydrological connection between any NHA/pNHA and the TDR, due to the absence of accommodation works proposed at or near any of the water crossings in the Suir and Nore catchments,

Regarding the proposed grid connection, the Cabragh Wetlands pNHA is with the ZoI due to potential for indirect effects on habitats at the pNHA via a downstream hydrological link arising from the GC crossing point on the Drish_020 waterbody. The Loughnans pNHA, which overlaps the SAC of the same name is traversed by the GC due to a mapping error which extends the pNHA boundary across the R693 regional road. The River Nore/Abbeyleix Woods Complex pNHA (002076) is crossed under the Nore via HDD. Proposed HDD entry and exit points are located outside the pNHA. Due to the close proximity of both the Loughans pNHA and the River Nore/Abbeyleix Woods Complex pNHA to the GC, potential for indirect effects via ground and surface water exists, in addition to potential for noise/visual disturbance to otter.

Inchbeg pNHA (000836) is of interest for habitats which are assessed within this chapter, and ornithological interests, which are assessed in Chapter 7 Ornithology. Inchbeg pNHA is located on the Nore 5.5 km downstream of the proposed Nore HDD crossing point and as such falls within the ZoI due to potential for indirect effects via hydrological linkage.

Information on connectivity and relative distances are included in Table 6-6 and Figure 6-2Table 6-5

Table 6-6: National Sites within ZoI of Proposed Development and Grid Connection

Site	Code	Designated Features	Closest Infrastructure
Proposed Wind Farm			
Kilcooly Abbey Lake pNHA	000958	- Mallard - Moorhen - Coot - Grey Heron - Waterfowl	T01; Borrow Pit (5.5 km)
Cabragh Wetlands pNHA	001934	- Marsh - Fen - Wildfowl - Wigeon - Teal - Mallard - Shoveler - Pintail - Whooper Swan - Bewicks' Swan	Proposed access track (9.8 km) Instream distance: 18.1 km
Grid Connection			
The Loughans pNHA (also an SAC)	000407	- Turloughs [3180]	0m (grid connection) pNHA boundary overlaps public road[18].
River Nore/Abbeyleix Woods Complex pNHA (overlapped by River Barrow and River Nore SAC; River Nore SPA)	002076	- *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] - Twaite Shad - Meadow Saffron - Ancient Woodland - Wet Woodland - Otter	0m (grid connection) GC travels under pNHA via HDD. Exit pit is within pNHA. No other above-ground activities within pNHA.

[18] The presence of the R693 within the pNHA boundary arises from inaccurate mapping of the pNHA. The southern boundary of the Loughans is delineated by the R693, as acknowledged by the SAC mapping which is more reliable, being subject to regular checks, updates and corrections where required.

Site	Code	Designated Features	Closest Infrastructure
Inchbeg pNHA	000836	- Wetland Habitats - Woodland - Golden Plover - Lapwing - Whooper Swan - Bewick's Swan - Curlew - Snipe - Mallard - Wigeon - Teal	5.5 km (instream distance from grid connection)
Cabragh wetlands pNHA	001934	- Listed above	25 km (instream distance from grid connection)

6.7.2.3 Other Protected Sites

6.7.2.3.1 Nature Reserves

The closest nature reserves in the surrounding region are primarily woodland sites: Coolacurragh Wood Nature Reserve (14 km north), Grantsown Wood and Granston Lough Nature Reserve (22.3 km north-west), Ballykeeffe Wood Nature Reserve (17.4 km east), Kyledohir Wood Nature Reserve (17.3 km south-east) and Garryricken Woods Nature Reserve (21.8 km south-east). None of these sites are within the ZoI due to absence of S-P-R connectivity.

6.7.2.3.2 Ramsar Sites

The closest Ramsar site is the Slieve Bloom Mountains SPA, located 30km North. Any potential effects on ornithological receptors are discussed in Chapter 7.

6.7.3 Habitats

6.7.3.1 Desktop Study

Within the desktop study, assessment of whether the Proposed Wind Farm, GC and TDR have potential connectivity with Article 17 habitats via land, air and hydrological/hydrogeological pathways was undertaken, referring to the map viewer and spatial data of EU Habitats Directive Annex Habitats in Article 17 Reporting (NPWS, 2019).

6.7.3.1.1 Proposed Wind Farm

The desktop study indicated an absence of direct effect pathways and also confirmed that no Article 17 habitats are overlapped by the Site. The closest habitat is *ex-situ* 6210 Orchid-rich calcareous grassland* located *c.*4.4 km south of the Site. As per IAQM (2024), dust assessment will normally be required where there is an 'ecological receptor' within 50 m of the boundary of the site and/or 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s). Although the Proposed Wind Farm includes large-scale construction activities, it is assessed that the *c.*4.4 km distance provides an adequate buffer to rule out a pathway for airborne effects between the closest Article 17 habitat and the Site.

No Article 17 habitats share the groundwater body with the Site, therefore, there is no hydrogeological pathway.

6.7.3.1.2 Proposed Grid Connection

There is no direct land pathway as no mapped Article 17 habitats overlap with the Proposed GC. In addition no air pathway to Article 17 habitats was identified as no mapped Article 17 habitats are located within 50m of the Proposed GC.

The Goul River crossed by the GC flows into the River Barrow and River Nore SAC (0002162). Within this SAC, an area of 91E0 Alluvial forests which could potentially be affected by water quality changes, is located *c.*22.1 km downstream of the GC crossing point on the Goul River. Therefore, there is a remote hydrological pathway to this Article 17 habitat, 91E0 Alluvial forests.

In addition, the GC has a hydrogeological pathway to the Article 17 habitats 3180 Turloughs within The Loughans SAC (000407) adjacent to the GC. This habitat shares the groundwater body with the GWDTE- The Loughnan Turlough (SAC000407), which includes karst conduits that could connect water flows throughout the groundwater body, linking the turlough and the GC.

6.7.3.1.3 Proposed Turbine Delivery Route

There is no direct land pathway as no Article 17 habitats overlap with the Proposed TDR. In addition, given the minimal and localised works, absence of in-stream works for the TDR, and absence of Article 17 habitats in the vicinity of the TDR (closest area is located 2.3 km from the nearest TDR node), it is concluded there are no air, hydrology and hydrological pathways between the TDR and Article 17 habitats.

6.7.3.2 Field Survey

The habitats at the Site for the Proposed Development were the subject of a detailed survey and assessment by Fehily Timoney and Company ecologists between July and October 2025. A habitat map of the Proposed Development lands is provided in Figure 6-7. All habitats described below have been classified in accordance with Fossitt (2000).

The Site of the Proposed Wind Farm is predominantly located within cutover bog (PB4) which often occurs in mosaics with areas of scrub (WS1) of grey willow/downy birch or gorse, immature woodland (WS2) and wet grassland (GS4). Raised bog (PB1) occurs around the edges of the Site. Calcareous and neutral grassland (GS1) occurs in patches along the existing bog railway along the northern site access route and also in the southern part of Lanespark Bog, establishing respectively on imported material associated with the bog railway and on dry cutover bog. Various woodland types occur in small areas, such as (mixed) broadleaved woodland (WD1), (mixed) conifer woodland (WD3), Ornamental/non-native shrub (WS3), oak-birch-holly woodland (WN1) and bog woodland (WN7).

Waterbodies within the Site include a network of drainage ditches (FW4), dystrophic lakes (FL1) and acid oligotrophic lakes (FL2), which have been established by flooding of drainage ditches and cutover bog. Reed and large sedge swamps (FS1) occurs, vegetating some ditches and surrounding some lakes. The hedgerows and treelines within the Site are associated with the agricultural lands in the proposed borrow pit footprint; a linear Scrub (WS1) formation also occurs in association with dystrophic lakes (FL1).

Artificial habitats within the Site include earth banks (BL2), buildings and artificial surfaces (BL3), spoil and bare ground (ED2) and recolonising bare ground (ED3).

The habitats along the Proposed Grid Connection (GC) are dominated by linear wooded habitats including hedgerows and treelines, grassy verges and surrounding agricultural habitats dominated by improved agricultural grassland (GA1). The presence of a turlough (FL6) at the Loughans SAC adjacent to the GC is noted.

The habitats along the TDR are dominated by Dry meadows and grassy verges (GS2) alongside Hedgerow (WL1) and Scrub (WS1) surrounding roundabout.

6.7.3.2.1 Proposed Wind Farm

The habitat type(s) at each turbine location and associated hard standings are presented in Table 6-7 and are more generally described thereafter within the broader description of habitats (Section 6.7.3.2.1.1 onwards) within the habitat survey study area (the habitat survey study area encompasses 250m buffer from the Proposed Turbines, associated Hardstands, Compounds, PDAs and Construction Borrow Pit, 50m buffer from proposed internal access tracks and amenity trails, and the entirety of the BEMP lands).

The habitats present at the wind farm site are mapped in Figure 6-7.

Table 6-7: Habitat at Each Turbine Location

Relevé	Habitat Type	Relevé at Turbine Foundation Location		
		Scientific name	Common name	Percentage cover (%)
T01 Turbine Location	Cutover Bog (PB4) (occurring within open Scrub WS1)	*Calluna vulgaris*	Ling	55
		Pinus contorta	Lodgepole pine	0.5
		Cladonia portentosa	-	1
		Cladonia floerkeana	-	0.5
		Cladonia chlorophaea	-	20
T01 Hardstand 1	Cutover Bog (PB4) (occurring within open Scrub WS1)	*Calluna vulgaris*	Ling	95
		Pinus contorta	Lodgepole pine	5
		Betula pubescens	Downy birch	1
		Hypnum jutlandicum	Heath plaitmoss	80
T01 Hardstand 2	Cutover Bog (PB4) (occurring within open Scrub WS1)	*Calluna vulgaris*	Ling	20
		Pinus sylvestris	Scots pine	10
		Eriophorum angustifolium	Common cottongrass	70
		Campylopus introflexus	Heath-star moss	1

Relevé	Habitat Type	Relevé at Turbine Foundation Location		
		Scientific name	Common name	Percentage cover (%)
		Dicranum scoparium	Broom forkmoss	0.5
		Cladonia floerkeana	-	2
		Cladonia chlorophaea	-	0.5
		Cladonia portentosa	-	0.5
T02 Turbine Location	Mosaic of Scrub (WS1) and Cutover Bog (PB4) - Low Sphagnum (LS1)	*Calluna vulgaris*	Ling	60
		Pinus sylvestris	Scots pine	20
		Rubus fruticosus agg.	Bramble	2
		Betula pubescens	Downy birch	10
		Salix cinerea	Grey willow	5
T02 Hardstand 1	Mosaic of Scrub (WL1) and Cutover Bog (PB4) (occurring on margin of Immature woodland WS2)	*Calluna vulgaris*	Ling	80
		Pinus sylvestris	Scots pine	50
		Betula pubescens	Downy birch	0.5
		Eriophorum angustifolium	Common cottongrass	0.5
T02 Hardstand 2	Mosaic of Scrub (WS1) / Cutover Bog (PB4) (occurring on margin of Immature woodland WS2)	*Calluna vulgaris*	Ling	50
		Molinia caerulea	Purple moor-grass	30
		Rubus fruticosus agg.	Bramble	10
		Pinus sylvestris	Scots pine	5
		Picea sitchensis	Sitka spruce	0.5
		Betula pubescens	Downy birch	0.5
		Salix cinerea	Grey willow	35
		Thuidium tamariscinum	Common Tamarisk-moss	1
T03 Location Turbine Location	Cutover bog (PB4) (occurring within Immature woodland WS2 clearing)	*Eriophorum angustifolium*	Common cottongrass	25
		Betula pubescens	Downy birch	5
		Equisetum arvense	Field horsetail	2
		Campylopus introflexus	Heath-star moss	30
		Dicranum scoparium	Broom forkmoss	1
		Cladonia chlorophaea	-	2
		Cladonia subulata	-	0.5
T03	Cutover Bog (PB4)	*Molinia caerulea*	Purple moor-grass	80

Relevé	Habitat Type	Relevé at Turbine Foundation Location		
		Scientific name	Common name	Percentage cover (%)
Hardstand 1		*Succisa pratensis*	Devil's-bit scabious	60
		Calluna vulgaris	Ling	10
		Potentilla erecta	Tormentil	2
		Centaurea nigra	Common knapweed	2
		Hypochaeris radicata	Cat's-ear	1
		Pilosella officinarum	Mouse-ear-hawkweed	10
		Polygala serpyllifolia	Heath milkwort	0.5
		Carex demissa	Common yellow-sedge	1
		Hypericum pulchrum	Slender St John's-wort	0.5
		Viola riviniana	Common dog-violet	0.5
		Epipactis palustris	Marsh helleborine	0.5
		Cladonia chlorophaea	-	2
T03 Hardstand 2	Mosaic of Scrub (WL1) and Cutover Bog (PB4) (occurring on margin of Immature woodland WS2)	*Molinia caerulea*	Purple moor-grass	100
		Betula pendula	Silver birch	55
		Equisetum arvense	Field horsetail	0.5
		Equisetum sylvaticum	Wood horsetail	0.5
T04 Turbine Location	Mosaic of Immature Woodland (WS2) and Cutover Bog (PB4) (occurring within Immature woodland WS2 clearing)	*Betula pubescens*	Downy birch	25
		Polytrichum commune	Common haircap	25
		Molinia caerulea	Purple moor-grass	10
		Eriophorum angustifolium	Common cottongrass	1
		Calluna vulgaris	Ling	0.5
		Hypnum jutlandicum	Heath plaitmoss	0.5
		Campylopus introflexus	Heath-star moss	1
T04 Hardstand 1	Immature Woodland (WS2)	*Salix cinerea*	Grey willow	60
		Molinia caerulea	Purple moor-grass	40
		Potentilla sterilis	Barren strawberry	1
		Equisetum arvense	Field horsetail	2
		Juncus effusus	Soft-rush	0.5
		Eriophorum angustifolium	Common cottongrass	0.5

Relevé	Habitat Type	Relevé at Turbine Foundation Location		
		Scientific name	Common name	Percentage cover (%)
		Cirsium vulgare	Spear thistle	0.5
T04 Hardstand 2	Cutover bog (PB4) (occurring within Immature woodland WS2 clearing)	*Calluna vulgaris*	Ling	80
		Hypnum jutlandicum	Heath plaitmoss	75
		Equisetum arvense	Field horsetail	0.5
		Molinia caerulea	Purple moor-grass	3
T05 Turbine Location	Cutover bog (PB4)	*Eriophorum angustifolium*	Common cottongrass	80
		Calluna vulgaris	Ling	20
		Betula pubescens	Downy birch	5
		Hypnum jutlandicum	Heath-star moss	10
T05 Hardstand 1	Immature Woodland (WS2)	*Molinia caerulea*	Purple moor-grass	30
		Betula pendula	Silver birch	100
T06 Turbine Location	Cutover Bog (PB4)	*Eriophorum angustifolium*	Common cottongrass	35
		Juncus effusus	Soft-rush	10
		Molinia caerulea	Purple moor-grass	3
		Betula pendula	Silver birch	25
		Chamaenerion angustifolium	Rosebay willowherb	0.5
		Salix cinerea	Grey willow	5
		Hypochaeris radicata	Cat's ear	1
T06 Hardstand 1	Cutover Bog (PB4)	*Eriophorum angustifolium*	Common cottongrass	90
		Typha latifolia	Bulrush	1
		Juncus effusus	Soft-rush	3
		Polytrichum commune	Common haircap	5
T06 Hardstand 2	Cutover Bog (PB4)	*Molinia caerulea*	Purple moor-grass	2
		Eriophorum angustifolium	Common cottongrass	60
		Betula pubescens	Downy birch	10
		Hypochaeris radicata	Cat's ear	0.5
		Hydrocotyle vulgaris	Marsh pennywort	0.5
		Campylopus flexuosus	Rusty swan-neck moss	1
		Kindbergia praelonga	Common feathermoss	1
T07	Immature Woodland (WS2)	*Eriophorum angustifolium*	Common cottongrass	5
		Betula pendula	Silver birch	70

Relevé	Habitat Type	Relevé at Turbine Foundation Location		
		Scientific name	Common name	Percentage cover (%)
Turbine Location		*Dryopteris dilatata*	Broad buckler-fern	20
		Rubus fruticosus agg.	Bramble	3
		Juncus effusus	Soft-rush	5
		Equisetum arvense	Field horsetail	2
T07 Hardstand 1	Cutover Bog (PB4) (occurring on margin of Immature woodland WS2)	*Molinia caerulea*	Purple moor-grass	40
		Dryopteris dilatata	Broad buckler-fern	1
		Rubus fruticosus agg.	Bramble	3
		Hypnum jutlandicum	Heath plaitmoss	0.5
		Polytrichum commune	Common haircap	0.5
		Dicranum scoparium	Broom forkmoss	1
		Campylopus flexuosus	Rusty swan-neck moss	1
T08 Turbine Location	Immature Woodland (WS2)	*Rubus fruticosus* agg.	Bramble	30
		Betula pubescens	Downy birch	70
		Salix cinerea	Grey willow	5
		Kindbergia praelonga	Common feathermoss	50
T08 Hardstand 1	Cutover bog (PB4)	*Calluna vulgaris*	Ling	70
		Eriophorum angustifolium	Common cottongrass	50
		Hypnum jutlandicum	Heath plaitmoss	25
T08 Hardstand 2	Cutover bog (PB4)	*Calluna vulgaris*	Ling	95
		Hypnum jutlandicum	Heath plaitmoss	90
T09 Turbine Location	Scrub (WS1)	*Holcus lanatus*	Yorkshire-fog	50
		Salix cinerea	Grey willow	20
		Betula pubescens	Downy birch	5
		Juncus effusus	Soft-rush	2
		Cirsium dissectum	Meadow thistle	0.5
		Agrostis canina	Velvet bent	20
T9 Hardstand	(Species list only) Recolonising ground (ED3) (occurring withinImmature	*Brachypodium sylvaticum*	False brome	-
		Hypochaeris radicata	Cat's ear	-
		Cirsium dissectum	Meadow thistle	-
		Succisa pratensis	Devil's-bit scabious	-
		Juncus effusus	Soft-rush	-

Relevé	Habitat Type	Relevé at Turbine Foundation Location		
		Scientific name	Common name	Percentage cover (%)
	woodland WS2 clearing)	*Polytrichum commune*	Common haircap	-
		Calluna vulgaris	Ling	-
		Calliregonnella cuspidata	Pointed spearmoss	-
		Plantago lanceolata	Ribwort plantain	-
		Daucus carota	Carrots	-
		Jacobaea vulgaris	Common ragwort	-
		Chamaenerion angustifolium	Rosebay willowherb	-
		Achillea millefolium	Yarrow	-
		Rumex acetosella	Sheep's sorrel	-
		Cladonia chlorophaea	-	-
		Betula pubescens	Downy birch	-
		Salix cinerea	Grey willow	-
T10 Turbine Location	Cutover bog (PB4)	*Juncus effusus*	Soft-rush	10
		Equisetum arvense	Field horsetail	0.5
		Hypnum jutlandicum	Heath star moss	2
		Dicranum scoparium	Broom forkmoss	0.5
T10 Hardstand	(Species list only) Cutover bog (PB4)	*Eriophorum angustifolium*	Common cottongrass	-
		Juncus bulbosus	Bulbous rush	-
		Triglochin palustris	Marsh arrowgrass	-
		Salix cinerea	Grey willow	-
		Betula pubescens	Downy birch	-
		Dryopteris affinis	Scaly male fern	-
		Scirpoides holoschoenus	Bulrush	-
		Hypochaeris radicata	Cat's ear	-
T11 Turbine Location	Cutover bog (PB4)	*Eriophorum angustifolium*	Common cottongrass	40
		Betula pubesens	Downy birch	2
		Campylopus flexuosus	Rusty swan-neck moss	2
T11 Hardstand 1	Cutover Bog (PB4) (occurring on Scrub WS1 margin)	*Chamaenerion angustifolium*	Rosebay willowherb	15
		Eriophorum angustifolium	Common cottongrass	80
		Holcus lanatus	Yorkshire-fog	5
		Juncus effusus	Soft-rush	2

Relevé	Habitat Type	Relevé at Turbine Foundation Location		
		Scientific name	Common name	Percentage cover (%)
		Epilobium montanum	Broad-leaved willowherb	0.5
T11 Hardstand 2	Cutover Bog (PB4)	*Eriophorum angustifolium*	Common cottongrass	95
		Betula pubesens	Downy birch	5
		Juncus effusus	Soft-rush	5
		Hypochaeris radicata	Cat's ear	0.5
		Salix cinerea	Grey willow	0.5
		Campylopus flexuosus	Rusty swan-neck moss	0.5

6.7.3.2.1.1 Cutover Bog PB4

As per Table 6-7, most of the turbines are located within cutaway peatlands, some of which form mosaics with scrub or immature woodland.

Depending on the environmental conditions such as hydrology and the stage after the cutaway activities, or the intensity of the disturbance in the past, mosaics of multiple vegetation communities have established within the cutover bog areas. It should be noted that ecological conservation values of the cutaway bog depend on each recolonising vegetation community, therefore, the ecological value assessments for each community type are shown under separated sections below. The ground levels of these areas are lower than surrounding habitats which have not been exploited for peat extraction. Cutaway peatland recolonised by tree species (>50% cover) were excluded here and classified as Scrub (WS1), Immature woodland (WS2) or other woodland habitats (WD or WN).

6.7.3.2.1.1.1 Cutover Bog PB4 with high *Sphagnum* cover

Among PB4 within the Site, several locations with cutover bog PB4 with high *Sphagnum* cover (40-90%) were identified outside the infrastructure footprint and associated buffers. IWM 128 “the habitats of cutover raised bog” by Smith and Crowley (2020) (hereafter, referred to as ‘IWM 128’) describes a cutover bog with high cover of *Sphagnum* mosses can be classified into three vegetation types based on species composition. Within the Site, the following two types were identified.

- *Sphagnum subnitens–Erica tetralix* cutover bog type (HS1) (Plate 6-1): in *c.*30m and 100m north of the proposed amenity trail near L2111 Derryvella, there are cutaway bog areas covered by >40% *Sphagnum* mosses, consisting of dominant heather with bell heather, hare's-tail cottongrass, *Sphagnum subnitens*, *S papillosum*, *S capillifolium* on low hummocks and bog asphodel and *S. cuspidatum* in hollows. It is deemed to relate to Bord na Móna peatland habitat Embryonic bog community (PBc).
- *Sphagnum cuspidatum–Eriophorum vaginatum* cutover bog type (HS2) (Plate 6-2): in *c.*55m of T01 turbine and *c.*40m to 840m of the aforementioned amenity trail, there are cutaway bog areas with >90% *Sphagnum* mosses establishing flooded areas along wet drainage ditches. *Sphagnum papillosum* and *Sphagnum cuspidatum* are dominant, creating flat and quacking matts, alongside frequent purple moor-grass and common cottongrass. It is deemed to relate to Bord na Móna peatland habitat *Sphagnum cuspidatum-Eriophorum angustifolium* community (PBb).

IWM 128 states that HS1 cutover bog type is required to be assessed if it has the affinity with active raised bog (ARB). It defines detailed thresholds for cutover bog to be ARB as below:

- Total Sphagnum cover >40%
- Presence of all eight (8) constant species (Table 6-8) within a 100 m^2 plot
- Presence of an additional four (4) indicator species, or species groups, (Table 6-8) within a 100 m^2 plot
- Absence of calcareous fen species, such as brown mosses
- <10% cover of species not typical of ombrotrophic raised bog

Table 6-8: Indicator species of Active Raised Bog (ARB) (source: Table 18 in IWM128)

Constant All eight species required	Additional Any four species / groups of species required	
Sphagnum capillifolium	*Andromeda polifolia*	*Menyanthes trifoliata*
Drosera rotundifolia	*Cladonia portentosa* and/or *C. ciliata*	*Sphagnum fuscum s.l.*
Narthecium ossifragum	*Cladonia uncialis*	*Sphagnum denticulatum*
Sphagnum papillosum	*Aulacomnium palustre*	*Sphagnum subnitens*
Eriophorum vaginatum	*Drosera anglica* and/or *D. intermedia*	*Sphagnum pulchrum*
Eriophorum angustifolium	*Leucobryum glaucum*	*Sphagnum magellanicum* agg
Rhynchospora alba	*Vaccinium oxycoccos*	*Sphagnum austinii*
Sphagnum cuspidatum	*Racomitrium lanuginosum, Pleurozia purpurea* and/or *Campylopus atrovirens*	

While no relevé in 100m^2 quadrat collected within HS1 cutover type during the field surveys is the limitation of this assessment, the species list recorded in one stop within each H1 area shows that all of this habitat type includes 6 constant species without round-leaved sundew (*Drosera rotundifolia*) and white beak-sedge and one additional species, *Sphagnum subnitens*. During the field surveys, it was confirmed that H1 habitats within the Site pass other three thresholds, namely, total Sphagnum cover >40%, <10% cover of species not typical of ombrotrophic raised bog and absence of calcareous fen species, such as brown mosses.

Given the failure to pass the indicator species criterion, it is concluded that HS1 cutover bog type within the Site does not qualify as ARB on cutover bog. However, the high cover of *Sphagnum* spp. and dominance of ombrotrophic bog species indicate that this habitat type has a potential to be regenerating into ARB, therefore, it is assessed as being of ***County Importance***.

Plate 6-1: ***Sphagnum subnitens–Erica tetralix*** **cutover bog type (HS1) (outside proposed infrastructure footprint and ZoI)**

Plate 6-2: ***Sphagnum cuspidatum–Eriophorum vaginatum*** **cutover bog type (HS2) (outside proposed infrastructure footprint and ZoI)**

6.7.3.2.1.1.2 Other Cutover Bog PB4

Areas dominated by bare peat were the largest habitat type within the cutaway atthe Site. Vegetation cover was usually low (0-10%) with occasional patches of common cottongrass, heather, glaucous sedge (*Carex flacca*) and purple moor-grass alongside recolonizing habitat species such as knotted pearlwort (*Sagina nodosa*) and bulbous rush (*Juncus bulbosus*) sparsely encroached by seedlings of downy birch, Scots pine and/or alder. Drainage ditches containing water are frequent throughout cutaway bog areas, creating hydrological gradients.

This cutover bog group was found across the Study Area for the Proposed Wind Farm, including the locations of T03, T04, T06, T10 and T11, the associated hardstands of T06, T07, T10 and T11 and the locations of PDA A-E and the construction compound in the southernmost section (Plate 6-3, Plate 6-4 and Plate 6-5).

Plate 6-3: **Relevé at T06 Location**

Plate 6-4: **Relevé at T10 Location**

Plate 6-5: Relevé at T11 Location

Within the Site, there are also cutaway bog that have been recolonised by a high cover of vascular plants, with <40% cover of *Sphagnum* mosses and ≤10% cover of bare peat . These areas form mosaics of patches dominated mainly by purple moor-grass, ericoids or cottongrass and occasionally small shallow pools as follow.

Cutover bog PB4 within the Site is partially characterised by dominant heather with heath plait-moss underneath occurs as patches or linear habitats surrounded, creating mosaics with other habitats. Other common species were bell-heather, heath star-moss, common cottongrass, purple moor-grass and seedlings of downy birch or pines. Generally, the habitat type was located at higher elevations than other areas of cutover bog, such as the transitional zones between peat extraction areas and earth banks, drainage ditches or roads. The substrate was firm without standing water/water seepage.

This habitat type was found across the Study Area for the Proposed Wind Farm, including the locations of T02, the associated hardstands of T01, T02, T04 and T08 and the location of the proposed compound, and main construction compound (Plate 6-6 and Plate 6-7).

While this habitat type has similarities with heath habitat (HH) due to abundant ericoids and heath plaitmoss, the manual notes that heath-dominated habitats on cutover bogs should rarely be classified as HH unless indicators such as green-ribbed sedge (*Carex binervis*), heath bedstraw (*Galium saxatile*), or heath rush (*Juncus squarrosus*) are present. During the on-site surveys, these indicators were not found within this habitat type. In addition, peat depth was observed to be likely deeper than 0.5m therefore ruling out heath habitat. Therefore, it was assigned to cutover bog PB4.

Plate 6-6: Relevé at T01 Hardstanding

Plate 6-7: Relevé at T02 Location

Some of cutover bog PB4 habitats within the Site is dominated by common cottongrass forming mosaics with other habitats on cutaway plots. Generally, the habitat type was located in lower and wetter places than other areas of cutover bog, such as depressions, margins of lakes, wet drainage ditches and immature woodland understories. The substrate was generally firm.

This type of habitat established in areas with varying wetness, occurring both in waterlogged areas and in areas without standing water, and the species compositions varies depending on the wetness. The wetter areas are often accompanied by marsh horsetail, jointed rush and bottle sedge occasionally with some small pools (water depth ranging from 3cm to 20cm) dominated by bog pondweed alongside delicate stonewort (*Chara virgata*) and lesser bladderwort (*Utricularia minor*). Purple moor-grass and heather are always present in the drier areas, encroached by downy birch, lodgepole pine and Scots pine occasionally.

This cutover bog type was found across the Study Area for the Proposed Wind Farm, including the location of T01 and T05, the associated hardstand of T01 and T11 and the location of the main construction compound, and the Meteorological Mast (Plate 6-8 and Plate 6-9).

Plate 6-8: Relevé at T05 Location

Plate 6-9: Relevé at T11 Hardstand

Cutover bog PB4 dominated by purple moor-grass within the Site showed variation in species composition between areas; however devil's-bit scabious and tormentil were constant species. In the northern section of the Site, bog myrtle (*Myrica gale*), wild angelica (*Angelica sylvestris*), round-leaved sundew, and marsh pennywort (*Hydrocotyle vulgaris*) were also identified within this habitat type.

Overall, the substrate was firm and lacked standing water. This habitat type usually formed mosaics with other cutover bog types, scrub and immature woodlands, and cannot sometimes be separated from the common cottongrass dominated type.

This cutover bog type was found across the Study Area for the Proposed Wind Farm, including the T03 hardstand (Plate 6-10 and Plate 6-11).

During walkover surveys, the presence of devil's-bit scabious areas, suitable habitat for marsh fritillary and in some cases, marsh fritillary larval webs were identified within this habitat type (see Section 6.7.5.4.1.2.1).

Plate 6-10: Relevé at T03 Hardstand

Plate 6-11: Area dominated by devil's-bit scabious along the access route in the northernmost section of the Site

Regarding Cutover bog PB4 within the Site, given the semi-natural condition, it is assessed as being ***Locally important, Higher value***.

6.7.3.2.1.2 Scrub WS1

Cutaway bog within the Study Area has been partially encroached by immature trees and shrubs. These encroached areas where woody species cover is >50%, and the canopy height is under 5m (4m in the wetland areas) are categorised as Scrub WS1. This habitat type within the Site forms mosaics with cutaway bog habitat often forming transitional zones between cutaway bog and woodlands or forming verges along existing tracks.

Within the Study Area of all Proposed Turbines, scrub on cutaway bog was identified during the site walkovers. Dominant species are downy birch and grey willow in most cases alongside eared willow (*Salix aurita*) and Sitka spruce. The understory is usually dominated by common cottongrass, ling, purple moor-grass and/or soft rush.

While it is featured by the low species richness and transitional nature, given the semi-natural nature and potential to develop into a woodland habitat, , it is assessed as being ***Locally important, Higher value***.

Plate 6-12: Relevé at T09

Plate 6-13: Scrub at T03 Hardstand

6.7.3.2.1.3 Immature woodland WS2

Immature woodlands are defined as habitats dominated by young tree species whose heights are under 5m (4m in wetlands) without developed tree layer structures which can be seen in mature woodlands. This habitat type within the Site consists of abundant downy birch, silver birch and/or grey willow with ground flora of bramble, purple moor-grass, common cottongrass and ling. It was identified across the Site, including within the hardstands of T04, T05, T06 and T07 (Plate 6-14 and Plate 6-15).

Although the habitat type is characterised by the low species richness, low cover or absence of *Sphagnum* spp., and early-stage in succession, given the semi-natural nature, it is assessed as being ***Locally important, Higher value***.

Plate 6-14: Relevé at T05 Hardstand

Plate 6-15: Immature woodland at T04 Hardstand

6.7.3.2.1.4 Drainage ditches FW4

Numerous drainage ditches intersect the cutover bog areas in the Site, with varying width/depth and species composition: some are completely vegetated with gorse, purple moor-grass and common cottongrass and dry, whilst others are completely open with peaty standing water and sparse aquatic plants, namely, broad-leaved pondweed (*Potamogeton natans*), bog pondweed (*P. polygonifolius*), small pondweed (*Potamogeton berchtoldii*) and lesser bladderwort, under water or wet but covered by feathery bog-moss (*Sphagnum cuspidatum*) as regenerating bog. Where vegetation was dominantly by bulrush, floating sweet-grass (*Glyceria fluitans*) and common reed (*Phragmites australis*), drainage ditches were assigned to reed and large sedge swamps (FS1). Drain blocking to re-wet cutover bog has caused localised flooding, resulting in formation of lakes, and in some cases as described in Section 0 giving rise to bog covered by High Sphagnum cover.

Drainage ditches are located within the 500m buffer of all turbines without diverse aquatic plants and without fisheries value (Plate 6-16 and Plate 6-17). Noting the importance of semi natural vegetation with open water to support amphibian breeding and aquatic plants establishing, it is assessed as being ***Locally important, Higher value*.**

Plate 6-16: Typical wet drainage ditch in the Site

Plate 6-17: Wet drainage ditch nearby the Proposed Construction Compound EBoP

6.7.3.2.1.5 Raised bog PB1

A number of areas of intact raised bog remnants PB1 were identified around the margins of the site during surveys. Although these areas have been subject to cutover peat extraction and historic turbary, no industrial peat extraction extensively to remove top vegetation and peat. These bogs are located mainly along the edges of the Site boundary, remaining after peat extraction activities which targeted the central part of the Site, and are therefore higher than the areas of cutaway bog. Most of the high bogs were bounded by drainage ditches and the margins were drying out, invaded by scrub and heath.

Overall, microtopography in these bogs was poorly developed, which is likely to be indicative of degradation caused by drying out. The microtopography consists mainly of uniform hummock - hollow complexes, without pools and with occasional lawns. Hummocks were 40cm height at average, mainly formed by *Sphagnum capillifolium* alongside constant but low amounts of *S. magellanicum* and *S. papillosum*. On the drier part of the hummocks, heather and bell-heather were dominant, along with abundant lichen, *Cladonia portentosa* in some areas. Hare's tail cottongrass and bog-rosemary were not abundant but were common on low hummocks. White beak-sedge and bog asphodel were dominant in hollows. Some hollows had shallow standing water with 2 - 3 cm water depth.

Within the Study Areas (250m buffer) for T04, T06 and T08 and within 50m of the proposed internal access track between T02 and T06 and the proposed access track in the northernmost section of the Site, a total of four areas of raised bog were identified. The areas of these raised bogs range from 0.2ha to 12.5ha.

Microphotography, wetness and species composition varies between the different areas of raised bog, influenced by various factors including past disturbance, location and number of drains, and extent of intact bog at each location.

To obtain representative data raised bog within the Site, a total of fourteen relevés were collected in the western boundary of the BEMP area, adjacent/north-east of the internal access track from T02 – T06 (eastern site boundary), 500m west of T04 and 170m north of T04, respectively. Among them, relevés 7 to 9 are adjacent to the footprint of internal access track from T02 – T06 (Plate 6-18 and Plate 6-19)..

Table 6-9: Relevé Surveys in Degraded Raised Bog Habitat (September 2025)

		Relevé 1	Relevé 2	Relevé 3	Relevé 4	Relevé 5	Relevé 6
Location		**Raised bog on western boundary pf BEMP area**					
Survey Date		22/09/2025	22/09/2025	22/09/2025	22/09/2025	22/09/2025	22/09/2025
Quadrat size		2m x 2m	2m x 2m	2m x 2m	2m x 2m	2m x 2m	2m x 2m
Bog Microtopography (Pool, Hollow, Hummock)		High hummock (>25cm) 80%, Hollow 4%, Lawn 9%.	High hummock (>25cm) 40%, Low hummock (<25cm) 30%, Lawn 30%.	High hummock (>25cm) 60%, Low hummock (<25cm) 30%, Hollow 5%, lawn 5%	Microtopography present (Low hummock (<25cm)) but not very pronounced.	Low hummock (<25cm) 90%, Lawn 10%.	Low hummock (<25cm) 90%, Hollow 10% (of which has 3% depression with water).
Firmness*		Soft.	Firm	Soft	Slight quake, wet	Slight quake, wet	Slight quake, wet
Veg Coverage (%)		93	99	98	90	85	
Bare ground (%)		3	0.5	1	0	0	0
Litter (%)		<1	Senescent heath 11%	Senescent heath 0.5%.	Senescent heath 10%	Senescent heath 15%	Senescent heath 5%
Standing Water (%)		4	0	0	0	0	5
Water depth (cm)		2	-	-	-	-	
Vascular Plant % Cover							
Calluna vulgaris	Ling	40	8	60	25	15	25
Erica tetrarix	Cross-leaved heath	10	30	15	15	25	5
Rhynchospora alba	White beak-sedge	5	3	7	5	2	2

		Relevé 1	Relevé 2	Relevé 3	Relevé 4	Relevé 5	Relevé 6
Andromeda polifolia	Bog-rosemary	0.1	0.3	0.1	1		0.5
Eriophorum vaginatum	Hare's-tail cottongrass	10	8	3			
Eriophorum angustifolium	Common cottongrass					1	
Narthecium ossifragum	Bog asphodel		5	1	2	2	5
Trichophorum germanicum	Deergrass		4		10	5	
Polygala serpyllifolia	Heath milkwort						0.5
Bryophyte % Cover							
Sphagnum magellanicum	Magellanic bogmoss	0.1	0.1		1		
Sphagnum papillosum	Papillose bogmoss			0.5		0.5	0.5
Sphagnum capillifolium	Acute-leaved bogmoss	20		40		2	7
Sphagnum subnitens	Lustrous bogmoss			1	5	15	
Sphagnum denticulatum	Cow-horn bogmoss			1	1	5	
Sphagnum cuspidatum	Feathery bogmoss						0.5
Dicranum scoparium	Broom forkmoss	0.3					
Hypnum jutlandicum	Heath plaitmoss				2	2	0.5
Lichen % Cover							
Cladonia portentosa		20	30	7	5	10	40
Cladonia uncialis subsp. *biuncialis*	-	1					

Table 6-10: Relevé Surveys in Degraded Raised Bog Habitat (September 2025)

		Relevé 7	Relevé 8	Relevé 9	Relevé 10	Relevé 11	Relevé 12
Location		**Raised bog adjacent/north-east of internal access track from T02 – T06 (eastern site boundary)**			**Raised bog 500m west of T04**		
Survey Date		24/09/2025	24/09/2025	24/09/2025	30/09/2025	30/09/2025	30/09/2025
Quadrat Size		2m x 2m	2m x 2m	2m x 2m	2m x 2m	2m x 2m	2m x 2m
Bog Microtopography (Pool, Hollow, Hummock)		No developed microtopography. Small drainage ditches intersecting.			Microtopography is quite varied. Some hollows are artificial (shallow excavations to provide peat for drain blocking).		
Firmness*		Firm	Firm	Firm	Soft Moderate quake	Soft Moderate quake	Firm
Veg Coverage (%)		100	80	90	100	100	100
Bare Ground (%)		0	0	0	0	0	0
Litter (%)		<1	<1	<1	<1	<1	<1
Standing Water (%)		Present within a drain	20% in a drain 1% Algae	10	0	20% Vegetated by *Sphagnum*	0
Water Depth (cm)		-	-	-	-	-	-
Vascular Plant % Cover							
Calluna vulgaris	Ling	70	15	50	30	60	70
Erica tetrarix	Cross-leaved heath	50	20	4	10	10	5
Erica cinerea	Bell heather			4			
Rhynchospora alba	White beak-sedge	1	5	5		1	

		Relevé 7	Relevé 8	Relevé 9	Relevé 10	Relevé 11	Relevé 12
Andromeda polifolia	Bog-rosemary			1			
Eriophorum vaginatum	Hare's-tail cottongrass	5	5	10	60	15	10
Eriophorum angustifolium	Common cottongrass		3			1	2
Narthecium ossifragum	Bog asphodel			0.5		10	3
Drosera rotundifolia	Round-leaved sundew		0.5			0.5	
Bryophyte % Cover							
Sphagnum magellanicum	Magellanic bogmoss		8	1	0.5	20	
Sphagnum capillifolium	Acute-leaved bogmoss		2	5	20	30	
Sphagnum subnitens	Lustrous bogmoss	0.5		3			20
Sphagnum cuspidatum	Feathery bogmoss		15			15	
Sphagnum palustre	Blunt-leaved bogmoss		5				
Sphagnum tenellum	Soft bogmoss					0.5	
Hypnum jutlandicum	Heath plaitmoss	2		3	2	2	10
Campylopus introflexus	Heath star-moss	2		1			
Leucobryum glaucum	Large whitemoss				15		
Lichen % Cover							
Cladonia portentosa	-	0.5	0.5		15	40	75
Cladonia chlorophaea	-		0.5				

Table 6-11: Relevé Surveys in Degraded Raised Bog Habitat (September 2025)

		Relevé 13	Relevé 14
Location		**Raised bog 170m north of T04**	
Survey Date		30/09/2025	30/09/2025
Quadrat Size		2m x 2m	2m x 2m
Bog Microtopography (Pool, Hollow, Hummock)		Microtopography present but not very pronounced or varied	
Firmness*		Slightly wet, slight quake	Slightly wet, slight quake
Veg Coverage (%)		100	100
Bare Ground (%)		0	0
Litter (%)		<1	<1
Standing Water (%)		0	0
Water Depth (cm)		-	-
Vascular Plant % Cover			
Calluna vulgaris	Ling	40	35
Erica tetrarix	Cross-leaved heath	5	
Erica cinerea	Bell heather		5
Eriophorum vaginatum	Hare's-tail cottongrass	10	60
Eriophorum angustifolium	Common cottongrass		0.5
Trichophorum germanicum	Deergrass		3
Bryophyte % Cover			
Sphagnum magellanicum	Magellanic bogmoss		5
Sphagnum capillifolium	Acute-leaved bogmoss		15
Sphagnum subnitens	Lustrous bogmoss	3	0.5
Sphagnum papillosum	Papillose bogmoss	1	
Hypnum jutlandicum	Heath plaitmoss	50	10
Lichen % Cover			
Cladonia portentosa	-	90	2

The relevés were assessed against the following publications to determine the potential correlation with Annex I type habitats '7120 Degraded raised bogs still capable of natural regeneration' and '7110 Active raised bogs':

- Best practice in raised bog restoration in Ireland (Mackin et al, 2017)
- Raised Bog Monitoring and Assessment Survey 2013 (Fernandez et al, 2014)
- Article 17 report, the Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. (NPWS, 2019)
- Article 17 report, the Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. (NPWS, 2025)

Typical species associated with raised bog habitat are set out in these publications and summarised in Table 6-12.

Table 6-12: Typical Raised Bog Species

Vascular Plants	Bryophytes and Lichens
Andromeda polifolia	*Aulacomnium palustre*
Drosera anglica	*Campylopus atrovirens*
D. intermedia	*Leucobryum glaucum*
D. rotundifolia	*Pleurozia purpurea*
Eriophorum angustifolium	*Sphagnum denticulatum*
E. vaginatum	*S. capillifolium*
Menyanthes trifoliata	*S. cuspidatum*
Narthecium ossifragum	*S. fuscum*
Racomitrium lanuginosum	*S. austinii*
Rhynchospora alba	*S. magellanicum*
Utricularia minor	*S. papillosum*
Vaccinium oxycoccos	*S. pulchrum*
	S. subnitens
	Cladonia spp. *(C. ciliata* and *C. portentosa)*

The high bog habitats within the Site are generally lacking well-developed bog microtopography such as hummock-hollow-pool systems, indicating relatively dry conditions typically associated with degradation. While the substrates of some areas are soft and water collects around boots when standing still, the saturated conditions and larger expanses of water associated with less degraded raised bog are absent. Following the ecotopes key in Appendix 2 of Fernandez et al. (2014), this habitat type within the Site is categorised as 'Marginal ecotope' due to pools being <10% cover in all areas of raised bog within the Site (based on site walkovers and interpretation of recent aerial imagery).

*"Marginal Physical characteristics: Water level low, surface generally hard, soft in spots e.g. Rhynchospora alba hollows. Degraded micro-topography, with very little differentiation between hummocks and hollows, etc. Non-algal pools & tall hummocks absent. Hollows can be frequent & these are dominated by Rhynchospora/Narthecium/Trichophorum in tussock form/Algal mats. Pools area absent except for tear pools. Characteristic species: In lawns Narthecium is most dominant, Sphagnum papillosum & S. capillifolium are present in small amounts (not in lawns, or in big hummocks, but in small patches). Trichophorum common in tussock form".*As per Article 17 report (NPWS, 2025), the definition of DRB is now explained by "*an-eco hydrological model that was developed based on LiDAR (Light Detection and Ranging) data. The model predicts where there is potential to restore active conditions on the high bog (NPWS, 2017). As a result, only those areas with the right combination of physical conditions (including surface shape, slope and drainage patterns) ultimately capable of supporting Active Raised Bog (ARB) are now considered as DRB. These are the areas of raised bogs whose hydrology has been disturbed so that their surfaces have dried out and suffered some species change or loss. Bog species of drier conditions now dominate, and peat formation has ceased. The water level is generally 10 cm or more below the surface and drops to 30+ cm below during dry summer weather. To qualify as DRB, these areas must still be capable of natural regeneration to active bog within 30 years if their hydrology is repaired (usually after restoration works, particularly blocking of drains). The remainder of the high bog that is neither ARB nor DRB is now referred to as 'Supporting Raised bog habitat'.*".

As per the hydrological modelling developed by the BnM via LiDAR data, it indicated that a total of three locations of raised bog habitats within the Site qualify as Annex I habitat type 7120 Degraded raised bogs to be capable of regeneration into ARB within 30 years with hydrological restoration measures. The potential DRBs are located outside of any footprint of infrastructure: 80m south and 450m north of the amenity trail near L2111Derryvella and 790m west of the access track near T02 turbine (Figure 6-8). These three locations are assessed as **National importance**.

Other raised bog habitats should be assigned to 'Supporting Raised bog habitat', following the Article report 2025, which does not correspond with DRB. Given that this type supports ombrotrophic bog species as natural bog habitat, it is assessed as **Locally important, higher value**.

Plate 6-18: **Relevé 7 at Raised bog along the footprint of the internal access track**

Plate 6-19: **Relevé 8 at Raised bog along the footprint of the internal access track**

6.7.3.2.1.6 Dystrophic lakes FL1

Numerous shallow lakes have formed on areas of cutover bog within the site. Open waterbodies lacking indicators of acidic lakes within the Site were assigned to dystrophic lakes FL1. Species recorded in this habitat included bulrush (*Typha latifolia*), floating sweet-grass (*Glyceria fluitans*), bulbous rush (*Juncus bulbosus*) and broad-leaved pondweed (*Potamogeton natans*) alongside occasional small pondweed (*Potamogeton berchtoldii*) and delicate stonewort (*Chara virgata*).

Aquatic baseline surveys within the Site were conducted in October 2021, September/October 2023 and September 2025 by Triturus Environmental Ltd. The reports assessed a total of 17 lakes (labelled L1 – L21) within the Site in terms of physical characteristics, substrate type, flow type, macrophyte and aquatic bryophyte and vegetation (See Appendix 6.2). Among them, a total of 16 lakes (L1 to L16) are assigned to dystrophic lakes FL1 (Plate 6-20 and Plate 6-21).

Potential for links with the Annex I habitat type 'Natural dystrophic lakes and ponds (3160)' was assessed. A working interpretation for Annex I lake habitats (O Connor, 2015) show the definition of 3160 as a species poor habitat, at its most typical dominated by aquatic *Sphagnum* spp., at its margins intergrading with blanket bog. Typical bryophyte, plant and charophyte species for this Annex I habitat are *Sphagnum cuspidatum*, *Sphagnum auriculatum*, bulbous rush, bog pondweed (*Potamogeton polygonifolius*), great fen-sedge (*Cladium mariscus*), floating club-rush (*Eleogiton fluitans*), bog bean (*Menyanthes trifoliata*), alternate water-milfoil (*Myriophyllum alterniflorum*), white water-lily (*Nymphaea alba*), floating bur-reed (*Sparganium angustifolium*), bladderworts (*Utricularia intermedia*), lesser bladderwort (*Utricularia minor*), smooth stonewort (*Nitella flexilis*) and translucent stonewort (*Nitella translucens*).

Dystrophic lakes within the Site are open water areas on cutaway peatland rather than natural lakes, in addition, most of the typical species for 3160 were not identified within the lakes. Therefore, it is concluded that dystrophic lakes within the Site do not qualify as Annex I habitat type natural dystrophic lakes and ponds (3160).

In terms of the ecological value of this habitat, given its semi-natural character and open water to support amphibian spawning, this lake type is assessed as **Local importance Higher value**.

Plate 6-20: Dystrophic lake L1

Plate 6-21: Dystrophic lake L16

6.7.3.2.1.7 Acid oligotrophic lakes FL2

Given their peaty substrate and aquatic plant species indicative of more acidic water, namely, bog pondweed, a total of four lakes (L18 to L21) mong the surveyed lakes by Triturus are assigned to acid oligotrophic lakes FL2.

Fossitt states this habitat type has a potential to link with Annex I habitat oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) (3110) or oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea* (3130).

The working interpretation (O Connor, 2015) sets definitions of these Annex I lake habitats as follows:

- 3110 Oligotrophic isoetid lake habitat. A habitat dominated by isoetids. Characteristic species include *Isoetes lacustris, Isoetes echinospora, Littorella uniflora, Lobelia dortmanna* and *Deschampsia setacea*. The habitat frequently occurs on sheltered, gently sloping shorelines. It is generally associated with peatland areas and base-poor water (pH often <6.5).
- 3130 Mixed Najas flexilis lake habitat. Typified by habitats with Najas flexilis, this is a more species rich habitat than 3110. It also contains *Isoetes lacustris, Isoetes echinospora*, and *Littorella uniflora*, but combined with some broad-leaved pondweeds such as *Potamogeton perfoliatus*. While frequently associated with peatland, this habitat type is found in catchments with more mixed geology, including at least some base-rich influence and pH closer to neutral (pH 7).

It should be noted that acid oligotrophic lakes within the Site are cutover lakes/pools rather than actual natural lakes, and the lake shores lack rocky margins and typical species within the definitions, such as shoreweed (*Littorella uniflora*) and water lobelia (*Lobelia dortmanna*). Therefore, it is concluded that this lake type within the Site does not qualify as Annex I habitat type oligotrophic waters containing very few minerals of sandy plains (3110) or oligotrophic to mesotrophic standing waters with vegetation (3130).

In terms of the ecological value of the habitat itself, given the semi-natural nature and open water to support amphibian spawning, this lake type is assessed as being **Local importance Higher value** due to their semi-natural character, potential to increase in diversity, and contribution to the site-wide habitat mosaic.

6.7.3.2.1.8 Other artificial lakes and ponds FL8

Located approx. 500m northwest of T09, there is an artificial lake (0.7ha and 0.3-1.0m deep) to the north of Lanespark Bog, adjacent to Loch Doire Bhile and the North Glengoole Stream. As with Loch Doire Bhile, this lake and was excavated as part of habitat creation on cutover bog. In the aquatic report, this lake is labelled as L17.

The habitat description from the aforementioned aquatic baseline report is as follow: "*the lake was fringed by common reed with occasional stands of broad-leaved pondweed. Stonewort (Chara sp.) was abundant on the lakebed. The open, gravelly banks supported scattered willow (Salix sp.) with coniferous afforestation (WD4) present to the north of the site*." The lakeshore was fringed by bottle sedge, common reed, water mint and marsh pennywort (*Hydrocotyle vulgaris*) during the site walkover by FT.

Fossitt (2000) shows this habitat type links with no Annex I habitats. In addition, these lakes do not support adequate typical species for Annex I lakes habitat type. Therefore, it is concluded that artificial lakes within the Site do not qualify as Annex I habitat type.

Given the absence of aquatic species or habitats of high conservation value but considering it's semi-natural character, this habitats is assessed as being ***locally important, higher value***.

Plate 6-22: Artificial lake in the southernmost section of the Site

Plate 6-23: Substrate of the base

6.7.3.2.1.9 Reed and large sedge swamps FS1

Within the Study Area, some open water habitats such as drainage ditches or lakes were covered or fringed by common reed (*Phragmites australis*), bottle sedge (*Carex rostrata*) and bulrush (*Typha latifolia*) (Plate 6-24 and Plate 6-25).

- A drainage ditch, vegetated by common reed, marsh horsetail, common cottongrass and floating sweet-grass, stretches within the Study Areas of T04, T05 and T07 along the internal access track. Given the absence of aquatic species or habitats of high conservation value but the semi-natural nature, this habitat was assessed as being ***locally important, higher value***.
- In the eastern area and margin of L1 located approx. 230m northwest of T01 (see Figure 2.2 in the Littleton wind farm aquatic baseline report for 2023, located in Appendix 6.2), 0.5ha swamp dominated by bottle sedge with floating sweet-grass, bulrush and bulbous rush. Given the semi natural nature, this habitat was assessed as being ***locally important, higher value*** as a habitat supporting rare plant species.
- The lake shore of L16 located approx. 240m southwest of T07 (see Figure 2.2 in the Littleton wind farm aquatic baseline report for 2023, located in Appendix 6.2) is fringed by a swamp habitat dominated by bottle sedge alongside common reed, marsh horsetail, bulrush and grey willow. In the southernmost part, a 40cm x 40cm stand of least bur-reed (*Sparganium natans*) (Near Threatened (NT) in the Irish Red List) was found. While the habitat supports the rare species, the population found was small (0.16m^2) for national or county scale. Given that, the ecological evaluation of site L16 was assessed as being ***locally important, higher value***.

Plate 6-24: Drainage ditch dominated by bulrush

Plate 6-25: Bottle sedge swamp along a lake shore

6.7.3.2.1.10 Dry calcareous and neutral grassland GS1

Early successional stage grassland with neutral/calcareous character is present along the existing bog railway running south from the proposed site entrance (Plate 6-26 and Plate 6-27). Many areas share characteristics with recolonising bare ground (ED3), with higher vegetative cover indicative of succession to grassland being patchy. This habitat has established primarily on the imported material used as the foundation for the rail line, resulting in a plant assemblage which differs from the surrounding cutover bog habitats. An area of till exposed during construction of the railway also occurs c. 550m north-west of T01 beside the rail line, providing a similarly neutral/calcareous substrate to that provided by the imported rail line foundation material.

Given the history of disturbance and the limestone bedrock (Dinantian Lower Impure Limestones) underlaying the Site in addition to the presence of glacial till, it is assessed that this calcareous/neutral grassland is of relatively recent origin, and is semi-natural habitat rather than natural grassland, resulting from the presence of imported material and the lime-rich glacial till under peat exposed by removal of peat for railway construction in the past.

The habitat was assessed against the following publications to determine the potential correlation with Annex I type habitats Semi-natural dry grasslands & scrub facies on calcareous substrates (6210); important orchid sites (*6210):

- The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. Irish Wildlife Manuals - IWM No. 102 (Martin *et al.* 2018);
- Irish Semi-natural Grassland Survey Annual Report No.4 (Devaney *et al.* 2013);
- The Irish Semi-natural Grassland Survey 2007-2012 – IWM No. 78 (O'Neill *et. al* 2013);
- The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. (NPWS, 2019 and 2025).

Positive indicators associated with calcareous grassland habitat are set out in these publications and summarised in Table 6-13.

Table 6-13: Positive Indicators of Calcareous Grassland

High Quality Positive Indicator Species	Positive Indicator Species
Antennaria dioica	*Arabis hirsuta*
Anthyllis vulneraria	*Brachypodium pinnatum*
Asperula cynanchica	*Bromopsis erecta*
Blackstonia perfoliata	*Carex flacca*
Briza media	*Ctenidium molluscum*
Campanula rotundifolia	*Daucus carota*
Carex caryophyllea	*Galium verum*
Carlina vulgaris	*Helictotrichon pubescens*
Centaurea scabiosa	*Homalothecium lutescens*
Filipendula vulgaris	*Leontodon hispidus / L. saxatilis* (record both but count as one in assessment)
Gentiana verna	*Lotus corniculatus*
Gentianella amarella/campestris	*Origanum vulgare*
Geranium sanguineum	*Pilosella officinarum*
Knautia arvensis	*Ranunculus bulbosus*
Koeleria macrantha	*Sesleria caerulea*
Linum catharticum	*Thymus polytrichus*
Primula veris	*Trisetum flavescens*
Sanguisorba minor	
Orchid species (record individual orchid species separately)	

Source: IWM No. 102 (Martin et al. 2018)

The Article 17 states the description of 6210 as follows:

"*The Annex I habitat 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) comprises species-rich plant communities found on shallow, well-drained calcareous substrates. It is considered a priority habitat only if it is an important orchid site, which in Ireland refers to sites that have any native orchid species other than the relatively common Dactylorhiza fuchsii and Dactylorhiza maculata. This habitat includes a mixture of grasses and herbs, with calcicole species typically frequent. It often occurs on obvious geological features such as eskers, outcropping limestone rock and in association with limestone pavement. The Burren (Clare/Galway) and Dartry Mountains (Sligo/Leitrim) are particularly important areas within the State for this Annex I habitat, but it can also be found scattered across much of the midlands.*"

"*With the exception of the relatively common Dactylorhiza fuchsii and Dactylorhiza maculata the 6210 habitat should be considered for the orchid-rich priority habitat *6210 if one or more of the following less common orchid species are present: Anacamptis pyramidalis, Coeloglossum viride, Dactylorhiza fuchsii v. okellyi, Epipactis palustris, Gymnadenia conopsea, Listera ovata, Neotinea maculata, Ophrys apifera, Ophrys insectifera, Orchis mascula, Orchis morio, Platanthera bifolia, Platanthera chlorantha, Spiranthes spiralis.*"

The species listed below for this habitat represents the complete list of species recorded from the entire habitat area on/adjacent to the old railway during the walkover; as such, it should be noted these species do not occur ubiquitously or at high densities but instead have a patchy distribution dispersed across the entire habitat area.

The species present include purple moor-grass, common knapweed, devil's-bit scabious, common ragwort, carrots[19] (*Daucus carota*), quaking grass (*Briza media*), glaucus sedge, lesser hawkbit (*Leontodon saxatilis*), common bent (*Agrostis capillaris*), tormentil, gorse, carline thistle (*Carlina vulgaris*), common yellow-sedge (*Carex demissa*), green sedge (*Carex oederi*), fragrant-orchids (*Gymnadenia conopsea s.l.*), bramble, common centaury (*Centaureum erythraea*), autumn hawkbit (*Scorzoneroides autumnalis*), heath spotted-orchid (*Dactylorhiza maculata*), selfheal (*Prunella vulgaris*), fairy flax (*Linum catharticum*), marsh horsetail (*Equisetum palustre*), slender St John's-wort (*Hypericum pulchrum*), wild strawberry (*Fragaria vesca*), yarrow (*Achillea millefolium*), silverweed (*Potentilla anserina*), weld (*Reseda luteola*), meadowsweet (*Fillipendula ulmaria*), bird's foot trefoil (*Lotus corniculatus*), coltsfoot (*Tussilago farfara*), eyebrights (*Euphrasia* agg.), perennial sow-thistle (*Sonchus arvensis*), marsh helleborine (*Epipactis palustris*), annual wall-rocket (*Diplotaxis muralis*), common milkwort (*Polygala vulgaris*), small fleabane (*Pulicaria vulgaris*), blue fleabane (*Erigeron acris*) and scarlet pimpernel (*Lysimachia arvensis*).

The species list taken along the whole length (*c.*933m) of this location showing a total of 6 high quality positive indicators (>2 species required within 4m^2 plus 20m buffer to pass the criteria), namely, quaking grass, fairy flax, carline thistle, fragrant-orchid, heath spotted-orchid and marsh helleborine, and a total of 4 positive indicators (>7 species required within 4m^2 plus 20m buffer to pass the criteria), namely, glaucous sedge, carrots, lesser hawkbit and bird's foot trefoil.

However, taking into account the walkover within the calcareous grassland on/adjacent to the old railway, it was determined that high quality and positive indicator species do not occur ubiquitously or at high densities and have a patchy distribution. Therefore, it is assessed that the numbers of positive indicators at a scale analogous to a monitoring stop-based assessment (2m x 2m plus 20m buffer) are inadequate to pass the criteria for the Annex I habitat [6210] 'Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia)', including the priority habitat 'Orchid-rich Calcareous Grassland*'.

Given the inadequate numbers of high quality / positive indicators at monitoring stop scale, this does not represent the Annex I type habitat [6210] (including Orchid-rich Calcareous Grassland*). While it does not represent Annex I habitat, this habitat is of ecological value due to the presence of calcareous grassland with dispersed high quality indicators including orchid species. As such, this habitat is assessed as being ***Locally important, Higher value***.

[19] In accordance with BSBI Plant Atlas, the common name for *Daucus carota* is carrots, as *Daucus carota* has a few subspecies. In addition, as per State (2010), wild carrot is used for *Daucus carota* subsp. *carota*, which occurs throughout the British Isles and is commoner in coastal habitats in the north and west of the Great Britain. Therefore, this report refers to *Daucus carota* as carrots.

Plate 6-26: Calcareous grassland along the bog operations rail

Plate 6-27: Carline thistle

In the southernmost part of the Site, another calcareous grassland (GS1) (8.8ha) is located approx. 240m southwest of T09. This habitat supports species of calcareous to neutral grassland such as carrots, common centaury, glaucous sedge, fairy flax and fragrant-orchid alongside some wet habitat species, namely creeping bent, silverweed, soft rush, creeping buttercup and Yorkshire-fog. An area of calcareous/neutral grassland is also present at the site entrance, comprised predominantly of more neutral/generalist vegetation around the margins with more calcareous influence evident in the centre of the field where the soil is likely to be shallower. Yarrow, silverweed, purple loosestrife, ribwort plantain, bittersweet, sheep's sorrel, slender St John's-wort, creeping buttercup, red clover, sheep's fescue, cock's-foot and bush vetch were the more generalist species, with carrots, cat's-ear, eyebrights and red bartsia present in the centre of the field. Bird's foot trefoil and quaking grass were rare.

With the same assessment above, given the poor richness of positive indicators, it is concluded that GS1 at this location does not qualify as of Annex I type habitat 6210 'Semi-natural dry grasslands and scrubland facies on calcareous substrates.

Given the assessment and the semi-natural character, this habitat was assessed as being ***Locally important, Higher value***.

6.7.3.2.1.11 Wet grassland GS4

Wet grassland GS4 wihin the Site supports water mint (*Mentha aquatica*) and purple-loosestrife (*Lythrum salicaria*) without the predominance of purple moor-grass, ling, common cottongrass or bare peat. All areas of wet grassland within the Site were found in the form of small or linear patches mainly as transitional habitats.

Along the proposed access track within the Study Area of T07, on the proposed site for the construction compound in the south of T07, wet grasslands were found as linear habitats near wet drainage ditches.

In the west shore of dystrophic lake L16, where is located within the Study Area of T07 at the site of the Proposed Meteorological Mast, a small patch of wet grassland is present. Due to it's location between cutover bog/scrub and swamp, the species composition represents a relatively transitional habitat with purple moor-grass, purple-loosestrife, bottle sedge, common cottongrass, marsh pennywort and common valerian (*Valeriana officinalis*).

Between the Proposed Construction Borrow Pit and Peat Deposition Area (PDA) A in the northeast of the Site, there is wet grassland consisting of cock's-foot, meadowsweet, bittersweet, smooth sow-thistle, common reed, rosebay willowherb, water mint, marsh woundwort, meadow vetchling and devil's-bit scabious along bog margins.

Approx. 100m north of the main construction compound, there is a grassland with evidence of intensive horse grazing with some wet habitat species such as silverweed and purple-loosestrife among scrub.

Given it's transitional nature on cutaway bog and poor numbers of positive indicator species, the wet grasslands described above do not correspond with the Annex 1 habitat '*Molinia meadows [6410]*'. However, this wet grassland generally supports devil's-bit scabious, which is the foodplant for marsh fritillary larvae. As such, this habitat was assessed as being ***Locally important, Higher value***.

Plate 6-28: Grazed wet grassland in the vicinity of Main Compound.

6.7.3.2.1.12 Improved agricultural grassland GA1

The site of the Proposed Construction Borrow Pit in the northeast section of the site is located within agricultural lands bordered by several hedgerows and treelines along the public road, Londfordpass South (Plate 6-29). It is predominantly an intensive monoculture crop managed for silage or grazing and as such is of limited biodiversity value.

The sward is uniform and recently replanted in the majority of fields, with perennial ryegrass (*Lolium perenne*) dominating. One field was less recently reseeded and has a higher proportion of self-seeded grasses including cock's-foot (*Dactylis glomerata*), Yorkshire-fog (*Holcus lanatus*) and timothy (*Phleum pratense*) although perennial ryegrass is still dominant.

A range of common forbs are present, including creeping buttercup (*Ranunculus repens*), meadow buttercup (*R. acris*), dandelion (*Taraxacum* agg.), broad-leaved dock (*Rumex obtusifolius*), greater plantain (*Plantago major*), common chickweed (*Stellaria media*), common mouse-ear (*Cerastium fontanum*), shepherd's-purse (*Capsella bursa-pastoris*), redshank (*Persicaria maculosa*), autumn hawkbit (*Scorzoneroides autumnalis*), small-flowered crane's-bill (*Geranium pusillum*), silverweed (*Potentilla anserina*), tufted vetch (*Vicia cracca*), red dead-nettle (*Lamium purpureum*), cat's-ear, pineappleweed (*Matricaria discoidea*), prickly sow-thistle (*Sonchus asper*) and common sorrel (*Rumex acetosa*). White clover (*Trifolium repens*) is common; this species is planted with grasses as a nitrogen-fixer but is also beneficial to bees. Patches of alfalfa (*Medicago sativa*) are present in one field. This long-lived legume was historically used as a fodder crop. Due their pattern of establishment (large dense patches) the alfalfa plants present in this field are considered likely to have originated from imported seed used in replanting the sward.

While the self-seeded forbs listed above increase the diversity of this habitat somewhat and the presence of clover and alfalfa are beneficial to pollinators, it is predominantly an intensive monoculture crop managed for silage and/or grazing and as such is of limited biodiversity value. As such these fields are ***Locally important Lower value***.

Plate 6-29: Improved agricultural grassland.

6.7.3.2.1.13 Dry meadows and grassy verges GS2

A strip of unmanaged grassland delineates the boundary between an agricultural field and the existing access track into the borrow pit lands. This is dominated by false oat-grass. Linear strips with 0.8m width of unmanaged grassy verges are also present in association with hedgerows (Plate 6-30).

Despite of the absence of diversity of flowering species for pollinators and, given the semi-natural nature, this habitat type within the Site is assessed as **Locally importance, higher value**.

Plate 6-30: Grassy verge abutting hedgerow

6.7.3.2.1.14 Hedgerows WL1

Hedgerows divide the agricultural lands where the Proposed Construction Borrow Pit is located (Plate 6-31). These vary in quality and management history; some are tall, wide and overgrown, while others have been trimmed back along the top and sides. All are relatively dense and well-established, with over-managed hedgerows beginning to recover.

Tree and shrub species present include hazel (*Corylus avellana*), elder (*Sambucus nigra*), hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), ash (*Fraxinus excelsior*), wych elm (*Ulmus glabra*), downy birch, sycamore (*Acer pseudoplatanus*), bramble, privet (*Ligustrum* sp.), dog rose (*Rosa canina* agg.), ivy (*Hedera helix s.l.*) and gorse (*Ulex europaeus*). Herbs and grasses present in fringing areas grasses include cleavers (*Galium aparine*), bracken, bittersweet, common nettle (*Urtica dioica*), hogweed (*Heracleum sphondylium*), pignut (*Conopodium majus*), cow parsley (*Anthriscus sylvestris*), cock's-foot, false oat-grass (*Arrhenatherum elatius*), bush vetch (*Vicia sepium*), marsh woundwort (*Stachys palustris*), great willowherb (*Epilobium hirsutum*), meadowsweet and common knapweed.

Given the potential to act as corridors and provide food for mammals and birds in the local area, this habitat type is assessed as ***Locally important, Higher value***.

Plate 6-31: Hedgerow

6.7.3.2.1.15 Bog woodland WN7

Bog woodland has established on the margins of Littleton and Lanespark bogs and across the cutaway peatland area (Plate 6-32). A narrow strip of bog woodland growing along both sides of the Longfordpass local road is overlapped by the proposed site access route.

Bog woodland is present within the Study Area of T05, T06, T07, T08, the Proposed PDA A, Main Compound, Substation, the amenity trail near T01 and internal access track T07. Canopy species are alder (*Alnus glutinosa*), downy birch, grey willow, and typical ground flora species were bracken, bramble and gorse.

In addition, linear strips of bog woodland comprised of downy birch and grey willow have colonised margins of the cutover bog abutting the Proposed Construction Borrow Pit area. Blackthorn and hazel area also present, and bramble, honeysuckle, bracken and ivy are present in the shrub and field layers. A drain containing common reed runs through this woodland, separating the cutover bog and agricultural land.

In the IWM 69 for monitoring of Annex I woodland type: 91D0 Bog woodland in Ireland, bog woodland is defined as woodland dominated by birch in the canopy with a *Sphagnum* cover > 25%. While downy birch is the dominant species of this habitat type within the Site, *Sphagnum* species and other typical moss species associated with the Annex I habitat such as *Hylocomium splendens* and *Aulacomnium palustre* are absent. Therefore, the bog woodlands within the Site do not correspond to Annex I type habitat 91D0 Bog woodland.

Given the dry conditions, absence of positive bryophytic indicators while considering its semi-natural character, this habitat is assessed as being ***Locally Importance, Higher Value***.

Plate 6-32: Bog woodland

6.7.3.2.1.16 Recolonising bare ground ED3

>50% cover of bare disturbed ground within the Site was categorized as recolonising bare ground (ED3), excluding cutaway peat areas which were assigned to PB4 Cutover bogs.

The proposed internal access track adjacent to T02, T03, T04, T05 is assigned to ED3 (Plate 6-33 and Plate 6-34).

In the northernmost section of the Site, which is in the north of Longford Pass East, two types of recolonising habitats were found on and in the vicinity of the proposed internal access track and the proposed amenity carpark. On the access track, there is an area recolonised by vegetation with almost 100% cover. This habitat consists of mixtures of species typically found on peaty ground, agricultural grassland and more neutral grassland, including broad-leaved plantain, yarrow, creeping thistle, fairy flax, tormentil, lesser hawkbit, red clover, sheep's fescue, eyebright, dandelion, ragwort, spear thistle, scented mayweed and meadow thistle. Approx. 50m east of the access track, recolonising habitat on disturbed ground along the existing bog railway rail is present.

In the south of the Site, the artificial gravel road running from the Site entrance along L2111 Derryvella towards T09-T11 within the Site and has been recolonised with 50-60% cover of purple moor-grass, yellow sedge and glaucous sedge.

Given the disturbed habitat nature and low coverage of vegetation, This habitat is assessed as being ***Locally Importance, lower Value***.

Plate 6-33: Recolonising bare ground within the footprint of the internal access track in the northernmost section of the Site.

Plate 6-34: Recolonising bare ground within the footprint of the internal access track in the middle section of the Site.

6.7.3.2.1.17 Dense bracken HD1

Dense bracken patches are located in the margins of woodlands and treelines or cutover bogs within the Study Area. This habitat is typically dominated by bracken with little other flora present.

Given the habitat is species poor and common in the area, it is assessed as being ***Locally important, Lower value***.

6.7.3.2.1.18 Mixed broadleaved/conifer woodland WD2

In the Site, there are woodlands comprising a mixture of broadleaved trees and conifers dominated by Scots pine, downy birch and grey willow. Within the Study Area, two small patches of this habitat type were found in the form of encroaching tree stands on cutaway 390m west of PDA A and 120m east of PDA B. In addition, the edge of the conifer plantation adjacent to the Site was mapped as this habitat type approx. 480m from T01 and T02.

Given that this habitat is species poor and common in the area, it is assessed as being ***Locally important, Lower value***.

6.7.3.2.1.19 Conifer plantation WD4

A sitka spruce (*Picea sitchensis*) plantation is located between T07 and T08. The majority of the plantation is located outside the site, with one small section of 0.7 ha in extent at the southern tip of the plantation being within the site (see Figure 6-7). Approx. 320m north of T04, the linear portion of a conifer plantation adjacent to the Site was mapped as this habitat type. Similarly, approx. 450m east of T01 and T02, the edge of a conifer plantation runs along the site boundary.

There are no areas of conifer plantation within the proposed infrastructure footprint or associated buffers (closest buffer is an access track buffer located 9.3 m from this habitat type) and as such, no felling of conifer plantation is required and no direct effects will occur.

Given the dominance of non-native species and its artificial nature, this habitat type is assessed as ***Locally important, Lower value***.

6.7.3.2.1.20 Treelines WL2

Although treeline is not the major habitat within the Study Area for the Proposed Wind Farm, a few types of treelines were identified as follows.

Adjacent to the Proposed Meteorological Mast, approx. 70m length treeline 4-7m in height, consisting of downy birch and grey willow, was confirmed to be present (Plate 6-35). Approx. 140m length treeline consisting of downy birch from PDA A and B was identified. It separates the Site and the adjoining agricultural fields.

This habitat type is assessed as ***Locally important, Higher value***.

Plate 6-35: Treeline of downy birch and grey willow adjacent to the Proposed Meteorological Mast

6.7.3.2.1.21 Oak-birch-holly woodland WN1

Adjacent to the proposed amenity trailamenity trail in the north of the Proposed PDA B, there is a portion of broadleaved woodland (approx. 1.2ha) dominated by hawthorn, hazel, holly and spindle in the canopy, with bramble and ivy in the ground flora. The woodland is relatively immature to semi-mature with 5 – 8m tree height, and 20cm DBH (diameter at breast hight) on average. Within the woodland, a drainage ditch 1.5m deep with steep banks is present.

Given it's semi-natural character, potential to provide connectivity, cover and food for mammals and birds in the local area, this habitat type is assessed as ***Locally important, Higher value***.

Plate 6-36: Oak-birch-holly woodland north of the Proposed PDA B

6.7.3.2.1.22 Earth banks BL2

Along the proposed internal access track to the south of the site entrance from the public road, Longfordpass East, there is a short and narrow linear ridge of peat with 1.5m height bordering the rail line and cutaway to the east of the rail. As such, it is considered to be originally constructed for the old railway. There is a track on the earth bank, covered by devils-bit scabious, silverweed, tormentil, slender St. John's-wort, fairy flax and purple moor-grass.

Given the disturbed habitat nature, limited biodiversity and the presence of small areas, it is assessed as **Locally importance, lower value**.

Plate 6-37: Earth Bank along the histrical bog operational rail.

6.7.3.2.1.23 Ornamental/non-native shrub WS3

Within the footprint of PDA A, there is an immature and non-native eucalyptus plantation. In ground flora layer, heather, purple moor-grassland, common cottongrass and heath star-moss scatter on bare peat.

Given the dominance of non-native tree species and bare peat, it is assessed ***Local importance, lower value***.

6.7.3.2.1.24 (Mixed) conifer woodland WD3

In *c.*200m west of the internal access track between T05 and T07, small area of conifer plantation with invading broad leaf trees is identified. This habitat is outside of the footprint and ZoI of the Proposed Development.

Given the dominance of non-native , it is assessed **Local importance, lower value**.

6.7.3.2.1.25 Depositing/lowland rivers FW2

A number of EPA-mapped watercourses occur around the margins, and also in some instances flow for short stretches within the proposed wind farm site. These streams and rivers are described here in terms of habitat characteristics, and further details of the aquatic ecosystem at these locations are provided within the aquatic ecology baseline reports (Appendix 6.2). Two of these, the Black (Twomileborris)_010 and the North Glengoole_010 intersect the proposed access track linking the northern and southern turbine clusters. This section of proposed access track follows an existing route formerly occupied by a bog railway and it is proposed to use the existing culverts, avoiding any requirement for new crossing structures or instream works. No other sections of Depositing/lowland rivers are overlapped by proposed infrastructure or associated buffers.

Please see Figure 2.1 (2021 Aquatic Report), Figure 2.1 (2023 Aquatic Report) and Figure 2.1 (2025 Aquatic Report) in Appendix 6.2 for the locations of aquatic survey sites referenced below.

6.7.3.2.1.25.1 Clover_020

The Clover_020 waterbody rises in the north-western periphery of the site. Aquatic ecology survey sites A3 (2021-23) and A4 (2025) are located c. 730 m downstream of the site. The Clover River tributary at this location had been historically straightened and deepened and was semi-dry when surveyed in 2021 and 2023, and dry in 2025. The channel contained only small localised pools of standing, stagnant rainwater, no flows, and featured a base of cobble and mixed gravels bedded in mud. No aquatic vegetation was present and the ephemeral channel likely only conveys water after heavy rainfall events or during floods.

6.7.3.2.1.25.1.1 Clover_010

The Clover_010 waterbody rises within the south-western edge of Littleton Bog within the site. A northern and southern channel rise within the site before flowing north/west out of the site and converging. Aquatic ecology survey site A4 (2021) is located on the northern channel immediately after it exits the site, and survey site A5 (2021) is located on at the sit boundary where the southern channel exits the site. Surveys on these channels in 2023 and 2025 were undertaken downstream, further from the site boundary.

The northern channel has been straightened and deepened historically, with steep V-shaped banks of 3-4m high. The stream was a homogenous 2.5-3m wide and 0.2-0.3m deep, suffered from low summer flows when surveyed, with very high peat staining. The substrata was almost exclusively peat, with localised, heavily bedded small boulder. The channel supported abundant common reed; water mint (*Mentha aquatica*) was occasional on sloping banks.

The southern channel has been historically straightened and deepened, with steep V-shaped banks of 5-8m in height. Whilst flowing through a channel of up to 6-7m wide, the river itself was invariably <1m wide at the time of survey (2021). The profile was of slow-flowing glide averaging 0.2-0.3m deep, with no riffle or pool areas. The substrata comprised almost exclusively deep (peat-derived) silt, often up to 0.3m in depth. Some superficial gravels were present but heavily bedded in silt. Peat-staining was high at the time of survey. There was abundant bulrush (*Typha latifolia*) instream and frequent water mint and common reed along channel margins. Water horsetail was occasional, with bottle sedge (*Carex rostrata*) also present.

6.7.3.2.1.25.1.2 Black (Twomileborris)_010

The Black (Twomileborris)_010 waterbody traverses the site in two areas: it flows under an existing culvert under the decommissioned bog railway route into Lanespark (Aquatic ecology survey site C2), and rises/runs along the site boundary on the south western margin of Littleton Bog (Aquatic ecology survey site C1).

Site C1 was located on the uppermost reaches of the Black River. The site was dry during all surveys, with no pools of standing water and a dry mud base. The channel had been straightened and deepened historically and averaged 1.5-2m wide with bank heights of 1-2m. Evidently, the channel was ephemeral, likely only conveying water during wetter periods. The channel was heavily scrubbed over with high levels of terrestrial encroachment and willow scrub.

At site C2, the river had been straightened and deepened historically, with some recovery evident. The stream flows under a large corrugated pipe culvert under the decommissioned bog railway route. Upstream, flows were low and the channel was heavily scrubbed. Downstream of the culvert, the channel narrowed and flows improved. Shallow glide and riffle predominated with occasional pool, grading to slow-flowing glide downstream. The river averaged 2-2.5m wide and 0.1-0.2m deep, with locally deeper pool to 0.3-0.5m. The substrata near the culvert were dominated by moderately-silted small cobble and medium-coarse gravels with occasional small boulder. However, downstream silt deposits became deep and frequent albeit flocculent (peat-derived with some sand). The river was heavily shaded by willow scrub. Downstream of the culvert, shallow slow-flowing glide and localised riffle was present with occasional pool, grading to slow-flowing glide downstream. The substrata were dominated by humic silt deposits (peat) with scattered heavily-silted small cobble and mixed gravels with occasional small boulder.

6.7.3.2.1.25.1.3 North Glengoole_010

The North Glengoole_010 waterbody flows under an existing culvert under the decommissioned bog railway route into Lanespark (Aquatic ecology survey site C4 (2021, 2025) and C3 (2023)). It also flows along the north-western and part of the western boundaries of Lanespark Bog. Along these sections, aquatic survey sites were located at the existing bridge leading to Lanespark (survey site C3 in 2021) and along the western margin to the east of T11 (survey site C3 in 2025).

At the location flowing under the decommissioned bog railway route, the river had been historically straightened and deepened with trapezoidal banks of up to 4m in height and old embankments evident along the channel. The river was 2-2.5m wide and 0.1-0.4m deep. Shallow glide predominated with only localised riffle and pool. In shallower areas near the culvert, the substrata comprised mixed gravels and small cobble with occasional boulder. However, outside of this area, depositional silt dominated (up to 0.2m deep). Hard substrata were exposed to moderate siltation and partial bedding. Cover of macrophytes was locally high in open areas of the channel with abundant fool's watercress, frequent water mint and brooklime (*Veronica beccabunga*) and localised bulrush (*Typha latifolia*).

At the existing bridge to Lanespark (Site C3 in 2021), the river had been historically straightened and deepened with steep V-shaped banks of 2-3m in height. The river averaged 2m wide and 0.1-0.15m deep, with localised small pools to 0.25m maximum. The profile comprised very shallow glide and riffle with limited pool. The river flowed through a perched twin-bore pipe culvert (0.3m fall). The substrata were dominated by medium to coarse gravels with small cobble and occasional small boulder. However, these were moderately compacted, with moderate to high siltation (peat-derived, plumes underfoot). At the eastern margin of Lanespark Bog (site C3 in 20245), the channel was <1m wide and broadly U-shaped with 2-3m high banks. The channel was dry when surveyed, with a mud base covered with leaf litter. The instream vegetation comprised occasional common reed and wild angelica (*Angelica sylvestris*).

6.7.3.2.1.25.1.4 Breagagh (Tipperary)_010

The Breagagh (Tipperary)_010 waterbody flows along the southern boundary of the site (southern boundary of Lanespark Bog). Aquatic ecology survey site D1 is located in this area.

Survey site D1 was located at a local road crossing, where the river flowed through a stacked three-bore box culvert. The channel had been straightened and deepened historically, resulting in a homogenous channel with poor hydromorphology and little instream recovery. Boulder revetments were present in the vicinity of the culvert. The river was 2.5-3m wide and 0.3-0.8m deep in deep, slow-flowing glide. Pool was occasional. Riffles were limited to the vicinity of the culvert. The substrata were dominated by compacted cobble with occasional boulder and limited interstitial mixed gravels. The site suffered from heavy siltation, although deposits were flocculent, with only very localised, shallow accumulations. Woody debris was frequent instream, which

improved habitat heterogeneity. The river flowed through a maturing broad-leaved plantation, and shading was high.

6.7.3.2.1.25.2 Drish_010

Two short tributaries of the Drish River (EPA name; also known as the Black River) (Drish_010 waterbody) rise along the north-eastern boundary of the site (north-eastern boundary of Littleton Bog). Aquatic ecology survey site B1 (2021) is located near the confluence where these two tributaries join immediately east of the site. Survey site B1 (2023, 2025) is located on the main channel of the Drish, upstream of the confluence with the tributaries draining the site. Survey site B2 (2025) is located on one of the tributaries along the site boundary.

Survey site B1 (2021) was located on a channel which had been heavily modified (straightened and deepened) and flows were intermittent at the time of survey, with frequent peat dams instream obstructing flow. The homogenous channel averaged 2m wide and <0.1m deep, with very deep silt (peat) deposits on the bed of up to 0.75m deep. Stagnant standing water was present locally, with several dry sections (between peat dams). The channel was heavily vegetated by terrestrial species and willow. However, more open areas supported abundant common duckweed and water mint. Reed canary grass (*Phalaris arundinacea*) was also frequent along the riparian zone.

Survey site B1 (2023, 2025) was located on a channel which had been extensively straightened and deepened throughout, resulting in a homogenous trapezoidal channel with very poor hydromorphology and low summer flows. The channelised river was 3-4m wide and 0.5-0.8m deep, with locally deeper glide to >1m. The profile was of stagnant glide and pool at the time of survey. The substrata were dominated by sand and heavily silted mixed gravels. Cobble and small boulder were scattered. The site was very heavily vegetated with near total cover of macrophytes. Fool's watercress and branched bur-reed was abundant with frequent common duckweed, ivy-leaved duckweed and lesser water parsnip (*Berula erecta*). Spiked water milfoil (*Myriophyllum spicatum*), blue water speedwell and water mint were occasional. River water dropwort (*Oenanthe fluviatilis*) Semi-floating mats of reed canary grass were abundant along the channel margins and sloping banks. The banks had been cleared historically and supported scattered trees.

Survey site B2 (2025) was located on the uppermost reaches of an unnamed Drish River tributary west of the proposed biodiversity enhancement area. This heavily modified stream was dry at the time of survey, with a mud base covered in leaf litter. The channel was broadly U-shaped and was 1.5-2m wide with bank heights of 1-2m. The channel was heavily scrubbed over with grey willow, bramble and gorse.

6.7.3.2.2 Proposed Grid Connection

6.7.3.2.2.1 Buildings and artificial surfaces BL3

After leaving the proposed farm site, the grid connection follows existing local and regional roads. These existing roads represent highly artificial surfaces which are of no value to wildlife.

6.7.3.2.2.2 Improved agricultural grassland GA1

Improved agricultural grassland is the dominant habitat in the areas surrounding the proposed grid connection. It is typically dominated by perennial rye-grass. Other species including Yorkshire fog and white clover (*Trifolium repens*) were also present. This highly artificial and intensively managed habitat is species-poor and is assessed as ***locally important, lower value*.**

This habitat type is not within the proposed footprint where the grid connection traverses public roads. The proposed grid connection traverses a section of GA1 where it emerges from the HDD exit pit on the east side of the River Barrow.

6.7.3.2.2.3 Dry meadows and grassy verges GS2

This habitat is present along road verges bordering roads traversed by the proposed grid connection. Species present include cocksfoot, Yorkshire fog, ribwort plantain, greater stitchwort (*Stellaria holostea*), common knapweed, common nettle, common cleavers (*Galium aparine*), hogweed, creeping buttercup, dandelion and hedge bindweed.

Due to its semi-natural character this habitat is ***locally important, higher value.***

This habitat type occurring along the proposed grid connection..

6.7.3.2.2.4 Arable crops BC1

Arable fields occur occasionally in the lands bordering the proposed grid connection. Monoculture crops including wheat, maize, oats and barley were noted in these fields during surveys.

Intrinsically, this highly artificial and intensively managed habitat is assessed as ***locally important, lower value.*** It is noted however that arable crops provide food sources for birds and mammals.

This habitat type is not within the proposed grid connection footprint.

6.7.3.2.2.5 (Mixed) broadleaved woodland WD2

Semi-natural woodland is present bordering the proposed grid connection along the R693 west of Freshford. Ash is frequent, and mature oaks (*Quercus* Sp.) are also present. Elder, ivy, sycamore, hawthorn, grey willow, bramble and nettle are also present.

This habitat is ***locally important, higher value.***

This habitat type is not within the proposed grid connection footprint. It is potentially subject to indirect effects from dust deposition.

6.7.3.2.2.6 Immature woodland WS2

An immature ash plantation bordering the proposed grid connection along the R693 west of Freshford is representative of this habitat type.

This habitat is ***locally important, higher value.***

It is not within the proposed grid connection footprint, but is potentially subject to indirect effects from dust deposition

6.7.3.2.2.7 Hedgerows WL1

The hedgerows bordering the grid connection vary in character and quality, ranging from mature hawthorn hedges, through excessively cropped agricultural hedges to domestic property boundaries delineated by non-native species such as cherry laurel. In addition to hawthorn, hedgerows along the GC also contained ash, ivy, sycamore, beech, bramble and dog-rose.

In addition to cherry laurel, beech and sycamore, other non-native species occurring along road margins and areas bounding the GC included snowberry, red osier dogwood, wall cotoneaster, traveller's joy and winter heliotrope.

This habitat is ***Local Importance, Higher value*.**

No hedgerows bounding the grid connection along public roads are within the proposed footprint; however, limited vegetation trimming may be required for safe machinery access. Hedgerows are potentially subject to indirect effects from dust deposition.

6.7.3.2.2.8 Treelines WL2

Ash is the most frequent species in treelines along the route where it follows the road network, however a suite of other species including beech and sycamore are also present. Treelines also occur in mosaic with hedgerows.

Treelines also occur along the Barrow in the area of the proposed HDD crossing. These riparian areas supported intermittent and narrow treelines of mature crack willow (*Salix fragilis*), grey willow, ash and alder with abundant bramble and reed canary grass.

This habitat is ***Local Importance, Higher value.***

No treelines bounding the grid connection along public roads are within the proposed footprint. The riparian treelines at the proposed barrow crossing are unlikely to be affected by HDD or other grid connection works in this area.

6.7.3.2.2.9 Depositing/lowland rivers FW2

The rivers crossed by the proposed grid connection vary in size, character, and condition and are described within the aquatic baseline report in Appendix 6.2 (sites G2 – G11). These range from small streams encompassing a variety of depths, morphologies and conditions, up to the main channel of the Barrow which reaches 1.5m in depth and 12-15m width.

The Proposed GC will cross The Drish River (16D02) at Bridge 100m u/s Longfordpass Bridge along Longfordpass East road. At this crossing point, it is identified by Triturus (2025) that the aquatic habitat at the crossing point potentially corresponds with Annex I habitat type Hydrophilous tall herb habitat (6430), given the species composition including positive indicators of 6430 (see), however, in a lowland context due to the lack of highland or rocky habitat species. Aquatic environment at this crossing point was reported to be poor flows and riffle function, which indicates that it would be difficult for the water quality to be turned over once it changes.

Biological water quality, based on Q-sampling, was calculated as Q3 (poor status) for all rivers crossed by the proposed grid connection which were suitable for Q sampling. The majority of these rivers were classified as ***Local Importance, Lower value*** (G2, G4, G5, G7, G8, G9), while G10 was classified as ***Local Importance, Higher value.*** Site G11 on the Barrow was classified as being of ***International importance*** due to its location within the River Barrow and River Nore SAC.

It is noted that no channel is present at Site G6, in contrast with EPA mapping. None of the rivers crossed by the proposed grid connection will be subject to direct effects; however, there is potential for indirect effects arising from surface runoff from roads along the GC draining to these rivers, dust deposition and HDD operations at the Barrow crossing.

6.7.3.2.2.10 Drainage ditches FW4

Drainage ditches are present bordering some sections of the road work in which the Proposed GC is located. Given that this habitat along the Proposed GC has been disturbed and modified and the aquatic habitat is ephemeral nature, the drainage ditches along the GC are assessed as ***Local Importance, Lower value.***

It is noted however they may be subject to indirect effects from surface runoff, and are an important factor in the assessment of potential indirect effects on rivers receiving from the GC due to interconnectedness of the wider hydrological network.

6.7.3.2.3 Proposed Turbine Delivery Route

The TDR from Foynes Port to the M7 Junction 17 is located within the existing road corridor and does not require any significant accommodation works. The accommodation works at TDR Nodes 1-3 are detailed below in Table 6-14.

Table 6-14: Habitats at TDR Nodes

Node	Location	Habitat Notes	Notes/Potential for Ecological Impacts
1	M8 Junction 4 East Roundabout	**Dry meadows & grassy verges GS2** on roundabout and road verges. Tightly mowed on roundabout & verges, unmanaged further back from road edges. Dandelion, false oat-grass, red clover, daisy, pointed spear moss, common ragwort, slender St. John's wort, Festuca sp., Yorkshire fog, common sedge, spear thistle, trailing tormentil, cocksfoot, knapweed, silverweed, meadowsweet (rare) ribwort plantain, creeping thistle. **Local Importance (Higher Value).** **Scrub WS1** surrounding roundabout - roadside landscape planting. Hawthorn, guelder rose, grey willow, birch Betula Sp., blackthorn, European gorse, ash, elder. **Local Importance (Higher Value).**	Areas of GS2 will be affected by placement of load bearing surfaces. WS1 will be affected by vegetation trimming.

Node	Location	Habitat Notes	Notes/Potential for Ecological Impacts
2	R693 / R639 Roundabout	**Dry meadows and grassy verges GS2** on road verges & roundabout, Similar to above. **Local Importance (Higher Value).** **Hedgerows WL1** along road verges. Includes both longer-established hawthorn hedges and more recent road landscaping planting, including represented by immature Scots pine, birch, ash and hazel. **Local Importance (Higher Value).**	Areas of GS2 will be affected by placement of load bearing surfaces. WL1 will be affected by tree felling and vegetation trimming.
3	R639 Longford Pass & Proposed Site Entrance	**Dry meadows and grassy verges GS2**; Gry calcareous/neutral grassland GS1; **Local Importance (Higher Value).** Recolonising bare ground ED3 **Local Importance (Lower Value).**	Oversail only – habitats not affected.

6.7.4 Flora in the Existing Environment

6.7.4.1 Rare and Protected Flora

6.7.4.1.1 Proposed Wind Farm

6.7.4.1.1.1 Desktop Study

The Site for the Proposed Wind Farm overlaps Ordnance Survey National Grid 10 km square S25. This 10 km grid square was searched for records of rare and protected vascular plant, bryophyte, lichen and charophyte species within the latest 20 years through the National Biodiversity Data Centre (NBDC) website (most recent search on 12th December 2025). In addition, the NPWS FPO map viewer for Vascular Plants, Charophytes and Lichens and the NPWS FPO Bryophyte Sites map viewer were also consulted website (most recent search on 12th December 2025). Furthermore, data on rare/protected species recorded in 10 km grid overlapping the Site was obtained from NPWS (received November 2025); this encompassed grid square S25.

This list was then compared to the lists of species protected under the Flora (Protection) Order of 2022, the Ireland Red List (IRL) No. 10: Vascular Plants (Wyse *et al.*, 2016) and the Ireland Red List No. 8: Bryophytes (Lockhart *et al.*, 2012).

Within the 10km grid square which overlap the Site (S25), four notable species have been recorded, namely, *Sphagnum auriculatum, S. cuspidatum, S. papillosum* and *S. tenellum*, in 2005. While these four *Sphagnum* mosses are categorised as least concern (LC), they are listed on Annex V of the Habitats Directive (species whose taking in the wild and exploitation may be subject to management measures). There is no record for FPO vascular plants, bryophytes and lichens within the 10km grid square within the previous 20 years. As threatened species, there is a record of least bur-reed (*Sparganium natans*), which is categorised as NT (Near Threatened) in the IRL (2016), in 2000-2019 within S26J, which is 2km grid square in the vicinity of the Site, as per BSBI Plant Atlas 2020

There are no FPO Bryophyte Sites at the proposed Site (closest is Johnstown in Co. Kilkenny, c. 6 km north). The species of interest at this site (located in cutover bog) is the liverwort *Pallavicinia lyellii*.

6.7.4.1.1.2 Field Survey

A single stand (0.16m^2) of least bur-reed was found in the south margin of the cutover lake (L16) within the Study Area of T07 (outside Proposed Development footprint).

Given the small scale of the presence, it is assessed as ***Locally important, higher value***

A small stand (several shoots) of Japanese knotweed is present near the existing northern site entrance (ITM 623110 659330). Although the stand is located in the vicinity of the proposed bell-mouth site entrance from the Longfordpass East local road, the location is outside of any footprints and buffers of the Proposed Development.

Sycamore is present in a hedgerow within the Proposed Construction Borrow Pit footprint.

Table 6-17Table 6-15 presents details of the rare and protected plant species records within 10 km squares S25 and field survey results for the Proposed Wind Farm.

Table 6-15: Rare and Protected Flora Species within the Proposed Wind Farm

Species	Desktop Study		Field Survey Within the Study Area?	Designation
	Record Year	Grid		
Least bur-reed (*Sparganium natans*)	2000-2019	S26J (BSBI Plant Atlas)	Yes Shoreline of L16 in 470m southwest of T07 0.16m^2 Stand	Threatened Species: Near Threatened

6.7.4.1.2 Proposed Grid Connection

6.7.4.1.2.1 Desktop Study

1km grid squares overlapping with the Proposed Grid Connection were also searched using the same method as for the Proposed Wind Farm. In addition, data on rare/protected species recorded in 10 km grid overlapping the Site was obtained from NPWS (received November 2025); this encompassed grid square S26, S36, S46, S47 and some 1km grid squares within them.

Within the 33 1km grid squares overlapping with the Proposed Grid Connection, one rare bryophyte species has been recorded, namely, *Grimmia orbicularis* within S4064 (Freshford) in 2010. There is no record for FPO vascular plants, charophytes and lichens and FPO Bryophyte Sites within the 10km grid square within the latest 20 years.

6.7.4.1.2.2 Field Survey

During the walkover along the Proposed Grid Connection in September 2025, no rare or protected flora species were recorded. The bridge along the GC on the western outskirts of Freshford was noted to provide suitable habitat for *Grimmia orbicularis*, but this species was not observed at the bridge. Due to the proposed use of HDD at this bridge, no potential for effects on this species.

6.7.4.1.3 Proposed Turbine Delivery Route

1km grid squares overlapping with/adjacent to the Turbine Delivery Route nodes, namely, S2764, S2259 and S2864 were also searched by the same method as the Proposed Wind Farm. In addition, data on rare/protected species recorded in the 10 km grid square overlapping the Site was obtained from NPWS (received November 2025); this encompassed grid squares S25 and S26 including S2764, S2259 and S2864.

Within 1km grid squares overlapping with the Proposed Turbine Delivery Route nodes, no rare or protected flora have been recorded in the last 20 years. There are no records for FPO vascular plants, charophytes and lichens and FPO Bryophyte Sites within the 10km grid squares within the latest 20 years.

As per the BSBI Plant Atlas 2020, opposite-leaved pondweed (*Groenlandia densa*), which is a protected species listed on the Irish Flora (Protection) Order 2022 is noted as being present in Urlingford in a pre-1930 record (tetrad S26W). This record is included on a precautionary basis since aquatic plants are generally under-recorded. Tetrad S26W overlaps three rivers, one of which is crossed by the GC and two of which are downstream. No works are proposed for bridges along the TDR.

6.7.4.1.4 Field Survey

During the walkover survey along the Proposed TDR in September 2025, no rare or protected flora species were recorded.

Table 6-16: Rare and Protected Flora Species along the Proposed Grid Connection and Turbine Delivery Route

Species	Desktop Study		Field Survey Along GC or TDR?	Designation
	Record Year	Grid		
Round-fruited Grimmia (*Grimmia orbicularis*)	2010	S4064	No	Threatened Species: Vulnerable
Opposite-leaved Pondweed (*Groenlandia densa*)	Pre-1930	S26W	No	Irish Flora (Protection) Order (revised 2022) Threatened Species: Near Threatened

6.7.4.2 Invasive and non-native species

Unless specified otherwise, the term "invasive species" in this EIAR refers to Third schedule species to the European Communities (Bird and Natural Habitat) Regulations 2011 (as amended). The Regulations make it an offence to plant, disperse, allow or cause to disperse, spread, or otherwise cause to grow any of the scheduled species. The presence of other non-native species which are assessed as "High/Medium Risk Invasive Species" by NBDC is also noted.

6.7.4.2.1 Proposed Wind Farm

6.7.4.2.1.1 Desktop Study

As well as rare and protected flora, the 10 km grid square S25 overlapping with the Proposed Wind Farm was searched for records of invasive and non-native vascular plant, bryophyte, lichen and charophyte species within the last 20 years through the National Biodiversity Data Centre (NBDC) website (most recent search on 12th December 2025). In addition, data on rare/protected species recorded in 10 km grid overlapping the Site was obtained from NPWS (received November 2025); this encompassed grid square S25.

Two stands of Japanese knotweed (*Reynoutria japonica*) listed in the Third Schedule has been recorded within 10km grid square S25, at 52°37'55.87" N, 7°41'33.8" W, respectively. It should be noted that the latter one is outside of the Study Area.

One other non-native species, sycamore (*Acer pseudoplatanus*), which is categorised as Medium Risk Invasive Species by NBDC is also present in historical records for S25.

6.7.4.2.1.2 Field Survey

A small stand (several shoots) of Japanese knotweed is present near the existing northern site entrance (ITM 623110 659330). Although the stand is located in the vicinity of the proposed bell-mouth site entrance from the Longfordpass East local road, the location is outside of any footprints and buffers of the Proposed Development.

Sycamore is present in a hedgerow within the Proposed Construction Borrow Pit footprint.

Table 6-17: Invasive/Non-native Flora within the Proposed Wind Farm

Species	Desktop Study		Field Survey Within the Study Area?	Designation
	Record Year	Grid		
Japanese knotweed (*Reynoutria japonica*)	2022	S200515	**No** Absence from the footprint/buffer of infrastructure.	**Third Schedule** High Risk Invasive Species
	2019	52°37'55.87" N, 7°41'33.8" W	**N/A** Outside of the footprint, buffer, Study Area of any infrastructure.	

Species	Desktop Study		Field Survey Within the Study Area?	Designation
	Record Year	Grid		
Sycamore (*Acer pseudoplatanus*)	2007	S25	**Yes** Hedgerow within the Proposed Construction Borrow Pit.	Medium Risk Invasive Species

6.7.4.2.2 Proposed Grid Connection

6.7.4.2.2.1 Desktop Study

1km grid squares overlapping the Site for the Proposed Grid Connection were also searched for invasive flora by the same method as the Proposed Wind Farm. In addition, data on rare/protected species recorded in 10 km grid overlapping the Site was obtained from NPWS (received November 2025); this encompassed grid square S26, S36, S46, S47 and some 1km grid squares within them.

One species listed in the Third Schedule, namely, giant hogweed (*Heracleum mantegazzianum*), has been historically record the vicinity of the grid connection, specifically at Clomantagh Lower within 100m grid square S353633, located c. 450m south of the proposed grid connection. The area in which this plant was recorded in down-gradient of the GC and there is no downstream hydrological connectivity between this area and the GC. The observer noted plants growing along a channel from a groundwater spring to the Nuenna_010 waterbody.

Sycamore (*Acer pseudoplatanus*), which is categorised as Medium Risk Invasive Species by NBDC is also present in historical records along the GC.

6.7.4.2.2.2 Field Survey

Cherry laurel, which is classified as a High Risk Invasive Species by NBDC, was recorded in a total of 4 locations along R432, R693, Longfordpass East and Link Road for the Proposed Grid Route. It should be noted that all identified stands are hedgerows of private dwellings.

Traveller's-joy (*Clematis vitalba*), which is classified as s Medium Risk Invasive Species by NBDC, was observed on a gate post set back from the R694.

Wall cotoneaster (*Cotoneaster horizontalis*), also classified as a Medium Risk Invasive Species by NBDC, was observed on a wall on the northern outskirts of Freshford (set back from GC).

Other non-native species occurring along road margins and areas bounding the GC included snowberry, red osier dogwood and winter heliotrope.

6.7.4.2.3 Proposed Turbine Delivery Route

6.7.4.2.3.1 Desktop Study

1km grid squares overlapping with/adjacent to the Turbine Delivery Route Nodes, namely, S2764, S2864 and S2360 were also searched by the same method as the Proposed Wind Farm site.

No records from the last 20 years for Third Schedule species or non-native species with Invasive Risk were found within S2764, S2864 and S2360.

6.7.4.2.3.2 Field Study

No invasive species listed on the Third Schedule or non-native species with Invasive Risk were found at TDR nodes during site walkovers.

Table 6-18: Invasive/Non-native Flora along the Proposed Grid Connection and Turbine Delivery Route

Species	Desktop Study		Field Survey Along GC or TDR?	Designation
	Record Year	Grid		
Giant hogweed (*Heracleum mantegazzianum*)	2022	S3563	No	**Third Schedule** High Risk Invasive Species
Sycamore (*Acer pseudoplatanus*)	2007	S3663 S4470	**Yes. Along the GC.** Dispersed throughout hedgerows.	Medium Risk Invasive Species
Cherry laurel (*Prunus laurocerasus*)	-	-	**Yes. Along the GC.** 4 locations along private dwellings' hedgerows along R432, R693, Longfordpass East and Link Road.	High Risk Invasive Species
Traveller's-joy (*Clematis vitalba*)	-	-	**Yes. Along the GC.** A single stand on a gate post of farmland along R694.	Medium Risk Invasive Species
Wall cotoneaster (*Cotoneaster horizontalis*)	2000-2019	S46C	**Yes. Along the GC.** A single stand near a gate of farmland along R694.	Medium Risk Invasive Species

6.7.5 Fauna in the Existing Environment

6.7.5.1 Non-Volant Mammals

6.7.5.1.1 Proposed Wind Farm

6.7.5.1.1.1 Desktop Study

The mammal species listed in Table 6-19 below have been recorded within the last 20 years within the 10km grid square (S25) in which the Proposed wind farm is located. Six protected mammal species have been recorded: namely Eurasian badger (*Meles meles*), west European hedgehog (*Erinaceus europaeus*), pine marten (*Martes martes*), otter (*Lutra lutra*), red squirrel (*Sciurus vulgaris*) and protected under the Wildlife (Amendment) Act, 2000 and/or the Habitat Direction, and fallow deer (*Dama dama*). In addition, six invasive mammal species regulated and/or assigned to Medium Risk Invasive Species in NBDC 2013 report has been recorded: European rabbit (*Oryctolagus cuniculus*), bank vole (*Myodes glareolus*), greater white-toothed shrew (*Crocidura russula*), fallow deer (*Dama dama*), American mink (*Neovison vison*) and grey squirrel (*Sciurus carolinensis*).

Furthermore, the survey data provided from the BnM survey data shows that pine marten, otter, Irish hare and stoat were found within the Site.

Table 6-19: Historical Mammal Records within 10km of the Proposed Wind Farm

Species	Year of Last Record	Grid/Location	Survey/Dataset	Designation
Eurasian badger (*Meles meles*)	2011 2022	S25 Within the Site	Badger Setts of Ireland Database,Road Kill Survey Bord na Móna Survey Data	Protected Species: Wildlife Acts
West European hedgehog (*Erinaceus europaeus*)	2009	S25	Atlas of Mammals in Ireland 2010-2015 Road Kill Survey	Protected Species: Wildlife Acts
Pine marten (*Martes martes)*	2021 2021 2022	S25 375m from T08 40m from T02	Mammals of Ireland 2016-2025 Bord na Móna Survey Data Bord na Móna Survey Data	Protected Species: Annex V, Wildlife Acts
Otter (*Lutra lutra*)	2013 2021	S25 40m from T02	Otter (Lutra lutra) records 2011-2015 Bord na Móna Survey Data	Protected Species: Annex II, Annex IV, Wildlife Acts
Red squirrel (*Sciurus vulgaris*)	2011	S25	Atlas of Mammals in Ireland 2010-2015	Protected Species: Wildlife Acts
Irish hare (*Lepus timidus hibernicus*)	2023	40m from the site entrance from Longfordpass East 300m from the internal access	Bord na Móna Survey Data	Protected Species: Wildlife Acts

Species	Year of Last Record	Grid/Location	Survey/Dataset	Designation
Stoat (*Mustela erminea* subsp. *erminea*)	2023	40m from the site entrance from Longfordpass East	Bord na Móna Survey Data	Protected Species: Wildlife Acts
European rabbit (*Oryctolagus cuniculus*)	2015	S25	Atlas of Mammals in Ireland 2010-2015	Invasive Species: Medium Risk Invasive Species (2013 Report)
Bank Vole (*Myodes glareolus*)	2013	S25	Atlas of Mammals in Ireland 2010-2015	Invasive Species: Medium Risk Invasive Species (2013 Report)
Greater White-toothed Shrew (*Crocidura russula)*	2013	S25	Atlas of Mammals in Ireland 2010-2015	Invasive Species: Medium Risk Invasive Species (2013 Report)
Fallow Deer (*Dama dama*)	2008	S25	Deer of Ireland Database	Invasive Species: Regulation S.I. 477/2011 (Ireland) High Risk Invasive Species (2013 Report) Protected Species: Wildlife Acts
American Mink (*Neovison vison*)	2010	S25	National Invasive Species Database	Invasive Species: Regulation S.I. 477/2011 (Ireland) High Risk Invasive Species (2013 Report)
Grey Squirrel (*Sciurus carolinensis*)	2011	S25	Atlas of Mammals in Ireland 2010-2015	Invasive Species: EU Invasive Alien Species Regulation No. 1143/2014 Species: Regulation S.I. 477/2011 (Ireland) High Risk Invasive Species (2013 Report)

6.7.5.1.1.2 Field Survey

Figure 6-8 in Volume VI shows the distribution of mammal field signs recorded during surveys.

6.7.5.1.1.2.1 Badger

As a result of the site walkovers between 2023 and 2025 by Fehily Timoney, a total of 4 badger setts were recorded within the Site. In addition, abundant signs of badger presence were recorded across the Site, including snuffle holes, latrines and prints. Table 6-20 shows the details of entrance numbers, activity, type and distance to the closest elements of the Proposed Development.

A historical disused subsidiary sett record (BnM, 2024) near the Littleton Labyrinth Carpark (Trail Point B) is also noted. No evidence of a sett was observed here in 2025 surveys, and it is noted that this area is now open to the public, with a recently constructed amenity trail located c. 50m from the previously identified sett location. Therefore, the existing baseline includes infrastructure and human presence in this area, and as such, the proposed access track following the existing amenity trail in this area would not give rise to a material increase in disturbance over the existing baseline.

Sett No. 1 is an inactive annex sett located in c. 144m from the biodiversity enhancement site (eucalyptus removal). Sett No. 2 is an inactive potential outlier sett located in c. 244m from the biodiversity enhancement site (tree planting).

Sett No. 4 is an active annex sett located in c. 56m from one of the Proposed PDA B and c. 50m from the internal access track. In addition, Sett No. 3 is an active main sett in c. 192m from the internal access track for the internal access track to the Construction Borrow Pit and c. 240m from one of the Proposed Peat Repository Area. Given that a family group resides in the locality, badger is assessed as being of ***County Importance.***

It should be noted that all of these setts are located outside of the footprint and associated felling buffers of the Proposed Development.

Table 6-20: Badger setts including relative distances to infrastructure

Sett No.	No. of entrances	Activity	Type	Closest Proposed Development (distance to a sett)	Notes
1	3	Inactive	Annex	Biodiversity enhancement (non-native *Eucalyptus* removal) (144m)	N/A
2	1	Inactive	Potential Outlier	Biodiversity enhancement (tree planting) (244m)	N/A
3	5	Active	Main	Internal access track to the Construction Borrow Pit (192m) Peat Deposition Area (240m)	N/A
4	3	Active	Annex	Amenity trail (50m) Peat Deposition Area B (56m)	N/A

6.7.5.1.1.2.2 Otter

No otter resting or breeding sites were recorded within the Proposed Development Site during dedicated otter surveys, which extended 200m upstream and downstream of watercourse crossings and where any drain or watercourse occurred within 150m of proposed infrastructure.

Otter sign surveys were conducted at aquatic ecology survey locations by Triturus (2025). No otter resting or breeding sites were recorded during the aquatic surveys along rivers or at the lakes/wetlands within the Study Area of the Proposed Wind Farm, and it was concluded that all surveyed sites were poor otter habitat, primarily due to insufficient prey resources. Otter spraints were found at survey site D3 on the Breegagh River (c. 700m south of T11), which flows along the southern boundary of the Site.

In addition, a live sighting of an adult otter observed from the internal access track between the proposed substation and T02 (otter was at a cutaway lake margin c. 270m west of the existing rail line) was recorded by a bird surveyor in October 2021. The same surveyor noted a historical record of otter at a small cutaway lake at Bawnreagh (c. 370 m southeast of T02), observed during 2020 (prior to surveys for the proposed development).

The majority of the drainage ditches within the Proposed Development site are small, located within cutaway bog and lack habitat connectivity with semi-natural habitats without fishery values. Given their small size, limited habitat connectivity with high fisheries value, the drainage ditches are not suitable for breeding or resting otter, although it is possible that otter could occasionally utilise some larger drains within the Site for commuting.

The presence of frogs at the site is likely to be exploited occasionally by otter as a food source, particularly during the frog breeding season when large concentrations of this amphibian can occur at breeding ponds.

Although there were no otter resting or breeding sites and low fisheries value of waterbodies within the Site, given the sightings, it is presumed that the commuting otters at the Site are of ***Local Importance, higher value***.

6.7.5.1.1.2.3 Irish Hare

The BnM survey data shows sighting records for a total of 6 Irish hares within the Site. In addition, A hare dropping was observed by FT within the cutover bog located in c. 280m west of T11 location within the Site in 2025. No breeding or resting places for this species were observed during the site walkovers.

Given the survey results above, it is presumed that the foraging and commuting Irish hares at the Site are of ***Local Importance, higher value***.

Plate 6-38: Hare dropping

6.7.5.1.1.2.4 Pine Marten

A pine marten (*Martes martes*), which is protected under the Wildlife (Amendment) Act, 2000 and EU Habitats Directive (Annex V species), was observed in c. 50m from the internal access track in the northernmost section of the Site in 2023. In addition, pine marten scat was found along the internal access track in the vicinity of T02. This species is also noted as being present within Hecated S25 in BnM historical records. No breeding or resting places for this species were observed during the site walkovers.

Given the survey results above, it is presumed that the foraging and commuting pine martens at the Site are of ***Local Importance, higher value***.

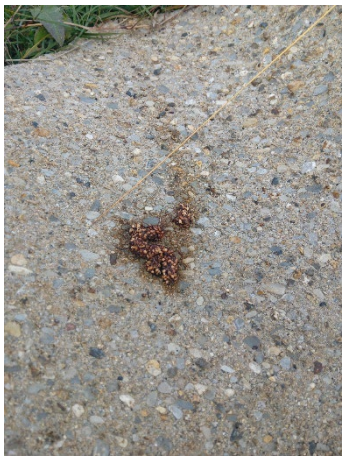


Plate 6-39: Pine marten scat

6.7.5.1.1.2.5 Red Squirrel

There is no survey data recorded during the field surveys within the Site conducted by FT.

Notwithstanding the above, given the desktop study, there is a potential of the presence of this species at the local scale. Therefore, it is presumed that the foraging and commuting red squirrel at the Site are of ***Local Importance, higher value***.

6.7.5.1.1.2.6 Stoat

Although no records for stoat were identified during the walkovers conducted by FT, the survey data provided by BnM shows that this species was present within the Site.

Given the survey results above, it is presumed that the foraging and commuting stoats at the Site are of ***Local Importance, higher value***.

6.7.5.1.1.2.7 Invasive/non-native Mammals

An individual of European rabbit, which is not legally regulated but classified as a Medium Risk Invasive Species by NBDC, was observed in the southernmost section of the Site. Deer tracks were observed c. 500m west of T02 and T04, and sika (*Cervus nippon*) rutting calls were subsequently heard to the east of the site. Sika is an invasive species listed on the Invasive Species: EU Invasive Alien Species Regulation, 2024 and classified as High Risk Invasive Species by the NBDC, although it is also a protected species under the Wildlife (Amendment) Act, 2000.

6.7.5.1.1.2.8 Other Mammals

Signs of fox including scat and a potential den were observed on the eastern boundary of the Site (outside proposed development footprint).

6.7.5.1.2 Given the survey results above, it is presumed that the foraging, commuting and potentially breeding foxes at the Site are of ***Local Importance, lower value***.Proposed Grid Connection

6.7.5.1.2.1 Desktop Study

The mammal species listed in Table 6-21 below have been recorded during the last 20 years within the 1km grid squares in which the Proposed Grid Connection is located. Five protected mammal species have been recorded: namely Eurasian badger, west European hedgehog, otter, pygmy shrew (*Sorex minutus*) and red squirrel (*Sciurus vulgaris*) protected under the Wildlife (Amendment) Act, 2000. Otter is also protected under Annex IV of the EU Habitats Directive.

Of note, NBDC records show there is a possible holt on the river Nore, located c. 850m downstream of the proposed HDD crossing on the river Nore, and located c. 20m from the Proposed GC on the N77 (within 1km grid, S4471). NBDC records here note a bridge with dry arch at this location with “exposed stones and mud” within the river. Otter records here include multiple footprints under the dry arch and on the sand bar plus fresh spraints on rocks and logs, and active otter slides. The records note a “possible holt at the foot bridge on west bank”.

There is a record of one invasive mammal species, American mink (*Neovison vison*) regulated under the EU Invasive Alien Species Regulation within 1km grid square S3163. In addition, other four mammal species not regulated but assigned to High/Medium Risk Invasive Species by NBDC, have been recorded within the 1km grid squares listed in Table 6-21: bank vole (*Myodes glareolus*), brown rat (*Rattus norvegicus*), greater white-toothed shrew (*Crocidura russula*) and rabbit.

Table 6-21: Historical Mammal Records within 1km grid squares overlapping with the Proposed Grid Connection

Species	Year of Last Record	Grid	Survey/Dataset	Protection
Protected Species				
Eurasian badger (*Meles meles*)	2006-2012 2010	S3563 S4267 S4469 S4472	Badger Setts of Ireland Database Atlas of Mammals in Ireland 2010-2015	Protected Species: Wildlife Acts
West European hedgehog (*Erinaceus europaeus*)	2022	S3965 S4065 S4066 S4267 S4369 S4470 S4471	Hedgehogs of Ireland	Protected Species: Wildlife Acts
Otter (*Lutra lutra*)	2015	S3563 S4471	Atlas of Mammals in Ireland 2010-2015	Protected Species: Annex IV Protected Species: Wildlife Acts
Pygmy shrew (*Sorex minutus*)	2012	S4372	Atlas of Mammals in Ireland 2010-2015	Protected Species: Wildlife Acts
Red squirrel (*Sciurus vulgaris*)	2022	S4064	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts
Invasive Species				
American mink (*Neovison vison*)	2010	S3163	Atlas of Mammals in Ireland 2010-2015	Invasive Species: EU Invasive Alien Species Regulation Invasive Species: High Risk Invasive Species
Bank vole (*Myodes glareolus*)	2012	S4372	Atlas of Mammals in Ireland 2010-2015	Invasive Species: Medium Risk Invasive Species
Brown rat (*Rattus norvegicus*)	2013	S3363	Atlas of Mammals in Ireland 2010-2015	Invasive Species: High Risk Invasive Species
Greater white-toothed shrew (*Crocidura russula*)	2012	S4372	Atlas of Mammals in Ireland 2010-2015	Invasive Species: Medium Risk Invasive Species

Species	Year of Last Record	Grid	Survey/Dataset	Protection
Rabbit (*Oryctolagus cuniculus*)	2010	S3163	Atlas of Mammals in Ireland 2010-2015	Invasive Species: Medium Risk Invasive Species

6.7.5.1.2.2 Field Survey

A otter spraint site was regularly recorded under Grange Bridge on the Lisdowney Stream. In addition, in the riverine of Lismaine Stream (15L16) and River Nore along the GC, suitable habitats for otter foraging were confirmed.

No resting or breeding places were present within 150m of any proposed grid connection river crossing.

Although there were no otter resting or breeding sites, foraging and commuting otters are present and as such assessed as ***Local Importance, higher value***, with Otter in the Nore catchment assessed as **County Importance**

6.7.5.1.3 Proposed Turbine Delivery Route

6.7.5.1.3.1 Desktop Study

The mammal species listed in Table 6-22 below have been recorded within the last 20 years within 1km grid squares S2764, S2864 and S2360 in which the Proposed Turbine Delivery nodes are located. A total of four protected mammal species protected under the Wildlife (Amendment) Act, 2000 were recorded within these, namely Eurasian badger, west European hedgehog, Irish hare and pine marten.

There are no invasive mammals regulated under EU Invasive Alien Species Regulation recorded within the relevant 1km grid squares. The non-native species rabbit, which is not regulated but classified as a Medium Risk Invasive Species by NBDC, has been recorded within S2864.

Table 6-22: Historical Mammal Records within 1km grid squares overlapping with the Proposed Grid Connection

Species	Year of Last Record	Grid	Survey/Dataset	Protection
Protected Species				
Eurasian badger (*Meles meles*)	2005	S2764, S2360	Badger Setts of Ireland Database	Protected Species: Wildlife Acts
West European hedgehog (*Erinaceus europaeus*)	2012	S2764	Road Kill Survey	Protected Species: Wildlife Acts
Irish Hare (*Lepus timidus* subsp. *hibernicus*)	2006	S2360	Atlas of Mammals in Ireland 2010-2015	Annex V Protected Species: Wildlife Acts
Pine Marten (*Martes martes*)	2012	S2764	Road Kill Survey	Annex V

Species	Year of Last Record	Grid	Survey/Dataset	Protection
				Protected Species: Wildlife Acts
Invasive Species				
Rabbit (*Oryctolagus cuniculus*)	2018	S2864	Mammals of Ireland 2016-2025	Invasive Species: Medium Risk Invasive Species

6.7.5.1.3.2 Field Survey

No mammal signs were recorded during surveys at the TDR nodes. Their disturbed location at roadsides limits their suitability for mammals to potential occasional foraging and commuting during quieter times of the night.

6.7.5.2 Bats

A detailed Bat Survey Report is presented in Appendix 6.3 of this EIAR, with findings summarised below.

6.7.5.2.1 Desktop Survey

There are five 10 km grid squares overlapped by the proposed development (including grid connection and TDR): S25, S26, S36, S46 and S47. The proposed wind farm mainly encompassed within in 10 km grid square S25. These 10 km grid squares held previous bat records as detailed in Table 6-23 below (NBDC maps, most recent data search 05/13/2026). The data requested from NPWS did not contain any bat species in the requested grid squares.

The distribution of bats indicated in the NBDC maps reflect survey effort or data input, and do not automatically reflect bat presence or abundance in a given area (an area without records may not have been previously surveyed or data may not have been publicly shared).

Table 6-23: Bat records in 10km Grid squares S25, S26, S36, S46 and S47

Species	S25	S26	S36	S46	S47
Brown long-eared bat (*Plecotus auritus*)	1	0	2	4	1
Common Pipistrelle (*Pipistrellus pipistrellus*)	320	7	125	3	8
Nathusius's Pipistrelle *(Pipistrellus nathusii)*	1	0	0	0	0
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	77	4	18	5	8
Pipistrelle *(Pipistrellus pipistrellus sensu lato)*	54	1	23	0	1

Species	S25	S26	S36	S46	S47
Daubenton's bat (*Myotis daubentonii*)	1	2	0	230	110
Leisler's bat (*Nyctalus leisleri*)	37	7	18	3	7
Natterer's bat *(Myotis nattereri)*	0	0	1	2	1

6.7.5.2.1.1 Bat Landscapes

Bat landscapes are plotted in 5 km grid squares, of which five overlap the proposed wind farm.

For the southern turbines (T9-T11), the bat landscape association model (Lundy et al., 2011) suggests that the development is part of a landscape that is of low-moderate suitability for all bats. These southern turbines and their environs are of low suitability for Nathusius's pipistrelle and lesser horseshoe bat, of low - moderate suitability for Leisler's bat, Natterer's bat and whiskered bat, of moderate suitability for brown long-eared bat, soprano pipistrelle and Daubenton's bat, while common pipistrelle has the highest suitability of moderate - high suitability.

The grid square encompassing turbines 1-6 and has an overall moderate suitability for all bats. These turbines and their environs are of low suitability for Nathusius's pipistrelle and lesser horseshoe bat, of moderate suitability for brown long-eared bat, soprano pipistrelle, Leisler's bat, Daubentons bat, whiskered bat and Natterer's bat, while common pipistrelle has the highest suitability of moderate - high suitability.

For turbines 7 and 8 the grid square associated with the landscape has an overall moderate suitability for all bats. These turbines and their environs are of low suitability for Nathusius's pipistrelle and lesser horseshoe bat, of low-moderate suitability for Daubenton's bat, whiskered bat and Natterer's bat, of moderate suitability for brown long-eared bat, soprano pipistrelle and Leisler's bat and of moderate-high suitability for common pipistrelle.

6.7.5.2.1.2 Bat Conservation Ireland Data

Examination of BCI data on bat roosts confirmed there are no known roosts present in this dataset in the 1 km grid squares within 300 m of the proposed wind farm and grid connection.

The dataset includes one record of a common pipistrelle roost located in a 1 km grid square c. 120m from the R693/R639 Roundabout TDR node. There are no buildings or potential roosting features at this TDR node which could potentially host bats. The closest building within the relevant 1 km grid square is located 600m away from this TDR node, and proposed works at the TDR node are unlikely to affect landscape-scale connectivity for bats.

6.7.5.2.1.3 Natura 2000 Sites

The only Natura 2000 sites designated for bats in Ireland are for lesser horseshoe bats. The proposed development is not within the potential ZoI of any sites designated for this species and is located outside their established range.

6.7.5.2.1.4 Ordnance Survey mapping, Aerial photography, Underground & Historical Sites

The desk-based review of Ordnance Survey mapping, aerial photography, and records from the National Monuments Service (NMS) and National Inventory of Architectural Heritage (NIAH) did not identify any underground structures, historic buildings, bridges, or other features within the development site or Turbine Delivery Route that would be considered of notable value for roosting bats. No historical structures with suitability for bat roosting were identified within the study areas. Two bridges mentioned above were observed along the Grid Connection Route as potential roost features both of which underwent an emergence survey discussed below.

Walkover surveys confirmed the findings of the desk study. No underground features or historic structures of relevance to bats were recorded on site or along associated routes. Furthermore, no potential roosting features of significance were identified during field inspections.

6.7.5.2.2 Habitat Suitability Assessment

All habitats within the site were assessed with regard to their suitability for bats. During the design phase, areas identified as having higher suitability were avoided. Consequently, habitats subject to construction impacts are not considered to be of high suitability for bats.

Within the site, habitats to be impacted comprise predominantly bare peat, scrub, immature woodland and limited areas of recently established bog woodland of generally low structural diversity. These habitats are assessed as being of low suitability for bat species present or likely to be present in the area. No Potential Roosting Features (PRFs) were identified within the site.

Habitat to be removed within the peat deposition area is comprised of immature non-native eucalyptus plantation with limited suitability for bats. Linear habitats proposed for removal are generally of low suitability.

Habitat removal associated with the substation will involve the loss of an area of bog woodland established on cutaway bog. This habitat is assessed as being of low suitability for roosting bats, and no PRFs were identified within the affected woodland.

Habitats along the grid connection route are dominated by linear wooded features including hedgerows and treelines, grassy verges, and adjacent agricultural land characterised by improved grassland. Overall habitat suitability for bats along this route is considered to be primarily low, although areas of higher quality landscape are present in parts of the wider hinterland surrounding the grid connection, particularly where woodland and higher quality treelines and hedgerows are present in the surrounding landscape.

All bridge crossings over rivers were inspected. No evidence of bat roosts or Potential Roosting Features (PRFs) was identified at all bridges except the Borrisbeg Stream (2) Bridge, where moderate suitability PRFs with no evidence of occupation by bats were observed. Numerous trees were assessed for PRFs (see Figure 6-6); however, these features are considered to be of low suitability due to limited suitability and small size of PRFs and existing disturbance associated with the busy road corridor.

Habitats along the turbine delivery route comprise dry meadows and grassy verges, scrub, hedgerows, and recolonising bare ground. These habitats are assessed as being of low suitability for bats due to limited extent, connectivity and low to moderate quality of hedgerows.

While small sections of hedgerow and scrub will be removed to facilitate turbine delivery, no PRFs were identified and the habitats affected are considered to be of low suitability for roosting, commuting, or foraging bats for the reasons outlined in the paragraph above.

Overall, habitat within the site and associated routes is assessed as being of low suitability for bats. This is primarily due to the dominance of bare peat and low-quality immature woodland and scrub habitats, which provide limited structural diversity, limited commuting routes/landscape connectivity and fewer roosting opportunities. In addition, existing disturbance from adjacent road infrastructure along the grid route and turbine delivery route further reduces the likelihood of significant bat activity within affected areas.

6.7.5.2.3 Static Detector Surveys

6.7.5.2.3.1 2025 Static Surveys

The location of the 2025 statics were chosen specifically to reflect the layout of the proposed wind turbines (see Figure 6-4). This approach ensures the survey data directly informs the placement of turbine infrastructure, helping to minimise potential impacts on important bat habitats. A total of 11 static units were deployed during each survey period. Overall, eight bat species were recorded (common pipistrelle, soprano pipistrelle, Nathusius's pipistrelle, Leisler's bat, brown long-eared bat, Natterer's bat, Daubenton's bat and whiskered bat). Manual verification of acoustic data ensured accurate species identification.

Common Pipistrelle

The total number of recordings for common pipistrelle at the proposed development during the 2025 activity season was 12,747 no. recordings; 31.54% of total recordings for this season. These were recorded over 103 nights which gives an average of 123.76 no. recordings per night.

Soprano Pipistrelle

The total number of recordings for soprano pipistrelle at the proposed development the 2025 activity season was 16980 no. recordings; 42.02% of total recordings. These were recorded over 103 nights which gives an average of 164.85 no. recordings per night.

Leisler's Bat

The total number of recordings for Leisler's bat at the proposed development during the 2025 activity season was 7699 no. recordings; 19.05% of total recordings. These were recorded over 103 nights which gives an average of 74.75 no. recordings per night.

Brown Long-eared Bat

The total number of recordings for brown long-eared bat at the proposed development during the 2025 activity season was 785 no. recordings; 1.94% of total recordings. These were recorded over 103 nights which gives an average of 7.62 no. recordings per night.

Daubenton's Bat

The total number of recordings for Daubenton's bat at the proposed development during the 2025 activity season was 1076 no. recordings; 2.66% of total recordings. These were recorded over 103 nights which gives an average of 10.45 no. recordings per night.

Whiskered Bat

The total number of recordings for Whiskered bat at the proposed development during the 2025 activity season was 225 no. recordings; 0.56% of total recordings. These were recorded over 103 nights which gives an average of 2.18 no. recordings per night.

Natterer's Bat

The total number of recordings for Natterers bat at the proposed development during the 2025 activity season was 678 no. recordings; 1.68% of total recordings. These were recorded over 103 nights which gives an average of 6.58 no. recordings per night.

Nathusius's Pipistrelle

The total number of recordings for Nathusius's pipistrelle at the proposed development during the 2025 activity season was 224 no. recordings; 0.55% of total recordings. These were recorded over 103 nights which gives an average of 2.17 no. recordings per night.

All Rounds:

As indicated below in Table 6-24 the highest level of activity was recorded during the summer 2025 round observing a total of 22281 bat passes over 58 nights giving an average of 384.2 passes per night with the highest activity in summer recorded at Detectors LT11, LT10 and LT1 (2025) respectively. Detector LT1 (2025) is located within scrub bounded by cutover bog but also connected to the wider network of wooded habitats onsite. Detector LT10 (2025) is located in cutover bog with areas of scrub surrounding. Detector LT11 (2025) is located on cutover bog with both scrub and immature woodland nearby with the immature woodland providing a linear corridor for commuting bats.

The spring 2025 round had a total of 11559 bat passes over 17 nights giving an average of 679.9 passes per night with the highest activity of 2025 being observed at LT8 with a total of 3171 passes recorded in spring. The habitat at LT8 is immature woodland; Detector LT8 (2025) was placed to the east of T8 in an area of cutover bog bordered by scrub linked to immature woodland at T8, representative of the interconnected habitat mosaic in which LT8 is located. The wooded edge habitats in this area serve as linear features which may be used by commuting and foraging bats. Detectors LT6 and LT10 (2025) had the next highest numbers of bat passes recorded with 2638 and 1622 respectively. The habitat at LT6 habitat consists of cutover bog; however, there are edge habitats formed by scrub and immature woodland nearby. Detector LT10 (2025) is located within cutover bog, with nearby scrub edges providing commuting routes for bats.

Autumn had the lowest bat activity recorded in 2025 with 6574 bat passes recorded giving an average of 234.79 bat passes recorded per night. Detectors LT8, LT9 and LT1 (2025) had the highest numbers of passes recorded in the autumn round.

For all detectors, with the exception of LT6 and LT8, summer had the highest level of activity.

For LT6 and LT8, spring had the highest level of activity, the habitats surrounding these turbines are cutover bog with immature woodland and scrub.

Summer had consistently high levels of activity throughout all detectors; however, spring and autumn activity levels varied between detectors but a significant gap between these two rounds and summer with the exception of LT6 and LT8.

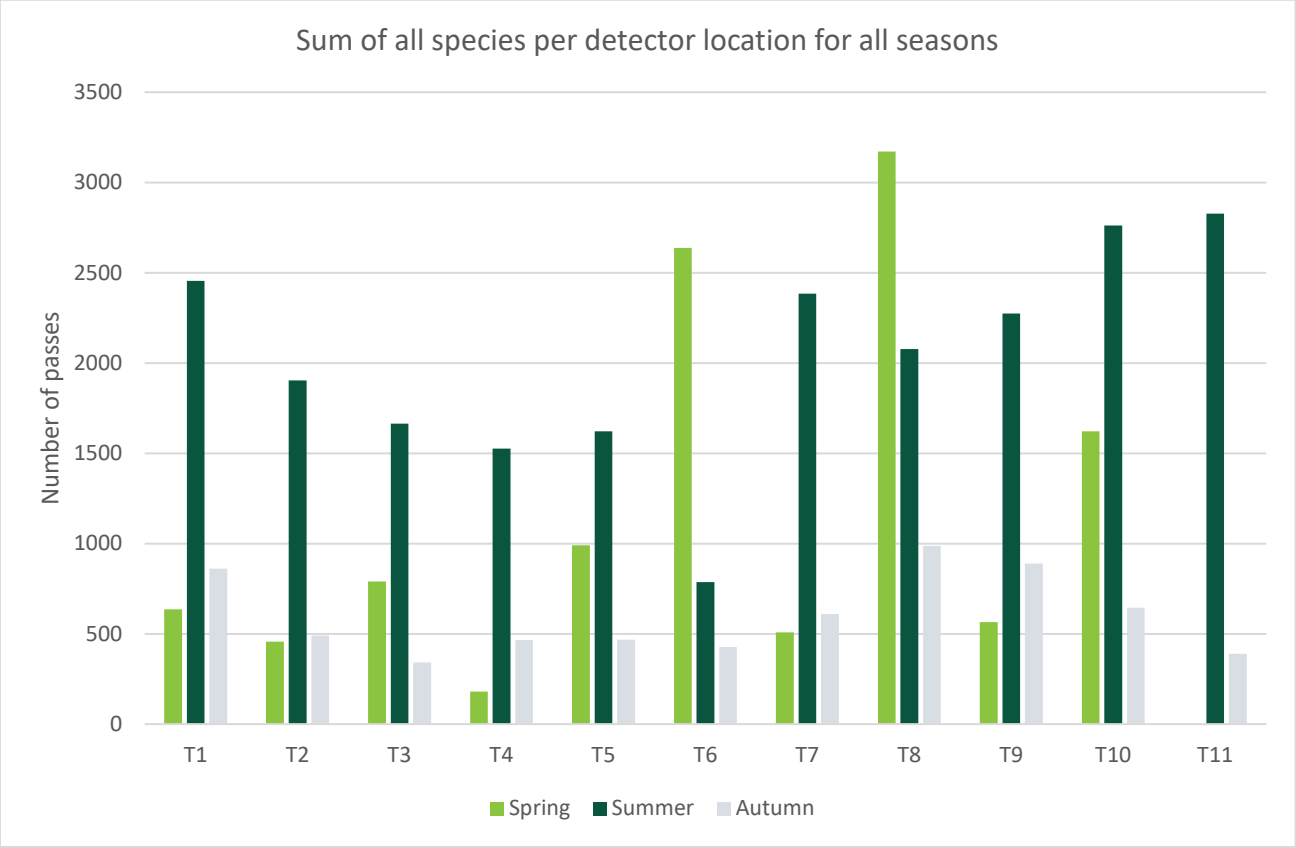


Figure 6-1: Sum of all species per detector location for all seasons in 2025

Table 6-24: Sum of all species per detector location for all seasons in 2025

Detector	Spring	Summer	Autumn	Total
LT1	636	2455	861	3952
LT2	457	1904	491	2852
LT3	791	1664	341	2796
LT4	180	1526	466	2172
LT5	990	1622	467	3079
LT6	2638	786	427	3851
LT7	509	2384	609	3502
LT8	3171	2077	987	6235
LT9	565	2274	890	3729
LT10	1622	2762	645	5029

Detector	Spring	Summer	Autumn	Total
LT11	0	2827	390	3217
Total	11559	22281	6574	40414

6.7.5.2.3.1.1 2025 - Spring (Round 1)

During the spring deployment there were a total of 11559 passes recorded across 11 detectors (refer to Table 6-25). Common Pipistrelle account for 59.77% of the passes recorded with 36.33% of spring common pipistrelle calls have been recorded at Detector LT8 (2025). Soprano pipistrelle account for the next highest number of recorded passes with 19.59% followed by Leisler's bat which account for 16.43% of calls recorded. The remaining species collectively account for only 4.21% of the passes recorded. Detectors LT6, LT8 and LT10 (2025) have the three highest number of recordings respectively. All of these detectors were located on cutover bog with Detector LT6 (2025) having linear habitats of scrub and immature woodland in the surrounding area while Detector LT10 (2025) has scrub habitat adjacent. Detector LT8 (2025) has scrub adjacent to the deployment location, which is connected to nearby immature woodland. Figure 6-2 shows that shows a season-wide trend where common pipistrelle, soprano pipistrelle and Leisler's bat activity peaks at 23:00 and decreases from then onwards.

Table 6-25: Total number of passes recorded per species per detector for spring 2025

Row Labels	General Location/ Habitat Association	Myotis Daubentonii	Myotis nattereri	Myotis mystacinus	Nyctalus leisleri	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Pipistrellus nathusii	Plecotus auritus	Total
LT1	WS1 - Scrub	14	2	4	143	306	131	34	2	636
LT2	PB4 - Cutover bog	2	0	0	156	175	114	9	1	457
LT3	PB4 - Cutover bog	16	3	1	92	388	280	7	4	791
LT4	WS1 - Scrub	4	0	3	89	47	32	5	0	180
LT5	PB4 - Cutover bog	6	0	6	796	119	54	6	3	990
LT6	WS2 - Immature woodland	11	0	2	122	1977	443	48	35	2638
LT7	PB4 - Cutover bog	18	0	0	163	211	89	17	11	509
LT8	WS2 - Immature woodland	16	2	0	150	2510	407	66	20	3171
LT9	WS1 - Scrub	12	50	0	56	164	271	1	11	565
LT10	PB4 - Cutover bog	19	1	4	132	1012	443	2	9	1622
LT11	WS2 - Immature woodland	-	-	-	-	-	-	-	-	-
Total		118	58	20	1899	6909	2264	195	96	11559

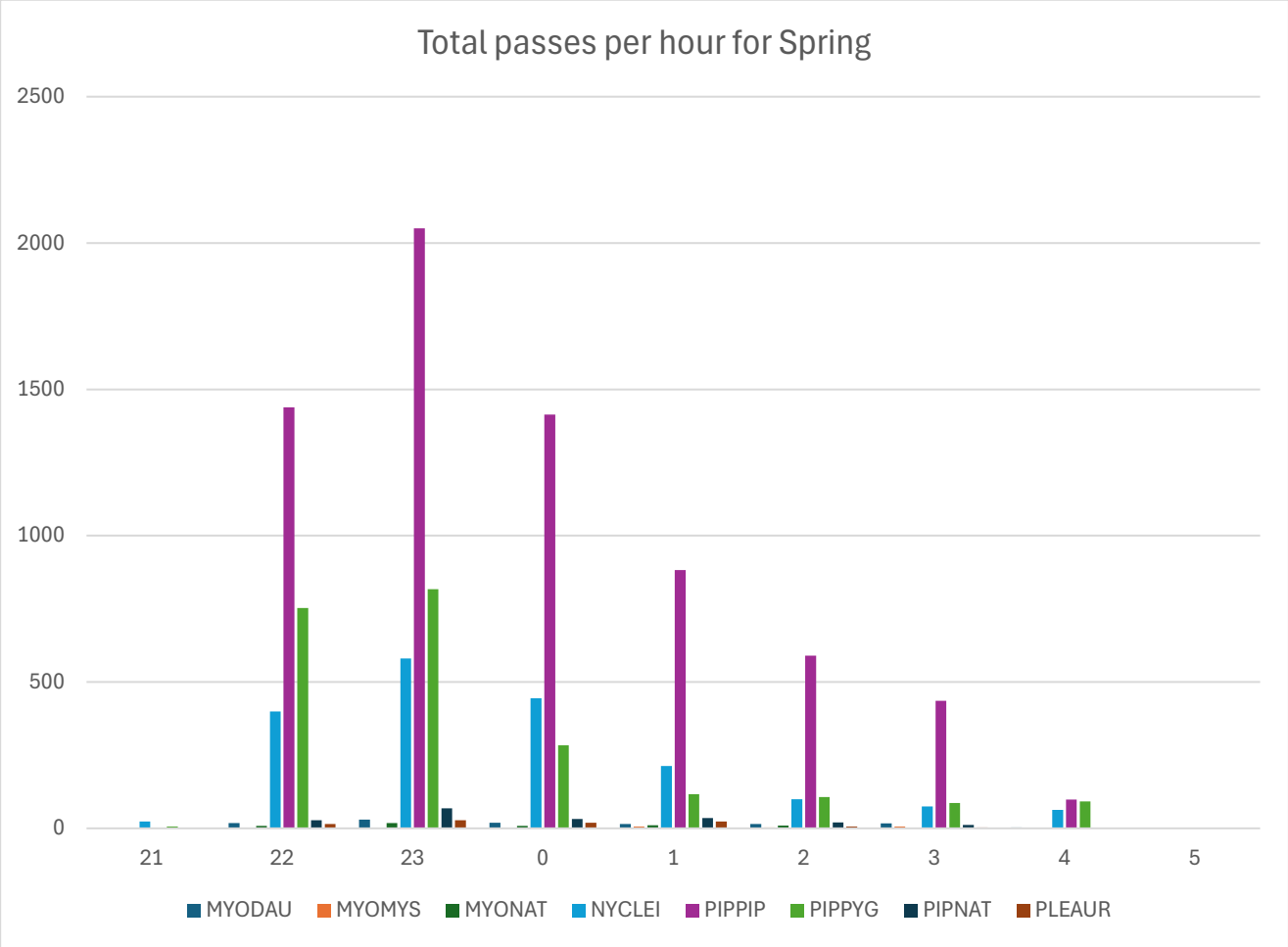


Figure 6-2: Total number of bat passes per hour per species for all 2025 spring detector locations

6.7.5.2.3.1.2 2025 - Summer (Round 2)

During the summer deployment there were a total of 22,281 passes recorded across 11 detectors (refer to Table 6-26). Soprano Pipistrelle account for 53.32% of passes recorded with 16.68% of summer soprano pipistrelle calls recorded at LT10 and 15.97% at LT11. Common Pipistrelle account for the next highest number of recorded passes with 22.26% followed by Leisler's bat which account for 17.71% of the passes recorded. The remaining species collected collectively account for only 6.71% of the passes recorded. Detectors LT11, LT10 and LT1 (2025) have the top three highest number of recordings respectively. Detector LT10 (2025) is located on cutover bog with scrub adjacent, and LT11 (2025) is located on cutover bog with scrub and immature woodland adjacent. Detector LT1 (2025) is located within scrub habitat. Figure 6-3 shows a season-wide trend where common pipistrelle, soprano pipistrelle and Leisler's bat activity peaks at 22:00, decreases until 03:00 and rises slightly for common pipistrelle and Leisler's bat again between 03:00 to 05:00 before almost completely ceasing by 06:00.

Table 6-26: Total number of passes recorded per species per detector for summer 2025

Row Labels	General Location/ Habitat Association	Myotis Daubentonii	Myotis nattereri	Myotis mystacinus	Nyctalus leisleri	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Pipistrellus nathusii	Plecotus auritus	Total
LT1	WS1 - Scrub	36	4	36	287	601	1468	2	21	2455
LT2	PB4 - Cutover bog	32	17	25	389	450	958	2	31	1904
LT3	PB4 - Cutover bog	66	11	5	347	343	865	0	27	1664
LT4	WS1 - Scrub	28	10	16	414	292	751	0	15	1526
LT5	PB4 - Cutover bog	37	17	11	444	391	670	6	46	1622
LT6	WS2 - Immature woodland	33	11	13	219	217	285	0	8	786
LT7	PB4 - Cutover bog	33	17	16	515	869	880	4	50	2384
LT8	WS2 - Immature woodland	75	20	13	529	451	951	0	38	2077
LT9	WS1 - Scrub	71	177	5	318	485	1173	4	41	2274
LT10	PB4 - Cutover bog	68	35	27	152	477	1982	0	21	2762
LT11	WS2 - Immature woodland	81	52	6	332	383	1897	4	72	2827
Total		560	371	173	3946	4959	11880	22	370	22281

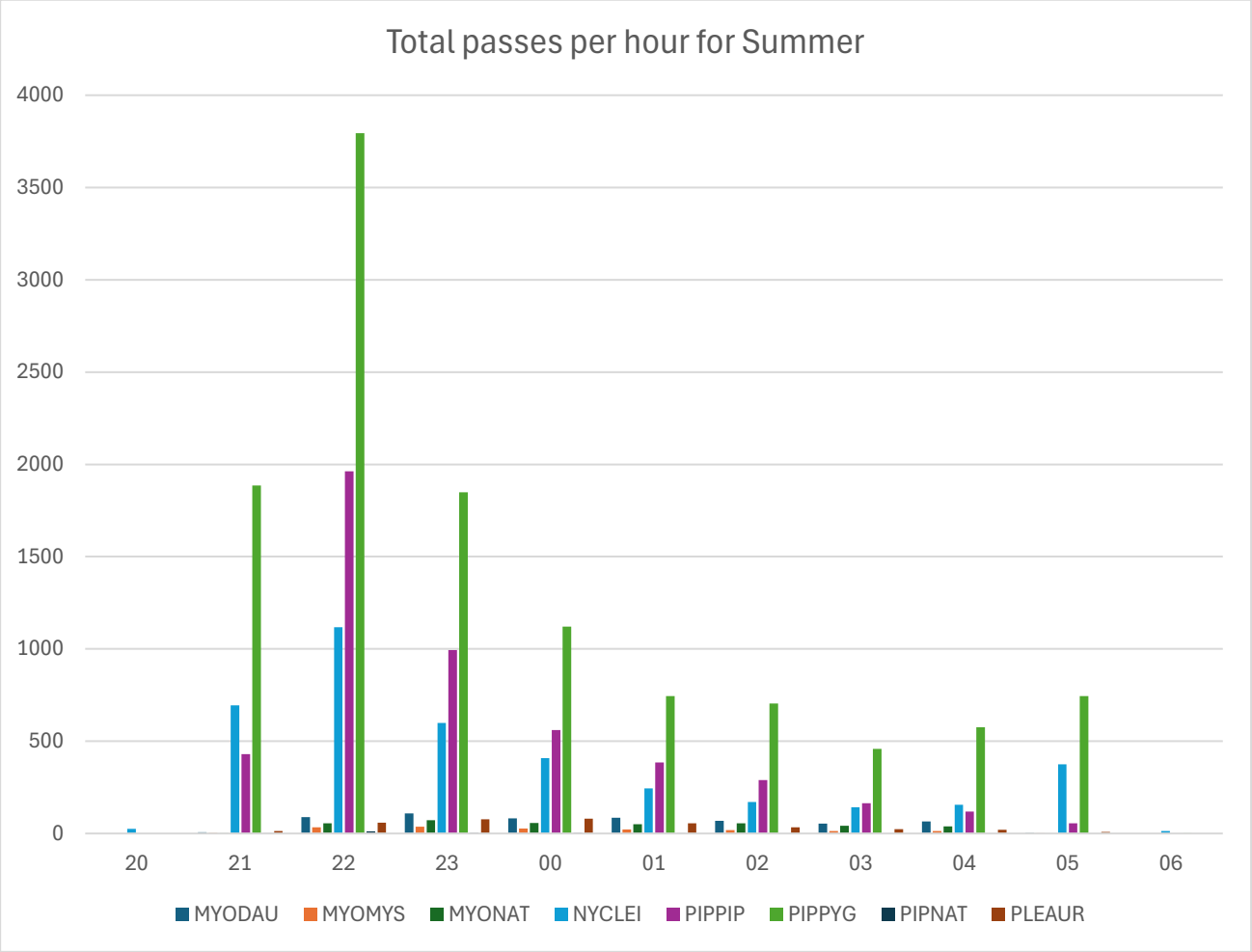


Figure 6-3: Total number of bat passes per hour per species for all 2025 summer detector locations

6.7.5.2.3.1.3 2025 - Autumn (Round 3)

During the autumn deployment there were a total of 6574 passes recorded across 11 detectors (refer to Table 6-27).

Soprano pipistrelle account for 43.14% of passes recorded with 19.57% of autumn soprano pipistrelle calls recorded at Detector LT1 (2025) and 18.58% at LT10. Leisler's bat accounts for the next highest number of recorded passes with 28.2% followed by common pipistrelle which account for 13.37% of the passes recorded. The remaining species collectively account for only 15.29% of recorded passes. Detectors LT8, LT9 and LT1 (2025) have the top three highest number of recordings respectively. Detectors LT9 and LT1 (2025) are located in scrub with immature woodland also adjacent at Detector LT9. The detector LT8 (2025) deployment location is on cutover bog adjacent to scrub connected to nearby immature woodland habitat. Figure 6-4 shows that common pipistrelle, soprano pipistrelle and Leisler's bat activity peaks at 21:00 and decreases until 05:00 where it rises slightly before decreasing again at 06:00.

Table 6-27: Total number of passes recorded per species per detector for autumn 2025

Row Labels	General Location/ Habitat Association	Myotis Daubentonii	Myotis nattereri	Myotis mystacinus	Nyctalus leisleri	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Pipistrellus nathusii	Plecotus auritus	Total
LT1	WS1 - Scrub	23	5	0	149	106	555	0	23	861
LT2	PB4 - Cutover bog	20	0	0	176	48	242	0	5	491
LT3	PB4 - Cutover bog	11	4	9	114	28	166	0	9	341
LT4	WS1 - Scrub	17	15	0	207	66	126	0	35	466
LT5	PB4 - Cutover bog	12	10	1	208	64	129	1	42	467
LT6	WS2 - Immature woodland	25	10	0	148	77	153	0	14	427
LT7	PB4 - Cutover bog	39	10	0	226	60	250	0	24	609
LT8	WS2 - Immature woodland	20	13	10	450	306	150	0	38	987
LT9	WS1 - Scrub	181	160	9	76	34	326	4	100	890
LT10	PB4 - Cutover bog	20	6	3	27	52	527	0	10	645
LT11	WS2 - Immature woodland	30	16	0	73	38	212	2	19	390
Total		398	249	32	1854	879	2836	7	319	6574

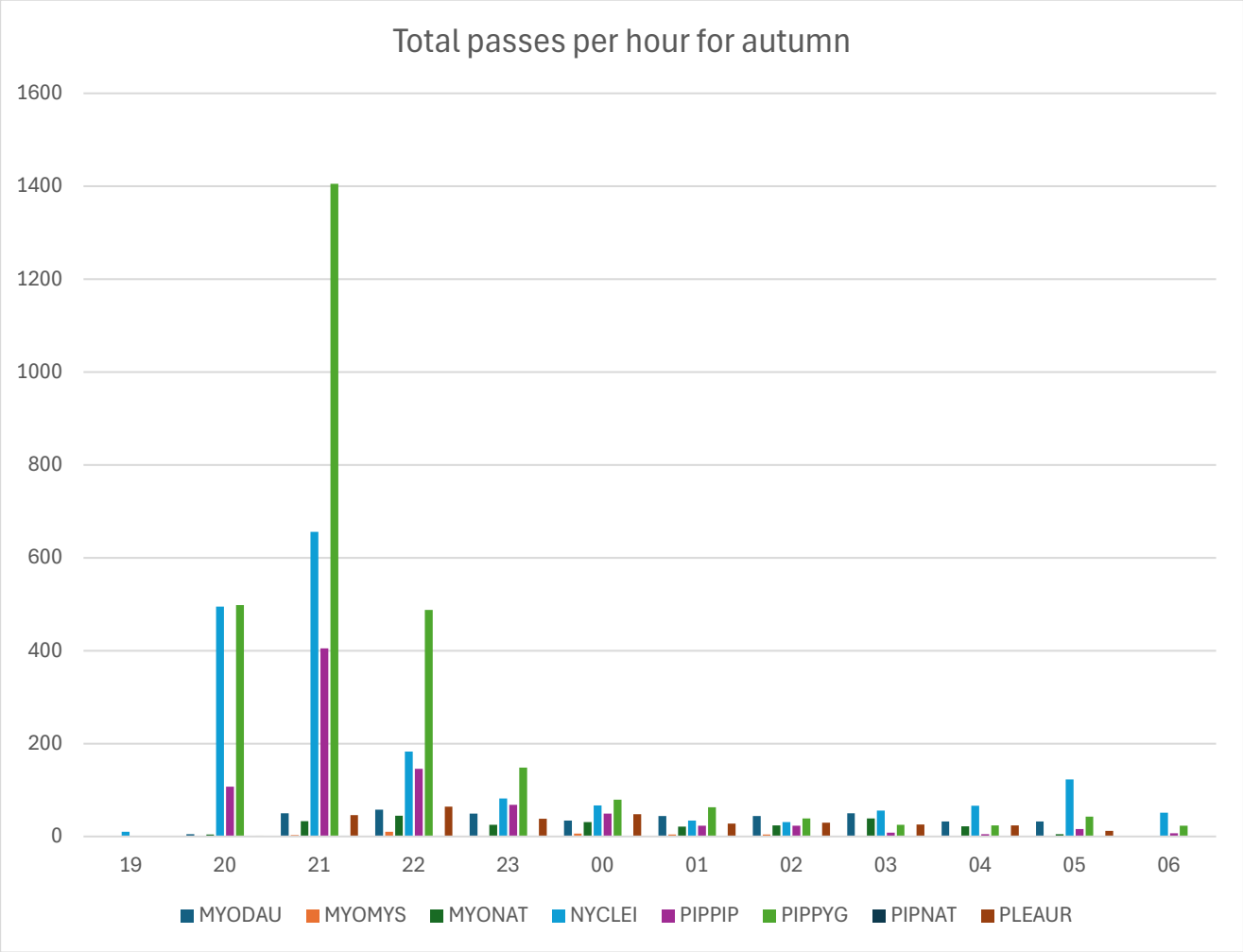


Figure 6-4: Total number of bat passes per hour per species for all 2025 Autumn detector locations

6.7.5.2.3.2 2023 Static Surveys

The locations of the 2023 static detectors were chosen to specifically reflect the proposed infrastructure layout during that period. Since the proposed layout has been updated since then through iterative constraints studies to minimise potential effects, the 2023 static detector results are primarily indicative of bat activity at the site scale, rather than the finalised turbine locations. A total of 11 static units were deployed during each survey period. Overall, eight bat species were recorded (common pipistrelle, soprano pipistrelle, Nathusius's pipistrelle, Leisler's bat, brown long-eared bat, Natterer's bat, Daubenton's bat and whiskered bat). Manual verification of acoustic data ensured accurate species identification.

Common Pipistrelle

The total number of recordings for common pipistrelle at the proposed development during the 2023 activity season was 18762 no. recordings; 44.2% of total recordings for this season. These were recorded over 76 nights which gives an average of 246.87 no. recordings per night.

Soprano Pipistrelle

The total number of recordings for soprano pipistrelle at the proposed development during the 2023 activity season was 14798 no. recordings; 34.86% of total recordings for this season. These were recorded over 76 nights which gives an average of 194.71 no. recordings per night.

Nathusius's Pipistrelle

The total number of recordings for nathusius's pipistrelle at the proposed development during the 2023 activity season was 289 no. recordings; 0.68% of total recordings for this season. These were recorded over 76 nights which gives an average of 3.8 no. recordings per night.

Leislers Bat

The total number of recordings for Leislers bat at the proposed development during the 2023 activity season was 5794 no. recordings; 13.65% of total recordings for this season. These were recorded over 76 nights which gives an average of 76.24 no. recordings per night.

Daubentons Bat

The total number of recordings for Daubentons bat at the proposed development the 2023 activity season was 1161 no. recordings; 2.74% of total recordings for this season. These were recorded over 76 nights which gives an average of 15.28 no. recordings per night.

Natterers Bat

The total number of recordings for Natterers bat at the proposed development during the 2023 activity season was 464 no. recordings; 1.1% of total recordings for this season. These were recorded over 76 nights which gives an average of 6.12 no. recordings per night.

Whiskered Bat

The total number of recordings for Whiskered bat at the proposed development during the 2023 activity season was 373 no. recordings; 0.88% of total recordings for this season. These were recorded over 76 nights which gives an average of 4.91 no. recordings per night.

Brown Long-eared bat

The total number of recordings for Brown long-eared bat at the proposed development during the 2023 activity season was 808 no. recordings; 1.9% of total recordings for this season. These were recorded over 76 nights which gives an average of 10.63 no. recordings per night.

6.7.5.2.4 Bat Activity/Transect Surveys (2023)

For the 2023 bat activity season, three dusk transect surveys were undertaken on dates outlined in Appendix 6.3. The transect routes along with distribution of bats recorded are displayed in EIAR Appendix VI Figure 6-9, Figure 6-10 and Figure 6-11. The total pass results obtained using Batlogger M2 bat detectors are presented in Table 6-28. The data collected shows that the linear features walked had associated bat activity in 2023.

Table 6-28: Total bat passes per transect survey

	Littleton Activity Transect		
Species	**Round 1 - 29/06/23**	**Round 2 - 27/07/23**	**Round 3 - 20/09/2023**
Common pipistrelle	37	37	3
Soprano pipistrelle	20	36	40
Nathusius's pipistrelle	1	0	3
Leisler's bat	13	18	23
Brown Long-eared bat	2	1	8
Daubenton's bat	1	2	0
Whiskered bat	0	0	0
Natterers bat	0	0	0
Total passes	74	94	77

6.7.5.2.5 Roost Survey Results

6.7.5.2.5.1 Proposed Wind Farm

Surveys of the proposed wind farm study area (300m turbine buffer and 200m access track/infrastructure buffer) determined that potential roosting features are absent as no mature trees with PRFs were observed aside from intermittent mature trees of ash covered in ivy outside of the site boundary but within 200m of the borrow pit construction. These trees were assessed and found to have low potential due to heavily managed hedgerows and the trees being intermittent reducing the quality of the commuting corridor. There is no suitable bat roosting habitat within the PDA footprints.

6.7.5.2.5.2 Grid Connection & TDR

The grid connection route and TDR accommodation works locations were assessed for the presence of buildings, bridges and trees which could potentially offer suitable bat roosting habitat. No derelict buildings with bat roosting potential/potential to be affected by the proposed grid connection or TDR were identified. No potential tree roost features were identified as might be affected TDR works. Several bridges and trees occur along the grid connection route which were assessed as set out hereunder. No works are proposed at any of the bridges along the TDR.

6.7.5.2.5.2.1 Bridges

The results of bridge assessments/inspections carried out at bridges along the proposed grid connection are detailed within Appendix 6.3. No reinforcement works are proposed for bridges along the TDR; the proposed grid cable crossing methodology for all bridges is HDD.

A total of two bridges located along the GC were identified as having potential suitability for roosting bats, as detailed below.

Borrisbeg Stream Bridge (2)

This bridge structure carries the R693 road over the channel draining the adjacent Loughane turlough. As such, it remains dry for long periods, and was dry when surveyed in late September/early October 2025. The structure is a single arch formed by an older masonry barrel vault which has been extended laterally by the addition of a bottomless concrete box culvert on the upstream side.

Numerous gaps are present in the stonework of the barrel arch, and several gaps are also present in the spandrel wall, with the majority of crevices in the barrel arch having some suitability for roosting bats based on their size, accessibility, location and condition. No signs of bat occupancy were recorded during the inspection however. It was noted that very dense tree and bramble cover surrounding the channel up and down-stream may limit access for bats, although some gaps permitting entry are likely to exist.

Based on the presence of PRFs under this bridge it was assessed to have moderate roosting potential and the requirement for an emergence survey was identified.

Plate 6-40: Borrisbeg Stream Bridge (2)

Gorteenahilla Stream Bridge

This single arch bridge has a highly modified channel upstream, with vertical walls comprised of concrete and masonry c. 3-4m high forming the banks. The parapets are concrete on the upstream side, and stone on the downstream side. The arch barrel is masonry. The pointing on the downstream side (parapet & spandrel walls) is in good condition, with no gaps observed. At the downstream arch which forms an opening in a retaining wall running along the southern side of the R693, the Gorteenahilla discharges immediately into the Nuenna River, which is characterised on this section by a riverbed comprised of limestone bedrock, forming a series of cascades and deep pools. As such, no access from either side of the bridge over the Gorteenahilla was possible. No PRFs were visible from vantage points overlooking the bridge. Due to restricted access, an emergence survey was required.

Plate 6-41: Gorteenahilla Stream Bridge (upstream)

Plate 6-42: Gorteenahilla Stream Bridge (downstream)

6.7.5.2.5.2.2 Trees (TDR)

No trees with potential for bat roosting are present in areas potentially affected by vegetation trimming associated with the TDR.

6.7.5.2.5.2.3 Trees (Grid Connection)

The results of ground-level tree assessments (GLTA) carried out along the proposed grid connection are detailed in Appendix 6.3. While a number of trees with low potential for bat roosting were noted along the grid connection, these are unlikely to be affected by GC works, and the roosting potential of all of these trees is negligible suitability for roosting bats due to their disturbed locations beside busy regional roads (R693/R694).

6.7.5.2.6 Roost emergence/ re-entry surveys

The trees within the wind farm roost survey study area are predominantly immature and semi-mature. No potential bat roost features were observed within the wind farm roost survey study area.

No bats were observed emerging from either of the two bridges which required further surveying along the Grid Connection Route. A total of four species, namely Leisler's, brown long-eared, common and soprano pipistrelle bat were active in the locality of the bridges but did not emerge from the bridges (see Table 6-30). While the Borrisbeg Stream Bridge (2) has moderate roosting potential, no signs of occupancy by bats were observed.

See Table 6-29 for details relating to both emergence surveys and general observations on the bridges surveyed.

Table 6-29: Emergence survey results

Bridge	Survey Date	Comment	Status
Gorteenahilla Stream Bridge (downstream)	13-10-25	No emergence observed; no bats observed. Bridge was very busy with traffic and the Freshwell Sauna located downstream had excessive lighting from floodlights. Streetlights along road were not causing excessive light pollution immediately downstream of bridge.	Low potential; no emergence observed.
Gorteenahilla Stream Bridge (upstream)	13-10-25	No emergence observed; several bats observed hunting upstream. Streetlights along road were not causing excessive light pollution immediately upstream of bridge.	Low potential; no emergence observed.
Borrisbeg Stream Bridge (2) (downstream)	14-10-25	No emergence observed; no bats seen along channel on either side. Bats heard likely to be flying along tree line outside tree tunnel over the dry river channel. This channel with its small tree tunnel may be too restricted for hunting bats Bridge was inspected before emergence survey, using both infrared scope and torch, all crevices visible with torch; no bats were observed with torch nor heat sources detected with scope. No signs of occupancy by bats.	No emergence observed; no signs of occupancy; not a winter roost.
Borrisbeg Stream Bridge (2) (upstream)	14-10-25	No emergence observed; no bats seen along channel on either side. Bats detected likely to be flying along tree line outside tree tunnel over the dry river channel. This channel with its small tree tunnel may be too restricted for hunting bats.	No emergence observed; no signs of occupancy; not a winter roost.

Table 6-30: Summary of species active in surrounding areas during emergence surveys (no emergence recorded)

Species	Borrisbeg Stream Bridge (2) (upstream)	Borrisbeg Stream Bridge (2) (downstream)	Gorteenahilla Stream Bridge (upstream)	Gorteenahilla Stream Bridge (downstream)	Total
Nyctalus leisleri	0	0	3	0	3
Pipistrellus pipistrellus	4	9	4	2	19
Pipistrellus pygmaeus	2	2	10	2	16
Plecotus auritus	5	9	0	0	14
Total	11	20	17	4	52

6.7.5.3 Herpetofauna

6.7.5.3.1 Proposed Wind Farm

6.7.5.3.1.1 Desktop Study

Ordnance Survey National Grid 10 km square S25, which overlaps with the Site for the Proposed Wind Farm, was searched for records of herpetofauna (amphibians and reptiles) within the latest 20 years through the National Biodiversity Data Centre (NBDC) website (most recent search on 12th December 2025). In addition, data on rare/protected species recorded in 10 km grid overlapping the Site was obtained from NPWS (received November 2025); this encompassed grid square S25.

There is a 100m resolution record for smooth newt (*Lissotriton vulgaris*), which is protected under the Wildlife (Amendment) Act, 2000, within the Site from 2018 near T08, and another 100m resolution record from 2016 near Derryvilla c. 300m east of the southern section of the Site. The latter observation recorded a newt being predated by a grey heron. In addition, there is a record for the species within the footprint of the Proposed Amenity trail, including artificial lakes, near T09 in the southernmost section of the Site in 2010.

Common frog (*Rana temporaria*), which is protected under the Wildlife (Amendment) Act, 2000 and the EU Habitats Directive, was recorded in a 100m grid square overlapping the internal access track between the middle and the southern sections of the Site.

There are no records of common lizard (*Zootaca vivipara*) overlapping the site, and the closest record located just under 4km east of the Site, dates from 1971.

Table 6-31: Historical Herpetofauna Records within 10km of the Proposed Wind Farm

Species	Year of Last Record	Grid	Survey/Dataset	Protection
Smooth newt (*Lissotriton vulgaris*)	2018	S2151 S223513 S223548	Bord na Mona species data Amphibians and reptiles of Ireland	Protected Species: Wildlife Acts
Common Frog (*Rana temporaria*)	2016	S217521	Amphibians and reptiles of Ireland	Annex V Protected Species: Wildlife Acts

6.7.5.3.1.2 Field Survey

Common frog was recorded during surveys, with adults observed at a number of locations distributed across the Site. The habitat mosaics at the Site are suitable for this species, with adults encountered in dense vegetation, and abundant pools providing both hunting and breeding habitat. While no breeding sites were detected, the abundance of flooded areas onsite and confirmed presence of adult frogs indicate a breeding population is present. Potential breeding habitat is distributed across the Site. Given the numbers of records indicating the high density of this species within the Site, it is presumed the Site supports a breeding population of common frog of ***Local Importance (Higher Value).***

A total of two observations of smooth newt were recorded during surveys. An individual was encountered on bare peat in an area of recolonised cutover bog to the south of T08 in 2023, and another individual was observed near Lake L13 in 2025. The abundance and structural diversity of flooded areas onsite and confirmed presence of adults indicate a breeding population is present. Potential breeding habitat is distributed across the Site. Given the numbers of records indicating the high density of this species within the Site, it is presumed the Site supports a breeding population of smooth newt of ***Local Importance (Higher Value).***

While there are no historical records of common lizard (*Zootoca vivipara*) overlapping the site, and the single record in the wider region is 55 years old, the habitat mosaic at the site is potentially suitable for this species. Given that, it is presumed the Site has the potential to support common lizard of ***Local Importance (Higher Value).***

6.7.5.3.2 Proposed Grid Connection

6.7.5.3.2.1 Desktop Study

There are no records of herpetofauna for the latest 20 years within the 1km grid squares overlapping the Proposed Grid Route.

6.7.5.3.2.2 Field Survey

No herpetofauna were observed along the Proposed Grid Route.

6.7.5.3.3 Proposed Turbine Route

6.7.5.3.3.1 Desktop Study

There are no records of herpetofauna for the latest 20 years within the 1km grid squares overlapping the Proposed Turbine Delivery Route nodes.

6.7.5.3.3.2 Field Survey

No herpetofauna were observed along the Proposed Grid Route.

6.7.5.4 Terrestrial Invertebrates

6.7.5.4.1 Proposed Wind Farm

6.7.5.4.1.1 Desktop Study

Ordnance Survey National Grid 10 km square S25, which overlaps with the Site for the Proposed Wind Farm, was searched for records of invertebrates within the last 20 years through the National Biodiversity Data Centre (NBDC) website (most recent search on 12th December 2025). In addition, data on rare/protected species recorded in the 10 km grid squares overlapping the Site was obtained from NPWS (received November 2025); this encompassed grid square S25.

Across these datasets, a total of 154 records of marsh fritillary (*Euphydryas aurinia*) records are present within S25, comprised of 56 NPWS 10km records identifying Derryville (Lough Doire Bhile) as their location, and 98 NBDC records which are primarily 100m resolution records (the majority of which are located around Lough Doire Bhile). These records span the years 2000 to 2021. Marsh fritillary is an Annex II species under the EU Habitats Directive and categorised as Vulnerable species in the IRL (2016), with 1m resolution within S25 including the Site in 2010 and 2012.

Lough Doire Bhile (also known as Derryvilla), which is outside the Site, is located north of the southern turbine cluster (T09-T11) and 36m north-east of a Proposed Amenity trail. These are predominantly larval web records. There is one record for this species in the 1 km grid square S2152 overlapping the southern part of the Site.

In addition, there are records for threatened butterfly species in the 1 km grid square S2152 overlapping the southern part of the Site: wall brown (*Lasiommata megera*) and small heath (*Coenonympha pamphilus*).

Furthermore, within grid square S25 overlapping the Site, there are records of one of threatened butterfly species, six threatened bee species, one threatened water beetle species and three threatened moth species within the last 20 years.

Table 6-32 shows the details of historical terrestrial invertebrate records within 10km of the Site.

Table 6-32: Historical Terrestrial Invertebrates Records within 10km of the Proposed Wind Farm

Species	Grid Squares overlapping the Site	Year of Last Record	Survey/Dataset	Conservation status/ Protection	NBDC and NPWS records within the study area
Butterflies					
Marsh fritillary (*Euphydryas aurinia*)	S25	2021 2023	Bord na Móna species data Marsh Fritillary - Colonies Survey South and East Ireland 2012 Butterflies of Ireland pre-2022	Annex II Threatened Species: Vulnerable	56 NPWS 10km records identifying Derryville (Lough Doire Bhile) as their location 98 NBDC records which are primarily 100m resolution records (the majority of which are located around Lough Doire Bhile). 2 records were identified in *c.*190m northeast of the internal access track between T02 and T06 (the BnM survey data).
Wall brown (*Lasiommata megera*)	S2152 S25	2009	Irish Butterfly Monitoring Scheme	Threatened Species: Endangered	2 records within 10km grid square overlapping the Site. There is a record for this species in the 1 km grid square S2152 overlapping the southern part of the Site.
Dingy skipper (*Erynnis tages*)	S223548 S2152 S25	2021	Irish Butterfly Monitoring Scheme; Atlas of Butterflies in Ireland 2021	Threatened Species: Near Threatened	A 100m resolution record observed 40 individuals near the proposed location of T08. A 1 km resolution record observed 10 individuals in area of Lough Doire Bhile (also known as Derryvilla). 7 records within 10km grid square overlapping the Site in 2021.
Small heath (*Coenonympha pamphilus*)	S230596 S2152	2012	Irish Butterfly Monitoring Scheme; Atlas of Butterflies in Ireland 2021	Threatened Species: Near Threatened	There is a single 100m resolution record of this species overlapping the northern tip of the Site. There is also a record for this species in the 1 km grid square S2152 overlapping the southern part of the Site.

Species	Grid Squares overlapping the Site	Year of Last Record	Survey/Dataset	Conservation status/ Protection	NBDC and NPWS records within the study area
Bees					
Moss carder-bee (*Bombus (Thoracombus) muscorum)*	S235598	2021	National Biodiversity Data Centre: online record submission	Threatened Species: Near Threatened	There is a single 100m resolution record of this species overlapping the northern tip of the Site.
Gipsy Cuckoo Bee (*Bombus (Psithyrus) bohemicus*)	S25	2018	Atlas of Mammals in Ireland 2010-2015; Mammals of Ireland 2016-2025	Threatened Species: Near Threatened	There is a single 100m resolution record of this species overlapping the southern tip of the Site.
Red-tailed Bumblebee (*Bombus lapidarius*)	S25	2025	Bees of Ireland	Threatened Species: Near threatened	2 records within 10km grid square overlapping the Site.
Gypsy cuckoo bee (*Bombus bohemicus*)	S25	2022	Bees of Ireland	Threatened Species: Near threatened	Single record within 10km grid square overlapping the Site.
Moss carder bee (*Bombus muscorum*)	S25	2025	Bees of Ireland	Threatened Species: Near threatened	4 records within 10km grid square overlapping the Site.
Willughby's leafcutter bee (*Megachile willughbiella*)	S25	2025	Bees of Ireland	Threatened Species: Near threatened	Single record within 10km grid square overlapping the Site.

Species	Grid Squares overlapping the Site	Year of Last Record	Survey/Dataset	Conservation status/ Protection	NBDC and NPWS records within the study area
Water beetle					
Hydroporus obsoletus	S25	2007	Water Beetles of Ireland	Threatened Species: Near threatened	Single record within 10km grid square the Site.
Moths					
Small chocolate-tip moth (*Clostera pigra*)	S2153	2013	Moths Ireland	Threatened Species: Near threatened	Single record within 1km grid square overlapping the Site.
Small eggar moth (*Eriogaster lanestris*)	S2153	2013	Moths Ireland	Threatened Species: Near threatened	Single record within 1km grid square overlapping the Site.
Small purple-barred moth (*Phytometra viridaria*)	S2153	2013	Moths Ireland	Threatened Species: Near threatened	Single record within 1km grid square overlapping the Site.

6.7.5.4.1.2 Field Survey

6.7.5.4.1.2.1 Marsh Fritillary

Larval webs

During the walkovers in 2021, marsh fritillary larval webs were recorded clustered in a number of locations, including: dense mature grassy vegetation *c.* 40m west of the proposed access track leading to T01; grassy/heath type vegetation *c.* 30m west of the internal access track between T02 and T04; heath type vegetation between T05 and T07 and a grassy ride south of T08. In the walkovers in 2023, larval webs were recorded at a number of locations across the Site, including several webs in grassy vegetation recolonising bare peat within c. 6m of the proposed internal access track in the south of T07; a web in similar vegetation c. 14m from the proposed internal access track in the east of T05; a web on a recolonised peat bank beside the existing railway in the north of the Site (*c.* 20m from proposed access track) and a web in open vegetation on recently recolonised bare peat in the north of the Site, c. 35m from the proposed internal access track. Furthermore, active larvae were also recorded at the latter two locations.

The 2025 survey within the Site confirmed the distribution of suitable habitat remained similar to 2023. In 2025, nine larval webs were recorded, eight of which were active (see Table 6-33 and Figure 6-12). An adult was also observed in flight near a section of the proposed internal access track, south-west of T07.

Table 6-33: Marsh fritillary Survey results

Map id	Type	Quantity	Year
1	Larval web with caterpillars	1	2023
2	Larval webs with caterpillars	3	2023
3	Discarded larval web	1	2023
7	Discarded larval web	1	2023
8	Larval web	1	2023
10	Larval webs	2	2023
11	Larval webs	3	2023
12	Larval webs (2 active)	13	2023
13	Larval web with caterpillars	1	2023
14	Larval Webs (2 active)	5	2023
15	Larval web with caterpillars	1	2023
4	Discarded larval web	1	2025
5	Larval webs (2 active)	3	2025
6	Larval webs with caterpillars	5	2025
9	Adult	1	2025

In addition to the above, larval webs were also recorded in a meadow with abundant devil's-bit scabious at Lough Doire Bile outside the Site (located north of the southernmost section of the Site) during the site walkovers both in 2021 and 2023. The highest concentration of larval webs was recorded in this area (20 webs, several of which had active larvae). Larval web searches were not repeated in 2025 at Lough Doire Bhile which is outside the proposed development site; however, an abundance of suitable habitat was confirmed to persist at this location.

Based on distribution of NBDC data, records for marsh fritillary in Co. Tipperary are concentrated around the site, including the section of the Site adjacent to Longfordpass East and Lough Doire Bile, for the latest 20 years.

Based on the presence of suitable habitat and concentration of records in the locality, the site is assessed as being of ***County Importance*** for marsh fritillary.

Habitats with the food plant, devil's bit-scabious

As per the Habitat Condition form for Marsh Fritillary Monitoring Scheme by NBDC, vegetation composition requires >20% freq. of devil's-bit scabious of abundance growing in 12-25 cm tall swards and <10% cover of scrub (>0.5 m tall) to be classified as suitable habitat for marsh fritillary.

During the 2025 survey, a total of 48 habitat areas which fit the good condition criteria were identified within the Site (Table 6-34). In the summary, habitats with high cover of devil's-bit scabious such as such as cutover bogs dominated by ling or purple moor-grass and wet grasslands were identified primarily along the existing and proposed internal access tracks within the Site. Among them, the largest habitat areas are 1.78 ha at Lough Doire Bhile outside the site to the north of T09 – T11, and 1.38 ha along the internal access track located c. 80m north-west of T05. The median value for the areas of the habitats with abundant devil's-bit scabious is approx. 0.03ha, therefore, the habitat areas are on average small-scale patches.

The areas of marsh fritillary habitat recorded during surveys are detailed in Table 6-34, which also notes their position relative to the proposed infrastructure footprint and associated buffers.

Given that these habitats are in good condition but scattered and small, in terms of their ability to support Marsh Fritillary, they are assessed individually as ***Locally important, Higher value.***

Table 6-34: Marsh fritillary habitat areas summary

id	X (ITM)	Y (ITM)	Distance to footprint	Area (ha)
1	623044	659439	21m	0.08
2	623034	659388	0m	0.09
3	623084	659310	0m	0.01
4	623128	659302	20m	0.03
5	623154	659176	0m	0.02
6	623188	659156	0m	0.05
7	623257	658769	0m	0.02
8	623287	658625	4m	0.01
9	623316	658518	3m	0.02
10	623322	658466	3m	0.07
11	623672	658843	0m	0.01

id	X (ITM)	Y (ITM)	Distance to footprint	Area (ha)
12	623673	658811	3m	0.01
13	623682	658663	27m	0.02
14	623344	658405	0m	0.07
15	623383	658265	0m	0.02
16	623457	657948	0m	0.05
17	623654	657174	0m	0.02
18	624018	657343	170m	0.04
19	624296	657199	110m	0.01
20	624355	657189	149m	0.05
21	623678	656745	1.5m	0.01
22	623686	656711	0m	0.01
23	623761	656569	0m	0.19
24	623403	656468	21m	0.00
25	623357	656403	93	0.02
26	623574	656114	0m	0.00
27	623143	656081	0m	0.14
28	623088	655984	0m	0.05
29	622963	655804	12m	0.06
30	622971	655768	0m	0.05
31	623058	655573	0m	0.07
32	623061	655502	1.5m	0.04
33	623052	655451	41m	0.30
34	623543	655338	0m	0.20
35	622813	655534	0m	1.39
36	622621	655288	5m	0.16
37	622359	654889	3m	0.04
38	622284	654774	0m	0.06
39	622098	654491	0.5m	0.02
40	621813	654030	0m	0.01
41	621518	653502	3m	0.12
42	620968	652624	6m	0.07
43	620481	652189	0m	0.09
44	621584	651980	32m	1.78
45	621422	651819	1m	0.01

id	X (ITM)	Y (ITM)	Distance to footprint	Area (ha)
46	621387	651798	4m	0.00
47	621423	651643	114m	0.02
48	621464	651611	132m	0.01

6.7.5.4.1.2.2 Other Terrestrial Invertebrates

The following other terrestrial Invertebrate species were recorded at the site (Table 6-35).

Table 6-35: Other terrestrial invertebrates

Species	Record year	Conservation Status
Black Darter *Sympetrum danae*	2025	Least Concern
Brown Hawker *Aeshna grandis*	2025	Least Concern
Small tortoiseshell *Aglais urticae*	2023	Least Concern
Fox moth *Macrothylacia rubi* (adult & caterpillar)	2023, 2025	Least Concern
Meadow Brown *Maniola jurtina*	2023	Least Concern
Red-veined Darter *Sympetrum fonscolombii*	2023	Not Assessed (Rare Migrant)
Large Red Damselfly *Pyrrhosoma nymphula*	2023	Least Concern
Moorland Hawker *Aeshna juncea*	2023	Least Concern
Speckled Wood *Pararge aegeria*	2023	Least Concern
Small Copper *Lycaena phlaeas*	2023	Least Concern
Painted Lady *Vanessa cardui*	2023	Least Concern
Silver Y Moth *Autographa gamma*	2023	Not Assessed

While no rare/protected invertebrates were found during the field survey, the desktop study indicates that it is possible for notable species to inhabit or utilise habitats within the Site. It is presumed that the potential is ***Local importance, higher value***.

6.7.5.4.2 Proposed Grid Connection

6.7.5.4.2.1 Desktop Study

There are historical records of Desmoulin's whorl snail (*Vertigo moulinsiana*) (Annex II) in 10 km grid square S47 which overlaps Ballyragget (grid connection substation location). Locations of records within this hectad occur at Lisbigney bog, in wet riparian vegetation along the Barrow (just south of Ballynakill), and to the east of Ballyragget. As such, there are no records of this species in areas which could potentially be affected by the GC.

There are 3 records for threatened water beetle species, namely, *Agabus congener* (VU), *Agabus labiatus* (NT), *Helophorus nanus* (VU) within a turlough The Loughans SAC, located beside the Proposed Grid Connection.

In addition, within a 1 km grid square in the town of Urlingford, which is traversed by the Proposed Grid Connection will intersect, there is single record (2022) for red-tailed Bumblebee (*Bombus lapidarius*), which is a near threatened species.

No records of this species or any other rare/protected terrestrial invertebrates directly overlapping the Proposed Grid Connection were identified.

6.7.5.4.2.2 Field Survey

No terrestrial invertebrate species and suitable habitats for notable species listed above were observed during surveys of the Proposed Grid Route and the HDD crossing points.

No records for an individual and suitable habitats of Desmoulin's whorl snail.

Therefore, it is presumed that the population of notable invertebrates along the GC is of ***Local Importance, lower value***.

6.7.5.4.3 Proposed Turbine Delivery Route

6.7.5.4.3.1 Desktop Study

There are no historical records of notable terrestrial invertebrate species within the 1km grid squares overlapping with the Proposed Turbine Delivery Route nodes within the last 20 years.

6.7.5.4.3.2 Field Survey

No terrestrial invertebrate species were observed during surveys of the Proposed Turbine Delivery Route nodes.

6.7.6 Aquatic Ecology

6.7.6.1 Desktop Study

S25, the 10km grid square overlapping the Proposed Wind Farm and S15 which is located downstream of the Proposed Wind Farm within the Suir Catchment and the 1km grid squares along the Proposed Grid Connection and Turbine Delivery Route were searched for NPWS and NBDC historical records for the last 20 years. Table 6-36 details these records.

No rare/protected fish, molluscs and aquatic invertebrates were recorded during the last 20 years within the Proposed Wind Farm site. However, three rare and/or protected fish species, namely, Atlantic salmon (*Salmo salar*), European eel (*Anguilla anguilla*) and brook lamprey (*Lampetra planeri*), and white-clawed crayfish were recorded within 1km grid squares including rivers located downstream of watercourses draining the Proposed Wind Farm.

Within two of 1km grids along the Proposed Grid Connection, S3563 and S4471, otters were recorded in 2015 as mentioned in Section 6.7.5.1.2.1.

No rare/protected fish, molluscs and aquatic invertebrates were recorded in areas overlapping the Proposed Turbine Delivery Route nodes within the last 20 years.

As per aquatic baseline reports for the Proposed Development by Triturus Environmental Ltd., it has been reported that the rivers relevant to the Proposed Development support a number of aquatic species as detailed below.

"*The Clover River, a tributary of the Drish River, is known to support brown trout, lamprey (Lampetra sp.), three-spined stickleback, pike, perch (Perca fluviatilis) and stone loach (Triturus 2021 & 2023 data). The Breegagh River, another Drish River tributary, also supports Atlantic salmon, brown trout, lamprey (Lampetra sp.), European eel, minnow, stone loach and three-spined stickleback (Triturus 2021 & 2023 data). The Black River (Two Mile Borris) is known to support Atlantic salmon, brown trout, lamprey (Lampetra sp.), European eel and stone loach (Triturus 2021 & 2023 data; O'Connor, 2007). The North Glengoole River, a Black River tributary, supports Atlantic salmon, brown trout, European eel and three-spined stickleback (Triturus 2021 & 2023 data).*"

In addition, the Suir Catchment which is overlapped by the Proposed Wind Farm, TDR and western end of the GC is "a catchment with previous records of *Margaritifera*, current status unknown" based on *Margaritifera* Sensitive Areas mapping (NPWS, 2020).

The catchments overlapping the rest of the Proposed Grid Connection, namely the Nore Middle and Nore Upper are designated to Catchments of other extant populations for freshwater pearl mussel and catchments of SAC populations listed in S.I. 296 of 2009, respectively. However, Triturus (2025) noted the following: "*a low number of records were available for freshwater pearl mussel (Margaritifera margaritifera) for the River Nore located between the River Erkina confluence and Ballyragget in the 1993 to 2007 period (i.e. including a stretch downstream of the proposed project). However, no live mussel has been recorded in this area of the River Nore since 2007 (Pascal Sweeney pers. comm.), including during a survey completed in May 2023 (Triturus data)*".

Table 6-36: Historical Aquatic Ecology Records within 10km grid squares overlapping/downstream of the Proposed Wind Farm and 1km grid squares overlapping the GC and TDR nides

Species	Year of Last Record	Grid	Location	Survey/Dataset	Protection
Proposed Wind Farm					
Atlantic Salmon (*Salmo salar*)	2013	S1055	Outside but downstream of the Proposed Wind Farm. 1km grid including River Suir, unnamed stream and Lower River Suir SAC.	Local BioBlitz Challenge 2013	Protected Species: Annex II and Annex V Threatened Species: Vulnerable
European Eel (*Anguilla anguilla*)	2013	S1055	Outside but downstream of the Proposed Wind Farm. 1km grid including River Suir, unnamed stream and Lower River Suir SAC.	Local BioBlitz Challenge 2013	Threatened Species: OSPAR Convention Threatened Species: Critically Endangered
Brook Lamprey (*Lampetra planeri*)	2016	S1055	Outside but downstream of the Proposed Wind Farm. 1km grid including River Suir, unnamed stream and Lower River Suir SAC, 10km west of the Site	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	Protected Species: Annex II and Annex V Protected Species: Wildlife Acts
White-clawed Crayfish (*Austropotamobius pallipes*)	2017 2007 2007	S15 S206583 S164560	Outside but downstream of the Proposed Wind Farm. Clover River, 2.5km west of the Site. Breagagh river, 4.0km west of the Site	General Biodiversity Records from Ireland	Protected Species: Annex II

Species	Year of Last Record	Grid	Location	Survey/Dataset	Protection
Proposed Grid Connection / Turbine Delivery Route					
Otter (*Lutra lutra*)	2015	S3563 S4471	Along the Proposed Grid Connection.	Atlas of Mammals in Ireland 2010-2015	Protected Species: Annex IV Protected Species: Wildlife Acts

6.7.6.2 Field Survey

Triturus Environmental Ltd. conducted aquatic ecology surveys for the Proposed Development in 2021, 2023 and 2025 at locations covering the Site and surrounding catchment, the Proposed GC, TDR and surrounding catchments. A fisheries habitat appraisal of all aquatic survey sites was completed.

Survey sites were at 16 no. riverine and 17 no. lacustrine sites surveyed in September and October 2021, 30 no. riverine and 17 no. lacustrine in September and October 2023 and 29 no. riverine or 4 no. lacustrine sites surveyed in September 2025, which are located within the River Suir and River Nore Catchments. A total 21 no. lacustrine sites within the Site were surveyed over 2021, 2023 and 2025 (see Appendix 6.2).

As mentioned in Chapter 9, 1 no. watercourse crossing for the GC is located within the River Suir Catchment. This is situated at an existing crossing where a local road passes over the Black River (Drish River) within the Drish_020 WFD river sub-basin. In addition, the following crossings for the GC are located within the Nore Catchment:

- There is an existing road bridge crossing over the Goul River (EPA Code: 15G02) to the southwest of Urlingford along the R639 in the Goul_202 WFD river sub-basin;
- An existing road bridge crossing along the R639 at Urlingford over the Ardreagh Stream (EPA Code: 15A03) in the Ardreagh_010 WFD river sub-basin;
- 2 no. existing crossings (road bridges) along the R693 over the Borrisbeg Stream (EPA Code: 15B18) in the Goul_030 WFD river sub-basin;
- A crossing along the R693 over the EPA mapped Clomantagh Lower Stream (EPA Code: 15C91) in the Nuenna_010 WFD river sub-basin. However, site inspections could not identify a watercourse at this location. This crossing is included in the impact assessment for the purposes of a conservative assessment;
- There are 2 no. existing crossings located in the Nuenna_020 WFD river sub-basin in the vicinity of Freshford. These crossings occur along the R693 over the Gorteenahilla Stream (EPA Code: 15G08) and along the R694 over an unmapped watercourse;
- An existing road bridge crossing over the Lismaine Stream (EPA Code: 15L16) along the R694 in the Nore_150 WFD river sub-basin;
- An existing crossing over the Lisdowney Stream (EPA Code: 15L02) along the R694 in the Nore_140 WFD river sub-basin; and,
- A new proposed crossing over the River Nore in the vicinity of Ballyragget substation.

The detailed baseline assessment of the aquatic environment is presented in Appendix 6.2 and summarised hereunder.

6.7.6.2.1 Fisheries

During field surveys at riverine sites, Atlantic salmon, lamprey (*Lampetra* sp.), European eel, brown trout (*Salmo trutta*), stone loach (*Barbatula barbatula*), minnow (*Phoxinus phoxinus*), pike (*Esox luciu*), perch (*Perca fluviatilis*) and three-spined stickleback (*Gasterosteus aculeatus*), were recorded.

Atlantic salmon were recorded from a total of 7 no. sites located on the Drish River, Ballygammane River, Black River and its North Glengoole River tributary and the Breegagh River. Brown trout were also recorded at these sites, in addition to sites on the Clover River, North Glengoole River and the Black River. Although the quality of salmonid habitat was recorded generally as poor due to significant hydromorphological pressures resulting from arterial drainage (i.e. extensive straightening & deepening)" throughout the surveyed sites, some riverine sites were found of excellent to good for holding, nursery and/or spawning.

Lamprey ammocoetes (*Lampetra* sp.) were recorded from 2 no. sites on the Black River (low density) and Breegagh River (high density) during targeted electro-fishing. *Lampetra* sp. was also recorded at site in Breegagh River, Ballymurreen Bridge 2023 and 2021, Black River, Two Mile Borris 2025. It is considered that the distribution of lamprey within the surveyed sites was highly restricted due to the paucity of suitable nursery (soft sediment) habitat, in addition to the presence of sub-optimal or absence of spawning habitat, primarily caused by significant arterial drainage pressures.

European eel were only recorded in low densities at a total of 7 no. sites on an unnamed Clover River tributary, Drish River, North Glengoole River and the Black River. The aquatic baseline report considers the suitability of the riverine sites as habitats for European eel is low due to the following factors: "*the paucity of eel recorded during the electro-fishing surveys was considered to reflect a combination sub-optimal habitat resulting from historical modifications and low summer flows at numerous survey sites and the large instream distance from marine habitats*".

None of the lakes at the Site are considered to be of fisheries value due to being shallow, highly turbid (peat stained), poorly vegetated, isolated from other aquatic habitats and of lower productivity.

Given the above, it is presumed that the holding, nursery and/or spawning fish species within the waterbodies within the Site and along the GC are ***Locally Importance, higher value***.

6.7.6.2.2 White-Clawed Crayfish

In 2025, an adult white-clawed crayfish was captured via hand searching from the riverine site on the Ardreagh River upstream of the GC crossing point in Urlingford. No other live crayfish were recorded across all other surveys. In addition, inspection of otter spraints at 3 no. sites on the Black River, Breegagh River and Lisdowney Stream did not reveal the presence of crayfish remains in 2025.

In addition, white-clawed crayfish eDNA was detected at sites on the Clover River, Black River, Drish River and Breegagh River in 2021, and that recent crayfish remains were recorded in otter spraint at survey site E2 in 2023 on the Ardreagh River, Lisduff, which overlaps the GC. Furthermore, some good suitability for white-clawed crayfish was identified at sites of 2023 and 2025 surveys along the GC.

Given the slight signs of the presence, it is presumed that white-clawed crayfish existing within the Site and along the GC is ***Locally Importance, higher value***.

6.7.6.2.3 Macro-invertebrates

Gyrinus urinator, which is noted as IUCN Near-Threatened (NT) species in the IRL Water beetles (Foster *et al*., 2009), was recorded at site C6 on the Black River, located downstream of the watercourses draining the Site in September 2025. Given the amount of the record, it is presumed that *Gyrinus urinator* present downstream of the Site is ***Locally Importance, higher value***.

With the exception of the above, no other rare or protected macro-invertebrate species (according to national red lists) were recorded in the biological water quality samples taken from 28 no. wetted riverine sites in September 2023, 17 no. lake/wetland sites in October 2023, and 20 no. wetted riverine sites or 4 no. sweep samples from lake sites in 2025. Whilst not protected, as a note, the nationally uncommon dytiscid beetle (*Hyphydrus ovatus*) and the pigmy backswimmer (*Plea minutissima*) were recorded in 2025 at sites L18 and L20 respectively.

6.7.6.3 Aquatic Ecological Value

Generally, the watercourses within the Site and in the downstream in the wider catchment have been subjected to hydromorphological pressures. In addition, the lakes within the Site have established as cutover bog lakes/ponds rather than natural lakes with shallow depth, high turbidity and poor fisheries value; therefore all are assessed as being **Locally important Lower value** in terms of aquatic ecology. The findings of desktop assessment and field survey informed the assessed ecological importance of these aquatic habitats and species as set out in Table 6-37.

Table 6-37: Aquatic Ecological Value

SITE and Description	Q-value	Salmonid value/records	Lamprey value/records	White-clawed crayfish value/records	Otter records	Other higher value species	Aquatic Ecological Value
Riverine within the Site and/or along the Grid Connection							
SITE A1a (2021) Unnamed stream, Longfordpass North	N/A, site was dry in 2021	Unsuitable due to dry, ephemeral nature	Unsuitable due to dry, ephemeral nature	N/A	None	-	**Locally important (lower value)**
SITE A2 (2021)/A1b (2023) Upper reaches of an unnamed Drish River tributary	N/A, site was dry in 2021 Q-value=3 (poor) in 2023	Poor	Poor	Unsuitable	None	-	**Locally important (lower value)**
SITE A2 (2023) Lower reaches of an unnamed tributary of the Drish River	Q-value=2-3 (poor) in 2023	Unsuitable due to dry, ephemeral nature	Unsuitable due to dry, ephemeral nature	Unsuitable	None	-	**Locally important (lower value)**
SITE: A3 (2021, 2023)/ A4 (2025) Unnamed tributary of the Clover River	Q-value=2-3 (poor) in 2023 N/A, site was dry in 2025	Unsuitable due to semi-dry, ephemeral nature	Unsuitable due to semi-dry, ephemeral nature	Unsuitable	None	-	**Locally important (lower value)**
SITE A4 (2021) Unnamed stream, Noard in cutover bogs	Q-value=3 (poor) in 2021	Poor	Poor	Poor	None	European eel recorded in 2021	**Locally important (higher value)**
SITE: A4 (2023)/ A1 (2025)	Q-value=3 (poor) in 2023, 2025	Poor holding / nursery No spawning	Unsuitable	Poor	Regular spraint No signs in 2025	-	**Locally important (higher value)**

SITE and Description	Q-value	Salmonid value/records	Lamprey value/records	White-clawed crayfish value/records	Otter records	Other higher value species	Aquatic Ecological Value
Upper reaches of unnamed tributary of the Clover River, Noard.		Brown trout recorded in 2023					
SITE: A5 (2023)/A2 (2025) Unnamed tributary of the Clover River.	Q-value=3 (poor) in 2021 & 2023 N/A, site was dry in 2025	Unsuitable due to siltation and enrichment	Unsuitable due to siltation and enrichment	Poor	None	-	**Locally important (lower value)**
SITE A6 (2021) Clover River, Noard	Q-value=3-4 (moderate) in 2021	Good for adult Limited spawning Brown trout recorded in 2021	Moderate spawining Sub-optimal for lamprey ammocoete	Two predated white-clawed crayfish were recorded in 2021	Sprint recorded in upstream of the bridge in 2021	Good suitability for European eel	**Locally important (higher value)**
SITE A5 (2021), A6 (2023)/A3 (2025) Clover River, Leigh	Q-value=3 (poor) in 2021, 2023 & 2025	Good holding Limited, localised spawning Brown trout recorded in 2023	Moderate spawning upstream Sub-optimal to unsuitable for nursery	Moderate Remains of predated crayfish recorded in 2021	Spraint recorede in upstream ot the bridge in 2023 No signs in 2025	-	**Locally important (higher value)**
SITE: A7 (2023)/ A5 (2025) Clover River, Noard	Q-value=3-4 (moderate) in 2023 Q-value=3 (poor) in 2025	Moderate holding Limited spawning / nursery Atlantic salmon, brown trout recorded in 2023	Sub-optimal spawning / nursery Lamprey sp. recorded 2023	Good	Prints in 2023 No signs in 2025	Good suitability for European eel	**Locally important (higher value)**

SITE and Description	Q-value	Salmonid value/records	Lamprey value/records	White-clawed crayfish value/records	Otter records	Other higher value species	Aquatic Ecological Value
SITE B1 (2021) Unnamed stream, Longfordpass South	Q-value=3 (poor) in 2021	Unsuitable due to siltation and the lack of flow	Unsuitable due to siltation and the lack of flow	Unsuitable	None		**Locally important (lower value)**
SITE B1 (2023 & 2025) Drish River, Longfordpass South	Q-value=3 (poor) in 2023, 2025	Poor	N/A	Low	None	Good suitability for European eels	**Locally important (lower value)**
SITE B2 (2025) Uppermost reaches of unnamed Drish River tributary	N/A, site was dry	None	None	Low	None	-	**Locally important (lower value)**
SITE B2 (2021, 2023)/ B3/G1 (2025) Drish River, Longfordpass North Annex I hydrophilous tall herb (6430) habitat present	Q-value=2-3 (poor) in 2023 Q-value=3 (poor) in 2025	Poor Atlantic salmon recorded in 2023	Poor	Low	None; known to use site (spraint site upstream)	European eel recorded in 2021 & 2023	**County importance**
SITE B3 (2021, 2023)/ B4 (2025) Drish River, Castletown Bridge	Q-value=2-3 (poor) in 2023 Q-value=3 (poor) in 2021 & 2025	Good holding Poor spawning / nursery Brown trout recorded in 2023	Poor spawning / nursery Lamprey sp. recorded in 2023	Good	None	Good suitability for European eels	**Locally important (higher value)**
SITE B4 (2021) Cooleeny River, Killoran	N/A, site was dry	Unsuitable due to dry, ephemeral nature	Unsuitable due to dry, ephemeral nature	N/A	None		**Locally important (lower value)**

SITE and Description	Q-value	Salmonid value/records	Lamprey value/records	White-clawed crayfish value/records	Otter records	Other higher value species	Aquatic Ecological Value
SITE B5 (2021)/ B4 (2023) Drish River at Ballyduff Bridge	Q-value=3-4 (moderate) in 2021 Q-value=3 (poor) in 2023	Good holding / spawning Excellent nursery Atlantic salmon, brown trout recorded in 2021 & 2023	Limited spawning Unsuitable nursery	Good	None; regular spraint known upstream	European eel recorded in 2021 Good suitability for European eels	**Locally important (higher value)**
SITE B5 (2023 and 2025) Drish River, Drish Bridge	Q-value=4 (good) in 2023 Q-value=3 (poor) in2025	Excellent holding / nursery Good to high spawning upstream Atlantic salmon, brown trout recorded in 2023	Limited nursey Good to high spawning upstream Lamprey sp. recorded in 2023	Good	None	European eel recorded in 2023	**Locally important (higher value)**
SITE B6 (2021) Ballygammane River, Athlummon	Q-value=3 (poor) in2021	Limited holding Some suitability for spawning but reduced Most value nursery Atlantic salmon, brown trout recorded in 2021	There were some soft sediment accumulations but largely flocculent Lamprey sp. recorded in 2021	Low	None	-	**Locally important (higher value)**
SITE B6 (2025) River Suir (16S02), Thurles Bridge	Q-value=3 (poor) in 2025	Limited holding Moderate spawning Good nursery	Sub-optimal nursery	Moderate to Poor	None	-	**County important**

SITE and Description	Q-value	Salmonid value/records	Lamprey value/records	White-clawed crayfish value/records	Otter records	Other higher value species	Aquatic Ecological Value
SITE C1 (2021) Black River, Clonoura	N/A, site was dry	Unsuitable due to dry, ephemeral nature	Unsuitable due to dry, ephemeral nature	N/A	None	-	**Locally important (lower value)**
SITE C1 (2023 and 2025) Black River, Clonoura	N/A, site was dry	Unsuitable due to dry, ephemeral nature	Unsuitable due to dry, ephemeral nature	Unsuitable	None	-	**Locally important (lower value)**
SITE C2 (2021, 2023 and 2025) Black River, Derryvella	Q-value=3 (poor) in 2021, 2023 & 2025	Good holding Limited spawning Moderate nursery --- Brown trout recorded in 2023	Limited spawning Unsuitable nursery	Limited	None	Some suitability for European eel	**Locally important (higher value)**
SITE C3 (2021) North Glengoole River, Derryvella	N/A	Low nursery Spawning habitat was present --- Atlantic salmon recorded in 2021	Unsuitable	Poor	None	European eel recorded in 2021	**Locally important (higher value)**
SITE C3 (2025) Heavily modified tributary of Glengoole North River adjacent to the proposed turbine array .	N/A, site was dry	None	None	Unsuitable	None	-	**Locally important (lower value)**
SITE C3 (2023)/C4 (2021, 2025)		Moderate holding / spawning	Poor	Limited	None		

SITE and Description	Q-value	Salmonid value/records	Lamprey value/records	White-clawed crayfish value/records	Otter records	Other higher value species	Aquatic Ecological Value
North Glengoole River at rail crossing (culvert), upstream of the Black River	Q-value=3-4 (moderate) in 2021 Q-value=3 (poor) in 2023, 2025	Brown trout recorded in 2021 & 2023				Some suitability for European eel	**Locally important (higher value)**
SITE C4 (2023)/C5 (2021, 2025) Black River, Derryhogan .	Q-value=3 (poor) in 2023 Q-value=3-4 (moderate) in 2025	Good holding Moderate spawning / nursery Brown trout recorded in 2021 & 2023	Limited spawning (improved upstream) Unsuitable nursery	Poor eDNA of white-clawed crayfish detected in 2021	None	-	**Locally important (higher value)**
SITE C5 (2023)/C6 (2021, 2025) Black River, Two Mile Borris Annex I floating river vegetation [3260]	Q-value=4 (good) in 2021 Q-value=3 (poor) in 2023, 2025	Good holding Limited spawning Very high to good nursery Atlantic salmon, brown trout recorded in 2021 & 2023	Limited spawning / nursey Lamprey sp. recorded in 2021 & 2023	Good	Abundant prints (2023 & 2025) and spraint (2025)	Red-listed beetle Gyrinus urinator recorded in 2025 European eel recorded in 2023	**Locally important (higher value)**
SITE D1 (2021) Breegagh River, Killeen	Q-value=3 (poor) in 2021	Excellent for adult Good holding Moderate nursery No spawning habitat	No spawning habitat	Low	None	Some good suitability for European eel	**Locally important (higher value)**

SITE and Description	Q-value	Salmonid value/records	Lamprey value/records	White-clawed crayfish value/records	Otter records	Other higher value species	Aquatic Ecological Value
		Atlantic salmon, brown trout recorded in 2021					
SITE D1 (2023 and 2025) Breegagh River, Killeen	Q-value=3-4 (moderate) in 2023 Q-value=3 (poor) in 2025	High holding Poor spawning Good nursery --- Atlantic salmon, brown trout recorded in 2023	Poor	Limited	None	-	**Locally important (higher value)**
SITE D2 (2021, 2023 and 2025) Breegagh River, Ballymurreen Bridge	Q-value=3 (poor) in 2021, 2023 & 2025	Poor holding Sparse spawning Moderate nursery --- Atlantic salmon, brown trout recorded in 2021 & 2023	Localised spawning (area reduced in 2025) Sub-optimal nursery --- Lamprey sp. recorded in 2021 & 2023	Good	Abundant prints. Otter signs recorded in 2025.	-	**Locally important (higher value)**
SITE D3 (2023 and 2025) Breegagh River, Archerstown Bridge Annex I floating river vegetation [3260] (2023 only; absent in 2025)	Q-value=3-4 (moderate) in 2023 Q-value=3 (poor) in 2025	Excellent to high holding / nursery High to good spawning --- Atlantic salmon, brown trout recorded in 2023	Poor nursery High spawning upstream	High	Otter signs recorded in 2023	European eel recorded in 2023	**Locally important (higher value)**

SITE and Description	Q-value	Salmonid value/records	Lamprey value/records	White-clawed crayfish value/records	Otter records	Other higher value species	Aquatic Ecological Value
SITE E5 (2023) Clomantanagh Lower Stream, Clomantanagh Lower	Q-value=2 (bad) in 2023	Unsuitable due to heavy siltation and modification	Unsuitable due to heavy siltation and modification	Unsuitable	None	-	**Locally important (lower value)**
SITE G2 (2025) River Goul, Urlingford	Q-value=3 (poor) in 2025	Poor	Poor	Unsuitable	None	-	**Locally important (lower value)**
SITE G3 (2025) Ardreagh River, Urlingford	Q-value=3 (poor) in 2025	Moderate spawning / nursery Some value holding in upstream	Some nursery suitability for lamprey ammocoetes	Low --- Single individual was recorded in 2025	None	Some suitability for European eel	**Locally important (higher value)**
SITE G4 (2025) Borrisbeg River, Borrismore	Q-value=3 (poor) in 2025	Low spawning Moderate nursery Limited holding	Some stability for lamprey ammocoetes	Moderate	None	Some suitability for European eel	**Locally important (higher value)**
SITE G5 (2025) Borrisbeg River, Borrismore	N/A, site was dry	Poor to Unsuitable due to dry, ephemeral nature	Poor to Unsuitable due to dry, ephemeral nature	Poor to Unsuitable due to dry, ephemeral nature	None	-	**Local importance (lower value)**
SITE G6 (2025) Clomantagh Lower Stream, Clomantagh Lower	N/A, site was dry	Unsuitable due to dry, ephemeral nature	Unsuitable due to dry, ephemeral nature	Unsuitable due to dry, ephemeral nature	None	-	**Local importance (lower value)**

SITE and Description	Q-value	Salmonid value/records	Lamprey value/records	White-clawed crayfish value/records	Otter records	Other higher value species	Aquatic Ecological Value
SITE G7 (2025) Gorteenahilla River, Freshford	N/A, site was dry	Unsuitable due to dry, ephemeral nature	Unsuitable due to dry, ephemeral nature	Unsuitable due to dry, ephemeral nature	None	-	**Local importance (lower value)**
SITE G8 (2025) Unmapped stream at the R694	N/A, site was dry	Unsuitable due to being highly modified and dry	Unsuitable due to being highly modified and dry	Unsuitable due to being highly modified and dry	None	-	**Local importance (lower value)**
SITE E8 (2023) / G9 (2025) Lismaine Stream (15L16), a tributary of the River Nore	N/A, site was dry	Unsuitable due to dry, ephemeral nature but some physical suitability in further downstream	Unsuitable due to dry, ephemeral nature	Unsuitable due to dry, ephemeral nature	None	-	**Local importance (lower value)**
SITE E9 (2023) / G10 (2025) Lismaine Stream (15L16), a tributary of the River Nore	Q-value=3 (poor) in 2025	Highest value nursery Valuable holding Some value spawning but getting degreded --- Atlantic salmon, brown trout recorded in 2023	Unsuitable nursery Some value spawning but getting degraded	Moderate	Regular spraint site recoded in 2025	Locally suitable for European eel European eel recorded in 2023	**Local importance (higher value)**
SITE E10 (2023) River Nore, Parksgrove In River Barrow and River Nore SAC (002162), The River	Q-value=3-4 (moderate) in 2023	Known to support Atlantic salmon, brown trout (Triturus 2021 data)	Known to support lamprey spp. (Triturus 2021 data)	Low	None Some suitability for foraging	Known to support European eel (Triturus 2021 data)	**International importance**

SITE and Description	Q-value	Salmonid value/records	Lamprey value/records	White-clawed crayfish value/records	Otter records	Other higher value species	Aquatic Ecological Value
Nore/Abbeyleix Woods Complex pNHA (002076) and the River Nore SPA (004233)		Valuable holding Limited nursery, spawning	Moderate nursery Unsuitable spawning				
SITE G11 (2025) River Nore, Moatpark In River Barrow and River Nore SAC (002162), The River Nore/Abbeyleix Woods Complex pNHA (002076) and the River Nore SPA (004233)	Q-value=3 (poor) in 2025	Highly valuable spawning upstream, no suitable spawning / nursery downstream Good holding	Some value for lamprey ammocoetes	Moderate	None High suitability for foraging	Suitable for European eel holding	**International importance**
Lakes/Wetlands at Site							
SITE L1 -16 (2023) Small-large cutover bog lakes and ponds	N/A	Poor	Poor	None	None	-	**Locally important (lower value)**
SITE L17 (2023) Artificial lake near Loch Doire Bhile	N/A	None	None	Good	None		**Locally important (lower value)**
SITE L18 - 21 (2025) Oligotrophic cutover peatland bog lakes	N/A	None	None	None	None		**Locally important (lower value)**

6.8 Identification of Key Ecological Receptors

Table 6-38 lists all identified ecological receptors and assigns them an ecological importance in accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009). This table also provides the rationale for this determination and identifies the habitats and species that are Key Ecological Receptors (KERs). The potential effects of the Proposed Development on these ecological receptors is considered in the impacts section of this report and mitigation/ measures will be incorporated into the Proposed Development where required, to avoid potential significant effects on these receptors.

Table 6-38: Ecological Receptors

Category	Feature	Evaluation	Rationale for KER	KER
European Designated Sites	**The Proposed Wind Farm** Lower River Suir SAC (002137)	Internationally Important	Special Area of Conservation (SAC) identified in the AASR/NIS which accompanies the planning application as having S-P-R connectivity with the Proposed Development. (Note the S-P-R connectivity to the Slievefelim to Silvermines Mountains SPA and Slieve Bloom Mountains SPA is assessed in Chapter 7 - Ornithology of this EIAR).	Yes
	The Proposed GC/TDR The Loughans SAC (000407), The River Barrow and River Nore SAC (002162).			
Nationally Designated Sites	Kilcooly Abbey Lake pNHA (000958)	National Importance	Nationally Designated Site without any S-P-R connectivity for habitats and non-avian fauna. Has ornithological interest and as such is assessed in detail within Chapter 7 Ornithology.	Yes (See Chapter 7.)
	Cabragh Wetlands pNHA (001934) The Loughnans pNHA (000407) The River Nore/Abbeyleix Woods Complex pNHA (002076)		Nationally Designated Sites identified as having S-P-R connectivity with the Proposed Development.	Yes

Category	Feature	Evaluation	Rationale for KER	KER
Terrestrial Habitats and Associated Species	Cutover Bog (PB4) with high *Sphagnum* cover	County Importance	Cutover bog is the dominant habitat identified within the Study Area. Cutaway bog within the Site do not correspond to habitat types that are listed on Annex I of the EU Habitats Directive. HS group has significant coverage of Sphagnum moss, which indicates this group has potential to develop into raised bog and/or Annex I type habitat Active raised bogs (7110) over long-terms period. However, HS group cutover bogs do not overlap the footprint of the Proposed Development.	No
	Cutover Bog (PB4)	Local Importance – Higher Value	Cutover bog PB4 is the major habitat type within the Site. Semi-natural habitat, having a potential to accommodate mammals, herpetofauna and invertebrates for foraging, resting and commuting. Vegetation communities are various across the Site.	Yes
	Scrub (WS1)	Local Importance – Higher Value	Scrub consisting of downy birch, grey willow and/or gorse were identified within the Study Area of all Proposed Turbines. Semi-natural habitat.	Yes
	Immature Woodland (WS2)	Local Importance – Higher Value	Immature woodlands consisting of 5m (4m in wetlands) height downy birch and grey willow without well-developed canopy-subcanopy-shrub layers were identified within the Study Area of all Proposed Turbines. Semi-natural habitat.	Yes

Category	Feature	Evaluation	Rationale for KER	KER
	Raised Bog (PB1)	National Importance	The high bog habitats within the Site were encompassed by drainage ditches and the margins were drying out, and correspond with 'Marginal ecotope' without pools and high hummocks. While there is no infrastructure proposed within the high bog habitat within the Site, this habitat occurs within 20m of the proposed access track in the northernmost section of the Site and within 20m of the proposed internal access track between T02 and T06.	Yes
	Reed and large sedge swamps (FS1)	Local Importance – Higher Value	Waterlogged habitats with vegetation surrounding open waterbodies have potential to provide important habitats for smooth newts laying eggs and to support a diversity of aquatic plants.	Yes
	Dry calcareous and neutral grassland (GS1)	Local Importance – Higher Value	The main internal access track in the northern section of the Site overlaps dry calcareous grassland which has established along the disused bog railway and adjacent access track. While a number of indicator species for calcareous grassland were recorded, the conditions under which this habitat is establishing originate from human activity and recent disturbance. Although this habitat supports several high quality/positive indicators for Annex I type habitat 6210 Semi-natural dry grasslands, including orchid species, indicator species do not occur ubiquitously or at high densities and have a patchy distribution.	Yes

Category	Feature	Evaluation	Rationale for KER	KER
			In addition, this habitat established with artificial intervention and were intensively disturbed by horse grazing, trampling and other human activity. Therefore, it is deemed that GS1 at this location is not representative of Annex I calcareous grassland type. GS1 at the southernmost section lacks adequate high quality and positive indicators and orchid species, although several calcicoles were identified. As such, it is deemed that GS1 at this location is not representative of Annex I calcareous grassland type.	
	Wet grassland (GS4)	Local Importance – Higher Value	Found along internal access tracks. Given the transitional nature on cutover habitats and poor numbers of positive indicator species, the wet grasslands at the Site do not correspond with the Annex 1 habitat '*Molinia meadows [6410]*'. However, this habitat type generally supports devil's-bit scabious, which is the foodplant for marsh fritillary.	Yes
	Improved agricultural grassland (GA1)	Local Importance – Lower Value	Intensively managed and artificial habitat of limited biodiversity value.	No
	Dry meadows and grassy verges (GS2)	Local Importance – Higher Value	This habitat is found along the hedgerows overlapped by the Proposed Construction Borrow Pit and on road margins along the GC. Semi-natural habitat.	Yes
	Bog woodland (WN7)	Local Importance – Higher Value	This habitat is found around as small patches within the footprint of the Site entrance along the Longfordpass East local road and within 500m of some turbines, located at the edges of the Site boundary.	Yes

Category	Feature	Evaluation	Rationale for KER	KER
			It does not correspond with Annex I type habitat 91D0 Bog woodland due to the absence of *Sphagnum* cover and other indicator species of this habitat.	
	Recolonising bare ground (ED3)	Local Importance – Lower Value	Early successional habitat of limited biodiversity value.	No
	Dense bracken (HD1)	Local Importance – Lower Value	Habitat of limited biodiversity value.	No
	Mixed broadleaved/conifer woodland (WD2)	Local Importance – Higher Value	Semi-natural habitat; outside proposed footprint and ZoI. However, there is the potential to be affected by dust deposition.	Yes
	Conifer plantation (WD4)	Local Importance – Lower Value	Intensively managed and artificial habitat of limited biodiversity value. Outside proposed infrastructure footprint; limited overlap with habitat survey ZoI.	No
	Hedgerows (WL1) and Treelines (WL2)	Local Importance – Higher Value	These linear habitats, while having a generally low floristic composition provide valuable ecosystem services for flora and fauna species in the locality in terms of cover, refuge and connectivity.	Yes
	Oak-birch-holly woodland (WN1)	Local Importance – Higher Value	An area of this habitat type is overlapped by a proposed amenity trail north of the Proposed PDA B. Mature trees which are considered to be of Local Importance, Higher value due to their ecological corridor functionality and ecosystem services for local ecological receptors.	Yes
	Earth banks (BL2)	Local Importance – Lower Value	Habitat of limited biodiversity value.	No
	Buildings and artificial surfaces (BL3)	Local Importance – Lower Value	Habitat of limited biodiversity value.	No
	Spoil and bare ground (ED2)	Local Importance – Lower Value	Habitat of limited biodiversity value.	No

Category	Feature	Evaluation	Rationale for KER	KER
	Ornamental/non-native shrub (WS3)	Local Importance – Lower Value	Non-native species and bare peat are dominant.	No
	(Mixed) conifer woodland (WD3)	Local Importance – Higher Value	Semi-natural habitat; outside proposed footprint and ZoI.	No
Aquatic Habitats and Associated Species	Dystrophic lakes (FL1)	Local Importance – Higher Value	Although all lakes within the Study Area lack significant fisheries/aquatic invertebrate value due to shallow water and high turbidity, these lakes form semi-natural habitats and have potential to support rare aquatic species such as least bur-reed at local scale.	Yes
	Acid oligotrophic lakes (FL2)	Local Importance – Higher Value	Although all lakes within the Study Area lack significant fisheries/aquatic invertebrate value due to shallow water and high turbidity, these lakes form semi-natural habitats and have potential to support aquatic plant species.	Yes
	Other artificial lakes and ponds (FL8)	Local Importance – Higher Value	Although aquatic species or habitats of high conservation value are absent in the artificial lake within the southernmost section of the Site, this open water habitat has potential to support white-clawed crayfish, diverse aquatic plants and to host breeding frogs as with adjoining Loch Doire Bhile. Outside proposed footprint and ZoI.	No
	Drainage ditches (FW4)	Local Importance – Higher Value	The site of the Proposed Development is drained by numerous artificial drainage ditches. These are predominantly small man-made, slow flowing channels that are often devoid of vegetation. Although the biodiversity value is limited, open and stagnant water habitats are locally important to host breeding amphibians and to support rare/protected aquatic plants which can spread by birds of waterways even if there is no connectivity with other waterbodies.	Yes

	Depositing/lowland rivers (FW2)	International Importance County Importance Local Importance – Higher Value Local Importance – Lower Value	The proposed development drains to the Suir and Nore catchments via a number (insert number if you want) of rivers ranging from Local Importance (Lower Value) to International Importance. The two proposed access track crossing points in the Suir catchment will utilise existing culverts, avoiding the need for any instream works or construction of crossing structures. All proposed GC river crossing points will utilise HDD, thereby avoiding instream works and works to existing bridges along the route. While instream works and works to existing bridges are not required, potential for effects on water quality arising from runoff from construction areas exists. As such, all receiving watercourses are potentially subject to indirect effects. The rivers comprising the receiving catchments as a whole are considered a KER due to interconnectedness of the river network within each receiving catchment.	Yes

Category	Feature	Evaluation	Rationale for KER	KER
	Least bur-reed (*Sparganium natans*)	Local Importance – Higher Value	Least bur-reed is not protected species but listed in the Irish Red List for Vascular Plants (2016) as Near Threatened species. The single small stand of this species was found at the bottle sedge swamp in the south shore of the dystrophic lake (L16). The size of the stand found is relatively small, 0.04m^2. This location is outside of any footprints and buffers of the Proposed Wind Farm.	No
	Freshwater pearl mussel (*Margaritifera margaritifera*)	International Importance	The Proposed GC will cross the River Nore via HDD, minimising potential for effects on aquatic receptors. The Nore supports freshwater pearl mussel, which is a QI species for the SAC. The Proposed GC overlaps sensitive catchments for the species, namely Nore Middle and Nore Upper. A low number of records were available for pearl mussel for the River Nore located between the River Erkina confluence and Ballyragget in the 1993 to 2007 period (i.e. downstream of the proposed project). However, this species has not been recorded in this area since 2007, including field surveys by Triturus in 2023 and 2025. Notwithstanding above, there is potential for indirect effects on upstream populations via effects on salmonid hosts.	Yes
	White-clawed crayfish (*Austropotamobius pallipes*)	Local Importance – Higher Value	While not present in the watercourses surveyed within the Site, an adult white-clawed crayfish was captured via hand searching from the riverine site on the Ardreagh River which is crossed by the Proposed Grid Connection. Although no in-stream-works are proposed for the GC, potential for water pollution remains due to runoff and the risk of accidental spillages associated with works in the road corridor.	Yes

Category	Feature	Evaluation	Rationale for KER	KER
	Fisheries - Atlantic salmon, brown trout, European eel and lamprey spp.	Locally Importance – Higher Value	These notable fish species were found within the rivers crossed by the Proposed Grid Connection during the field survey by Triturus in 2023 and 2025. While the Proposed GC will cross watercourses via HDD without in-stream works, in an unmitigated scenario, there might be a risk of sediment or pollutant runoff from excavation works in the road corridor. Other rivers with suitable habitats for these fish species along the Proposed GC could potentially be affected by water pollution due to accidental sediment runoff during the construction phase.	Yes
Protected Terrestrial Mammals	Badger (*Meles meles*)	County Importance	Badger is protected under the Wildlife Act. Two inactive badger setts (annex, outlier sett) are located within c. 144m, 244m from Proposed biodiversity enhancement measures (non-native *Eucalyptus* removal, tree planting) respectively. One active badger sett (main sett) is located outside of the footprint/buffer of the Proposed Development, 192m from the nearest access track. Sett No. 4 is an active annex sett located outside of the footprint/buffer of the Proposed Development, c. 56m from one of the Proposed PDAs/50m from amenity trail.	Yes
	Otter (*Lutra lutra*)	County Importance	Otter is protected under the EU Habitats Directive Annex II and Annex IV and Wildlife Act. One potential holt has been recorded on the riverine of the River Nore in the vicinity of the crossing point for the GC. This point is within River Barrow and River Nore SAC. Therefore, the construction might cause the destruction and/or disturbance of breeding habitat and individual mortality.	Yes

Category	Feature	Evaluation	Rationale for KER	KER
			The majority of watercourses within the Proposed Development site are drainage ditches within cutover bogs and no habitat connectivity with semi-natural habitats and no significant fisheries value; therefore, they are not suitable for otter. However, habitat for otter foraging is potentially subject to indirect effects arising from reductions in water quality affecting prey abundance within watercourses downstream of drains within the Site or along the GC/TDR.	
	Pine Marten (*Martes martes*)	Local Importance – Higher Value	While no breeding or resting places observed, live sighting was confirmed in 2023 within the Site.	Yes
	Irish Hare (*Lepus timidus* subsp. *hibernicus*)	Local Importance – Higher Value	Although the BnM survey data shows sighting records for a total of 6 Irish hares within the Site, hares are a vagile species which do not use fixed locations for resting or breeding and suitable supporting habitat for hare is common and widespread in the locality and wider landscape.	No
	Red Squirrel (*Sciurus vulgaris*)	Local Importance – Higher Value	No resting and breeding sites were identified during the field survey. It is likely that any disturbance to red squirrel as a result of the Proposed Development would have been minimal, as the most areas of woodlands such as conifer plantation and mixed conifer woodland, within which red squirrel may be situated, are outside of the footprint.	No

Category	Feature	Evaluation	Rationale for KER	KER
	Stoat (*Mustela erminea* subsp. *hibernica*)	Local Importance – Higher Value	Although the BnM survey data shows the presence of stoat within the Site, stoats are a vagile species, and no suitable habitats for their dens such as habitats with mature trees with hollows or rock crevices are within the Site/along the GC and TDR.	No
	Daubenton's Bat (*Myotis daubentonii*) Whiskered Bat (*Myotis mystacinus*) Natterer's Bat (*Myotis nattereri*) Leisler's bat (*Nyctalus leisleri*) Nathusius' Pipistrelle (*Pipistrellus nathusii*) Common Pipistrelle (*Pipistrellus pipistrellus*) Soprano Pipistrelle (*Pipistrellus pygmaeus*) Brown Long-eared Bat (*Plecotus auritus*)	Local Importance (Higher Value)	Potential collision/barotrauma, habitat alteration, habitat loss. Bat species have been assessed as Local Importance (Higher Value) as they represent a resident or regularly occurring populations assessed to be important at the local level and are listed in Annex IV of the EU Habitats Directive.	Yes
Herpetofauna	Common lizard (*Zootoca vivipara*)	Local Importance – Higher Value	While not recorded during the site visits, suitable habitat for this species is present in the Proposed Development Site.	Yes
	Smooth newt (*Lissotriton vulgaris*)	Local Importance – Higher Value	This species is a protected species under the Wildlife Acts. Two observations of adults recorded at the Site. The abundance and structural diversity of flooded areas onsite and confirmed presence of adults indicate a breeding population is present. Potential breeding habitat is distributed across the Site.	Yes

Category	Feature	Evaluation	Rationale for KER	KER
	Common Frog (*Rana temporaria*)	County Importance	This species is listed under Annex V of the EU Habitats Directive. While no breeding sites were detected during the filed surveys, there is a number of records of adult individuals within the Site. The habitat mosaics at the Site are suitable for this species, with adults encountered in dense vegetation, and abundant pools providing both hunting and breeding habitat.	Yes
Invertebrates	Marsh Fritillary *Euphydryas aurinia*	County Importance	This species is listed under Annex II of the EU Habitats Directive and there are records for the area. Larval webs, including both of active and discarded, were detected at total of 14 no. locations across the Site between 2023 and 2025. Habitat types were grassy heath with devil'-bit scabious on cutover bogs or wet grasslands.	Yes
	Desmoulin's whorl snail (*Vertigo moulinsiana*)	Local Importance, lower value.	Although the desktop study shows the record of this species within the grid overlapping the GC, no individual and suitable habitats were found during the field survey.	No
	Gyrinus urinator	Local Importance – Higher Value	Rare aquatic beetle, *Gyrinus urinator*, was recorded within the watercourse (C6, see Appendix 6.2) recorded downstream of the Site. Should accidental water pollution caused by the Proposed Development within the Site, this species could be affected.	Yes
	Other Rare/threatened invertebrates	Local Importance – Higher Value	The desktop study shows the potential for the presence of a total of 13 threatened invertebrates within S25 grid, overlapping the Site. Potentially subject to effects arising from changes to habitats at the Site. No records along the GC/TDR.	Yes

6.9 Assessment of Effects on Biodiversity

6.9.1 Do-Nothing Scenario

Whether the Proposed Development were to proceed or not, the remaining measures outlined in the Rehabilitation Plans will continue to be implemented by BnM in agreement with the EPA. The site would continue to be managed as it has been, i.e. continuing revegetation and expansion of wet areas following implementation of Phase 1 rehabilitation (drain blocking and decommissioning of pumps implemented between 2018 and 2021) in peatland habitats, and intensive grassland and hedgerow management within the borrow pit area.

Phase 1 rehabilitation works were completed in Littleton, Longfordpass and Lanespark bogs between 2018-2021. The measures completed included the blocking of drains which has resulted in the presence of areas of standing water within the Site. It is noted that no drain blocking has been carried out in the small area of Longfordpass Bog overlapped by the site.

The current baseline in the peatland areas is variable in terms of progress of rehabilitation/revegetation; areas where peat extraction and ancillary activities ceased earlier are at more advanced stages of revegetation/rehabilitation, while areas where peat extraction ceased later are in the earlier stages of revegetation. As such, certain parts of the site such as the Derryhogan Lakes (see Figure 7-1) and some areas of marginal bog woodland are at more advanced stages of rehabilitation which are likely to be indicative of the habitats which will develop at the more advanced stages of rehabilitation. It is noted that while areas with more advanced stages of revegetation are likely to more closely represent the habitats which will ultimately develop, they are likely to develop further, i.e. wetland habitats are likely to get wetter and continue to expand where suitable conditions exist, and woodland habitats are likely to increase in structural and species diversity as they mature.

As such, the areas with longer-stablished revegetation processes are considered to be indicative of the habitats which will ultimately develop across the bogs within the site, i.e. a mosaic of wetland areas characterised by lakes and high-sphagnum areas of regenerating bog, woodland, and intermediate habitats with open scrub and grassy heath-type vegetation. While habitat types are likely to stabilise eventually, some level of dynamism is likely to persist and stochasticity is likely to influence habitat development and to maintain some level of flux even at the stage where habitats have become relatively stable (e.g. mature woodland and regenerating bog).

While a relatively uniform approach to rehabilitation was undertaken. i.e. drain blocking across the site, existing topography and hydrology have also played roles in the character and pace of revegetation/rewetting. For example, the Longfordpass Lakes developed relatively rapidly after pumping ceased, while other areas such as the north-eastern extremity of Littleton Bog are flooding much more gradually and at a more limited scale following drain blocking. Variability is also evident at Lanespark Bog, characterised by large flooded areas in the south, contrasting with dense scrub and grassland established in drier conditions south-west of T09, and relatively bare peat in many other parts of this bog where revegetation/re-wetting is at a less advanced stage.

The presence of feral horses is also noted to form part of the current baseline at Littleton Bog, with associated effects on vegetation in drier areas, and also potential effects on scrub and woodland development.

In summary, while trends indicative of the future ecological development of the site are well established, the habitats at the site are expected to develop further and increase in extent. These changes will occur irrespective of whether the Proposed Development proceeds or not.

In the do-nothing scenario, the land associated with the proposed borrow pit is likely to continue to be managed as improved agricultural grassland for silage production as it currently is.

The lands traversed by the proposed grid connection and TDR would continue to be used for travel/transport and agriculture.

6.9.2 Potential Effects During the Construction Phase

6.9.2.1 Peatland Rehabilitation

The conditions and associated habitats created by the Phase 1 rehabilitation measures which have been implemented form part of the ecological baseline and as such form an inherent component of the baseline environment considered in the impact assessment. The impact assessment fully considers existing and emerging trends associated with the peatland rehabilitation measures that have been implemented at the Site. The rehabilitation measures relevant to the bogs within the site; Littleton (BnM, 2026a), Longfordpass (2026b) and Lanespark (BnM, 2025a) have already been implemented, and no enhanced rehabilitation measures are proposed. Phase 2 enhanced (PCAS) measures are proposed only for nearby bogs outside the site (Ballybeg and Derryvella) (BnM, 2025a).

Construction of the Proposed Project will take place within the context of continued implementation of the Rehabilitation Plans (BnM 2026a, 2026b & 2025a) which consists of monitoring of the Littleton, Longfordpass and Lanespark Phase 1 measures and enhanced measures at nearby Ballybeg and Derryvella bogs. There will be localised effects arising from habitat loss and drainage as detailed in Section 6.9; however, the proposed wind farm will not interfere with the rehabilitation or compromise re-wetting and revegetation/regeneration at the site scale. The proposed development footprint is limited (proposed infrastructure occupies c.1.9% of the Site; PDAs occupy c. 1.6%) and will result in localised effects only – it will not interfere with key drainage management implemented for rewetting and as such is compatible with rewetting at the site scale. It is noted that wind farm projects compatible with peatland rehabilitation have previously been delivered, e.g. Cloncreen, Derrinlough, Bruckana and Mountlucas.

6.9.2.2 Effects on Designated Sites

6.9.2.2.1 European Sites

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

As per the EPA Guidance (2022), "*a biodiversity section of an EIAR, 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*".

The Screening for Appropriate Assessment concluded that 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 European sites, that the Proposed Development, individually or in combination with other plans and projects, would be likely to have a significant effect on European sites in respect of:

- Lower River Suir SAC (002137)
- The Loughans SAC (000407)
- River Barrow and River Nore SAC (002162)

A Natura Impact Statement was therefore prepared which examined the potential pathways for adverse effects on European Sites and prescribed mitigation to ensure the pathways by which such effects may occur have been robustly blocked through the use of avoidance, appropriate design and mitigation measures. The measures ensure that the construction, operation and decommissioning of the Proposed Development does not adversely affect the integrity of any European sites. Therefore, it can be objectively concluded that the Proposed Development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.

6.9.2.2.2 Natural Heritage Areas or Proposed Natural Heritage Areas

Cabragh Wetlands pNHA (001934) is located downstream of the watercourses draining the Site. Water flowing out of the site is channelled through silt ponds which remain in place following cessation of peat extraction. Considering that site drainage does not discharge directly to receiving waterbodies and that this pNHA is located c. 18 km downstream, potential for indirect effects is limited. Considering these factors (primarily in-stream distance), in addition to the wetland habitats at the pNHA being unlikely to be affected by siltation, effects are assessed as **short-term, indirect imperceptible negative.**

The Loughans pNHA (000407) supports the Annex I Habitat Turloughs [3180], which is the only large turlough in the south-east of the country. A turlough is a seasonal lake occurring on limestone bedrock areas with karst features, therefore, significantly affected by groundwater flows and chemistries of ground water. A part of the Proposed GC, c. 2.3km in length, shares the groundwater body with the pNHA, namely, GWDTE-The Loughnan Turlough (SAC000407), which karst conduits might connect water flows throughout the groundwater body. Although the potential for effects is limited due to depth of excavation (<1.5m), the scale of works along the GC being small and contained within the public road, given the sensitivity of base-rich/calcareous habitats to water quality changes and the rapid transit of water through karst conduits, accidental release and spillage of sediments and hydrocarbon into groundwater in close proximity to the turlough could result in **short-term, indirect significant negative effects** on the pNHA.

The River Nore/Abbeyleix Woods Complex pNHA (002076) along the River Nore will be crossed by the Proposed GC upstream of Ballyragget to reach the Ballyragget 110KV Substation. Although the crossing will be completed by Horizontal Directional Drilling (HDD) avoiding any instream works, risk of drilling fluid accidentally escaping from cracks or gaps in the riverbed substrate it cannot be excluded. In addition, potential for sediment runoff and fuel spillage from works within the road corridor cannot be excluded. Prior to mitigation, these would result in **a short-term, indirect significant negative effect** on aquatic receptors of the pNHA in the form of habitat degradation as a result of water pollution during the construction phase.

Inchbeg pNHA (000836) is located downstream of the proposed Nore GC grossing. Although the crossing will be completed by Horizontal Directional Drilling (HDD) avoiding any instream works, risk of drilling fluid accidentally escaping from cracks or gaps in the riverbed substrate it cannot be excluded. In addition, potential for sediment runoff and fuel spillage from works within the road corridor cannot be excluded. Considering the instream distance of c. 5.5 km between the proposed grossing point and this pNHA, prior to mitigation, these impacts would result in **a short-term, indirect slight to moderate negative effect** on aquatic receptors of the pNHA in the form of habitat degradation as a result of water pollution during the construction phase.

It should be noted that all pNHAs which could potentially be affected by the Proposed Development overlap European Sites for which likely significant effects have been identified within the AA Screening Report as below:

- Cabragh Wetlands pNHA (001934) overlaps the Lower River Suir SAC
- The Loughnans pNHA (000407) overlaps The Loughnans SAC
- The River Nore/Abbeyleix Woods Complex pNHA (002076) overlaps the River Barrow and River Nore SAC

- Inchbeg pNHA (000836) overlaps the River Barrow and River Nore SAC (002162)

The Natura Impact Statement was prepared in the light of the conclusions of the assessment on the implications for the European sites overlapping the National Sites and prescribed mitigation to ensure the pathway by which such effects may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures. The measures ensure that the construction, operation and decommissioning of the Proposed Development does not adversely affect the integrity of any European sites overlapping these pNHAs.

6.9.2.3 Effects on Habitats and Flora

6.9.2.3.1 Habitats

Potential effects on habitats include:

- Long-term direct loss of habitat within the Proposed Development footprint, noting that the consent application is seeking an operational period of 40 years,
- temporary to short-term deterioration in habitats adjacent to works areas due to disturbance from vehicle movements, runoff and precipitation of dust from works areas, drawdown of groundwater table due to dewatering of excavations,
- temporary to short-term deterioration of aquatic habitat quality due runoff from construction areas.

The Proposed Development, including the Wind Farm, GC and TDR, will result in the long-term loss of habitats within the footprint of the Proposed Development identified in Table 6-38. The Proposed Development will as well result in the long-term loss of a number of habitats of Local Importance (higher value) within the footprint of the Proposed Development, the following of which are identified as KERs in Table 6-38: Cutover Bog (PB4), Raised Bog (PB1), Drycalcareous/neutral grassland (GS1), Dry meadows and grassy verges (GS2), Reed and large sedge swamps (FS1), Dystrophic lakes (FL1), Acid oligotrophic lakes (FL2), Depositing/lowland rivers (FW2), Drainage ditches (FW4), Bog woodland (WN7), Mixed broadleaved/conifer woodland (WD2), Scrub (WS1), Immature woodland (WS2), Hedgerows (WL1) and Treelines (WL2) alongside small areas of Wet grassland (GS4), Oak-birch-holly woodland (WN1).

There is also potential during construction for the temporary deterioration of aquatic habitats including watercourses draining the site and GC, and the cutaway bog lakes at the site to arise from overland runoff or transportation of pollutants via the hydrological network.

The River Barrow is identified as a Depositing/lowland river (FW2) of International Importance.

Table 6-39 provides details of the extent of the recorded habitats within the development boundary and the extent of the habitat that will be lost to facilitate the Proposed Development.

Table 6-39: KER Habitats Loss (Areas)

Habitat Type	Selected as KER ?	Area within proposed development boundary (ha)	Habitat loss: infrastructure footprint (ha)	Habitat loss: infrastructure buffers (ha)	Habitat loss: turbine bat buffers (ha)	Habitat loss: temporary compounds (ha)	Habitat loss: PDAs (ha)	Habitat loss: Borrow Pit (ha)	Total habitat loss (ha) (% to total area)	Recoverable area (operational phase) (ha)	% of Loss Recoverable
KER Habitats											
FL1 - Dystrophic lakes	Yes	83.99	0.01	0.09	0	0	0	0	0.10 (0.1%)	0.09	92
FL2 - Acid oligotrophic lakes	Yes	1.90	0.02	0.04	0	0	0	0	0.06 (3.2%)	0.04	72
FS1 - Reed and large sedge swamps	Yes	9.64	0.10	0.29	0	0.02	0	0	0.42 (4.4%)	0.32	76
FW4 - Drainage ditches	Yes	9.85	0.24	0.32	0	0.11	0	0	0.68 (6.9%)	0.44	64
GS1 - Dry calcareous and neutral grassland	Yes	17.86	1.79	1.87	0	0.15	0	0	3.82 (21.4%)	2.02	53
GS2 - Dry meadows and grassy verges	Yes	0.40	0.02	0.01	0	0	0	0	0.04 (10.0%)	0.01	38
GS4 - Wet grassland	Yes	4.17	0.15	0.28	0	0	0	0	0.43 (10.3%)	0.28	65
PB1 - Raised bog	Yes	63.31	0	0	0	0	0	0	0	0	N/A
PB4 - Cutover bog	Yes[20]	573.96	13.23	19.72	0	2.20	13.84	0	48.98 (8.5%)	35.75	73
WN1 - Oak-birch-holly woodland	Yes	3.57	0.01	0.03	0	0	0	0	0.05 (1.4%)	0.03	69
WN7 - Bog woodland	Yes	24.14	0.60	0.63	0	0.44	3.99	0	5.66 (23.4%)	5.06	89
WS1 - Scrub	Yes	175.73	2.13	4.21	1.43	0.21	0.48	0	8.46 (4.8%)	6.33	75

[20] Note the Cutover bog at the proposed development contains numerous vegetation communities as described in Section 6.7.3.2.1.1, which include both Higher value and Lower value Local importance vegetation communities. The habitat loss assessment is based on a precautionary approach which assumes all Cutover bog is Higher value Local importance.

Habitat Type	Selected as KER ?	Area within proposed development boundary (ha)	Habitat loss: infrastructure footprint (ha)	Habitat loss: infrastructure buffers (ha)	Habitat loss: turbine bat buffers (ha)	Habitat loss: temporary compounds (ha)	Habitat loss: PDAs (ha)	Habitat loss: Borrow Pit (ha)	Total habitat loss (ha) (% to total area)	Recoverable area (operational phase) (ha)	% of Loss Recoverable
WS2 - Immature woodland	Yes	146.97	3.92	5.13	4.53	0.01	0	0	13.59 (9.2%)	9.67	71
Total for KERs	YES	1115.49	22.22	32.62	5.96	3.14	18.31	0	82.29 (7.4%)	60.04	73

Table 6-40: Non-KER Habitats Loss (Areas)

Habitat Type	Selected as KER ?	Area within proposed development boundary (ha)	Habitat loss: infrastructure footprint (ha)	Habitat loss: infrastructure buffers (ha)	Habitat loss: turbine bat buffers (ha)	Habitat loss: temporary compounds (ha)	Habitat loss: PDAs (ha)	Habitat loss: Borrow Pit (ha)	Total habitat loss (ha) (% to total area)	Recoverable area (operational phase) (ha)	% of Loss Recoverable
Non-KER Habitats											
BL2 - Earth banks	No	2.57	0.06	0.44	0	0.31	0	0	0.81 (31.5%)	0.75	92
BL3 - Buildings and artificial surfaces	No	0.26	0.00	0.02	0	0	0	0	0.02 (7.7%)	0.02	87
ED2 - Spoil and bare ground	No	1.75	0.10	0.31	0	0	0	0.002	0.41 (23.4%)	0.31	76
ED3 - Recolonising bare ground	No	9.37	0.15	0.38	0	0.09	0	0	0.61 (6.5%)	0.47	76
FL8 – Other artificial lakes	No	0.72	0	0	0	0	0	0	0	0	N/A
GA1 - Improved agricultural grassland	No	18.14	0.03	0.08	0	0	0	7.80	7.92 (43.7%)	7.89	100
HD1 - Dense bracken	No	4.84	0.01	0.05	0	0	0	0	0.06 (1.2%)	0.05	81
WS1/HD1 – Scrub/Dense bracken Mosaic	No	1.28	0	0	0	0	0	0	0	0	N/A
WD2 - Mixed broadleaved/conifer woodland	No	4.23	0	0	0	0	0	0	0	0	N/A
WD3 - (Mixed) conifer woodland	No	0.78	0	0	0	0	0	0	0	0	N/A
WD4 - Conifer plantation	No	9.78	0	0	0	0	0	0	0	0	N/A
WS3 - Ornamental/non-native shrub	No	6.02	0.08	0.20	0	0	0	0	0.28 (4.7%)	0.20	71
Total for non-KERs	No	59.74	0.43	1.48	0	0.4	0	7.8	10.11 (16.9%)	9.69	96

Table 6-41: KER Linear Habitat Loss

Habitat Type	Selected as KER ?	Length within proposed development boundary (m)	Habitat loss: infrastructure footprint (m)	Habitat loss: infrastructure buffers (m)	Habitat loss: temporary compounds (m)	Habitat loss: PDAs (m)	Habitat loss: Borrow Pit (m)	Total habitat loss (m) (% to total length)	Recoverable length (operational phase) (m)	% of Loss Recoverable
FS1 - Reed and large sedge swamps	Yes	1983.76	7.03	14.41	38.80	0	0	60.24 (3.0%)	53.21	88
FW4 - Drainage ditches	Yes	18632.14	666.12	1258.52	310.43	19.99	0	2255.06 (12.1%)	1588.94	70
WL1 - Hedgerows	Yes	1707.50	0	0	0	0	532.98	532.98 (31.2%)	532.98	100
Total for KERs	Yes	22323.4	673.15	1727.93	349.23	19.99	532.98	3303.08 (14.8%)	2175.13	66

Table 6-42: Non-KER Linear Habitat Loss

Habitat Type	Selected as KER ?	Length within proposed development boundary (m)	Habitat loss: infrastructure footprint (m)	Habitat loss: infrastructure buffers (m)	Habitat loss: temporary compounds (m)	Habitat loss: PDAs (m)	Habitat loss: Borrow Pit (m)	Total habitat loss (m) (% to total length)	Recoverable length (operational phase) (m)	% of Loss Recoverable
BL3 - Buildings and artificial surfaces	No	2189.91	6.35	14.84	0	0	0	21.19 (1.0%)	14.84	70
ED2 - Spoil and bare ground	No	475.86	0	7.78	0	0	0	7.78 (1.6%)	7.78	100
ED3 - Recolonising bare ground	No	2578.02	142.83	79.95	0	0	0	222.78 (8.6%)	79.95	36
Total for non-KERs	No	5243.79	149.18	102.57	0	0	0	251.75 (48.0%)	102.57	41

Total loss of KER and non-KER habitats is indicated in Table 6-39 to Table 6-42 in addition to a more detailed breakdown of habitat loss according to the various footprints associated with the Proposed Wind Farm. In summary, out of a total habitat loss of 92.4 ha (area) and 3.6 km (linear), KER habitat loss contributes 82.29 ha and 3.3 km of the total.

This in-depth analysis has been undertaken due to the fact that a high proportion of habitat loss is recoverable, i.e. elements of the proposed wind farm such as infrastructure buffers (areas adjacent to the infrastructure footprint where felling for construction access and site drainage area located) (see below), temporary compounds and peat deposition areas which will be available for recolonisation by natural or semi-natural habitats during the operational phase, as distinct from the areas covered by the infrastructure footprint which will be lost for the duration of operation.

Infrastructure Buffers are as follows:

- Access tracks: 7m
- Amenity Trails: 3.5m
- Hard Standings: 10m
- Substation: 10m

Recoverable areas will not all be returned to their original habitat types. Various natural and semi-natural habitat types will establish in 'recoverable areas' following construction, ranging from habitats similar to those lost, to new types depending on specific management measures as defined within mitigation and enhancement measures. For example, areas of WS2 and PB4 within the main PDA footprint will be managed to produce heath-type habitats, replacing the existing bare peat and non-native eucalyptus plantation within the PDA footprint. Large areas of the infrastructure buffers used for construction access and site drainage will be available for recolonisation, encompassing natural recolonisation, and creation/translocation of habitats such as Calcareous grassland GS1 to offset losses in nearby areas and retain seedbanks and soils removed from the infrastructure footprint. Temporary compounds will in most cases be reinstated to habitat types to pre-construction conditions; the exception to this is that creation of a substrate suitable for establishment of Calcareous grassland GS1 is proposed for the main site compound.

The potential effects on habitats which are KERs as a result of the Proposed Development are discussed in detail in the sections below.

Table 6-43: Assessment of Effects on Cutover Bog (PB4)

Description of Effect	Assessment of Significance	Is Mitigation Required
The construction of the proposed windfarm and associated infrastructure will result in the direct loss of 48.98 ha (8.5% relative to overall cutover bog within the Site boundary) of cutover bog . This is predominantly in relation to the excavations required for turbine foundations and hard standings. The internal access tracks and hardstandings will be left in place after decommissioning of the Proposed Development. The permanent loss of cutover bog habitat covers 13.23 ha. It should be noted that the internal access tracks shall be constructed by a combination of founded and floating methods as required, the majority of the access tracks will be floated, with elements of access tracks for areas around hardstands and around accesses to public roads being founded. The remaining 35.75ha will be temporarily lost, disturbed or altered for the buffers of infrastructure, temporary compounds and PDAs and be recoverable/available for recolonisation by semi-natural habitats types during the operational phase.	The cutover habitats within the Site are highly modified from their original state (i.e. previously intact raised bog). Among the habitats to be lost, Low *Sphagnum* group is of Local Importance (Higher Value), while Bare Peat group is Local Importance (Lower Value). Low *Sphagnum* group might naturally develop from the retained Bare Peat group within the Site through vegetation succession; therefore, this habitat loss is considered reversible where permanent loss does not occur. However, it is proposed that all the internal site access tracks and turbine hard standings to be constructed on cutover bog will be left in place. Given the above and the magnitude of habitat loss (*c.* 50ha), the reduction in the overall area of cutover bog habitat is a **short-term, significant, reversible negative effect** at the local scale. Permanent loss of 13.23 ha of cutover bog (2.3% of total within the site) is a **permanent, slight, negative effect** at the local scale. **No significant drainage related impacts** on are anticipated as a result of the Proposed Development, having regard to the drainage design using the existing drainage system and the historical drainage across Littleton Bog. In addition, given the proposed floating construction method for roads, much of the peat will remain in situ with the exception of a small depth taken as part of vegetation removal within the road footprint.	Yes, the effect of habitat loss on cutover bog within the Site is considered to be **long-term and significant**. In addition, Littleton bog covers the largest extant cutover bogs in Irish Midlands (Gallagher *et al.*, 2019). Mitigation is required to offset the removal of cutover bog habitat and to provide alternative habitat for marsh fritillary foraging. A Biodiversity Enhancement and Management Plan has been prepared for the Proposed Development which includes the management of retained cutover bog within the Site for the duration of the operation of the Proposed Development.

Description of Effect	Assessment of Significance	Is Mitigation Required
	It is considered that the runoff rate will increase due to soil permeability being reduced by the construction of hardstands and access tracks on cutover bog. The baseline scenario runoff rates were originally high with the prevailing peat soils (96% runoff), although the runoff rate would increase into 100% due to the construction (see details in Chapter 9). The Proposed Development **therefore does not have potential for significant effects** in this regard.	

Table 6-44: Assessment of Effects on Raised Bog (PB1)

Description of Effect	Assessment of Significance	Is Mitigation Required
The Proposed Development has been specifically designed to avoid direct effects on areas of remnant raised bog, and to minimise potential for indirect effects, Therefore, there is no potential for direct effect for each KER at the outset. The construction of the internal access track between T02 and T06 will be along one of raised bogs, although the infrastructure footprint has been designed to avoid overlapping any raised bogs within the Site. The raised bog at this location would be potentially affected by dust emissions due to the construction of the access track and traffic on the track for the Proposed Development. The construction of the internal access track will be installed c. 20m from the area of raised bog mapped in the northernmost section of the Site adjacent to the public road (Longfordpass east). A section of proposed amenity trail will be constructed c. 30 m north of the area of raised bog at Derryhogan (north of the L2111) (see Figure 6-7). It is noted that a facebank separates the proposed amenity trail, which is at a lower level than the raised bog to the south. The acrotelm was historically removed in the area where the proposed access track is located, but there is no face bank separating this area from the intact raised bog.	All extraction works will generally be completed above the local groundwater table and the majority of the access tracks will be floated. In addition, there are drainage ditches historically inserted within the raised bog between T02 and T06 as a part of peat extraction activities in Littleton Bog, therefore, a **short-term imperceptible indirect effect** on the raised bog between T02 and T06 is anticipated. No existing drains were found within and along the north-east margin of the raised bog in the northernmost section. Therefore, the installation of the internal access tracks and associated drainage could result in localised effects on the water table, although it is noted that the area of cutover bog in which the access track is proposed is relatively dry, indicating the water table is unlikely to be uniform across the cutover bog and adjacent raised bog. However, limited risk of indirect effects from drying out remain prior to mitigation. As such, a **permanent, indirect slight negative effect** is assessed for the raised bog in the northernmost section. Following the guidance for assessment of dust (IAQM, 2024), significance of dust emission produced by the Proposed Development for the raised bog was assessed. Earthworks and trackout to be proposed at the location are basically considered as being High and Low Magnitude, respectively. As per hydrological modelling provided by BnM, it is assessed that areas of	Yes. Although there will be no direct habitat loss, and the Proposed Development has been deliberately designed to minimise the potential for effects on raised bog habitat, indirect significant effects are assessed for the two raised bogs due to dust emission produced from the construction and the traffic including earthworks and trackout and for the raised bog in the northernmost section due to potential for indirect drying out effects.

Description of Effect	Assessment of Significance	Is Mitigation Required
This historical disturbance has resulted in relatively dry ground conditions relative to the adjacent intact raised bog, indicating that the water table is not uniformly high across both the intact bog and adjacent cutover area. As such, while limited potential for indirect effects arising from construction of the access track in the cutover bog exists, it is minimal. Notwithstanding this, due to the absence of existing drains in this area, potential for access track construction in this area to result in indirect drying out effects on the raised bog remains, prior to mitigation.	Annex I DRB within the raised bog at Derryhogan are located c. 70m south of the amenity trail. DRB is capable of being restored into active raised bogs (ARB) within 30 years by rewetting measures. Given the proximity between the two aforementioned raised bogs and the proposed tracks, sensitivity of the raised bog to ecological impacts is considered high. Therefore, dust emission and deposition caused from access track construction and traffic is potentially **a temporary, significant negative effect.**	

Table 6-45: Assessment of Effects on Dystrophic lakes (FL1) and Acid oligotrophic lakes (FL2)

Description of Effect	Assessment of Significance	Is Mitigation Required
The Proposed Development will necessitate the removal of 0.1ha of dystrophic lakes (0.1% relative to the overall total within the Site boundary) and 0.06ha of oligotrophic acid lakes (3.2% relative to the overall total within the Site boundary). These habitats will be removed from within infrastructure footprints and buffers: Dystrophic lake will overlap the access track in south of T07 and oligotrophic acid lakes will be intersected by a turning head of T06. These lake habitats to be lost have potential to accommodate amphibian breeding at the local scale.	These areas will be constructed via floating method without excavating the existing ground, consisting of geogrid laid on the peat and stone built over this (see 3.4.5.2 Floating Method in the CEMP). Stone materials will be sourced from the on-site borrow pit and quarries in the vicinity. Therefore, the Proposed Development has been designed to minimize the impact excluding earthworks in the lake bottoms. The habitat to be lost is a small percentage of the overall lakes within the surrounding landscape, however the internal site access tracks will be permanently retained in place. As such, the reduction in the overall area of lake habitats is a **permanent, not significant and negative effect** at the local scale. Notwithstanding the use of floating construction methods, there might be still the risk of an accidental fuel/oil leak or cement spill into these lake habitats due to the construction works and vehicle access. Although there were no aquatic species of high ecological value within the lakes during field surveys, oligotrophic and dystrophic lakes are characterized by water being base-poor and low in nutrients. Therefore, these habitats are potentially sensitive to water quality changes due to construction. As such, water quality change by pollutant and sediment produced by the construction and the traffic is a **short-term slight negative effect** at the local scale.	Yes. Although the Proposed Development has been deliberately designed to minimise the potential for effects on lake habitats, and the habitat loss areas are small relative to the overall lake habitat resource within the Site, mitigation is required to avoid or minimise potential water quality change from pollutants and sediment due to construction and traffic.

Table 6-46: Assessment of Effects on Dry calcareous and neutral grassland (GS1)

Description of Effect	Assessment of Significance	Is Mitigation Required
Dry calcareous grassland along the existing bog railway overlaps the footprint and buffer of internal access track and proposed compounds to the west of PDA A at the middle section of the Site. This grassland habitat type within the Site does not conform to the Annex I type habitat 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) due to inadequate numbers and low density of positive indicator species at the monitoring stop scale, although it supports several high quality/positive indicators of the habitat type. The internal access track is proposed to be left in situ post decommissioning, although the decommissioning plan is subject to consent at the end of the operational phase. As such, it is assessed that the proposed development will result in the permanent loss of 1.79ha of this grassland habitat. The main compound, substation construction compound and access track buffers will be temporary during the construction phase of the Proposed Development, and the habitat to be lost in these footprints (2.02ha) will be reinstated outside the proposed footprint.	The disturbance to and loss of this calcareous grassland is considered a **permanent (1.79ha)/ long-term (2.02ha), significant negative effect** at the local scale as the habitat supports high quality/positive indicators alongside abundant chalk fragrant-orchid.	Yes, mitigation is required to compensate the removal of the calcareous grassland habitat to support local calcicoles.

Table 6-47: Assessment of Effects on Dry meadows and grassy verges (GS2)

Description of Effect	Assessment of Significance	Is Mitigation Required
The footprints and buffers of the access tracks and site entrance for the Proposed Development partially overlap with Dry meadows and grassy verges (GS2) for 0.04ha at the northernmost boundary and east boundary of the Site. This grassland habitat within the Site does not conform to any Annex I type habitats and mainly establishes as roadside verges and is of low ecological value in terms of the species mix. The internal access track will remain in situ post construction of the Proposed Development and as such will result in a permanent irreversible loss of 0.03ha. The remaining 0.01ha will be recoverable area at the operational phase.	The disturbance to and loss of dry meadows and grassy verges is considered **a permanent, imperceptible and negative effect** as it covers a very small area and this habitat is likely to suffer successional scrub encroachment over time, thereby reducing species diversity.	No. The effect on dry meadows and grassy verges within the Site is assessed to be imperceptible, given the small scale of loss.

Table 6-48: Assessment of Effects on Wet grassland (GS4)

Description of Effect	Assessment of Significance	Is Mitigation Required
The footprints and buffers of the access tracks for the Proposed Development partially overlap with Wet grassland (GS4) for 0.43ha at the northernmost boundary and east boundary of the Site. The internal access track will remain in situ post construction of the Proposed Development and as such will result in a permanent loss of 0.15ha. The remaining 0.28ha will be recoverable area at the operational phase. This grassland habitat within the Site does not conform to any Annex I type habitats such as 6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*). Among them, the buffer of access track for the proposed Borrow Pit overlaps a small portion of suitable habitats for marsh fritillary with devil's-bit scabious, which is the larval foodplant. Regarding the remaining wet grassland overlapping the footprints, no suitable habitat was identified during the field surveys.	The disturbance to and loss of wet grassland is considered a permanent (0.15ha)/a **long-term** (0.28ha), **moderate** and **negative effect**.	Yes. This loss will be offset by management of the proposed main PDA for marsh fritillary. The habitat loss is on a small scale and that the majority of suitable habitat for marsh fritillary within the Site will be retained.

Table 6-49: Assessment of Effects on Scrub (WS1) and Immature Woodland (WS2)

Description of Effect	Assessment of Significance	Is Mitigation Required
The Proposed Development will necessitate the removal of 8.46ha of scrub habitat (4.8% relative to the overall total within the Site boundary) and 13.59ha of immature woodland (9.2% relative to the overall habitat within the Site boundary) established on cutover bogs across the Site. This habitat will be removed from within infrastructure buffers, bat buffers associated with the turbines, temporary compounds and PDAs. However, permanent habitat loss within the infrastructure footprint, bat buffers and PDAs is lower (2.13 ha of scrub and 93.92 ha of immature woodland). These early-stage woody habitats have potential to develop into various types of mature woodland over a long-term period.	The loss of scrub and immature woodland within the Site is assessed as being **a long-term, reversible, significant negative effect** as the habitat loss areas are relatively large (8.46ha and 13.59ha, respectively) and these habitats providing suitable habitats for the local wildlife foraging, commuting and resting. although scrub and immature woodland have potential to redevelop by encroaching retained cutover bogs within the Site.	Yes. The loss of wooded habitats will be offset by a total of 6.6 ha tree planting in the BEMP area, 0.33 ha replanting of substation compound and 1.94 ha restoration of remaining eucalyptus outside the main PDA footprint to Native scrub. As such a total of 8.87 ha of planting and wooded habitat measures offset the permanent habitat loss.

Table 6-50: Assessment of Effects on Reed and large sedge swamps (FS1)

Description of Effect	Assessment of Significance	Is Mitigation Required
Drainage ditches have been inserted across the Site as a part of the operation of Littleton bog, and some of them are vegetated by common reed, floating sweet-grass and/or bulrush as Reed and large sedge swamps (FS1). The habitat loss of sedge swamps within drains is *c.* 2.0km (3.0%) for infrastructure footprints and buffers and temporary compounds. The swamp habitat to be lost establishes within shallow drains along the existing internal road. These habitats are of importance given that the semi-natural nature and potential to support local amphibians breeding and foraging as signate water habitats. As embedded design, drainage infrastructure will be newly constructed in parallel with the internal access track construction, a SuDS design approach shall ensure that existing drainage patterns shall be maintained throughout the Site in accordance with the Surface Water Management Plan (Appendix 9.2, Volume3). This will be followed by the construction of the turbine hardstanding areas and foundations. In addition, where the infrastructure will cross drains within the Site, the Proposed Development has been designed to use culverts.	The loss of these habitats within the landscape is assessed as being **a short-term, reversible, moderate and negative effect**. Potential indirect effects on the aquatic receiving environment are assessed in Section 6.9.2.5 below.	No. No permanent significant effects on drainage ditches and swamps within drains are anticipated, with the implementation of the SWMP which will offset potential effects by creating new drains and enhancing retained drains.

Table 6-51: Assessment of Effects on Drainage ditches (FW4)

Description of Effect	Assessment of Significance	Is Mitigation Required
Drainage ditches have been inserted across the Site as a part of the operation of Littleton bog. The habitat loss of drainage ditches is *c.* 18.6km (12.1%). This habitat will be removed from within infrastructure footprints and buffers, temporary compounds and PDAs. These habitats are of importance given that the semi-natural nature and potential to support local amphibians breeding and foraging as signate water habitats. As embedded design, where drainage infrastructure will be newly constructed in parallel with the internal access track construction, and a SuDS design approach shall ensure that existing and retaining drainage patterns shall be maintained throughout the Site in accordance with the Surface Water Management Plan (Appendix 9.2, Volume3). This will be followed by the construction of the turbine hardstanding areas and foundations. In addition, where the infrastructure will cross drains within the Site, the Proposed Development has been designed to use culverts.	The loss of these habitats within the landscape is assessed as being **a short-term, reversible, moderate and negative effect**. Potential indirect effects on the aquatic receiving environment are assessed in Section 6.9.2.5 below.	No. No permanent significant effects on drainage ditches and swamps within drains are anticipated, with the implementation of the SWMP which will offset potential effects by creating new drains and enhancing retained drains.

Table 6-52: Assessment of Effects on Hedgerow (WL2)

Description of Effect	Assessment of Significance	Is Mitigation Required
The Proposed Development will remove 532.98m of hedgerows within the Site for the Proposed Borrow Pit. The loss will be *c.* 31% of the overall hedgerows within the Site. Hedgerows within the Site consists of native woodland species such as hawthorn, blackthorn, ash, elder, wych elm, downy birch and hazel alongside sycamore. It seems that the hedgerows have been managed with regular trimming into box shape, which is assessed as being favourable profile. These habitats provide connectivity between local agricultural fields and woodlands within Littleton bog for the local wildlife. Given that active badger setts were found within the Site, this connectivity is of high ecological value at the local scale. Although *c.* 69% of hedgerows within the Site will be retained, the loss of the connectivity between the local fields and the Site and habitat fragmentation will be caused due to the habitat loss by the construction.	The loss of these habitats within the landscape is assessed as being a **permanent, significant and negative effect** at the local scale since it could cause the loss of connectivity for local wildlife, including commuting and foraging badgers .	Yes. A Biodiversity Enhancement and Management Plan has been prepared for the Proposed Development which includes the reinstatement of hedgerows within the borrow pit footprint.

Table 6-53: Assessment of Effects on Oak-birch-holly woodland (WN1)

Description of Effect	Assessment of Significance	Is Mitigation Required
Oak-birch-holly woodland overlaps the footprint and buffer of the amenity trail in the north of T01 location. The habitat loss area will be 0.05ha (1.4% relative to the overall habitat within the Site). This habitat is considered of importance to support badger breeding and commuting. No habitat fragmentation is anticipated due to the amenity trail.	The habitat loss of oak-birch-holly woodland within the landscape is assessed as being a **permanent imperceptible negative effect** at the local scale as the habitat loss area is at small scale relative to the wider local landscape.	No, no significant effects on this woodland type are anticipated. It is noted that as part of the Biodiversity Enhancement and Management Plan for the Proposed Development it is proposed to maintain bat habitat connectivity along the northern margin of the amenity trail traversing this habitat by retaining trees or replanting after construction to maintain the existing line feature along the adjacent agricultural field.

Table 6-54: Assessment of Effects on Bog woodland (WN7)

Description of Effect	Assessment of Significance	Is Mitigation Required
Bog woodlands overlap the footprints and buffers of the access track at the northernmost section, the access track and site entrance from Longfordpass East and the access track at the southernmost section within the Site. The habitat loss area will be 5.66ha (23.4% relative to the overall habitat within the Site). This habitat type within the Site does not correspond with the Annex I habitat type 91D0 Bog woodland. 0.60ha will be permanently lost within the infrastructure footprint.	The habitat loss and fragmentation of bog woodland within the Site is assessed as being a **long-term (5.06ha) / permanent (0.60ha), moderate and negative** effect at the local scale, given that semi-natural woodland itself is of high value at the local scale, and it supports mammals and invertebrates commuting, foraging and resting.	Yes. It is proposed to replant the area of woodland lost within the proposed substation footprint.

6.9.2.3.2 Introduction and Spread of Invasive Species

This section discusses only invasive species listed the Third schedule to the European Communities (Bird and Natural Habitat) Regulations 2011 (as amended). A further four non-native species were recorded (one at both the site and GC, and three along the GC) (see Table 6-17 and Table 6-18). Due to their non-regulated status and setback from proposed works areas, no significant effects are predicted and control/avoidance measures are not required for these species.

A small stand of Japanese Knotweed, which is a Third Schedule invasive species, was detected during field surveys by FT in 2025 at the proposed bell-mouth entrance of the Site from the Longfordpass North local road (Access Point 4) (outside proposed access track and associated buffer). As such, there is potential for disturbance of the ground at this location to arise during construction of the site entrance and as a result, potential spread of this species. Regarding other locations where historical records of Japanese knotweed are indicated in NBDC databases, the following is noted: the location at the southern boundary of Lanespark Bog was surveyed and it was confirmed that Japanese knotweed was absent in the footprint/buffer. The other location indicated by NBDC records in the townland of Derryhogan was not surveyed due to its location outside the study area / ZoI.

Another Third Schedule invasive species, giant hogweed was recorded in 2022 within the 1km grid square along the Proposed GC (S3563). This species was confirmed to be absent from the GC during field surveys and the historical record is located downhill/downstream of the GC, reducing potential for spread towards the GC. Giant hogweed generally produces several thousand seeds per its flower head. In addition to seeds travelling for short distances by wind, they can as well be dispersed over longer distances by rivers, streams, machinery and any movement of soil contaminated by seeds. As such, while confirmed absent by field surveys, potential for future spread to the GC remains a possibility.

Japanese knotweed and giant hogweed are highly invasive, non-native species which spread along transport routes and rivers to outcompete floristic biodiversity by forming dense stands which suppresses growth of other species. The spread of Japanese knotweed and giant hogweed would be a significant short term but reversible effect.

The effects of the spread of these invasive species would be **significant and long-term, albeit reversible**.

6.9.2.4 Effects on Terrestrial Fauna During Construction

The Proposed Development has the potential to result in habitat loss and disturbance impacts on faunal species that were recorded on the site. As such, the potential for effects on Faunal Receptors in terms of habitat loss/fragmentation and disturbance/displacement is discussed hereunder.

6.9.2.4.1 Badger

The entrance of the active annex sett (Sett No. 4) is located 56m from one of the Proposed PDAs and 50m from a section of amenity trail. It is noted that the proposed road infrastructure at this location will be floated road on cutover bog, requiring only minimal site clearance / soil excavation. As per TII (2005), "*badger sett tunnel systems can extend up to c. 20m from sett entrances.*" Therefore, the proposed layout avoids potential for direct effects, and also observes the 50m breeding season buffer prescribed in TII (2005) guidance. A large buffer is in place around the main sett (193m to nearest proposed infrastructure), avoiding potential effects. Two inactive badger setts (annex and outlier setts) were identified during the aforementioned survey in 2025 to be located within c. 144m and 244m from the proposed biodiversity enhancement sites (non-native *Eucalyptus* removal, tree planting), respectively.

There is limited potential for localised temporary effects from lighting in the event that occasional night work is required, and lighting will also be used at temporary compounds during the winter months. This will result in potential disturbance to foraging or commuting badgers, but will be very localised, with the majority of habitats remaining undisturbed. Noise disturbance may disturb commuting or foraging badger if works are undertaken after dark; however any such effects will be temporary and localised.

The Proposed Development will not result in any significant fragmentation of badger habitat during construction, and the site-scale habitat mosaic will be retained. The development will result in small scale reduction in available foraging habitat for badger. However, this is only slight in significance given the availability of foraging habitat in the wider environmental context.

A such, both direct and indirect effects on badger are assessed to be **Imperceptible** to **Slight Local** effects in the categories discussed above.

Prior to mitigation, there is potential for direct mortality to occur in the event that a new sett is established within the construction ZoI prior to construction. Direct mortality of badgers would be a **Significant Short-term Local Reversible** effect.

6.9.2.4.2 Otter

Potential otter sensitivity within the Wind Farm Site and Proposed TDR is low as no otter resting or breeding sites were recorded during field surveys within the Site and watercourses along the Proposed TDR (no works are proposed at existing crossings along the TDR). Live sightings of adult otters at cutaway bog lakes in Littleton Bog were recorded by an FT ornithologist on two occasions (see Section 6.7.5.1.1.2.2). The site is assessed to be used for commuting and may also be used occasionally for foraging.

Regarding the GC, NBDC records indicate a potential otter holt was recorded on the river Nore, located c. 850m downstream of the Proposed HDD crossing for the GC on the River Nore, and located c. 20m from the GC where it traverses the existing road corridor along the N77 (record located within 1km grid square S4471). In addition, aquatic ecology and otter surveys identified otter signs such as spraints and prints along watercourses which will be crossed by the Proposed GC via the HDD. No breeding or resting places were observed within 150m of any proposed GC river crossing.

While the Proposed Development has been deliberately designed such that all major infrastructure (turbine foundations, hardstanding, substation and construction compounds) avoids in-stream works, there is potential for brief noise disturbance to affect otter resting, breeding and commuting along the Nore. The proposed development will not impact the extent of otter habitat availability along the Nore given that no works are proposed to take place within the river or the riparian area. There is also potential for temporary noise and lighting disturbance to affect commuting or foraging otter at the site. Due to absence of breeding or resting sites within the proposed development footprint and surrounding areas, there is no potential for direct mortality.

Considering the transient and mobile nature of works, in addition to their location within the existing road corridor which already has a baseline of traffic noise and human presence, in addition to screening provided by existing riparian vegetation, potential disturbance effects associated with construction of the GC are identified as **Brief, Slight** and **Reversible** at the **Local scale**.

Potential disturbance to commuting and foraging otter at the site is assessed as **Temporary, Slight** and **Reversible** at the **Local scale**.

Furthermore, in the absence of mitigation, potential indirect effects arising from pollution of watercourses located downstream of drains within the Site or along the Proposed GC/TDR with suitable otter foraging habitats could be affected by accidental fuel leaks, siltation or drilling fluid leaks giving rise to a **short-term, slight to moderate negative reversible effect** at the **Local scale**. on otter foraging habitats. Therefore, mitigation measures are required to avoid water pollution due to the Proposed Development.

6.9.2.4.3 Pine Marten

Pine marten have been recorded as being active within the local landscape. However, no dens were found during the mammal surveys encompassing the footprint of the Proposed Development. Dens are normally used only during the breeding season. Pine marten use refuge sites outside these periods which are less visible and more casual. Therefore, it is assessed that the permanent loss of wooded habitats is unlikely to negatively affect the local pine marten population. Wooded habitats, expansive and varied peatlands, hedgerows and treelines are abundant in the greater area and therefore the effect of habitat loss is considered to be **Long-term Slight Reversible effect** at the **Local scale**.

There is a possibility that pine marten breeding or resting sites close to the footprints could be disturbed during felling operations. It is likely that effects to pine marten where dens or refuge sites are affected will be **Short-term Significant Reversible** effect at the **Local** scale prior to mitigation. Should dens will be present and active during the construction phase, destruction of dens by machinery could occur, potentially leading to pine marten injury or death, particularly during the breeding period. This would constitute a **negative, medium-term, moderate** to **significant** effect on locally important populations of pine marten. Therefore, mitigation in the form of pre-construction surveys to check for the presence of active dens in woodland habitats within the proposed infrastructure footprint is required.

6.9.2.4.4 Bats

6.9.2.4.4.1 Loss or Damage to Commuting and Foraging Habitat

In the absence of appropriate design measures, the loss or degradation of commuting and foraging habitat could reduce feeding opportunities and/or displace local bat populations. Littleton Bog is predominantly composed of cutover bog, scrub, immature woodland and bog woodland, with a full description of habitats provided in Section 6.7.3 above.

Further details on vegetation removal required within and around the development footprint is detailed in Table 6-39. Any tree removal will be undertaken to maintain a 50m buffer between turbine blade tips and adjacent canopy, in line with current best practice (Natural England, 2014; NatureScot, 2021). As all habitat being lost is of low suitability due to patchy connectivity within the site and sub-optimal connectivity with bat habitats in the wider landscape and low levels of bat activity throughout the site indicating low suitability (see Section 6.9.3.6) it is not expected to negatively impact bat populations in the area. The localised removal of dense areas of wooded habitats may result in a positive effect to bat populations by increasing linear edge habitat which is known to support commuting and foraging activity.

Most turbines have been positioned to avoid key linear habitat features. Where turbine siting necessitates the removal of linear immature woodland or scrub, these areas are of low ecological value based on results gathered from static detectors and transect activity surveys confirm low activity levels for bats in the area.

Furthermore, linear planting habitat occurring elsewhere on site to offset this habitat removal which will incorporate native species appropriate to the local area and will aim to strengthen existing habitat connectivity and ecological function.

A **short- to medium-term slight effect at local scale** may arise from reduction in connectivity may occur.

The proposed substation and associated temporary construction compound are located within a long linear block of immature woodland and scrub that will be interrupted through felling within the substation and compound footprint during construction. The substation temporary compound will be replanted upon completion of works, reinstating bat commuting routes. In addition, connectivity on the western side of the woodland block will be maintained by trees retained on the opposite side of the existing rail line. Therefore, only a short-term effect is anticipated.

The peat deposition area will require the clearance of low-quality scrub and associated habitat, which will naturally regenerate over time. Given the low habitat suitability and low bat activity recorded in this area, impacts are expected to be negligible. The borrow pit is located within agricultural grassland (GA1) bounded by hedgerows (WL1), which will be removed. However, alternative commuting habitats are present in the surrounding landscape; therefore, the impact on bats is also considered negligible. The turbine delivery route will affect immature trees at one location: Node 3 (removal of trees). The affected trees are immature specimens originating from roadside landscaping.

In several locations, removal relates to narrow linear strips of habitat, which will not compromise the integrity of edge habitats or overall landscape connectivity. In areas where removal passes through blocks of habitat, the formation of new linear corridors will maintain connectivity and may provide enhanced foraging opportunities.

Extensive areas of similar woodland and scrub habitat are present within the surrounding landscape, providing alternative opportunities for commuting and foraging bats.

Works along the grid connection route will involve limited vegetation trimming, with no substantive removal of low suitability bat habitat.

Overall, given the large proportion of the site that will remain undisturbed, alongside the targeted retention of key habitat features, potential effects are assessed to be limited to a **short- to medium-term slight effect at local scale** and no significant effects on bat commuting or foraging habitat are predicted as a result of the Proposed Project.

6.9.2.4.4.2 Loss or Damage to Roosts

No Potential Roost Features (PRFs) were identified within 300 m of the proposed turbine locations or within 30 m of all other proposed infrastructure at the wind farm site, and no PRFs were identified in areas potentially affected by the TDR. Roost assessments undertaken along the grid connection route included the inspection of bridges and trees. Examination of bridges identified two structures that required emergence surveys; however, no bat emergence or evidence of roost occupancy was recorded during surveys. Both bridges were assessed as having potential for use as night roosts during the summer period; the Borrisbeg (2) bridge was confirmed not to be a winter roost. The proposed HDD crossing methodology for rivers along the GC will avoid direct effects and disturbance of bats potentially roosting bridges.

The roost survey of trees along the grid connection identified a number of PRFs; however, these features were assessed as having negligible to low suitability. Given their location along the R693 regional road reducing roosting suitability due to existing traffic disturbance and the absence of direct effects from grid connection works, potential impacts on these PRFs are considered to be imperceptible.

It is not proposed to fell any trees with potential roosting features. No trees with roosting potential were observed during surveys of the Site and TDR.

Potential effects on trees with PRFs along the grid connection arising from grid connection works are imperceptible due to the negligible to low suitability of PRFs, their disturbed location beside the R693 regional road, and separation from works areas placing them outside the ZoI for effects.

As such, potential effects in this category are limited to **Temporary Imperceptible** effects at **Local scale.**

6.9.2.4.4.3 Displacement of Individuals or Populations

The Proposed Wind Farm is situated within Cutover bog (PB4), Scrub (WS1) Immature woodland (WS2) and Bog Woodland (WN7), the examples of which occur at the site are of low suitability for commuting, foraging and roosting bats.

As part of the Proposed Project, a number of linear areas of scrub and immature woodland are located within the bat felling buffers and infrastructure development footprint will require removal or partial clearance. Although these features contribute to the site's overall connectivity and habitat diversity, the majority of linear features within the site will be retained, and habitat fragmentation has been avoided in the layout design.

As such, the proposed development will not result in displacement of individual bats or local populations.

6.9.2.4.4.4 Lighting

Artificial light creates a barrier to bats so lighting has been avoided where possible. However, the potential requirement for infrequent night work requiring artificial lighting cannot be ruled out. It is assumed that construction could occasionally be required to continue under lighting across site as needed over winter. Activities which may require lighting include concrete pours, turbine erection and installation of the grid connection. Turbine deliveries typically occur at night. Lighting will be required at temporary construction compounds during the winter months.

Since bat activity is reduced during winter, with only sporadic activity during warmer and calmer weather, potential for foraging bats to occur during winter is greatly reduced.

As such, a **Temporary Slight** to **Moderate** effect could occur at **Local scale** prior to mitigation.

6.9.2.4.5 Amphibians

Protected amphibian species, namely, common frog and smooth newt, have been recorded within the Site. In addition, while no breeding sites were detected during the field surveys by FT in 2023 and 2025, there is a number of records for adult common frog throughout the Site and to records of adult smooth newts in Littleton Bog. In addition, there is potential for these amphibians to use habitats for breeding and foraging, such as wet drainage ditches, waterlogged swamps, scrub and lakes within the Site.

Aquatic habitats with potential to support common frog and smooth newt breeding and foraging will be lost: a total of 1.26 ha (1.2% of total wetland habitat areas), c. 2.3km of drainage ditches and reed/large sedge swamp (11.2% of linear wetland habitats), in addition to small ponds occurring within cutover bogs, due to construction of the Proposed Wind Farm. As such, the Proposed Development will result in the loss of terrestrial breeding and foraging habitats, resulting in **a long-term, moderate negative effect** on amphibians at the local scale.

In addition, if individual newts/frogs and eggs/spawn was directly affected through injury or mortality, **a short-term, significant negative effect at the local scale** would occur.

Therefore, measures are required to mitigate the potential effects of habitat loss and individual mortality of amphibians.

6.9.2.4.6 Reptiles

While no common lizards were observed during surveys within the Site and along the GC/TDR, it is deemed that some potentially suitable habitats for foraging and breeding such as cutaway bog with recolonising vegetation exist within the Site. Therefore, the Proposed Development will result in the loss of potential breeding and foraging habitats, resulting in a potential **long-term, slight negative effect** on common lizard at the local scale.

In addition, there is potential that common lizards could be injured or killed by machinery, resulting in a **short-term, significant negative effect**.

Therefore, mitigation measures are required for common lizard.

6.9.2.4.7 Marsh Fritillary

Active and discarded larval webs were detected at a total of 18 no. locations across the Site between 2021 and 2025. Habitat types in which these webs were found were cutaway bog dominated by ericoid and purple moor-grass and wet grasslands supporting a population of devil's-bit scabious.

The recorded suitable habitat for marsh fritillary laying eggs and foraging overlap *c.* 0.71ha (out of a total 5.62ha of suitable habitat recorded within the entire Site) of the footprints/buffers of the internal access tracks, construction compounds and hardstanding of turbine T04, and three locations at which larval webs were found to overlap with the footprints/buffers of the internal access tracks and amenity trail. As such, the Proposed Development will result in the loss of suitable habitats for marsh fritillary (*c.* 13% of the overall habitat) (Figure 6-13).

The internal access track and hardstanding will be left in place after decommissioning operations of the Proposed Development and overlap suitable habitats of marsh fritillary for 0.10ha. Although the remaining 0.61ha will be available for natural recolonisation during the operational phase, it is not guaranteed that devil's-bit scabious will naturally re-vegetate these locations.

Lough Doire Bhile, where the greatest number of records for marsh fritillary in Littleton Bog is located, will not be affected by the Proposed Development.

As such, the Proposed Development will result in the loss of breeding and foraging habitat, resulting in **a long-term slight negative** effect at the **local scale**. However, if larvae were directly affected through injury or mortality, a **short-term, significant negative effect** would occur at the **local scale**. Therefore, mitigation measures areas required, including pre-construction surveys to confirm the presence of larval webs.

6.9.2.4.8 Other invertebrates

Gyrinus urinator, which is noted as IUCN Near-Threatened (NT) species in the IRL Water beetles (Foster *et al*., 2009), was recorded at site C6 on the Black River in September 2025. The record location is located on the Black River at Twomile Borris, over 6.5 km downstream from the proposed access track to Lanespark Bog which will utilise existing culverts carrying the former bog railway route over the Black and Glengoole rivers.

Therefore, should any accidental water pollution occur within these rivers during the construction phase, potential for **an indirect short-term slight negative effect** at the **local scale** on this rare water beetle could arise. Mitigation measures are required to avoid accidental fuel, oil or chemical spills into watercourses draining the Site.

The desktop study shows there are records for a total of 13 threatened invertebrate species within Hectad S25 overlapping the Site (see Table 6-32). As such, there is a potential for these species to utilise habitats within the Site such as open grassland, cutaway bog, swamp and lakes. Therefore, habitat loss could result in a **direct long-term moderate negative effect** at the **local scale** on these rare invertebrates. Mitigation is required to recreate and restore various type habitats within the Site potentially used by these invertebrates.

6.9.2.5 Effects on Aquatic Environments and Associated Aquatic Fauna

The potential effects on water quality during the construction phase of the Proposed Development are described in Chapter 9 – Hydrology and Water Quality of this EIAR and are described here specifically in relation to biodiversity. In addition, the detailed potential effects of the Proposed Development on aquatic receptors for River Barrow and River Nore SAC and the Loughans SAC, which have been assessed as being of International Importance, are described in the AA and NIS. Effects on pNHAs overlapping these SACs are detailed in Section 6.9.2.2.

Littleton Bog including the Site has been operated with the drainage system under licence from the EPA (P0499-01), so that all drainage water, surface water or runoff water with sediment and pollutant will be collected into the existing drainage network running in Littleton Bog and trapped in settlement ponds before being discharged at 3 no. pumping stations into the local streams (the pumps no longer operate, leaving discharges to occur naturally based on fluctuating water levels).

As such this section assesses the potential for likely significant effects on aquatic receptors including aquatic habitats (i.e. River Suir and Drish Rivers, arterial drainage channels, land drains and cutover bog ponds/lakes), salmonids, lamprey, white-clawed crayfish, European eel, freshwater pearl mussel and aquatic invertebrates and other aquatic habitats identified during the desk study and detailed survey work and likely to occur downstream of the Proposed Development.

The Proposed Grid Connection will be installed under the River Nore via HDD, which is designated as the River Barrow and River Nore SAC, to reach the Ballyragget 110KV Substation. The River Nore SAC supports aquatic species of international importance as such as salmonid, lampreys, freshwater pearl mussels and white-clawed crayfish as the QI species. This crossing point is included in the catchment of SAC populations of freshwater pearl mussels, namely, the Nore Upper, and overlaps the SAC habitat distribution target of the species. While no in-stream works will occur, there is still the risk of drilling fluid accidentally entering from cracks or gaps of the riverbed substrate into the stream and fuel spillage or siltation from entry/exit pits or works within the road corridor during the construction. If these events occurred, they could give rise to an **indirect short-term significant negative effect** at the local scale on aquatic receptors including the QI species of the SAC in the form of habitat degradation as a result of water pollution during the construction phase.

Among watercourses at crossing points with the infrastructure of the Proposed Wind Farm, Black River, Derryvella (site C2 2025) and North Glengoole River, Derryvella (site C4 2025) are assessed as being local importance, higher value, given the presence of brown trout, which was recorded via electro-fishing surveys (Triturus 2021, 2023), and good to limited salmonid habitat values for holding, nursery and spawning. Similarly, Ardreagh River, Urlingford (site G3 2025), Borrisbeg River, Borrismore Lismaine Stream (15L16) (site G4 2025) and a tributary of the River Nore (site G10 2025), where the GC will cross, are assessed as local importance, higher value, as some suitable habitats of high to limited fisheries values and individuals of white clawed crayfish and/or Atlantic salmon and/or spraints of otter were recorded between 2021 and 2025.

The Drish River (site B3/G1 2025) where the GC crosses, is considered to be of county importance, given that otter is known to utilise the site, records of Atlantic salmon and European eel, and the presence of Annex I habitat type [6430] Hydrophilous tall herb fringe communities. While the layout of the Proposed Grid Connection has been specifically designed to avoid in-stream works within the main watercourses, there would be potential risk of an accidental fuel leak and oil and chemical spill without any mitigation measurements, resulting in **indirect short-term significant effect** on aquatic receptors in the form of habitat degradation as a result of water pollution during the construction phase.

Most of the surveyed watercourses located downstream of the Site are considered locally important (lower value) or locally important (higher value) with the exception of the River Suir (county importance) and the River Nore (international importance). In the watercourses downstream assessed as higher value, there were records of the presence of rare/protected species such as Atlantic salmon, brown trout, lamprey spp. and European eel, signs of otter and white-clawed crayfish (eDNA) and suitable habitats for fish species.

While the layout of the Proposed Development has been specifically designed to avoid in-stream works within rivers, there is a potential risk from water pollution due to accidental spillage of fuels, sediment runoff, cement products or wastewater into surface/ground water or escape of HDD drilling fluid to riverbeds during the construction phase. These potential occurrences could give rise to **indirect short-term significant effects at the local scale** on aquatic receptors including the aforementioned fish and white-clawed crayfish and habitats, which are sensitive to changes in water quality and turbidity, and secondary effects on otter through effects on prey species.

6.9.3 Potential Effects During the Operational Phase

6.9.3.1 Grid Connection & TDR

No operational phase effects are anticipated to arise from the GC.

In the event that any turbine components are required to be replaced, the TDR may be used during the operational phase, potentially giving rise to effects similar to those described for the construction phase in Section 6.9.2.

6.9.3.2 Peatland Rehabilitation

The impact assessment fully considers existing and emerging trends associated with the peatland rehabilitation plans being implemented at the site. The conditions and associated habitats created by the re-wetting measures which have been implemented form part of the ecological baseline and as such form an inherent component of the baseline environment considered in the impact assessment. The rehabilitation measures relevant to the bogs within the site; Littleton (BnM, 2026a), Longfordpass (2026b) and Lanespark (BnM, 2025a) have already been implemented, and no further interventions are proposed. Additional measures are proposed only for adjacent bogs outside the site (Ballybeg and Derryvella) (BnM, 2025a).

Operation of the Proposed Project will take place within the context of continued implementation of the Rehabilitation Plans (BnM 2026a, 2026b & 2025a). There will be localised effects arising from habitat loss and drainage as detailed in Section 6.9; however, the proposed wind farm will not interfere with the rehabilitation plan or compromise re-wetting and revegetation/regeneration at the site scale. The proposed development footprint is limited (proposed infrastructure occupies c.1.9% of the Site; PDAs occupy c. 1.6%) and will result in localised effects only – it will not interfere with key drainage management requirements for rewetting and as such is compatible with rewetting at the site scale. It is noted that wind farm projects compatible with peatland rehabilitation have previously been delivered, e.g. Cloncreen, Derrinlough, Bruckana and Mountlucas.

6.9.3.3 Protected Sites

6.9.3.3.1 European Sites

A Natura Impact Statement (NIS) has been prepared for the Proposed Wind Farm. The NIS addresses potential for adverse effects on the integrity of European sites resulting from the proposed project either alone or in-combination with other projects and plans. The Stage One Appropriate Assessment Screening report concluded that, in the absence of mitigation measures (which have not been considered at screening stage), likely significant effects on the qualifying interests of the Lower River Suir SAC (002137), The Loughans SAC (000407) and River Barrow and River Nore SAC (002162) during the operational phase cannot be excluded on the basis of objective scientific information.

A Stage 2 Appropriate Assessment (Natura Impact Statement) of the potential effects on these European Sites was therefore required.

The Natura Impact Statement concluded that, in the light of the conclusions of the assessment which it shall conduct on the implications for the European sites concerned, the competent authority is enabled to ascertain that the proposed project will not adversely affect the integrity of any of the European sites concerned. No operational phase effects to the Lower River Suir SAC (002137), The Loughans SAC (000407) and River Barrow and River Nore SAC (002162) were identified following mitigation.

The potential effects on SPAs and the relevant National sites during the operational phase are discussed in Chapter 7 Ornithology.

6.9.3.3.2 Natural Heritage Areas or Proposed Natural Heritage Areas

No potential effects on national sites were identified for the operational phase.

6.9.3.4 Effects on Habitats and Flora

The operation of the Proposed Development will not result in any additional land take and as such there is no potential for any significant effects on habitats of ecological value within the Site.

The Proposed Development will have positive effects on habitats due to the proposed habitat enhancement measures which will develop throughout the operational phase of the Proposed Development as part of the Biodiversity Enhancement and Management Plan.

Japanese knotweed is required to be monitored for two years at minimum and five years at maximum to ensure the effectiveness of treatment/eradication measures. Therefore, the risk of spreading this invasive species will remain during the operational phase, and if spread occurred, there would be a **long-term, significant negative effect** at the **local scale** on the local habitats and native flora prior to mitigation.

Potential indirect effects on water quality within the site could occur due to sediment erosion and runoff during the early stages of the operational phase, which could give rise to a **Short-term Slight** Reversible effect at the Local scale until soils are re-vegetated. There is also potential for water quality effects to arise from soil disturbance or pollution associated with maintenance of the bat felling buffers, and maintenance operations such as replacement of oils and lubricants in turbines and transformers. Therefore, mitigation measures are required to avoid water pollution due to operational phase works.

6.9.3.5 Effects on Terrestrial Fauna During Operation

6.9.3.5.1 Badger, Otter & Pine Marten

The operation of the Proposed Development will not result in any additional habitat loss.

The level of human activity associated with the maintenance of the operational wind farm will be infrequent and minimal given that it will be monitored remotely. Maintenance of the 76 m bat felling buffers around turbines may result in periodic disturbance to mammals.

In the event that a new badger sett becomes established inside or within 50m of the bat felling buffers during operation, potentially *Significant Short-term* Reversible effects at the Local scale could arise if a sett was damaged and/or badgers were killed or injured prior to mitigation.

Any negative effects to other mammals during the operational phase of the windfarm are deemed to be *Long-term Imperceptible* Reversible effect at the Local scale.

Regarding otters, there will be no in-stream and watercourse crossing works activity during the operational phase of the Proposed Development, and therefore, no significant effects on disturbance or replacement of otters. However, it is still deemed that there is potential for indirect effect (prior to mitigation) on water quality within the site, due to sediment erosion and runoff during the operational phase (most likely during early operational phase prior to revegetation of bare soils; also limited potential for bat buffer maintenance to result in soil disturbance). It is assessed as being short-term, slight and reversible negative effect on the habitats for otter foraging at the local scale. Therefore, mitigation measures are required to avoid water pollution due to operational works.

In the operational phase, it is expected that visitors will utilise the Littleton Bog for the amenity recreation, therefore, these notable mammals within the Site could be affected by visual disturbance. It should be noted that all proposed amenity trails and associated parkings have adequate buffers, over 50m, which is defined as general construction buffer (NRA, 2005), with the existing badger setts. Regarding otter and pine marten, no resting and breeding sites were found within the Site. While individuals commuting and foraging across the Site might be affected to some extent, based on the above, it is deemed that the visual disturbance to badger, otter and pine marten in the operational phase is assessed to be a **Temporary Slight** effect**.** Therefore, mitigation measures are not required.

Mammal fencing as per TII specification CC-SCD-00324 will be installed along amenity trail and access track sections where barriers are required to prevent dogs and walkers from accessing key habitat areas for breeding birds. Predator fencing will be installed around the Derryhogan Lakes area to protect breeding curlew. See Figure 7.7 for locations of mammal and predator fencing**.**

The majority of the site will remain accessible to larger mammals (the exceptions are Derryhogan Lakes which will be fully closed off by predator fencing to protect nesting curlew, and the area around T03 which will be fully encircled by mammal fencing); however, long sections of mammal fencing will require larger mammals to make longer journeys to circumnavigate fencing to cross Littleton Bog from east to west and to cross Lanespark Bog from north to south. As such, some degree of habitat fragmentation may occur for larger mammals such as badger and otter, although it is noted that both species have potential to climb over mammal fencing.

As such, the proposed mammal fencing will result in a **Long-term Slight** to **Moderate** effect for badger and otter. The effect on pine martin is assessed as **Long-term Not significant.**

6.9.3.6 Effects on Bats During Operation

6.9.3.6.1 Activity Assessment

Statistical analysis was carried out for the data obtained for each of the years 2023 and 2025 using Ecobat median percentile scores. As per Table 6-55 below, the colour scheme applies to the following values for each species recorded:

Table 6-55: Bat activity levels categorised by percentile scores

Ecobat Percentile	Bat Activity Level
81 - 100	High
61 - 80	Moderate/High
41 - 60	Moderate
21 - 40	Moderate/Low
0 - 20	Low

Table 6-56: Activity per species and detector (2023)

Activity level classification based on median percentiles categorised as per Table 6-55 above.

			Median Percentiles							
		Location	Myotis daubentonii	Myotis mystacinus	Myotis nattereri	Nyctalus leisleri	Pipistrellus nathusii	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Plecotus auritus
2023	Spring	L1	6	2	0	1	37	4	9	4
		L2	6	2	6	1	18	4	11	4
		L3	8	0	6	2	0	2	4	1
		L4	9	2	6	2	0	0	2	1
		L5	1	0	10	2	0	0	1	1
		L6	9	2	15	4	23	8	1	7
		L7	6	2	0	3	11	0	1	4
		L8	14	4	6	6	14	1	1	7
		L9	6	4	13	6	0	0	5	4
		L10	12	4	10	8	8	1	6	13
		L11	9	2	6	6	8	2	15	13

			Median Percentiles							
		Location	Myotis daubentonii	Myotis mystacinus	Myotis nattereri	Nyctalus leisleri	Pipistrellus nathusii	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Plecotus auritus
	Summer	L1	11	6	13	4	0	1	13	13
		L2	11	0	0	1	0	0	6	4
		L3	4	6	19	2	0	0	3	5
		L4	2	3	12	4	0	0	2	4
		L5	6	3	6	4	0	0	3	4
		L6	9	6	18	4	0	1	3	13
		L7	6	3	6	2	0	0	3	9
		L8	9	3	6	8	0	2	1	9
		L9	8	4	33	9	8	0	2	15
		L10	11	5	19	5	0	0	12	4
		L11	10	5	12	6	0	0	8	9
	Autumn	L1	11	3	22	3	0	0	0	7
		L2	6	0	5	0	11	0	0	1
		L3	-	-	-	-	-	-	-	-

			Median Percentiles							
		Location	Myotis daubentonii	Myotis mystacinus	Myotis nattereri	Nyctalus leisleri	Pipistrellus nathusii	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Plecotus auritus
		L4	5	3	5	0	8	0	0	1
		L5	3	0	5	0	11	0	0	1
		L6	7	3	5	4	11	0	0	4
		L7	11	3	5	4	0	0	0	4
		L8	1	3	22	1	8	0	0	1
		L9	13	3	20	3	11	0	0	1
		L10	5	1	15	0	8	0	12	4
		L11	5	1	12	0	14	0	0	1

Table 6-57: Activity per species and detector (2025)

Activity level classification based on median percentiles categorised as per Table 6-55 above.

			Median Percentiles							
		Location	Myotis daubentonii	Myotis mystacinus	Myotis nattereri	Nyctalus leisleri	Pipistrellus nathusii	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Plecotus auritus
2025	Spring	LT1	5	1	5	1	18	0	1	4
		LT2	1	0	0	1	13	0	1	1
		LT3	5	1	5	1	8	0	1	3
		LT4	7	2	0	0	15	0	0	0
		LT5	4	1	0	16	22	0	0	1
		LT6	1	1	0	3	34	4	4	9
		LT7	5	0	0	3	13	1	1	4
		LT8	1	0	5	5	35	8	4	13
		LT9	1	0	19	1	8	0	4	3
		LT10	5	2	5	4	13	2	5	3
		LT11	-	-	-	-	-	-	-	-

			Median Percentiles							
		Location	Myotis daubentonii	Myotis mystacinus	Myotis nattereri	Nyctalus leisleri	Pipistrellus nathusii	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Plecotus auritus
	Summer	LT1	6	3	7	5	9	0	13	7
		LT2	6	3	15	10	9	0	9	4
		LT3	9	3	7	9	0	0	8	4
		LT4	6	3	7	7	0	0	6	1
		LT5	6	3	7	10	9	0	4	7
		LT6	9	6	7	7	0	0	3	1
		LT7	6	3	7	9	9	1	7	4
		LT8	9	5	15	12	0	0	9	4
		LT9	11	3	32	6	9	0	9	7
		LT10	12	6	15	3	0	0	16	4
		LT11	14	3	15	9	9	0	14	9
	Autumn	LT1	6	0	7	2	0	0	7	4
		LT2	6	0	0	5	0	0	3	1
		LT3	2	1	10	2	0	0	1	1

			Median Percentiles							
		Location	Myotis daubentonii	Myotis mystacinus	Myotis nattereri	Nyctalus leisleri	Pipistrellus nathusii	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Plecotus auritus
		LT4	2	0	7	3	0	0	0	9
		LT5	2	1	13	3	8	0	0	9
		LT6	6	0	7	4	0	0	1	1
		LT7	7	0	7	5	0	0	2	3
		LT8	2	1	7	9	0	0	1	9
		LT9	21	1	33	2	8	0	2	18
		LT10	6	1	7	0	0	0	3	1
		LT11	6	0	7	1	8	0	2	1

Assessment of Site Risk - Collision Mortality Risk

Based on the two-stage approach assessing potential risk to bats (NatureScot 2021), taking into consideration habitat and development related features (refer to

Table 6-59). An overall assessment of risk can then be made by considering the site assessment in relation to the bat activity output from

Table 6-56 and Table 6-57 (refer to Table 6-60) and taking into account the relative vulnerability of each species of bat present at the population level based on the NatureScot (2021) receptor evaluation (adapted from Wray et al., 2010) aligned to the Irish context referencing IWM 134 *'Bat mitigation Guidelines for Ireland*' (Marnell et al., 2022) and Article 17 Reporting/Guidance (refer to Table 6-61).

Eight species of bat were recorded during the 2023 and 2025 bat surveys at the proposed development. Table 6-61 provides an ecological evaluation of each bat species and the collision risk factor in relation to wind farms. Four of the bat species recorded are considered to be high risk, namely common pipistrelle, soprano pipistrelle, Nathusius's pipistrelle and Leisler's bat (Table 6-61).

All bats recorded are classified as 'Least Concern' on the Irish Red List (Marnell et al., 2019) and protected under the EU Habitats Directive Annex IV and Wildlife Acts.

Using the NatureScot guidelines outlined in Table 6-58, the following risk assessment for the individual turbines in relation to each bat species recorded was completed using the following values:

Project Size = **Medium** (>10 turbines, other wind energy developments within 10km)

Habitat Risk = **Low** (habitats mainly consist of cutover bog, immature woodland and scrub with low bat activity and no roost features)

Therefore, based on

Table 6-59, a Site Risk Assessment score value of 2 was applied to the site as a whole. The impact assessment is determined by multiplying the Site Risk Assessment value (2) by the Ecobat median percentile (most frequent activity category) activity values for each turbine, converted to the activity score as shown in Table 6-60. See Table 6-55 for conversion of median percentiles to Ecobat activity levels (there are 5 ecobat activity levels across the median percentile range of 0-100).

Individual bat species have varying susceptibility to turbine collision based on their habitat preferences, flight characteristics and habitual flight altitudes (see Table 6-61). The median percentile activity levels for each of the High Risk (Leisler's, common pipistrelle, soprano pipistrelle and Nathusius' pipistrelle) were averaged across each survey season and converted to the corresponding Ecobat activity category for use in the risk assessment matrix (Table 6-60).

The Impact Assessment is then carried out for the individual turbines using the overall site assessment value (2) and compared to the Risk Assessment Matrix (Table 6-60) in order to determine the level of overall risk to the population.

Table 6-58: Initial site risk assessment NatureScot (2021)

Site Risk Level (1-5)*	Project Size			
		Small	Medium	Large
Habitat Risk	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5

Key: Green (1-2) - low/lowest site risk; Amber (3) - medium site risk; Red (4-5) - high/highest site risk.

* Some sites could conceivably be assessed as being of no (0) risk to bats. This assessment is only likely to be valid in more extreme environments, such as above the known altitudinal range of bats, or outside the known geographical distribution of any resident British species.

Habitat Risk	Description
Low	Small number of potential roost features, of low quality. Low quality foraging habitat that could be used by small numbers of foraging bats. Isolated site not connected to the wider landscape by prominent linear features.
Moderate	Buildings, trees or other structures with moderate-high potential as roost sites on or near the site. Habitat could be used extensively by foraging bats. Site is connected to the wider landscape by linear features such as scrub, tree lines and streams.
High	Numerous suitable buildings, trees (particularly mature ancient woodland) or other structures with moderate-high potential as roost sites on or near the site, and/or confirmed roosts present close to or on the site. Extensive and diverse habitat mosaic of high quality for foraging bats. Site is connected to the wider landscape by a network of strong linear features such as rivers, blocks of woodland and mature hedgerows. At/near edge of range and/or on an important flyway. Close to key roost and/or swarming site.

Project Size	Description
Small	Small scale development (≤10 turbines). No other wind energy developments within 10km. Comprising turbines <50m in height.
Medium	Larger developments (between 10 and 40 turbines). May have some other wind developments within 5km. Comprising turbines 50-100m in height.
Large	Largest developments (>40 turbines) with other wind energy developments within 5km. Comprising turbines >100m in height.

Table 6-59: Stage 1 site risk assessment based on habitat and project size as outlined in NatureScot (2021)

Site Risk Level (1-5)		Project size		
		Small	Medium	Large
Habitat Risk	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5

Table 6-60: Risk assessment matrix

	Ecobat activity percentile category					
Site Risk	**Nil (0)**	**Low (1)**	**Low – Moderate (2)**	**Moderate (3)**	**Moderate – High (4)**	**High (5)**
Lowest (1)	0	1	2	3	4	5
Low (2)	0	2	4	6	8	10
Medium (3)	0	3	6	9	12	15
High (4)	0	4	8	12	15	18
Highest (5)	0	5	10	15	20	25

Overall assessment value (i.e Turbine Risk Value) is then compared to the ranges below:

Low Overall Risk (0-4)	Medium Overall Risk (5-12)	High Overall Risk (13-25)

Table 6-61: Level of potential vulnerability of populations of Irish bats species (NatureScot, 2021; adapted from Wray *et al.*, 2010)

	Low collision risk	Medium collision risk	High collision risk
Common species	N/A	N/A	Common pipistrelle Soprano pipistrelle Leisler's bat
Rare Species	Brown long-eared bat Daubentons bat Natterers bat	N/A	Nathusius's pipistrelle
Rarer Species	Whiskered bat	N/A	N/A

Table 6-62: Risk assessment for each detector location for the four high risk bat species for 2023

			Leislers bat		Common pipistrelle		Soprano pipistrelle		Nathusius's pipistrelle	
	Detector ID	Site risk value	Ecobat median category	Detector risk (site risk x median category)	Ecobat median category	Detector risk (site risk x median category)	Ecobat median category	Detector risk (site risk x median category)	Ecobat median category	Detector risk (site risk x median category)
Spring	L1	2	1	2	1	2	1	2	2	4
	L2	2	1	2	1	2	1	2	1	2
	L3	2	1	2	1	2	1	2	0	0
	L4	2	1	2	0	0	1	2	0	0
	L5	2	1	2	0	0	1	2	0	0
	L6	2	1	2	1	2	1	2	2	4
	L7	2	1	2	0	0	1	2	1	2
	L8	2	1	2	1	2	1	2	1	2
	L9	2	1	2	0	0	1	2	0	0
	L10	2	1	2	1	2	1	2	1	2
	L11	2	1	2	1	2	1	2	1	2

			Leislers bat		Common pipistrelle		Soprano pipistrelle		Nathusius's pipistrelle	
Summer	L1	2	1	2	1	2	1	2	0	0
	L2	2	1	2	0	0	1	2	0	0
	L3	2	1	2	0	0	1	2	0	0
	L4	2	1	2	0	0	1	2	0	0
	L5	2	1	2	0	0	1	2	0	0
	L6	2	1	2	1	2	1	2	0	0
	L7	2	1	2	0	0	1	2	0	0
	L8	2	1	2	1	2	1	2	0	0
	L9	2	1	2	0	0	1	2	1	2
	L10	2	1	2	0	0	1	2	0	0
	L11	2	1	2	0	0	1	2	0	0
Autumn	L1	2	1	2	0	0	0	0	0	0
	L2	2	0	0	0	0	0	0	1	2
	L3	2	-	-	-	-	-	-	-	-
	L4	2	0	0	0	0	0	0	1	2
	L5	2	0	0	0	0	0	0	1	2

			Leislers bat		Common pipistrelle		Soprano pipistrelle		Nathusius's pipistrelle	
	L6	2	1	2	0	0	0	0	1	2
	L7	2	1	2	0	0	0	0	0	0
	L8	2	1	2	0	0	0	0	1	2
	L9	2	1	2	0	0	0	0	1	2
	L10	2	0	0	0	0	1	2	1	2
	L11	2	0	0	0	0	0	0	1	2

Table 6-63: Risk assessment for each detector location for the four high risk bat species for 2025

			Leislers bat		Common pipistrelle		Soprano pipistrelle		Nathusius'spipistrelle	
	Detector ID	Site risk value	Ecobat median category	Detector risk (site risk x median category)	Ecobat median category	Detector risk (site risk x median category)	Ecobat median category	Detector risk (site risk x median category)	Ecobat median category	Detector risk (site risk x median category)
Spring	LT1	2	1	2	0	0	1	2	1	2
	LT2	2	1	2	0	0	1	2	1	2
	LT3	2	1	2	0	0	1	2	1	2
	LT4	2	0	0	0	0	0	0	1	2
	LT5	2	1	2	0	0	0	0	2	4
	LT6	2	1	2	1	2	1	2	2	4
	LT7	2	1	2	1	2	1	2	1	2
	LT8	2	1	2	1	2	1	2	2	4
	LT9	2	1	2	0	0	1	2	1	2
	LT10	2	1	2	1	2	1	2	1	2
	LT11	2	-	-	-	-	-	-	-	-

			Leislers bat		Common pipistrelle		Soprano pipistrelle		Nathusius'spipistrelle	
Summer	LT1	2	1	2	0	0	1	2	1	2
	LT2	2	1	2	0	0	1	2	1	2
	LT3	2	1	2	0	0	1	2	0	0
	LT4	2	1	2	0	0	1	2	0	0
	LT5	2	1	2	0	0	1	2	1	2
	LT6	2	1	2	0	0	1	2	0	0
	LT7	2	1	2	1	2	1	2	1	2
	LT8	2	1	2	0	0	1	2	0	0
	LT9	2	1	2	0	0	1	2	1	2
	LT10	2	1	2	0	0	1	2	0	0
	LT11	2	1	2	0	0	1	2	1	2
Autumn	LT1	2	1	2	0	0	1	2	0	0
	LT2	2	1	2	0	0	1	2	0	0
	LT3	2	1	2	0	0	1	2	0	0
	LT4	2	1	2	0	0	0	0	0	0
	LT5	2	1	2	0	0	0	0	1	2

			Leislers bat		Common pipistrelle		Soprano pipistrelle		Nathusius'spipistrelle	
	LT6	2	1	2	0	0	1	2	0	0
	LT7	2	1	2	0	0	1	2	0	0
	LT8	2	1	2	0	0	1	2	0	0
	LT9	2	1	2	0	0	1	2	1	2
	LT10	2	0	0	0	0	1	2	0	0
	LT11	2	1	2	0	0	1	2	1	2

Both direct collision with rotor blades and barotrauma (injuries to internal air cavities and blood vessels caused by sudden change in air pressure behind a moving blade), have been found to directly effect bats (e.g. Cryan & Barclay, 2009, Rydell et al., 2010, Cryan et al. 2014, & Mathews et al., 2016). The evaluation of Irish bat species likely to be at risk from collision and barotrauma is detailed in Table 6-61 and is in part related to the likelihood of different species flying at rotor blade height in an open landscape. It is noted that common pipistrelles have been demonstrated to be attracted to wind turbines and occur around wind turbines at higher levels than at control locations nearby (Richardson et al 2021).

Given the low collision risk, low recorded activity levels and low turbine risk identified for all bat species, the potential direct effects of the operational phase upon bat species are considered to be **Long-term Not Significant** and Reversible at the **Local level**.

6.9.3.6.2 Lighting

Sensor-triggered lighting will be installed at the proposed substation to provide safe access for operatives during the operational phase. The potential effect of lighting on bats at this location will be highly localised but has potential to affect bats foraging or commuting in this area, resulting in a **Long-term Slight** effect at the **Local level** prior to mitigation.

It appears that aviation obstruction lighting installed on top of wind turbines may affect the likelihood of bats colliding with turbines. Research on this topic (Bennett and Hale, 2014) indicates that red aviation lights on wind turbines do not increase bat-turbine collisions.

6.9.3.7 Amphibians

The operation of the Proposed Development will not impede the free movement of amphibians through the environment. However, there is still a possibility that the operational vegetation management measures such as mowing for bat buffer twice per year might cause *Short-term, Slight* Reversible effects on the habitat loss of amphibians at the Local scale prior to mitigation. .

6.9.3.8 Marsh Fritillary

There is potential for the local marsh fritillary population to expand into the turbine felling buffers in the event that suitable habitat including the larval food plant devil's bit scabious established in these areas due to operational vegetation management measures, giving rise to potential for ***Short-term Significant*** Reversible effects at the Local scale prior to mitigation.

6.9.3.9 Other invertebrates

As the operational works relevant to hydrology and water quality, some maintenance works may be completed, such as maintenance of site entrances, internal roads, hardstand areas and amenity trails. While the works may be minor and infrequent, there might be potential effects on the water quality of watercourses within the Site and the downstream water bodies due to the release of suspended solids and hydrocarbons from site vehicles into surface water within the Site. These could result in an indirect **short-term slight** negative effect on *Gyrinus urinator* at the local scale prior to mitigation.

The operation of the Proposed Development has a possibility that the operational vegetation management measures such as mowing for bat buffer twice per year may cause **Short-term Slight** Reversible effects on terrestrial invertebrates at the Local scale.

6.9.3.10 Effects on Aquatic Environments and Associated Aquatic Fauna

In the same context of Section 6.9.1, the potential effects on water quality during the operational phase of the Proposed Development are described in Chapter 9 – Hydrology and Water Quality of this EIAR and are described here specifically in relation to biodiversity.

As the operational works relevant to hydrology and water quality, some maintenance works may be completed, such as maintenance of site entrances, internal roads, hardstand areas and amenity trails. While the works may be minor and infrequent, there might be potential effects on the water quality of watercourses within the Site and the downstream water bodies due to the release of suspended solids and hydrocarbons from site vehicles into surface water within the Site. These could result in **short-term, indirect, slight negative effects** on the local aquatic ecology prior to mitigation.

It should be noted that there will be no instream and watercourse crossing works activity during the operational phase of the Proposed Development and therefore no potential for loss of aquatic habitat.

6.9.4 Potential Effects During Decommissioning

Decommissioning is outlined in Chapter 4 Project Description. The decommissioning plan is subject to agreement with the planning authority at the end of the operational phase.

On decommissioning of the Proposed Wind Farm, the above ground turbine components will be disassembled via cranes and removed from the Site. Operating cranes within the Site and disassembling works might cause dust emissions and watercourse pollution to the remaining habitats and noise disturbance to fauna within the Site.

It is proposed that all internal site access tracks and turbine hard standings will be left in place. Turbine foundations and hard standings will be covered using original stripped topsoil, which would have been placed adjacent to the works area and landscaped during the construction stage, and allowed to revegetate naturally.

Soils excavated during the construction phase will be managed in the Proposed PDAs in accordance with the Soils Management Plan and will be re-used to cover the turbine hardstands. There is potential for vegetation and habitats which have established on stockpiled peat to be disturbed by re-use of this material to reinstate the turbine hardstands. Operation of machinery may cause dust emissions and watercourse pollution to the remaining habitats and noise disturbance to fauna within the Site.

The decommissioning works will be at a much smaller scale than that of the construction stage and as such potential for significant effects is much reduced. However, mitigation to prevent significant impacts on terrestrial fauna and on water quality and associated aquatic fauna will be applicable to the decommissioning phase given that the potential impacts are the same as those at construction stage: sediment runoff, disturbance to species, risk of spills (noting however that bridges and culverts will remain in situ and as such no in-stream works are required). **Short-term Slight Reversible** effects at **Local scale** could occur prior to mitigation.

It is proposed that infrastructure for the Proposed GC including the on-site substation and ancillary electrical equipment shall form part of the national grid and will be left in situ. The temporary accommodation works along the TDR will not be required for the decommissioning phase as turbine components can be dismantled on site and removed using standard HGVs. Therefore, there will be no significant effects due to the decommissioning of the Proposed GC and TDR.

6.9.4.1 Peatland Rehabilitation

Similarly to the construction phase, the impact assessment fully considers existing and emerging trends associated with relevant peatland rehabilitation plans. Wind farm decommissioning activities will utilise the proposed access tracks and be limited to the proposed infrastructure footprint. As such, they will not affect any future habitats arising from rehabilitation measures.

6.10 Mitigation Measures for Biodiversity

Mitigation is prescribed in accordance with the Environmental Protection Agency EPA guidance on EIAR (EPA,2022) which requires mitigation by avoidance as a first approach. Where this is not feasible, measures to prevent impacts from giving rise to significant effects should be adopted (e.g. design of bunded storage). Where impacts cannot be avoided e.g. generation of noise, mitigation by reduction of impact is required to limit the exposure of the receptor to an acceptable level (often achieved by interrupting the pathway between the source and receptor).

Mitigation measures are described below which will avoid, reduce and where possible, offset likely significant effects arising in relation to biodiversity from the construction, operation and decommissioning of the Proposed Development. These mitigation measures shall be implemented in full.

6.10.1 Mitigation by Avoidance and Design

As part of the design evolution for the Proposed Development the Design Team and the Planning and Environmental Teams worked closely together to ensure that constraints were considered from the outset, in order to formulate a development which would avoid, by design and at source, potential for significant effects. In this regard, the following measures are incorporated into the Proposed Development design to reduce impacts on designated sites, flora and fauna through avoidance and design:

- The grid connection river crossing methodology will use horizontal directional drilling (HDD) to avoid direct effects on riverine habitats and to avoid disturbance to bridge structures with potential to be used by roosting bats.
- The hard-standing area of the wind turbine has been kept to the minimum necessary for the maximum turbine range proposed, including all site clearance works to minimise land take of habitats and flora.
- Care has been taken to ensure that sufficient buffers are in place between wind farm infrastructure and hydrological features such as rivers and streams. Buffers of a minimum of 50m from natural watercourses have been maintained, excepting where crossing points occur.
- Intensive site investigations were undertaken to ascertain a detailed understanding of the peat profile and karst risk within the Site. All extraction works will be completed above the local groundwater table. In addition, the internal access tracks will be constructed via the floated method to keep much of the peat remaining in situ with the exception of a small depth taken as part of vegetation removal within the road footprint.
- The drainage for the section of proposed access track at the southern end of Longfordpass Bog has been designed to omit roadside drainage from the western side of the access track where it runs c. 20m east of intact (non-Annex I) raised bog (see Figure D101 of the drainage layout). Roadside drainage on this section has been positioned on the eastern side of the proposed track to reduce potential for indirect effects on the raised bog habitat to the west. The access track will be floated to avoid unnecessary excavation and silt fencing will be installed along the western margin to contain any potential runoff within the works area. No access will be permitted beyond the western margin of the access track on this section.

- The footprint of the Proposed Development has been kept to the minimum necessary, including the use of layout design methods including existing roads and stream crossings to minimise excavation works and loss of habitat.
- Field surveys were conducted to confirm the existence and distribution of badger setts within the Site, and the optimum design of the Proposed Development has been prepared based on the informed findings to avoid causing disturbance and loss of badger setts and/or disturbance/injury/mortality of badgers.

6.10.2 Mitigation Measures During the Construction Phase

Construction is expected to cause significant effects on ecological receptors at local to national levels, as outlined in Section 6.9. The mitigation measures described below will reduce these effects such that significant effects will not occur. Mitigation is prescribed having regard to the following guidelines:

- Bennun et al. (2021). Mitigating biodiversity impacts associated with solar and wind energy development. Guidelines for project developers.
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (2008)
- The Inland Fisheries Ireland publication 'Guidelines on protection of fisheries during construction works in and adjacent to waters' (IFI, 2016).
- (SEPA) (2009) Engineering in the Water Environment Good Practice Guide: Temporary Construction Methods
- Guidelines for the Treatment of Bats during the Construction of National Road Schemes (NRA, 2006b);
- Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. (Marnell et. al, 2022)
- Guidelines For the Treatment of Otters Prior to the Construction of National Road Schemes and NRA (2009)
- Guidelines For the Treatment of Badgers Prior to The Construction of National Road Schemes
- NRA (2010) Guidelines for the Management of Noxious Weeds and Non- Native Invasive Plant Species on National Roads. National Roads Authority, Dublin.
- Irish Water IW-AMP-SOP-009 Information and Guidance Document on Japanese knotweed
- Best Practice Management Guidelines for Japanese Knotweed (Invasive Species Ireland, 2015)

6.10.2.1 Designated Sites

All potential effects on designated sites are related to the potential water quality changes due to release and accidental spillage of sediments and hydrocarbons into the protected waterbodies supporting habitats and species in SACs and NHAs via surface water or groundwater pathways. Therefore, the mitigation measures for sediment and hydrocarbons control to prevent significant incidents for aquatic ecology will be implemented as outlined in Chapter 9 and the following Section 6.10.2.3 Aquatic Ecology.

6.10.2.2 Habitats and Flora

6.10.2.2.1 Mitigation or Compensation of Habitat Loss

Dust Control

Dust control measures such as dust suppression to dampen down haul roads alongside setting a speed limit for vehicles on the access road are presented in Chapter 4 – Project Description proposes and will be adopted to ensure the protection of the surrounding sensitive environments including raised bogs within the Site during construction.

Mitigation for Raised Bog in the Northernmost Section

To minimise and mitigate the indirect effect on the water table of the raised bog in the northernmost section due to the installation of internal access track and associated drains, the following measures will be implemented:

- The internal access road in the northernmost section will be constructed via floating method (as outlined in Chapter 4 – the Project Description) to allow the depth of peat excavation to be minimised.
- No roadside drain will be installed on the western side of the proposed access track at this location.
- No access will be permitted beyond the western edge of the proposed access track at this location.

Dry Calcareous Grassland Translocation and Enhancement

To mitigate the effects on the local calcicoles due to the removal of calcareous grassland within the Site, it is proposed to re-use material excavated from under the existing rail line to landscape roadside areas such as drain edges in order to retain this soil and the associated seedbank close to its current location. To avoid accidentally discharging this soil during the mitigation works near drains, water protection measures will be used such as temporary silt traps (silt fences) around the existing drains.

Monitoring and vegetation management such as removal of scrub and trees to maintain open calcareous grassland will be carried out by a qualified ecologist in years 1, 2, 3, 5, 10, 15, 20 and 30 of operation.

Woodland Re-planting at Substation Compound

To mitigate the effects due to the removal scrub/immature woodland habitats, the mitigation measures and enhancement plan proposed within the Biodiversity Enhancement Management Plan will be conducted during the construction and post-construction phases as follows:

- As mitigation, following construction, the area of immature woodland removed from the substation compound footprint will be replanted with whips of downy birch, which is the primary pioneer tree species of woodlands on cutover bogs within the Site.
- In addition, a line of downy birch or other suitable native trees in the local area of standard size will be planted along the western margin bordering the existing rail line/proposed access track to restore connectivity for bats in advance of the re-planted woodland re-establishing.
- Tree protection will be provided to protect trees from grazing animals during the establishment phase.

Hedgerow Reinstatement

Where hedgerow removal is required for the Proposed Borrow Pit within the Site, these will be reinstated with native hedgerow and tree species which are indigenous to the local area and will include elm *Ulmus* spp., willows *Salix* spp. and downy birch as the main canopy species and hazel, hawthorn and blackthorn as the smaller shrub layer in order to create a well-developed layered structure which provide the similar function and diversity with native woodlands. In addition, as the pioneer species to support the early succession stage, willow, elder or downy birch are recommended to be planted, where possible.

To achieve favourable conditions of hedgerows, a cutting regime which allows at minimum the development and maintenance of highly favourable structure and ecological status outlined in the HAS guidance, i.e. over 4m height, over 3m width, overgrown, top heavy and undercut with outgrowth and dense base profile, connected with semi-natural habitats or woodlands will be observed during the operational phase.

Water Quality Change Control for Lakes/Rivers

Mitigation measures to control runoff, leaks or spillages of hydrocarbons and release of cement-based products are presented in Chapter 9 – Hydrology and Water Quality and will be adopted to ensure the protection of the aquatic environment during construction.

6.10.2.2.2 Management of the Spread of Non-Native Invasive Species

The importation of all construction material to Site will be in accordance with Ireland's Invasive Alien Species Soil and Stone Pathway Action Plan 2023 – 2027 (NPWS, June 2023) which requires implementation of biosecurity measures in advance of bringing material to site.

Japanese Knotweed

A small stand (several shoots) of Japanese Knotweed, which is a Third Schedule invasive species, was detected during field surveys by FT in 2025 at the proposed bell-mouth entrance to the Site from the Longfordpass North local road (AP 4). As such there is potential for disturbance of the ground at this location of access track construction works to result in the spread of this species.

Although Japanese knotweed plants flower, all flowers in Ireland and Britain are female, precluding the possibility of sexual reproduction. The way of spreading here is entirely through the movement of rhizomes or rhizome fragments in soil or cut stems. Japanese knotweed has an extraordinary ability to spread vegetatively from crown, stem and rhizome (underground root) if disturbed. Even tiny amounts of cut stem, crown or rhizome can produce a new plant.

Controlling the spread of the species is therefore dependent on preventing the spread of the stem, crown or rhizome. Red/purple shoots appear early in spring, which in some cases have an asparagus-like appearance but, as the canes grow, the leaves unfurl, and the plant takes its more characteristic appearance. The mature canes are like bamboo, being hollow, and have a characteristic pattern of purple speckles. The leaves are shield-shaped with pointed tips and a flat base, arranged in a zig-zag formation. The plant can grow to over 3m in height. Flowering occurs in late summer/autumn (End July – typically August) and consists of small creamy white flowers. During the winter the leaves die back and reveal orange/brown woody erect stems. Rhizomes are bright orange inside and can extend to a depth of 3m and a width of 7m around the visible growth above ground.

Specific consideration will be given to the construction of the bell-mouth entrance and internal access track in the vicinity of the stand of Japanese knotweed identified within the Site, due to the individual itself existing and the potential for disturbance of soil which might be contaminated by rhizomes of Japanese knotweed. The stand of Japanese knotweed and associated rhizome soil infestation buffer (8 m buffer around plant) near the proposed AP 4 entrance and internal access track will be managed, according to the following methodologies.

- The following control measures for Japanese knotweed within the Site will be conducted prior to the construction phase.
- A stand of Japanese knotweed is present near the proposed bell-mouth site entrance onto the Longfordpass local road (see Figure 6-16). A buffer of > 8m separates this from the nearest proposed site activity (edge of access track felling buffer). A further 7m buffer lies between the edge of the felling buffer and the proposed access track, providing a buffer of > 15m between the current baseline growth and closest proposed construction area. As such, it is highly unlikely that either construction of felling activities will interact with this growth of knotweed. However, measures to control/eradicate this species are provided to ensure any potential changes to the baseline are mitigated against.
- In addition to the management of the recorded stand above, a pre-construction survey to reconfirm the findings of the EIAR will be carried out during the growing season immediately prior to the construction phase by qualified ecologists and this will include consultation with Tipperary County Council to understand the status of ongoing treatment. This will mark out the extent/likely extent of the invasive plant material such as dead canes and rhizomes to create a buffer zone. As per NRA (2010) guidelines, the general infection area of this species is up to 7m horizontally (and up to 3m in depth), therefore, the buffer zone from identified stands of Japanese knotweed will be set for 7m at the smallest
- If either a new or existing stand and associated rhizome buffer is found to overlap the construction areas/infrastructure footprint during the pre-construction phase, eradication by physical methods such as excavation of the stand and surrounding soils will be carried out prior to the construction phase. This measure will be implemented under direction and supervision of an invasive species specialist. Where required following eradication, all contaminated material including soils potentially including stems and rhizomes of Japanese knotweed or Japanese knotweed vegetation itself will either be removed from site by an appropriately licensed waste contractor to a suitably licenced facility or disposed of following advice from an invasive species management specialist in accordance with relevant legislation and guidance.
- Due to the potential for significant negative effects on the aquatic environment from herbicides, the prioritisation of physical control over chemical methods must guide management strategies. It is recommended to avoid spraying as an application method unless essential, instead favouring application using 'weed wipers' or direct injection if herbicides are deemed necessary.
- Footwear and clothing of operatives working near invasive species will be checked for rhizomes, dead canes or other viable material before exiting the Site. Such operatives will also use boot brushes prior to exiting the site.
- All vehicles exiting the area of Japanese knotweed infestation will be examined to prevent the transport of rhizomes, dead canes and any other plant materials.
- New sightings of the invasive plant species identified within the Site will be relayed to the contractor for invasive species control. These areas will follow the same protocol as the current infected area.
- Monitoring and follow-up control for Japanese knotweed will be carried out in order to be completely eradicated from the Site. As per the manual of NRA (2010), the follow-up is considered to take the minimum two years (and up to five years) after any control. Therefore, the monitoring survey to ensure the eradication will be conducted by a qualified ecologist (the ECoW) in its growing season and accompanied with the proper follow-up control implemented by a licenced specialist.

It should be noted that an Invasive Species Management Plan (ISMP) for the Proposed Development has been prepared to describe the further detailed treatment/management of the invasive species within the Site (see Appendix 6.4).

Giant Hogweed

Noting the presence of a historical record for the Third Schedule invasive species giant hogweed recorded in 2022 within 1km grid square (S3563) overlapping the Proposed Grid Connection, measures to control and eradicate this species are included on a precautionary basis. This species was confirmed to be absent from the GC; the historical record is located c. 450m south-east of the GC, downhill and downstream of the GC, reducing the likelihood of potential spread towards the GC prior to construction.

A preconstruction survey will be conducted to confirm the continued absence of this species from the GC prior to construction. The ISMP contains a suite of measures for the control and eradication of this species, which will be implemented if required (see Appendix 6.4).

6.10.2.3 Aquatic Ecology

Mitigation to control runoff from Site is presented in Chapter 9 – Hydrology and Water Quality and will be adopted to ensure the protection of the aquatic environment during construction.

The main potential for significant effects during the construction phase on the aquatic environment is via water pollution. Construction phase mitigation for hydrology and water quality will follow that outlined in Chapter 9– Hydrology and Water Quality, and the mitigation measures outlined will be adhered to in conjunction with those outlined in this chapter, relating to the protection of specific aquatic species, noting that all measures for the protection of water quality, as detailed in Chapter 9, will also protect the aquatic ecology and fisheries value of downstream watercourses, particularly the habitats supporting sensitive aquatic species and with connectivity to River Barrow and River Nore SAC, Lower River Suir SAC and The Loughans SAC supporting aquatic habitats/species of high ecological values.

River Nore Grid Connection Crossing

Section 6.9.2.5 describes the potential effects on the water quality of the River Nore and its aquatic ecology, such as freshwater pearl mussel, salmonid, lampreys and white-clawed crayfish, due to accidental spillage of fuels and sediments into the river during the crossing construction via the HDD.

Chapter 9 proposes mitigation measures to prevent potential effects on the water quality of the River Nore due to the Proposed GC and summarises the rationale for no significant effects, with the measures as follows.

<u>Mitigation Measures for Directional Drilling</u>

- Although no in-stream works are proposed, the drilling works will only be done over a dry period between July and September (as required by IFI for in-stream works) to avoid the salmon spawning season and to have more favourable (dryer) ground conditions;
- The crossing works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance;
- There will be no storage of material / equipment or overnight parking of machinery inside the 15m buffer zone;
- Before any ground works are undertaken, double silt fencing will be placed upslope of the watercourse channel along the 15m buffer zone boundary;

- Additional silt fencing or straw bales (pinned down firmly with stakes) will be placed across any natural surface depressions / channels that slope towards the watercourse;
- Silt fencing will be embedded into the local soils to ensure all site water is captured and filtered;
- The area around the bentonite batching, pumping and recycling plant will be bunded using terram (as it will clog) and sandbags in order to contain any spillages;
- Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area;
- Spills of drilling fluid will be clean up immediately and stored in an adequately sized skip before been taken off-site;
- If rainfall events occur during the works, there will be a requirement to collect and treat small volumes of surface water from areas of disturbed ground (i.e. soil and subsoil exposures created during site preparation works);
- This will be completed using a shallow swale and sump down slope of the disturbed ground; and water will be pumped to a proposed percolation area at least 50m from the watercourse;
- The discharge of water onto vegetated ground at the percolation area will be via a silt bag which will filter any remaining sediment from the pumped water. The entire percolation area will be enclosed by a perimeter of double silt fencing;
- Any sediment laden water from the works area will not be discharged directly to a watercourse or drain;
- Works shall not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted;
- Daily monitoring of the compound works area, the water treatment and pumping system and the percolation area will be completed by a suitably qualified person during the construction phase. All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter is discharged to the watercourse;
- If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied;
- On completion of the works, the ground surface disturbed during the site preparation works and at the entry and exit pits will be carefully reinstated and re-seeded at the soonest opportunity to prevent soil erosion;
- The silt fencing upslope of the river will be left in place and maintained until the disturbed ground has re-vegetated;
- There will be no batching or storage of cement allowed at the watercourse crossing;
- There will be no refuelling allowed within 100m of the watercourse crossing; and,
- All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing.

Fracture Blow-out (Frac-out) Prevention and Contingency Plan

- The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used);
- The area around the drilling fluid batching, pumping and recycling plants will be bunded using terram and/or sandbags to contain any potential spillage;
- One or more lines of silt fencing will be placed between the works area and the adjacent river;

- Spills of drilling fluid will be cleaned up immediately and transported off-site for disposal at a licensed facility;
- Adequately sized skips will be used where temporary storage of arisings are required;
- The drilling process / pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse;
- This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped;
- Any frac-out material will be contained and removed off-site;
- The drilling location will be reviewed, before re-commencing with a higher viscosity drilling fluid mix; and,
- If the risk of further frac-out is high, a new drilling alignment will be sought at the crossing location.

Leakages or Spillages and Release of Sediments and Pollutant into Watercourses

Section 6.9.1 describes the potential effects on the water quality of a number of watercourses to be crossed by the infrastructure of the Proposed Wind Farm and GC due to accidental leakages, spillages and release of sediments and pollutant despite of no in-stream works, where the crossing is required.

Chapter 9 and the CEMP propose the mitigation measures and the emergency procedures to prevent environmental pollution incidents on the local aquatic ecology to be taken across the Proposed Development as below**;**

Sediment Control within the Existing Drains within the Site

- Interceptor drains will convey clean runoff water around works areas to the existing downstream drainage system (field drains and main drains). Where required, interceptor drains will be installed in advance of any construction works commencing. This will ensure that clean water is kept clear by diverting surface water flow around excavations, construction areas and temporary storage areas. Where possible (depending on orientation), existing field drains can be used as interceptors drains;
- Collector drains will be used to intercept and collect runoff from construction areas (from turbine base/hardstand areas, construction compounds, and the substation). During the construction phase temporary settlement ponds will be used to attenuate and treat runoff from the construction areas (from turbine base/hardstand areas, construction compounds, and the substation) and treated water will then discharge into existing field drains and main drains. Temporary settlement ponds will be removed at the end of the construction phase (end of high risk period), and wind farm runoff will discharge into existing field drains and main drains;
- During the construction phase, temporary silt traps (silt fences) will be used as an additional water protection measures around the existing bog drainage network, particularly where works are proposed within 50m of a natural watercourse. The silt fences will be placed in the existing drains downstream of construction works, and the associated construction area run-off water will be diverted into proposed interceptor drains, or culverted under/across the works area;
- During the construction phase, dewatering silt bags will also be used as required. They can be used downgradient of turbine bases, where temporary pumping is required. Discharge from dewatering silt bags will flow into settlement ponds and treated water from settlement ponds will outfall to existing field drains and main drains;

- Within the Site layout there are section of proposed floating road between turbine infrastructure. In these sections, and depending on intermediate topography, a collector drain (dirty water system as described above) may be used during construction stage, or over the edge (OTE) drainage will occur. Over the edge drainage allows runoff from access tracks to flow into local field drains and be managed via the existing site drainage system. OTE drainage will only occur where topography allows, and it is only proposed in areas of low risk and remote from outfall locations (at least 150m from bog outfall locations. Silt traps and check dams will be installed in field drains downstream of OTE drainage areas, and these will provide attenuation and treatment of dirty water; and,
- Culverts will be required where site roads and proposed hardstands cross the main bog drainage networks. These will be installed with a minimum gradient to reduce the entrainment of suspended solids. All culverts will be inspected regularly and maintained where appropriate. Culverts will remain in-situ during the Operational Phase of the Proposed Development.

Hydrocarbon Leaks or Spills

- All plant will be inspected and certified to ensure they are leak free and in good working order prior to use on site;
- On-site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer or truck will be re-filled at the construction compound and will be towed/driven around the Site to where machinery is located. All machinery will carry spill kits for the event of any accidental spillages. The fuel bowser will be parked in a designated location on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be available during all refuelling operations and used when required;
- Fuel volumes stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume during the construction phase; and,
- An emergency preparedness and response procedure is required to prevent environmental pollution incidents. Emergency Silt Control and Spillage Response Procedures are included in Section 4 of the Surface Water Management Plan, which is included in Appendix of the CEMP.
- A comprehensive spill response plan and procedures will be actioned in the event of an accident or emergency. Suitable spill kits and absorbent material for dealing with oil spills will be maintained on site and will be provided in all construction vehicles. In the event of pollution or potential risk of pollution the Local Authority and Inland Fisheries Ireland will be informed immediately. Refer to the Surface Water Management Plan, which is included in the Appendix of the CEMP, for more information on spill response procedures.

Release of Cement-Based Products

- No batching of wet-cement products on-site is proposed. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will be the design approach;
- Where possible pre-cast elements for culverts and concrete works will be used;
- No washing out of the main body of any plant used in concrete transport or concreting operations will be allowed on-site;

- Where concrete is delivered on site, only the concrete truck chute will be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be isolated in temporary lined wash-out pits located near Site compounds. These temporary lined wash-out pits will be removed from the site once their utility is no longer required or at the end of the construction phase;
- Any washing out of concrete pumping plant will also be into the temporary lined wash-out pits;
- Weather forecasts will be used to plan dry days for pouring concrete; and,
- Construction contractors will ensure each concrete pour site is free of standing water and plastic covers will be available in case of a sudden rainfall event.

Groundwater Pollution relevant to the Loughnans Turlough

Section 6.9.2 describes the potential effects on the water quality of the groundwater underlying the Loughnans SAC and the Proposed GC due to the earthworks for the installation of the GC through extensively networked karst conduits.

Chapter 9 assesses the potential effects on karst features due to the Proposed GC as being not significant, given the following rationale:

- The excavation depth (<1.5m);
- The proposed works are minor and transient in nature;
- The works will be completed within the carriageway of the existing public road network; and,
- The proposed works are akin to roadworks/water pipeline works being completed across the country.

Notwithstanding that, the following mitigation measures are proposed in the same Chapter to be implemented:

- Site drainage will be put in place in order to prevent any poor quality drainage water reaching the local karst features.
- Mitigation measures mentioned above for the control of sediments, hydrocarbon and cementitious products to be implemented will as well ensure the protection of the groundwater water quality to avoid any significant impacts on that.

General Measures

Works within and adjacent to watercourses, as part of HDD, culvert and new bridge construction, will adhere the guidelines set out in the best practice documents as listed below for the control of water pollution:

- CIRIA (2001). Control of water pollution from construction sites - Guidance for consultants and contractors (C532). Construction Industry Research and Information Association, London.
- CIRIA (2006). Control of Pollution from Linear Construction Project; Technical Guidance (C648). Construction Industry Research and Information Association, London.
- CIRIA (2015). Manual on scour at bridges and other hydraulic structures, second edition (C742). Construction Industry Research and Information Association, London.

- CIRIA (2015). Environmental Good Practice on Site (4th edition) (C741). Construction Industry Research and Information Association, London.
- CIRIA (2019). Culvert, screen and outfall manual (C786). Construction Industry Research and Information Association, London.
- DHPLG (2019). Draft Revised Wind Energy Development Guidelines. Department of Housing, Planning and Local Government. December 2019
- Enterprise Ireland (unknown). Best Practice Guide (BPGCS005) Oil storage guidelines.
- IFI (2016). Guidelines on Protection of Fisheries during Construction Works in and adjacent to waters. Inland Fisheries Ireland, Dublin.
- IFI (2019) Windfarm scoping document (draft). Inland Fisheries Ireland, Dublin.
- IWEA (2012). Best Practice Guidelines for the Irish Wind Energy Industry. Guidance prepared by Fehily Timoney and Company for the Irish Wind Energy Association.
- Kilfeather, P.K. (2007). Maintenance and protection of the Inland Fisheries resource during road construction and improvement works. Requirements of the Southern Regional Fisheries Board. Southern Regional Fisheries Board, Clonmel, Co. Tipperary
- Murphy, D.F. (2004). Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites. Eastern Regional Fisheries Board, Dublin.
- NRA (2008). Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. National Roads Authority.
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Watercourses (UK Guidance Note);
- SNH (2012). Assessing the cumulative impact of onshore wind energy developments. Scottish Natural Heritage, March 2012.
- SNH (2019). Good Practice during Wind Farm Construction (4th edition). Scottish Natural Heritage.

6.10.2.4 Non-volant Mammals

A pre-construction mammal survey will be undertaken no later than 12 months pre-construction to reconfirm the findings of the EIAR.

An ecologist (the ECoW) will supervise areas where vegetation removal and tree felling will occur immediately prior to and during construction as appropriate (e.g., an ecologist may be required during some clearance works of areas where vegetation is too dense to check beforehand). This will ensure that any site-specific issues in relation to wildlife not currently present on Site will be reconfirmed prior to commencement of works to allow appropriate mitigation measures to be put in place.

In the event that protected mammals, or their resting places are recorded, the consenting authority will be updated, consulted with, relevant guidelines will be followed for the management of such species.

Construction operations shall be restricted to between 07:00 - 19:00 hours Monday to Friday and 07:00 - 13:00 hours on Saturdays. It should be noted that it will be necessary to commence turbine base concrete pours earlier due to time constraints incurred by the concrete curing process. Work on Sundays or public holidays will only be conducted in exceptional circumstances or in an emergency.

6.10.2.4.1 Badger

Four badger setts are present within the Site. Two inactive badger setts (annex/outlier sett) and are located within c. 38m, 156m from the Proposed biodiversity enhancement sites (tree planting). One active badger sett (main) is located outside of the footprint/buffer of the Proposed Development, 192m from the internal access track. One active annex sett is located outside of the footprint/buffer of the Proposed Development, c. 56m from one of the Proposed PDAs.

In the pre-construction phase, exclusion zone fencing and appropriate signage will be put in place around the setts to ensure that there will be no vehicles tracking that could impact the sett. Tool box talks will be given to ensure site operatives are familiar with this constraint.

No exclusion or hard blocking of setts is proposed.

- As per NRA Guidance, during the breeding season (December to June inclusive) no works will be undertaken within 50m of an active sett or pile driving within 150m of active setts.
- All supervision and surveys will be undertaken or supervised by an appropriately qualified ecologist in advance of construction.

The Consenting Authority will be contacted immediately should any of the following events occur:

- A new sett is recorded within the Study Area during works;
- There is evidence of badger persecution during surveys.

Pre-mitigation monitoring and ecological supervision will ensure correct implementation of badger mitigation measures at construction stage.

6.10.2.4.2 Otter

A pre-construction mammal survey will be undertaken (no later than 12 months prior to construction) alongside other mammal surveys within the Site and the GC crossing points to reconfirm the status of otter and if an otter holt should be encountered at any point, then NPWS will be informed and NRA Guidelines for the Treatment of Otters Prior To the Construction of National Road Schemes will be followed.

Regarding the mitigation measures for the water quality changes due to the Proposed GC crossing the River Nore, see Section 6.10.2.3 Aquatic Ecology.

6.10.2.4.3 Pine Marten

A pre-construction survey for pine marten will be undertaken (no later than 12 months prior to construction) alongside other mammal surveys within the Site and along the GC. In the event that an active den is found, measures will be implemented to avoid it during the breeding season.

6.10.2.1 Bats

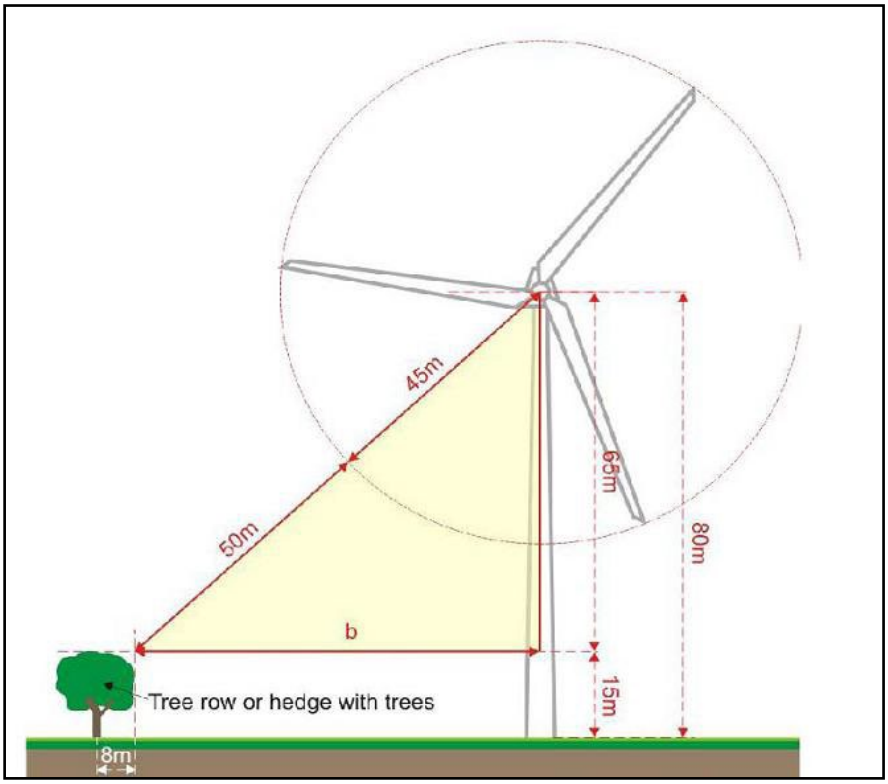
The following mitigation measures for bats will be implemented in full:

6.10.2.1.1 Vegetation Buffer

According to SNH (2021) guidance:

> *"The Eurobats guidance recommends a 200m buffer around woodland areas. There is, however, currently no scientific evidence to support this distance in the UK and it is recommended that a distance of 50m between turbine blade tip and nearest woodland (or other key habitat features such as wetlands etc.) is adequate mitigation in most, lower risk situations. Exceptionally, larger buffers may be appropriate, e.g. near major swarming and hibernation sites. The longevity of wind farms should also be taken into account and the maximum growth, or management, of woodland and other relevant habitat features considered in their planning. "*

These distances were taken into account during the design phase of the development. To minimize risk to bat populations, a vegetation clearance buffer zone will be provided around the turbines. The following formula was used to calculate the required felling buffer for the turbines (with example image taken from Natural



England – note not reflective of turbine dimensions the subject of this EIAR). Calculations were run for the proposed turbine dimensions in terms of hub height and blade length, and the bat buffer area is assessed in the EIAR.

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

where:
b = the distance on the ground between the edge of the canopy and the turbine (m)
bl = blade length (81m)

hh = hub height (119m)
fh = tree/hedgerow height (12m)

$$b = \sqrt{\{(50 + 81)^2 - (119 - 12)^2\}} = 75.6m$$

Based on this calculation, a 76m buffer (rounded up from 75.6m) has been adopted for all turbines.

Each of the locations of the eleven turbines was surveyed and the vegetation height informed the application of the dimensions of the blade tip buffer at turbine locations, dependant on the surrounding habitat and turbine specification. Taking projected tree growth based on species and site conditions into consideration, a tree height of 12m was assessed as a suitably precautionary height for calculation of buffer sizes at all proposed turbines.

Existing treelines, hedgerows and scrub within the bat buffers for any proposed turbine locations will be removed (note these habitat have been assessed for suitability to support other flora and fauna and have been determined as having local value – mitigation pertaining to site clearance will be employed at these areas). Buffers will be maintained throughout the lifetime of the wind farm as tree-free areas. This will be achieved through mechanical means only; the use of chemical substances is prohibited.

6.10.2.1.2 Supervision of vegetation clearance

An ecologist/ECoW will supervise areas where vegetation, scrub and hedgerow removal will occur prior to and during construction as appropriate (e.g., ecologist may be required during some clearance works of areas where vegetation is too dense to check beforehand). This will ensure that any Site-specific issues in relation to wildlife not currently present (e.g., Bat roost locations) on Site will be discovered prior to commencement of works to allow appropriate mitigation measures to be put in place. In the unlikely event that a bat roost is found, the NPWS will be informed, and the relevant guidelines will be implemented as appropriate (e.g. NRA guidelines).

6.10.2.1.3 Lighting restrictions

In general, artificial light creates a barrier to bats so lighting has been avoided where possible. Construction operations within the wind farm Site will take place during the hours of daylight where possible to minimise disturbances to faunal species at night. Some works along the cable route and wind farm Site may occur at night but the project ecologist/ECoW will limit night-time works to sections of the route / Site which avoid sensitive features (e.g. mature treelines, conifer plantation edge and tracks). Where lighting is required, directional lighting (i.e. lighting which only shines on work areas and not nearby countryside) will be used to prevent overspill.

This will be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only.

6.10.2.1.4 Pre-construction Surveys

If three years lapse between EIAR/planning-stage surveys and installation of the wind turbines, it will be necessary to repeat one season of surveys during the bat activity period (EUROBATS, 2014). Future survey work will be completed according to best practice guidelines available (Hundt, 2012; Collins, 2016; NatureScot, 2021; NIEA, 2021) and includes static detector, activity and roost inspection surveys.

It is not proposed to fell any trees with potential roosting features. No trees with roosting potential were observed during surveys of the Site and TDR.

Potential effects on trees with PRFs along the grid connection arising from grid connection works are imperceptible due to the negligible to low suitability of PRFs, their disturbed location beside the R693 regional road, and separation from works areas placing them outside the ZoI for direct effects.

If new bat roosts are present in areas affected by proposed felling, a bat derogation license will be sought from the National Parks and Wildlife Service.

6.10.2.2 Marsh Fritillary

Measures are required to avoid habitat loss and potential disturbance/injury to marsh fritillary due to the construction of the proposed infrastructure. The following mitigation for marsh fritillary is prescribed:

- Pre-construction surveys for marsh fritillary will be undertaken to reconfirm the findings of the EIAR.
- Areas of suitable marsh fritillary habitat within the Proposed Wind Farm footprint will be translocated to suitable locations in adjacent areas. These areas are identified in Table 6-64 and Figure 6-12, and any changes to the baseline will inform the translocation effort. Receptor areas will be prepared as required to ensure the successful establishment of translocated turves. Translocation will be achieved through the excavation and relocation of turves with vegetation comprising suitable larval habitat.
- If larval webs are present in any of the areas selected for translocation, translocation of turves and larval webs to suitable receptor areas outside the footprint will be undertaken. This will be achieved by marking the location of pupae/larvae, and carefully excavating the surrounding sod under ecological supervision. If required, translocation will be carried out immediately following the survey during September to ensure pupae/larvae can be relocated at the time of translocation.
- Monitoring will be carried out by a qualified ecologist in years 1, 2, 3, 5, 10, 15, 20, 30, 35 of operation.

Table 6-64: Areas of marsh fritillary habitat requiring translocation

id	X (ITM)	Y (ITM)	Area (ha)	Translocation/Notes
2	623034	659388	0.09	Partial translocation required
3	623084	659310	0.01	Partial translocation required
5	623154	659176	0.02	Partial translocation required
6	623188	659156	0.05	Partial translocation required
7	623257	658769	0.02	Partial translocation required
11	623672	658843	0.01	Partial translocation required
14	623344	658405	0.07	Partial translocation required
15	623383	658265	0.02	Partial translocation required
16	623457	657948	0.05	Partial translocation required
17	623654	657174	0.02	Partial translocation required
22	623686	656711	0.01	Partial translocation required
23	623761	656569	0.19	Partial translocation required

id	X (ITM)	Y (ITM)	Area (ha)	Translocation/Notes
26	623574	656114	0.00	Full translocation required
27	623143	656081	0.14	Partial translocation required
28	623088	655984	0.05	Partial translocation required
30	622971	655768	0.05	Partial translocation required
31	623058	655573	0.07	Partial translocation required
34	623543	655338	0.20	Partial translocation required
35	622813	655534	1.39	Partial translocation required
38	622284	654774	0.06	Partial translocation required
40	621813	654030	0.01	Partial translocation required
43	620481	652189	0.09	Partial translocation required

6.10.2.3 Herpetofauna

At the vegetation clearance stage, areas will be methodically disturbed prior to clearance in order to disturb these species so they leave the area prior to clearance works, reducing potential for individuals to remain in areas where they are at risk of injury or death. Mechanical disturbance to create noise and vibration can be used, in addition to human presence (walkover of vegetation clearance areas). A combination of both methods may be required, depending on site conditions.

In the event that construction is required to proceed during the breeding season of common frog (approximately January to midsummer), smooth newt (approximately February to June) and common lizard (approximately March to May), a pre-construction herpetofauna survey will be completed. If these species area present in areas with potential to be affected by vegetation clearance where it is not feasible to delay works until froglets, efts and juvenile lizards have dispersed from breeding sites, translocation under licence will be completed by a qualified ecologist.

Measures to exclude newts from areas affected by scrub clearance and active construction zones will be implemented to prevent injury or mortality of adult newts.

6.10.2.4 Project Ecologist/Ecological Clerk of Works (ECoW)

A Project Ecologist/Ecological Clerk of Works (ECoW) will be employed for the duration of the construction phase to ensure that all the mitigation measures set out in the EIAR, NIS and any conditions of consent pertaining to biodiversity are implemented. The Project Ecologist/ECoW will advise on environmental effects and communicate with the project owner and contractor to ensure the required actions to implement the mitigation prescribed in this EIAR are carried out. The Project Ecologist/ECoW will be awarded a level of authority and will be allowed to stop construction activity if there is potential for significant environmental effects other than those predicted and mitigated in the EIAR.

A Construction and Environmental Management Plan (CEMP) has been prepared for the Proposed Development (Appendix 4.1 of the EIAR). The CEMP will be finalised and implemented by the appointed contractor. The implementation of proposed mitigation measures, environmental commitments, as well as the monitoring and supervision of these measures will be managed through the CEMP. Mitigation measures to prevent significant negative effects to the KERs identified in this chapter will be incorporated into the development through the CEMP.

6.10.3 Mitigation Measures During the Operational Phase

6.10.3.1 Designated Sites

All potential significant effects on designated sites are related to the water quality change due to release and accidental spillage of sediments and hydrocarbons into waterbodies supporting habitats and species in SACs and pNHAs via surface water or groundwater pathways.

There will be no in-stream works, excavation and drilling during the operational phase. Maintenance works for infrastructure may be undertaken during the operational phase, and the same mitigation measures for sediment and hydrocarbons control with the construction phase will be implemented as outlined in Chapter 9 and the following Section 6.10.3.7 Aquatic Ecology.

6.10.3.2 Habitats and Flora

6.10.3.2.1 Monitoring of Habitat Restoration and Recreation

There is no additional habitat loss due to operational management. Monitoring is required where translocation of the calcareous grassland, re-wetting and restoration of the cutover bogs, recreation of the hedgerows, re-planting of the woodlands will be conducted as mitigation/enhancement measures during the construction phase. As indicators to monitor good status and successional progress of these habitats, it is recommended to refer to the criteria, positive indicators and/or favourable conditions shown in the following guidelines.

- Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.
- Foulkes, N., Fuller, J., Little, D., McCourt, S. and Murphy, P. (2013). Hedgerow Appraisal System - Best Practise Guidance on Hedgerow Survey, Data Collation and Appraisal. Woodlands of Ireland, Dublin. Unpublished Report [pdf].
- 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.
- Miyawaki method for creating forests

The monitoring years for each habitat are directed in the Biodiversity Enhancement Management Plan.

6.10.3.2.2 Monitoring of Invasive Species

Invasive species will continue to be monitored by a qualified ecologist to ensure the eradication, generally, up to five years from the first-time treatment, and where required, the follow-up control will be implemented by a licenced specialist. The ISMP will be prepared to describe the further specific control plan.

6.10.3.3 Non-volant Mammals

6.10.3.3.1 Badger

In the event that a new badger sett is discovered during maintenance of bat felling buffers (vegetation trimming), NPWS will be informed and the relevant guidance *Guidelines for the Treatment of Badgers Prior To the Construction of National Road Schemes* (NRA, 2008c) and will be followed.

The bat buffer pre-clearance badger survey shall extend 50m beyond the bat felling buffers.

6.10.3.3.2 Otter

There is potential for an indirect effect on fish species, which otter forages, due to water quality changes from erosion and sediment. Periodic inspections of sediment and erosion control measures will be undertaken until the risk of erosion or siltation has declined following the successful establishment of vegetation during the operational phase.

6.10.3.3.3 Pine Marten

No significant effects on pine marten is identified during the operational phase. Therefore, no additional mitigation measures are required.

6.10.3.4 Bats

6.10.3.4.1 Feathering of Blades

As per NatureScot 2021 guidelines the turbine blades will be feathered during low wind speeds; the angle of the blades is rotated to present the slimmest profile possible towards the wind, ensuring they do not rotate or 'idle' when not generating power. Turbine blades spinning in low wind can kill bats, however bats cannot be killed by feathered blades which are not spinning (Horn et al., 2008). The reduction in speed resulting from feathering compared with normal idling may reduce fatality rates by up to 50% (NatureScot 2021).

As such, the feathering of blades to prevent 'idling' during low wind speeds will be implemented for all turbines.

6.10.3.4.2 Cut-in Speeds/Curtailment

While bat activity varied by species, no detector/turbine locations had activity for any species higher than low/moderate levels (based on Ecobat median percentile scores).

Therefore, increased cut-in speeds are not required from commencement of operation, but will rather be reserved for implementation where required based on operational monitoring (see Section 6.10.3.4.3).

Modern, remotely-operated wind turbines as proposed here allow cut-in speeds to be controlled centrally/automatically, facilitating an operation regime designed to minimise harmful effects to bats.

The feathering of turbine blades combined with increased cut-in speeds have been shown to reduce bat fatalities from 30% and up to 90% (Adams et al., 2021, Arnett et al., 2011, 2013; Baerwald et al., 2009). The most recent of studies showed a 63% decrease in fatalities (Adams et al., 2021).

6.10.3.4.3 Operational Curtailment

Collision monitoring will be carried out for the first three years of operation, and an annual review at the end of each of these years will determine whether increased cut-in speeds should be implemented.

If, following any of the initial three years of post-construction surveys, carcass searches indicate fatalities are occurring (refer below), increased cut-in speeds will be implemented.

Alternatively, if it is found that the results of fatality searches reconfirm the level of bat activity at turbine locations remains low or low/moderate then curtailment will not be required.

Collision monitoring will subsequently be undertaken in years 5, 10, 15, 20, 25 and 30 with further review after each monitoring period.

If the requirement for curtailment is identified following the initial 3-year monitoring period, the following measures will be implemented:

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

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

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

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

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

- When the air temperature is above approximately 10°C at nacelle height (as bat activity is reduced below this temperature) and;
- Where the wind speed is above 5 - 6.5m/s at nacelle height. It has been shown that curtailing the operations of wind turbines at low wind speeds can reduce bat mortality dramatically, particularly during late summer and the early autumn months.

Due to the considerable unnecessary down time resulting from the "blanket curtailment" and the advances in smart curtailment a focused curtailment regime is further proposed as an optional means of achieving the level of curtailment indicated as required by operational monitoring.

This will focus on times and dates, corresponding with periods when the highest level of bat activity occur within the Site. This includes the use of the SCADA (Supervisory Control and Data Acquisitions) operating system (or equivalent) to only pause/feather the blades below a specified wind speed and above a specified temperature within specified time periods.

Post-construction collision monitoring surveys will be undertaken for the first three years of operation to confirm if curtailment is required in line with post-construction activity levels. The post construction surveys will be used to update the curtailment regime (blanket curtailment) designed around the values for the key weather parameters and other factors that are known to influence collision risk. This will include all of the following:

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

6.10.3.4.4 Lighting

The lighting installed at the proposed substation will utilise directional lighting (i.e. lighting which only shines on work areas and not nearby countryside) to prevent overspill. This will be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only. Lights will be sensor activated to minimise operation time; trigger sensitivity for the sensors will be specified to ensure the lights are not triggered by bat activity during periods when lighting is not required.

6.10.3.4.5 Buffer zones

The tree-free buffer zones around the turbines will be managed and maintained during the operational life of the development. These will be kept clear by mechanical means only (no chemicals / herbicides) and maintained on an annual basis in the same condition as during first clearance.

The immediate surroundings of individual turbines will be managed and maintained so that they do not attract insects (i.e. the concentration of insects in the wind turbine vicinity should be reduced as much as possible, but not such that insect abundancies affected elsewhere on the Site). This will be achieved through physical management of habitats without the use of toxic substances.

6.10.3.4.6 Monitoring of mitigation measures

The success of the implemented mitigation measures for bats on the project will be monitored for a period of no less than three years post construction and appropriate measures taken to enhance these if and where required.

6.10.3.4.7 Bat fatality monitoring

Whilst no significant residual impacts on bats are predicted, the proposed development could provide an opportunity to gain baseline data on bat/turbine interaction and the scheme will be monitored for bat fatalities for the first three years of operation (post construction surveys) and subsequently in years 5, 7, 10, 15, 20, 25 and 30 as part of the additional monitoring schedule.

The primary components of the bat mortality study will be as follows (whether curtailment is in place or not):

a) Carcass removal trials to establish levels of predator removal of possible fatalities. This will be done following best recommended practice and with due cognisance of published effects such as predator swamping, whereby excessive placement of carcasses increases predator presence and consequently skews results. No turbines which are used for carcass removal trials will be used for subsequent fatality monitoring.

b) Turbine searches for fatalities will be undertaken following best practice in terms of search area (focusing on the hard standing) (NatureScot, 2021) and at intervals selected to effectively sample fatality rates as determined by carcass removal trials in (a) above.

c) A standardised approach with a possible control group and/or variation in search techniques such as straight line transects/ randomly selected spiral transects/ dog searches will be undertaken. This will provide a means of robustly estimating the post construction collision fatality impact (if any).

d) Recorded fatalities will be calibrated against known predator removal rates to provide an estimate of overall fatality rates.

Table 6-65: Monitoring schedule proposed for bat mitigation measures

Mitigation measure	Monitoring required	Description	Duration
Mortality study	Fatality monitoring	Corpse searches beneath turbines to assess the impact of operation on bats.	From initial operation conducted during years 1, 2, 3, 5, 7, 10, 15, 20, 25 and 30 post construction.

Table 6-66: Summary of Operational-phase Mitigation Measures for Bats

Low Level Bat Mitigation: Applies to all turbines	Category
Operate the wind turbines in a manner that reduces the movement of the blades below the cut-in speed (e.g. by feathering the blades).	Feathering
Blanket curtailment will be implemented in the event that post-construction surveys indicate a high level of fatalities is occurring. The curtailment will involve operating the selected wind turbine from 30 minutes prior sunset to 30 minutes after sunrise at a cut-in speed of 5.5 m/s during specified weather conditions (10-11 °C and wind speed 5.0 to 6.5 m/s at nacelle hight) and during the active bat season (April to October). The requirement for curtailment/effectiveness if implemented will be monitored in all survey years i.e. 1, 2, 3 5, 7, 10, 15, 20, 25 and 30 with further review after each monitoring period.	Curtailment
Undertake a carcass search during years 1-3, and subsequently in years 5, 7, 10, 15, 20, 25 and 30 as part of the monitoring schedule.	Carcass monitoring
Maintain immediate area (76 m) around the wind turbines in a manner that does not attract insects.	Maintain vegetation free buffer
Lighting at the proposed substation will be directed to ensure light spill outside of intended areas does not occur, and lights will be sensor activated to minimise operation time.	Lighting restrictions

6.10.3.5 Marsh Fritillary

The pre-clearance bat buffer ecological survey shall include a marsh fritillary habitat appraisal, followed if necessary by a larval web survey. This will ensure that suitable mitigation and avoidance measures can be implemented in the event that marsh fritillary establish in the bat felling buffers during the operational phase.

Monitoring surveys and maintenance works for the translocated habitats for marsh fritillary will be implemented and supervised by a qualified ecologist to ensure that the mitigation measures during the construction phase are successful.

6.10.3.6 Herpetofauna

There is potential for an indirect effect on frogs or smooth newt due to water quality changes from erosion and sediment during the early operational phase prior to revegetation of bare soils. Periodic inspections of sediment and erosion control measures will be undertaken until the risk of erosion or siltation has declined following the successful establishment of vegetation during the operational phase.

The following mitigation for habitats supporting herpetofauna is proposed (see Appendix 6.1 for further details):

- In the post-construction phase, the settlement ponds within the BEMP area will be adapted to provide permanent and suitable breeding habitat for amphibians.
- Existing scrub around ponds will be retained where possible, in order to provide suitable supporting habitat and connectivity for smooth newt and common lizard foraging and commuting.

- Following construction, one side of each settlement pond will be excavated to form a shallow-angled slope providing variable water depth. The settlement ponds will be fenced to prevent disturbance. Access will be provided via gates.
- Monitoring surveys will be conducted in years 1, 2, 3, 5, 10, 15, 20, 30 and 35 post construction. In the early operational phase, the establishment of suitable vegetation, such as swamps of sedges, bulrush, common reed within and around ponds will be monitored.
- Ongoing management plan will be carried out along with the monitoring if required, including supplementary planting to achieve vegetative cover around ponds.

6.10.3.7 Aquatic Ecology

To avoid accidental leakages or spillages and release of sediments and pollutant into watercourses at the operational works, it will be required to implement the same mitigation measures with the construction phase mentioned in Section 6.10.2.3.

In addition, the drainage design to control runoff from the Proposed Development is proposed in Chapter 9. The design will be set to attenuate runoff by collecting in new proposed silt traps, settlement ponds and vegetated buffer areas prior to release into the existing drains within the Site. The details for the mitigation measures are proposed within Chapter 9 as follows;

- Interceptor drains will be installed up-gradient of all proposed 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 into downstream field drains;
- Collector drains will be used to gather runoff from internal site access tracks and turbine hardstanding areas of the Site likely to have entrained suspended sediment, and channel it to new local settlement ponds for sediment settling;
- On sections of internal site access tracks transverse drains ('grips') will be constructed where appropriate in the surface layer of the road to divert any runoff off the road into swales/roadside drains;
- Check dams will be used along sections of internal site access tracks drains to intercept silt at source. Check dams will be constructed from a 4/40mm non-friable crushed rock;
- Settlement ponds, emplaced downstream of internal site access tracks 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 existing drains;
- Settlement ponds will be designed in consideration of the greenfield runoff rate, existing bog settlement ponds will also buffer discharges from the bogs; and,
- Finally, all surface water runoff from the development will pass through the existing settlement ponds at the existing bog outfall locations.

6.10.4 Mitigation Measures During Decommissioning

Mitigation measures for the Proposed Wind Farm that will apply for the decommissioning phase relate to the protection of water quality (as outlined in Chapter 9 - Hydrology and Water Quality). Turbine foundations, access tracks and hardstand will be left in place and covered with peat/topsoil to revegetate at the decommissioning stage. It is considered that leaving the turbine foundations, access tracks and hardstand areas in-situ will cause less environmental damage than removing them. Grid connection infrastructure including the on-site substation and ancillary electrical equipment shall form part of the national grid and will be left in situ (as outlined in Chapter 4 – Project Description).

6.10.4.1 Designated Sites

The same mitigation measures will apply for the decommissioning phase as for the construction phase.

6.10.4.2 Habitats

Following removal of the turbines, the bat felling buffers will be allowed to succeed to woodland.

Where topsoil will be used for covering the turbines foundations and hardstand, a habitat loss will occur. Prior to this decommissioning work, a site for the borrow pit will be selected by qualified ecologist to minimise the effects on habitat loss. In addition, areas of PDAs selected for re-use in decommissioning will be surveyed to assess the species and habitats present. Appropriate measures to avoid or mitigate any potential effects which could arise will be implemented.

6.10.4.3 Terrestrial Mammals

Similar mitigation measures will apply for the decommissioning phase as for the construction phase.

Areas of PDAs selected for re-use in decommissioning will be surveyed to assess whether mammals are present. Appropriate measures to avoid or mitigate any potential effects which could arise will be implemented.

6.10.4.4 Bats

The same mitigation measures will apply for the decommissioning phase as for the construction phase.

6.10.4.5 Other Taxa

The same mitigation measures will apply for the decommissioning phase as for the construction phase.

6.10.4.6 Aquatic Ecology

In the event of decommissioning of the proposed wind farm, activities will take place in a similar fashion to the construction phase. Due to the proposed retention of the roads, hard standings and electrical infrastructure, potential for effects on water quality and aquatic ecology will be reduced in comparison to construction. The only potential sources of siltation will be the areas of soil used to cover the turbine foundations and hard stands. The mitigation measures outlined above for the construction phase will also be implemented as relevant for the protection of aquatic ecological interests during the decommissioning phase.

6.10.5 BEMP

6.10.5.1 BEMP Mitigation Measures

The Biodiversity Enhancement and Management Plan (BEMP) (Appendix 6.1; Figure 6-15) includes mitigation measures which extend across the construction and operational phases, in addition to a programme for the monitoring and maintenance of these measures. These measures are linked with the measures detailed above in Sections 6.10.2 and 6.10.3. They are listed here to clearly delineate their location within the mitigation section of the BEMP, but as noted above, these measures are linked back to the construction and operational mitigation measures detailed above.

BEMP Mitigation Measures:

- Bat buffer maintenance
- Translocation of calcareous/neutral soil from the northern access track footprint
- Translocation of marsh fritillary habitat
- Hedgerow/treeline reinstatement (TDR)
- Hedgerow reinstatement (Borrow Pit)
- Treeline Re-planting at R693 / R639 Roundabout
- Woodland re-planting at Substation Compound
- Maintain linear woodland habitats at amenity trail entrance
- Translocation of vegetation from T05 compound & reinstatement for cutover bog revegetating
- Reinstatement of temporary compounds for cutover bog revegetating
- Creation and management of amphibian ponds

Enhancement measures within the BEMP are separate from mitigation measures. These enhancement measures are summarised in Section 6.12 after Residual Effects.

6.10.5.2 Mitigation to Avoid or Reduce Effects from Implementation of BEMP Measures.

Where applicable, all mitigation specified within this chapter also applies to implementation of the proposed enhancement measures detailed within the BEMP (See Section 6.12, Appendix 6.1 and Figure 6-15). This will ensure that any potential negative effects to habitats, flora, faunal or aquatic receptors are avoided or mitigated during implementation of the proposed enhancement measures.

6.10.6 Vulnerability to Major Accidents or Disasters

Should a major accident or natural disaster occur, the potential sources of pollution onsite during the construction and operational phases of the Proposed Wind Farm are limited. The primary sources with the potential to cause significant environmental pollution and associated negative impacts on human health and the environment include the bulk storage of hydrocarbons, chemicals and wastes.

For biodiversity, the main possible accidents and disasters which could negatively impact upon habitats and species are considered to include the follows:

- Accidental release of sediment and pollutants into surface water and groundwater bodies;
- Fire; and,
- Flooding.

Accidental release of sediment and pollutants are addressed in Chapter 9- Water Quality and Hydrology and alongside Sections 6.10.2.3 and 6.10.3.7 Aquatic Ecology in this Chapter, proposing the control measures for release of sediments and hydrocarbons. In addition, the CEMP includes an emergency response plan to prevent and control environmental pollution incidents, including suitable spill kits and absorbent material for dealing with oil spills provided in all construction vehicles.

Given the majority of the Site consists of open peatland, woodland and scrub which are flammable, fire would be a significant incident to the local biodiversity. To avoid that, the CEMP states the Proposed Development will take the following precautionary measures:

- Smoking will be restricted on site to designated areas within the construction compounds only;
- Stockpiling of cleared vegetation / brash will not take place during periods of high fire risk;
- Machinery will be parked in a manner that allows them to be moved in an emergency and will be parked a reasonable distance apart from each other to avoid the risk of a fire spreading to adjacent machines;
- Areas must be left safe from the threat of fire following hot works. Hot work will only be undertaken by competent and trained personnel under a permit to work system and a fire risk assessment carried will be out for all hot works.

As the emergency response for fire relevant to biodiversity, the following procedures will be taken:

- All personnel will be made aware of the evacuation procedure during site induction. The Fire Services Acts of 1981 and 2003 require the holding of fire safety evacuation drills at specified intervals and the keeping of records of such drills.

In the event of flooding within the Site and/or along the GC/TDR, contaminated flood water from the construction site could disperse into surrounding terrestrial/aquatic habitats of high ecological value, leading to significant effects arising from habitat deterioration

The risk of flooding is addressed in Chapter 9 - Hydrology and Water Quality, which concludes that the Site is not mapped within any historic or modelled groundwater flood zones, and the Site will have a negligible impact on flood risk in the surrounding area, as a result of the Proposed Development. Furthermore, there is no expected increase to flood risk along the GC or TDR.

In the event of extreme weather conditions, the proposed/existing surface water drainage within cutover bog will manage storm water avoiding the risk of pluvial flooding across the Site. In addition, the rehabilitation of the Site will increase surface water retention/attenuation at the Site through drain blocking, re-profiling and the restoration of the bog hydrogeological regime and reduce the risk of flooding downstream of the Site.

Therefore, it is unlikely that the proposed development will result in increased flood risk, and it is unlikely that flood risk would result in effects on water quality, biodiversity and/or soil stability, , as the increased flood risk is considered negligible.

6.11 Residual Ecological Effects

6.11.1 Natural Heritage Areas or Proposed Natural Heritage Areas

With the implementation of mitigation measures, no residual effects on designated sites are predicted.

6.11.2 Habitats and Flora

No significant residual effects are predicted for habitats and flora.

Construction of the Proposed Wind Farm will lead to some permanent loss of habitat. The habitat loss will be the total area covered by the proposed wind farm infrastructure, temporary compounds and associated felling buffers and PDAs. Land take at junctions along the Proposed Turbine Delivery Route will be minimal.

The internal access tracks and the reinforced concrete and hardstandings associated with turbines will be permanently left in place, as to remove these would result in environmental nuisances such as noise, vibration, and dust. Turbine foundation pedestals and hard standings will be covered over with peat that was previously stripped and used for landscaping purposes during the construction stage and left to revegetate naturally.

Not all land take is permanent as modifications along the turbine delivery route will be reinstated, and the buffers for infrastructure and the temporary Construction Compounds and Peat Deposit Areas will be allowed to be recolonised naturally following construction into grasslands and/or heathlands by the local species around the retained habitats within the Site.

With the mitigation measures proposed, there will be no significant residual negative effect on habitats of high ecological value within the Site.

For aquatic habitats of higher value, mitigation measures as outlined in this Chapter and Chapter 9 – Water Quality and Hydrology as well as the use of HDD at grid connection watercourse crossings will ensure no significant residual effects remain.

With the application of the mitigation measures as outlined, it is concluded that there will be no significant residual effects on habitats and flora as a result of the construction, operation or decommissioning of the Proposed Development.

6.11.3 Mammals

Pre-construction surveys and supervision will be carried out by an ecologist to ensure badgers and their resting/breeding places protected. Exclusion zones, fencing and appropriate signage will be put in place around setts to ensure no effects arise from vehicular movements or human presence.

Pre-construction surveys and supervision will be carried out by an ecologist to ensure otters and their resting/breeding places are protected. Surveys and supervision to ensure pine marten are protected will also be carried out at pre-construction stage, in addition to general pre-construction surveys and supervision for all protected mammal species.

Following the implementation of mitigation for mammals and measures to avoid declines in water quality during the construction, operational and decommissioning phases, no significant residual effects will arise from habitat loss/degradation, death/injury, disturbance or displacement of mammals as a result of the Proposed Development.

Some permanent loss of areas of grassland and woodland habitats which could be used by foraging and breeding mammals will occur; however, these losses are minor and will not give rise to population-level effects due to the relatively low percentage of loss at the site scale and widespread availability of displacement habitats.

A Long-term Slight to Moderate Reversible Residual effect will occur for badger and otter.

6.11.4 Bats

There is no potential for the construction of the Proposed Development to result in Significant effects on the local bat population at any geographic scale, given the small area of habitat to be lost relative to the area of suitable habitat in the wider landscape and standard best practice mitigation measures outlined above which will be implemented during construction. In addition, the Proposed Development layout was designed to avoid high value bat habitat. Similarly, during operation, the monitoring and mitigation proposed will ensure no significant residual effect on local bat populations.

6.11.5 Aquatic Ecology

The ecological value of watercourses within the ZoI of the Proposed Development ranges from international importance such as the River Nore to local importance lower value due to high siltation (peat), modification, lack of flow and dense vegetation lacking fisheries value. Sensitive and protected species occur in the Suir/Nore catchments and downstream of the Proposed Development: notably salmonid species, lamprey sp., white-clawed crayfish, otter and European eel (recorded during field surveys) and freshwater pearl mussel (known to occur in these catchments).

Effects on aquatic ecology arising from the Proposed Development will be reduced to an imperceptible level during construction, operation and decommissioning phases with the implementation of mitigation measures as set out in Chapter 9- Water Quality and Hydrology and this chapter. With the mitigation measures to control the release and accidental spillage of sediment, cement and hydrocarbons, there will be no residual significant effects on the water quality of the watercourses on the Proposed Development, downstream and relevant groundwater bodies. The use of non-toxic biodegradable drilling fluid for HDD operations will ensure no significant effects occur in the event of a frac-out.

Following the implementation of mitigation, there will be no significant residual effect on aquatic habitats or species as a result of the Proposed Development. The design of the Proposed Development (including a 50m buffer between the main watercourses within the Proposed Development and the main infrastructure) and the best-practice measures to be implemented for the protection of water quality will ensure there are no significant residual effects on watercourses or aquatic fauna.

6.11.6 Marsh Fritillary

The Proposed Development includes mitigation to ensure no net loss of suitable habitat in the form of translocation of topsoil with devil's-bit scabious. Following the implementation of these measures, residual effects on marsh fritillary are assessed as not significant.

In addition enhancement measures such as habitat management comprising sward management and removal of encroaching scrub and trees from existing/translocated habitat areas, and management of PDA (A) to create marsh fritillary habitat will result in a net gain of suitable habitat for this species.

6.11.7 Herpetofauna

The presence of herpetofauna within the Site will be re-confirmed in the pre-construction phase, and if required, translocation of their eggs to suitable habitats outside of the proposed infrastructure footprints and associated buffers will be conducted by a qualified ecologist.

Measures to exclude newts from areas affected by scrub clearance and active construction zones will prevent injury or mortality of adult newts.

The effects of loss of supporting habitat for herpetofauna such as ponds/lakes within cutover bog, drainage ditches and open grasslands will be reduced by the mitigation measures outlined in this chapter.

Following the implementation of mitigation measures, there will be no significant residual effects on herpetofauna.

6.11.8 Overall Residual Effects

With the implementation of the detailed mitigation measures (outlined in this Chapter, Chapter 8 – Land, Soils and Geology, Chapter 9 – Water Quality and Hydrology, Chapter 10 – Air Quality and Climate, Chapter 11 – Noise and Vibration, the BEMP and the CEMP) there will be no significant residual effects from the Proposed Development on biodiversity.

6.12 Enhancement Measures

The BEMP (Appendix 6.1 and Figure 6-15) contains biodiversity enhancement measures, distinct from mitigation. These measures will contribute to offsetting habitat loss, and further reduce realised effects on flora and fauna. These are summarised below.

Enhancement Measures:

- Tree planting to establish woodland habitats
- Drain blocking to rewet and restore raised bog habitats
- Wetland retention and level monitoring for open water habitats
- Creation of ponds/scrapes in the main PDA
- Eucalyptus removal
- Calcareous grassland re-establishment at the main temporary compound
- Maintenance of suitable habitats for marsh fritillary
- Set log piles across the BEMP site to provide decayed timbers for invertebrates
- Creation of refugia piles and hibernacula for reptiles, amphibians, small mammals and invertebrates

6.13 Potential Cumulative Impacts on Biodiversity

A review of completed, permitted and proposed developments within the wider landscape was undertaken in order to assess the potential for cumulative impacts on biodiversity.

6.13.1 Cumulative Effects with Agriculture

Corine land cover maps (1990 – 2018) show that the majority of lands in the local areas surrounding the Proposed Wind Farm and Grid Connection are located are agricultural lands such as pasture or arable crop alongside transitional woodland scrub.

The IAQM (Holman *et al*. 2014) advises that agricultural activities may generate dust and this should be taken into account in a dust assessment. The Proposed Development would have the potential to interact with these agricultural activities via air pathways such as dust deposition to the local sensitive habitats. However, the mitigation measures proposed in Chapter 4 – Project Description and Chapter 10 – Air Quality and Climate will address dust emission produced by the Proposed Development and ensure there will be no significant dust emission as the result of the Proposed Development. Therefore, there will not be any significant cumulative effects via air pathways associated with agricultural activities.

Several rivers located in the vicinity of agricultural lands have been assessed as unsuitable habitat for fisheries due to heavy siltation and enrichment (Triturus 2021 & 2023). Agricultural activities can produce ammonia (NH3)(from both livestock and fertiliser) which can cause eutrophication of aquatic habitats. In addition, the water quality of the Drish River, where the Site and GC are located upstream and downstream, has been reported to be negatively impacted by peat extraction, forestry and agriculture. Therefore, the Proposed Development would have the potential to interact with these agricultural activities via hydrological pathways.

However, the mitigation measures outlined in this Chapter and Chapter 9 for the construction, operation and decommissioning phases of the Proposed Development will ensure the protection of downstream surface water quality. Therefore, there will not be any significant cumulative effects via water pathways associated with agricultural activities.

6.13.2 Cumulative Effects with Commercial Forestry

The Site boundary is adjacent to some forestry areas.

Although commercial forestry habitats are of lower ecological value due to their artificial nature and monocultural character, where the timing of tree felling and other maintenance works within forestry areas in the wider environment and works at the proposed development overlap, short-term negative effects such as habitat loss or disturbance affecting commuting and foraging local wildlife could occur.

However, the loss of wooded habitats associated with the Proposed Development will be a small percentage (8%) of the overall woodland areas within the Site. In addition, the mitigation measures outlined in this Chapter will ensure the protection of species supported by woodland habitats. Therefore, it is considered that there will not be a significant cumulative effect on the local wildlife associated with forestry activities.

Forestry activities have potential for negative effects on the aquatic environment due to release of sediment and nutrients. As per EPA data, forestry is a significant pressure on the Drish River and Clover River which drain the site. A few surveyed rivers located in the vicinity of plantation forest have been recorded as unsuitable habitat for fisheries due to heavy siltation and enrichment (Triturus 2021 & 2023). Therefore, the potential cumulative impacts on downstream water quality and quantity need to be assessed. The Proposed Development would have the potential to interact with these forestry activities via hydrological pathways to the local hydrological network.

However, the mitigation measures outlined in this Chapter and Chapter 9 for the construction, operation and decommissioning phases of the Proposed Development will ensure the protection of downstream surface water quality. as such, it is assessed that there will not be a significant cumulative effect via hydrological pathways associated with forestry activities.

6.13.3 Cumulative Effects with Bord na Móna PCAS Plans for Bogs in Ballybeg, Derryvella, Killeen, Inch, Bawnmore

Phase 1 rehabilitation measures including drain blocking and decommissioning of pumps have already been implemented for Littleton and Lanespark Bogs. Phase 1 rehabilitation works were completed in Littleton bog between 2018-2021, and have also been completed at Lanespark and Longfordpass. These measures included the blocking of drains which has resulted in the presence of areas of standing water within the Site. No enhanced rehabilitation measures are proposed by BnM for these bogs. Ongoing revegetation and associated monitoring are part of Phase 1 rehabilitation measures, although as noted above, measures to initiate rehabilitation have been completed.

The Phase 1 rehabilitation currently in progress is represented within the existing baseline, and as such is assessed in detail therein (see assessment of habitat effects in Section 6.9 and ornithological assessments in Sections 7.8.3 to 7.8.5 of Chapter 7). There will be localised effects arising from habitat loss and drainage as detailed in Section 6.9; however, the proposed wind farm will not interfere with the rehabilitation plan or compromise re-wetting and revegetation/regeneration at the site scale. The proposed development footprint is limited (proposed infrastructure occupies c.1.9% of the Site; PDAs occupy c. 1.6%) and will result in localised effects only – it will not interfere with key drainage management requirements for rewetting and as such is compatible with rewetting at the site scale. It is noted that wind farm projects compatible with peatland rehabilitation have previously been delivered, e.g. Cloncreen, Derrinlough, Bruckana and Mountlucas.

Peatlands Climate Action Scheme (PCAS) measures are proposed to be implemented in Ballybeg, Derryvella, Killeen, Inch, and Bawnmore Bogs respectively (BnM, 2025a,b,c,d). PCAS is enhanced rehabilitation which focuses on optimising suitable hydrological conditions (stable water levels close to the surface) by blocking production field drains, re-profiling peat fields and forming low bunds and other wetland measures. These measures will contribute to accelerating of re-wetting, regeneration and restoration of carbon sequestration.

There is no potential for interactions with proposed PCAS measures at Ballybeg and Derryvella Bogs, since there is no effect pathway in this category. PCAS will focus on the bogs subject to these measures (located outside the site) and comprise measures to optimise suitable hydrological conditions as described above; as such there is no mechanism by which construction, operational or decommissioning phase cumulative effects could occur.

No cumulative effects are predicted to arise in conjunction with enhanced rehabilitation (PCAS) measures implemented at the bogs outside the site (Ballybeg, Derryvella, Killeen, Inch, and Bawnmore).

6.13.4 Cumulative Effects with Other Wind Farm Developments

Chapter 4 – Project Description lists all consented and in operation wind farms within 20km of the Site. There are 5 no. consented wind farms and 11 no. in-operation wind farms (see Chapter 4).

Given the distance of other wind farms being 4km at the closest from the Proposed Development and the proposed mitigation measures to prevent significant effects from the Proposed Development, potential cumulative effects on biodiversity are likely to be limited to operational phase effects on bats. Since the predicted effects arising from potential collision or barotrauma for the proposed wind farm is identified as **Long-term Not Significant** and **Reversible** at the Local level, it is assessed that potential cumulative effects at local level will also remain **Long-term Not Significant**, and will reduce to **Long-term Imperceptible** at County scale.

In addition, Chapter 9- Water Quality and Hydrology assesses that there will be no potential for significant cumulative effects with other wind farm developments, given the best practice mitigation measures outlined in Chapter 9 for the protection of the water environment during the construction, operation and decommissioning phases.

6.13.5 Cumulative Effects with Other Wind Farm Grid Connection Routes

A study was completed to identify any grid connection routes associated with other wind farm developments which overlap with the proposed GC route.

From this study in Chapter 9, the following overlaps were recorded:

- 300m overlap with the grid connection underground cable route associated with the proposed Farranrory Wind Farm. The overlap occurs along the N77. Both grid connections are proposed to cross the Nore via HDD at different locations;
- ~10km overlap with the grid connection underground cable route associated with the proposed Briskalagh Wind Farm. The overlap occurs along the R694 from Freshford to the N77, and along the N77 as far as the HDD crossing locations under the River Nore; and,
- The HDD crossing over the Nore is also located in the vicinity of the proposed HDD crossing for the grid connection associated with the proposed Seskin Wind Farm.

Given the proposed mitigation measures to avoid significant effects from the Proposed Development and mitigation prescribed in the EIARs for the other wind farms, no cumulative effects on biodiversity via land and air pathways are likely.

In addition, Chapter 9- Water Quality and Hydrology assesses that there will be no potential for significant cumulative effects with other wind farm developments, given the best practice mitigation measures outlined Chapter 9 for the protection of the water environment during the construction, operation and decommissioning phases.

6.13.6 Cumulative Effects with Other Developments

There are a number of larger scale developments within 20 km of the Project including: a number of large housing developments; a recreational shared cycle and walkway; a healthcare waste treatment/recycling facility and waste transfer station; an anaerobic digestion plant; a single storey drive-thru restaurant; temporary road widening works and construction of temporary sections of stoned roads and all ancillary development on the R691 and L-2107-2 at bends and junctions to enable the delivery of turbine components; a solar structure and all associated site works at an urban location in Thurles town; an increase to the footprint of the substation compound and increase to the footprint of the substation building associated with Farranrory wind farm; modifications to an existing waste facility; construction of an 1,800 sq.m sludge holding building; demolition of existing residential dwelling with the reconstruction of a two storey terrace building as a pre school facility; relocation of a single storey detached prefabricated office building with commercial vehicle weighbridge; the relocation of a public civic amenity recycling facility, signage and planting; upgrade to the existing Togher Crescent Wastewater Pumping Station; a new junior playing field; truck servicing and maintenance workshop building; construction of two anaerobic digesters.

These developments are listed in Appendix 1.2 of Chapter 1.

There is potential for cumulative effects on water quality from the construction phases for these developments in the absence of mitigation. However, the mitigation measures outlined in this Chapter and Chapter 9 for the construction, operation and decommissioning phases of the Proposed Development will ensure the protection of downstream surface water quality. As such, it is assessed that there will not be a significant cumulative effect via hydrological pathways associated with Other Developments.

Of note also is the N77 Ballyragget Village to Ballynaslee Road Improvement Scheme which was constructed along the N77, north of the proposed HDD crossing of the River Nore. As the scheme is completed there is no potential for cumulative impacts on water quality or disturbance to otter associated with this proposed road improvement development.

6.13.6.1 Recreational Trail

Bord na Móna (BNM) recreational cycle and walkway - Bord na Móna (BNM) has proposed the construction of a recreational cycle and walkway to connect into the existing Loch Dhoire Bhile Loop which will include the repurposing of existing former rail bed, existing bog headlands / former high fields, and along pre-existing machine access routes (Tipperary County Council Planning Application: 2560154, appeal to ACP, with grant permission with revised conditions issued on 27/01/2026, ref PL92.323662). The cycle/walkway route is located within the Ballybeg-Lanespark-Derryvilla bog group and within the Black (Twomileborris) River catchment. In the event that construction of the proposed development overlapped with construction of the recreational cycle and walkway, cumulative effects associated with water quality changes could potentially occur, prior to mitigation.

6.13.6.2 Afforestation

Afforestation application by BNM (CN90049) in 2022 – For the establishment of 203.39 hectares of native broadleaf woodland on industrial cutaway bog areas at Ballybeg and Lanespark. These bogs are within the Black (Twomileborris) River catchment. The afforestation works will be required to be carried out in accordance with the Department of Agriculture, Food & the Marine's (DAFM) Environmental Requirements for Afforestation (June 2024). These Environmental Requirements include the obligation "To create at the outset, a buffer of natural ground vegetation positioned between defined water features and the forest crop and associated operations, in order to protect water quality and aquatic ecosystems from possible sediment and nutrient runoff from the site at afforestation and throughout the remainder of the forest rotation". As such no impacts on the local watercourses are likely. The seeding and planting of native trees will stabilise exposed bogs, reduce wind and water erosion, and enhance biodiversity, which will have a positive effect on local watercourses.

This afforestation proposal would encourage the establishment of native woodland in drier areas of cutaway bog, and as such aligns with the existing emerging trends whereby scrub and immature woodland are establishing in drier areas of cutaway bog. The afforestation proposal would simply accelerate these trends and expand the extent of areas covered by wooded habitats more rapidly. No significant cumulative effects in conjunction with this proposal are anticipated.

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