MWP

Environmental Impact Assessment Report (EIAR)

Chapter 05 Biodiversity

Dernacart Wind Farm
110kV Substation and Grid Connection

Statkraft Ireland

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MWP, Engineering and Environmental Consultants
Address: Reen Point, Blennerville, Tralee, Co. Kerry, V92 X2T

www.mwp.ie

5. Biodiversity

5.1 Introduction

5.1.1 Project Summary

This chapter considers the potential impacts and effects on biodiversity arising from the proposed development which is comprised of the following three main elements:

1. Underground collector cable and Access Track which comprises 2.45km of underground electric cabling systems between the consented Dernacart Wind Farm site and the proposed 110kV substation overlain with 5.5m wide stone access track,
2. One 110kV substation with associated compound,
3. Underground grid connection cable which comprises 10.85km of 110kV underground electrical cabling from the proposed 110kV substation to the consented Bracklone 110kV substation including enabling works, services diversions, joint bays, along the grid route.

Other associated works with the three elements listed above:

- New entrance and access road to substation site from the R423,
- New clear span and box culvert /piped water crossings,
- Peat/spoil deposition areas,
- and all associated felling, drainage and ancillary works necessary to facilitate the development.

A full description of the proposed development and all associated project elements is provided in Chapter 2 of this EIAR.

A report for screening for Appropriate Assessment and NIS have also been prepared (See Planning Documents)

The three elements of the proposed development listed above will be referred to as the following throughout this chapter:

1. Underground wind farm collector cable and access track,
2. 110kV substation and,
3. 110kV underground grid cable route.

See Figure 5.1 below showing the proposed development site layout.

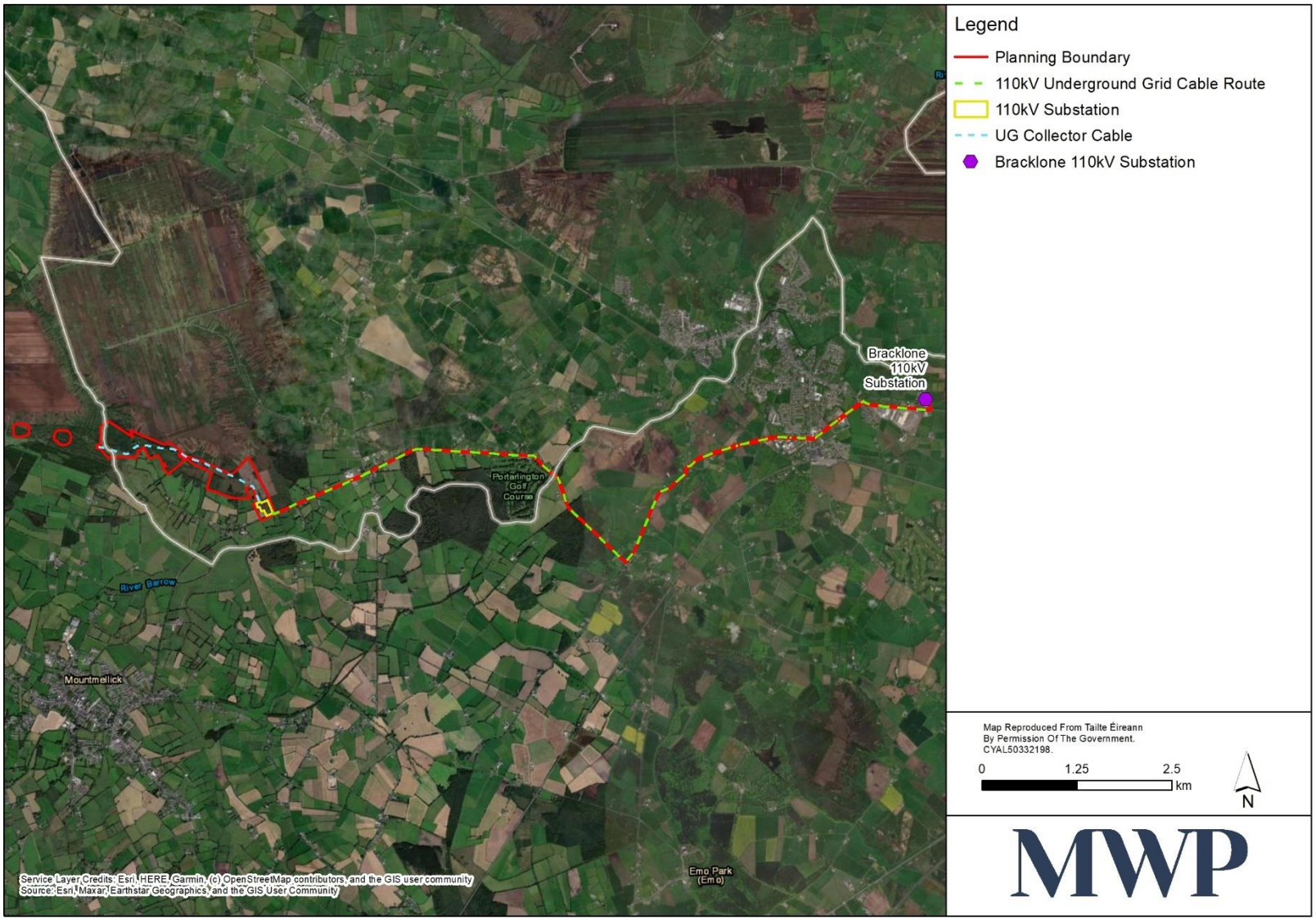

Figure 5.1. Proposed Development Site layout

5.1.2 Project Team

This assessment was completed by Fiona McKenna (BSc Hons, Wildlife Biology). Fiona is an Ecologist with Malachy Walsh and Partners (MWP) and has over 4 years' experience in ecological surveying and report writing for impact assessments. She has contributed to numerous reports for Screening for Appropriate Assessment, Natura Impact Statements (NIS), Ecological Impact Assessment (EcIA) and Biodiversity chapters for Environmental Impact Assessment Reports (EIAR). She has also authored and contributed to a number of reports for bat and ornithological survey work and is experienced in the collation of data and in field ecology survey techniques.

Field work for this project was conducted by Fiona and three other MWP ecologists, Gerard Hayes, Maureen Kelliher and Rob Beer with the assistance of Oisín Cassasin an ecology intern on placement from the Munster Technological University (MTU) Wildlife Biology undergraduate degree course.

Gerard (Ba. Sc.) carried out aquatic surveys. Gerard is a Senior Ecologist with MWP and has over 15 years' experience in environmental consultancy. He is a member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Gerard has a diverse ecological profile, with Phase 1 habitat, mammal (including bats), bird, amphibian, macroinvertebrate, and tree survey experience. His responsibilities include report writing (EIS, EIA, EA, AA, NIS), aquatic surveying and ecological monitoring. His project involvement has been primarily in the areas of wind energy development, waste-water treatment plants, roads/bridges, water supply, flood defense and hydro schemes. He is co-author and/or carried out surveys for NPWS Irish Wildlife Manual Nos. 15, 24, 26, 37, 45.

Maureen (BSc Hons, Wildlife Biology) assisted with general site walkover, habitat surveys and deployment of camera traps. Maureen is a recent graduate from MTU and commenced working at MWP in October 2023. In the previous year Maureen completed her work placement with MWP and continued to work full time for the summer period before returning to university in September 2022. During this period, she took part in several bat and habitat surveys with subsequent contributions to bat and ornithological reports. She has also undertaken bat surveying for Bat Conservation Ireland, is an avid bryologist and is a member of the British Bryological Society for over 3 years. Maureen has assisted in Freshwater Pearl Mussel surveying in Cork and Kerry including Phyto-benthos sampling for river water quality throughout Munster. Throughout her four-year undergraduate degree, Maureen gained generous experience in field data collation and ecological survey methods.

Rob assisted with assessing bat roost suitability, deployment of static bat units and bat data analysis. Rob is a Senior Ecologist with six years full-time experience, since graduating in 2017. Rob has recently joined MWP and had previously been working in the UK. Rob is experienced in a range of standard and complex ecological surveys in accordance with British standards, including but not limited to, UK habitat classification surveys and JNCC Phase 1 surveys, Biodiversity Net Gain (BNG) metric and reporting, bat surveys (stages 1 & 2), reptile surveys, badger surveys, & great crested newt (GCN) surveys. Rob is a holder of a Natural England bat license level 2, a holder of a Natural England GCN license level 1 and has a FISC level 2 certificate. Rob also has extensive experience with ecological clerk of works (ECoW) for a range of species across diverse project types, from small householder projects to large infrastructure projects such as rail and road schemes. This includes conducting supervisions and overseeing licenced works in relation to bat, badger and GCN. Rob has extensive experience in bat related work and historically volunteered with a number of different bat groups in the UK; this has enabled him to gain a vast amount of experience in all types of bat surveys and work. In addition to his experience with stage 1 and 2 surveys he has also been part of numerous hibernation roost surveys, and other roost counts/inspections where he is proficient in the use of endoscopes and hand netting, and the handling of bat species.

5.1.3 Relevant Legislation

The legislation underpinning biodiversity and nature conservation in Ireland includes the following;

- Irish Wildlife Act 1976 to 2024, as amended,
- The European Communities (Birds and Natural Habitats) Regulations 2011-2015 (S.I. 477/2011), and the European Union (Birds and Natural Habitats) (Amendment) Regulations 2021 (S.I. 293/2021),
- EU Habitats Directive (92/43/EC), as amended,
- EU Birds Directive (2009/147/EC), as amended,
- The EU Water Framework Directive (2000/60/EC),
- Planning and Development Act (2000), as amended,
- Planning and Development Regulations 2001 to 2023, as amended; and
- Flora (Protection) Order, 2022.

5.2 Methodology

5.2.1 Guidelines and Best Practice

The following guidance documents and relevant publications were used,

- '*Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland'* published by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018),
- '*Guidelines for Assessment of Ecological Impacts of National Road Schemes'* (NRA, 2009),
- '*Best Practice Guidance for Habitat Survey and Mapping'* (Smith *et al*., 2011),
- '*Bat mitigation guidelines for Ireland v2*'. Irish Wildlife Manuals, No. 134. (Marnell *et al*., 2022),
- '*Bat surveys for Professional Ecologists: Good Practice Guidelines (4th edition)*'. Bat Conservation Trust, London. (Collins/BCT, 2023),
- '*Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition)*'. (Collins/BCT, 2016),
- Other information sources and reports footnoted in the course of the report.

5.2.2 Scope of Assessment

This assessment considers the potential effects with regard to each phase of the proposed development: namely the construction phase and operational phase. Appropriate mitigation measures are described to avoid, reduce or offset potential negative impact(s).

The objectives of the assessment were to:

- Identify and document protected habitats and species within the study area and extending away from it through desk top studies,

- Undertake baseline ecological surveys at the study area and evaluate the nature conservation importance of the ecological resources identified using a scientifically robust and objective methodology based on current National and International best practice,
- Predict the potential direct, indirect and cumulative effects of the project on biodiversity; and
- Prescribe mitigation measures, to minimise potential effects on biodiversity.

5.2.3 Assessment Criteria

This section outlines the criteria upon which evaluations of the importance of ecological features and the assessments of the ecological impact of the project on these features are made, referring to relevant legislation and guidelines.

5.2.3.1 Evaluation

Guidance on Ecological Impact Assessment (CIEEM, 2018) recommends categories of nature conservation value that relate to a geographical framework (International, through to Local). The evaluation set out in this chapter and the assessment of the effects of the proposed development follows methodologies set out in *'Guidelines for Assessment of Ecological Impacts of National Roads Schemes'* (NRA, 2009). The guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned based on the importance of any particular ecological receptor. The guidelines provide a basis for determination of whether any particular site, habitat, or species is of importance on the following scales:

- International,
- National,
- County,
- Local Importance (higher value) and,
- Local Importance (lower value).

The NRA Ecological Impact Guidelines (2009) clearly sets out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna.

The value of habitats is assessed based on its condition, size, rarity, conservation and legal status. The value of fauna is assessed on its biodiversity value, legal status and conservation status. Biodiversity value is based on its national distribution, abundance or rarity, and associated trends.

The significance of an effect is determined by way of professional judgement and the use of EPA criteria for assessing impact (EPA 2022). The criteria for assessing quality of impacts and significance of effects are set out in Table 5.1.

Table 5.1: Criteria for assessing impacts based on CIEEM (2019) & (EPA, 2022)

Parameter	Description
Direction (Quality)	Positive: A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral: No impacts or impacts that are imperceptible, within normal bounds of variation or within the margin of forecasting error.

Parameter	Description	
	Negative: A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).	
Magnitude	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	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	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
Extent	The area over which an impact occurs.	
Duration	Momentary – effects lasting from seconds to minutes Brief – effects lasting less than one day Temporary – effects lasting less than a year Short term – effects lasting 1 to 7 years Medium term – effects lasting 7 to 15 years Long term – effects lasting 15 to 60 years Permanent – effects lasting over 60 years	
Reversibility	Irreversible impact: permanent changes from which recovery is not possible within a reasonable time scale or for which there is no reasonable chance of action being taken to reverse it. Reversible impact: temporary changes in which spontaneous recovery is possible or for which effective mitigation (avoidance/cancellation/reduction of effect) or compensation (offset/recompense/offer benefit) is possible.	
Frequency and timing	Frequency – How often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).	

Where potential impacts on ecological receptors of Local Importance (higher value) or greater have been assessed to result in likely significant effects, mitigation measures were incorporated into the design of the proposed development. The proposed development has been designed to specifically avoid, reduce and minimise impacts on all such ecological receptors, referred to as Key Ecological Receptors (KERs). Where potential impacts on KERs are predicted, mitigation has been prescribed to avoid, reduce and abate those impacts.

5.2.3.2 Cumulative Effects

Potential cumulative impacts of the proposed development in combination with other developments and activities have been assessed. A cumulative impact arises from incremental changes caused by other past, present or reasonably foreseeable actions together with the proposed development. The list of cumulative developments considered in the EIAR is provided in EIAR Volume 2 Chapter 1.

5.2.4 Study Area

The study areas for the desk review and field surveys were identified through consideration of the nature, size and location of the proposed development (mostly in the public road) and the ecological features likely, or known, to be present.

The study area for the field surveys includes all lands within the proposed development as shown by the redline boundary in Figure 5.1 above. This study area was used for all terrestrial ecology surveys. Incidental sightings of

birds, mammals or amphibians were noted during the field surveys. Trees and/or and structures that may provide suitable locations for bat roosts and potential suitable bat foraging habitat were also noted during the survey.

5.2.5 Zone of Influence (ZOI)

The 'zone of influence' (ZOI) for a project is the geographical area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries. The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change (CIEEM, 2018). With regard to potential impacts on biodiversity, the following criteria were considered when identifying the potential ZOI at the initial stages of the project:

- The nature, size and location of the proposed development,
- Identification of potential effect pathways to key ecological receptors,
- The sensitivities of the relevant key ecological receptors,
- Identification of suitable habitats for high conservation value species,
- Ecological connectivity between the project and the wider landscape.

5.2.6 Desk Study

- Ordnance Survey Ireland (OSI) aerial photography,1:50000 mapping, GeoHive and other online satellite imagery sources,
- Environmental Protection Agency (EPA) online mapping,
- National Parks and Wildlife Service (NPWS) online datasets and literature,
- National Biodiversity Data Centre (NBDC) online mapping;
- Inland Fisheries Ireland (IFI) (online fish sampling reports and datasets);
- Ireland Red List No. 10: Vascular Plants (Wyse-Jackson *et. al.* 2016);
- Geological Survey Ireland (GSI) area maps;
- Bat Conservation Ireland (BCI);
- Dernacart Wind Farm EIAR (Planning Ref 20/78, ABP-310312-21),
    - Biodiversity Chapter 12
    - Natural Power Bat Report 2018 (Appendix 12.2 of the Biodiversity Chapter 12)

5.2.6.1 Data Requests

Data requests were submitted to:

- NPWS in September 2023 and November 2023 and,
- Bat Conservation Ireland (BCI) in December 2023.

Results of these data requests are discussed in the sub-sections of Existing Environment - Section 5.3 below.

5.2.7 Field Surveys

Ecological surveys were completed using a combination of walkover and driven surveys to provide a comprehensive overview of the baseline ecology in the study area. Site visits and surveys were carried out in suitable weather conditions following best practice and in the expert opinion of the author, are considered sufficient to assess all potential significant ecological effects associated with the project. Habitats were classified in-field following the Heritage Council Publication 'A Guide to Habitats in Ireland' (Fossitt, 2000).

Incidental sightings of birds, mammals or amphibians were noted during the field surveys. Trees or and structures that may provide suitable locations for bat roosts and potential suitable bat foraging habitat were also noted during the survey.

The presence of any invasive and non-native plant species was documented, including GPS location, and size and area of infestation. During surveys particular focus was given to species listed on the Third Schedule of the of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011, as amended).

All survey dates and description are listed in Table 5.2 below:

Table 5.2: List of all surveys carried out

Dates of surveys	Survey description
18th, 19th and 20th July 2023	• Multi-disciplinary ecological site walkover of initially proposed substation locations. Driven survey of 110Kv grid route. • Deployment of camera traps and static bat units.
3rd August 2023	• The watercourses potentially impacted by the proposed development were surveyed for fish habitat suitability.
11th and 12th October 2023	Following the update to the site layout which included the underground wind farm collector cable and access road, and 110kV substation location further surveys were carried out: • Multi-disciplinary ecological walkover survey of updated sections, mapping • habitats and signs of mammals. Deployment of camera traps.
30th November 2023	Following amendment of a portion of underground wind farm collector cable and access road being moved northwards: • Multi-disciplinary ecological walkover survey of updated route. Bealtaine ecology assisted during this site visit. • Collect camera traps left out in October.
11th, 12th, and 20th April 2024	• Site visit to check bat roost suitability and to deploy static bat units along the underground wind farm collector cable and access road and at 110kV substation area. • Set up/collect camera traps. • Visit two additional areas for proposed peat/spoil deposition at the consented Dernacart Wind Farm site where Turbines 4 and 5 are to be located.

5.2.7.1 Bats

5.2.7.1.1 July 2023

Passive Automated Bat Surveys (PAB)

Three static bat detector units (Model: SM Mini) were deployed at the far western portion of the grid route where there were two previously proposed substation options, for five days in July 2023 (21st – 25th) in line with Collins 2016.

5.2.7.1.2 April 2024

Passive Automated Bat Surveys (PAB)

PAB surveys were undertaken using bio-acoustic recording units (static bat detectors – Model: SM mini) set up at eight pre-selected sampling locations (SPs). There were seven SPs along the collector cable route and one SP at the location of the proposed substation. The purpose of the surveys was to remotely record bat activity over extended periods to capture data on the level of bat activity at the Site and its spatial and temporal distribution. PAB surveys were undertaken in April 2024 corresponding to the spring bat survey period, as described by Collins (2016). All SP locations coordinates and habitats listed in **Table 5.3** and locations shown in **Figure 5.2** below.

Table 5.3: SP location and habitat description

Sampling Point (SP)	Coordinates (ITM) X	Y	Location Description
SP1	645312	711121	Within an area of scrub within an ash tree plantation.
SP2	645630	711016	Bordering conifer plantation.
SP3	645775	711128	Mixed deciduous and conifer wooded area, close to a forest track.
SP4	646217	711064	Within an area of holy, ash and birch surrounded by conifer plantation.
SP5	646411	710994	On the edge of a forest track within an area of willow and birch scrub.
SP6	647177	710660	Along a forest track with immature trees lining the ditch, opposite a conifer plantation.
SP7	647329	710552	Within an area of scrub bordering established hedgerow.
SP8	647491	710348	Within an area of scrub, wet grassland, bog woodland and bracken.

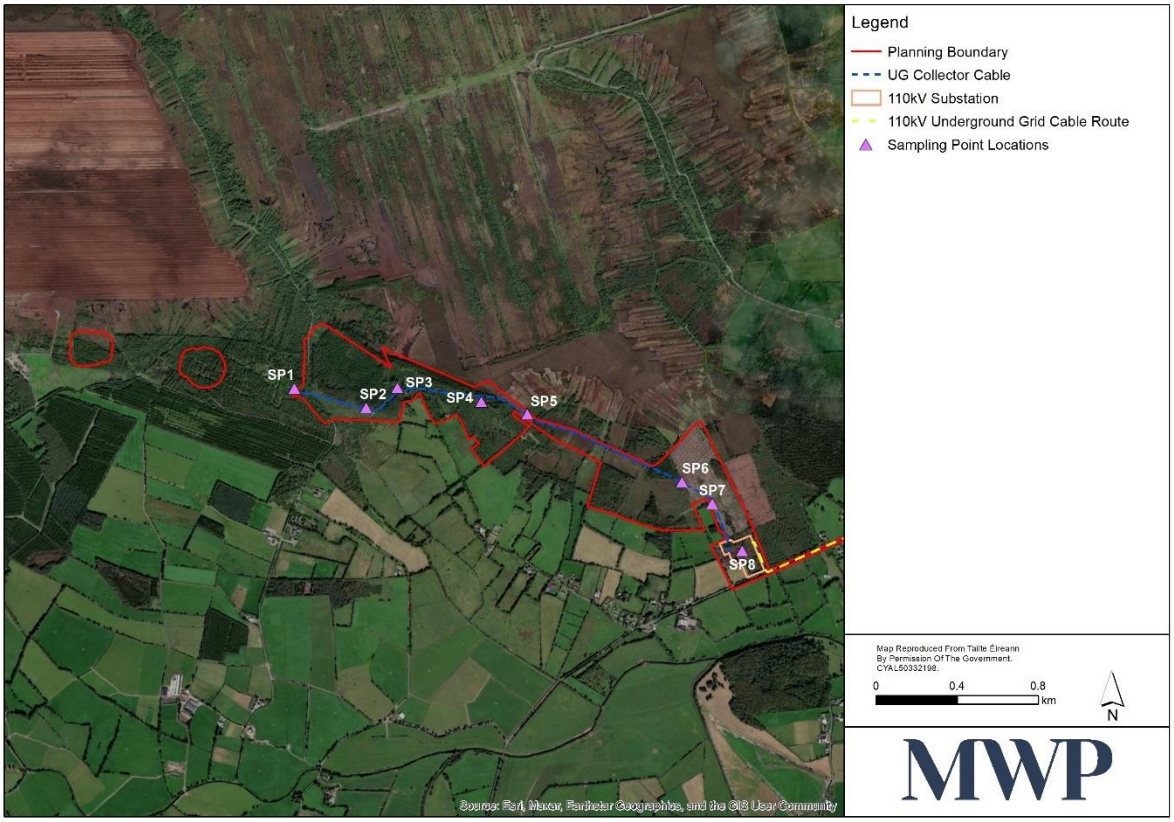

Figure 5.2. PAB survey SP locations

Bat Roost Inspection Surveys - Trees

A preliminary ground-level roost assessment of trees along the collector cable route and the location of the proposed substation was undertaken on 11th and 12th April 2024. This involved detailed daytime inspections of the exteriors of trees to search for features with potential to support roosting bats (i.e., Potential Roost Features - PRFs), such as holes, cracks, crevices and splits, loose bark, dense ivy etc., or signs of roosting bats, such as droppings, staining etc. On completion, each tree was categorized as having either 'negligible', 'low', 'moderate' or 'high' suitability for roosting bats. The results of the PRAs determined whether further surveys were required. Survey methods were in line with that recommended in Collins (2023).

5.2.7.2 Other Mammals (excluding bats)

During multi-disciplinary ecological walkover surveys, habitats within the study area were searched for any evidence of terrestrial mammal activity such as prints, droppings, burrow-holes, dens/setts, feeding signs and trails. The surveys had regard to 'Animal Tracks and Signs' (Bang and Dahlstrom, 2006). Several Wildlife cameras (camera traps) were deployed in July 2023, October 2023 and April 2024 [(under NPWS Licences (Licence No. 215/20220) and (Licence No. 227/2023)].

All camera locations are presented in Figure 5.3 below.

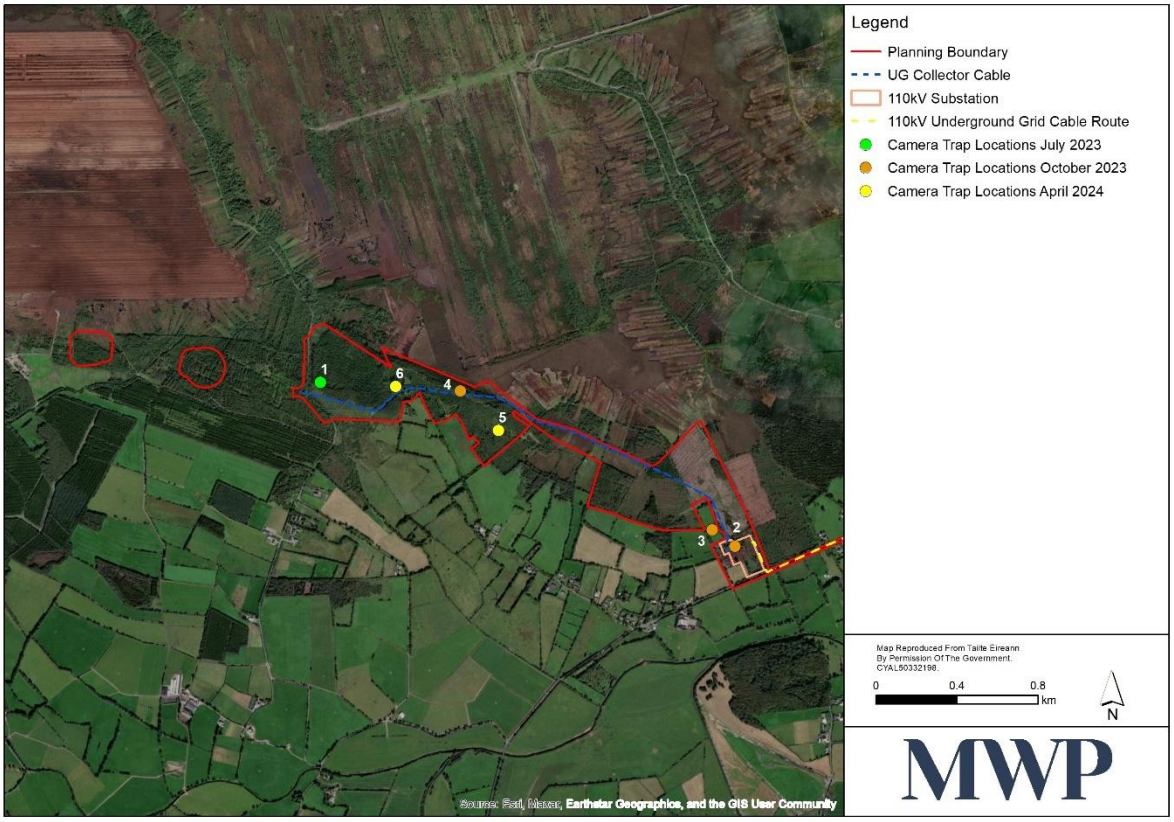

Figure 5.3. Camera trap locations

5.2.7.3 Birds, Amphibians, Reptiles and Macroinvertebrates

All birds, amphibians, reptiles and macroinvertebrates encountered during all site visits were recorded.

5.2.7.4 Fish Habitat Suitability

The watercourses potentially impacted by the proposed development were surveyed on 3rd August 2023. Two representative survey locations were selected on the Cottoner's Brook (Site 1 and Site 2), the watercourse that drains the western extent of the proposed development. Other watercourses were examined at/near the proposed grid route (Site 3 – Site 7). Site locations are provided in **Table 5.4** and illustrated in **Figure 5.4**.

Table 5.4: Aquatic Survey Locations

Site	Watercourse	EPA code	EPA segment code	Order	ITM X	ITM Y
1	Cottoner's Brook	14C15	14_1840	2	645433	710989
2	Cottoner's Brook	14C15	14_1024	3	646570	709673
3	Garryhinch	14G17	14_1784	1	648612	710647
4	Clonygowan	14C51	14_1770	3	649274	710975
5	Un-named	-	14_1715	1	649575	711064
6	Rathmore	14R16	14_1514	1	649944	711042
7	River Barrow	14B01	14_1643	5	651286	710728

Figure 5.4. Aquatic Survey Locations

Habitat assessment was carried out at survey sites using the methodology given in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003). Watercourses were photographed at survey site locations. Anthropogenic and livestock influences on fluvial and riparian habitats

were noted along the surveyed stretches. Aquatic survey sites were assessed in terms of physical characteristics, including flow type (riffle[1], glide[2] and pool[3] and channel form.

The results of the aquatic habitat survey were used in conjunction with the document 'Ecology of the Atlantic Salmon' (Hendry and Cragg-Hine, 2003) to assess habitat suitability for salmonids at selected representative sites. An evaluation of lamprey nursery habitat was also carried out based on the habitat requirements of juvenile lampreys as outlined in Maitland (2003). The leaflet '*The Evaluation of habitat for Salmon and Trout*' (DANI, 1995) to assess habitat suitability for salmonids at selected representative sites.

5.2.7.5 Invasive Species

All invasive species encountered during all site visits were recorded.

5.2.8 Limitations

In general, limitations to methodologies, procedures and equipment can arise during the course of an ecological assessment. Some limitations may be foreseen and can be accounted for while others may not be apparent until the actual assessment has taken place.

Best efforts were made to survey as much of the footprint of the proposed development as possible, however, some parts of the proposed collector cable route and the footprint of the 110kV substation were inaccessible due to thick, dense scrub and dense conifer plantations. Health and safety concerns prevented access to and extremely wet and waterlogged fields.

These survey limitations are not considered to have significantly impacted upon the collection of sufficient data to inform a robust impact assessment on any ecological receptor. No other limitations or difficulties were encountered.

5.3 Existing Environment

5.3.1 Site Location and General Description

The proposed development is located within southeast County Offaly and northeast County Laois (see **Figure 5.5** below). The proposed substation site comprises a mix of agricultural grasslands, scrub and marginal lands with mature and semi mature trees in the townland of Barranaghs in Co. Offaly. The site is situated in a rural, lightly-populated area south of Garryhinch Bog and approximately 1.3km southwest of Garryhinch village, approximately 3km northeast of Mountmellick town and approximately 6km southwest of Portarlington town.

The proposed access track and underground electrical cabling from the Dernacart Wind Farm to the relocated substation is also lies in the townland of Barranaghs and traverses through commercial forestry, scrub and peatland.

The proposed underground 110kV grid connection cable will connect the proposed 110kV Dernacart Wind Farm substation at Barranaghs to the consented 110kV substation at Brackalone, Co. Laois. The physical environment along the majority of the route is characterised by a patchwork farmland, with fields enclosed by hedgerows, along with boglands and conifer plantation with sections of ribbon development.

[1] Described in EA (2003) as shallow, fast-flowing, water with a distinctly disturbed surface over unconsolidated gravel-pebble, or cobble, substrate
[2] Laminar flow where water movement did not produce a disturbed surface
[3] Little/no observable flow

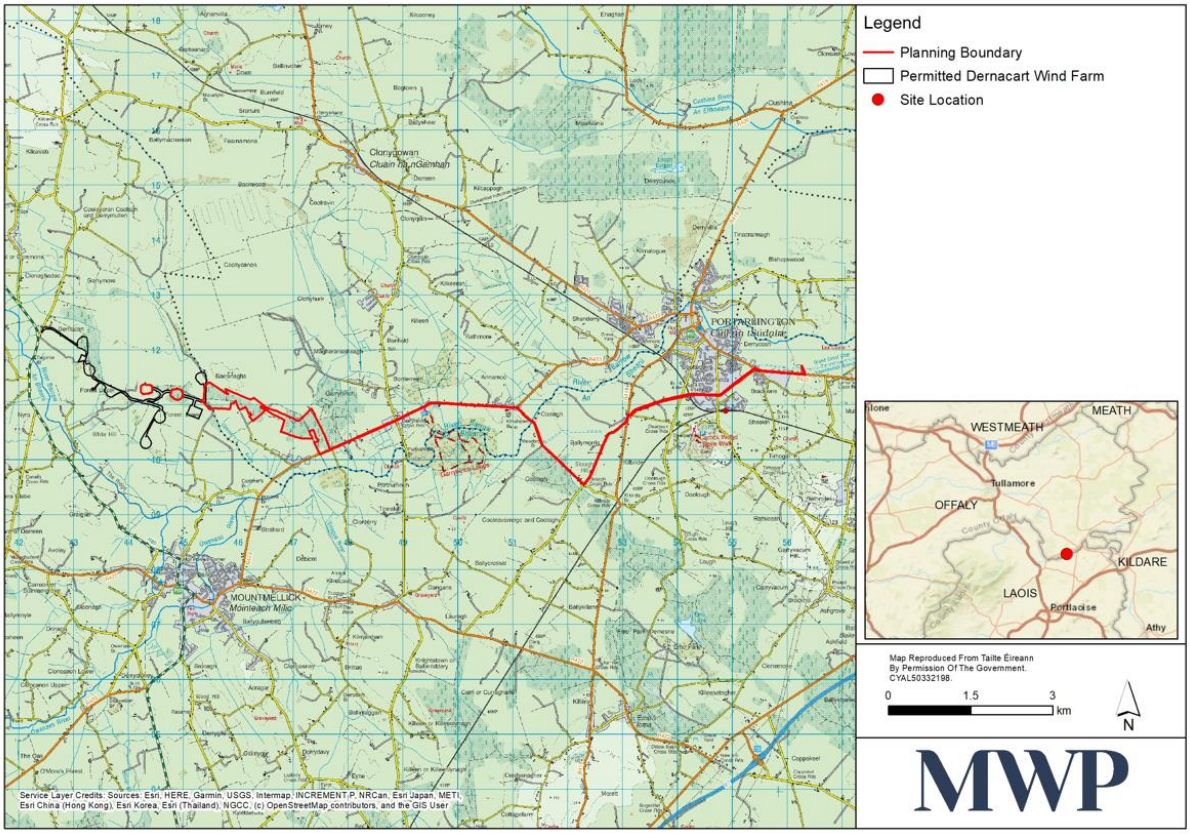

Figure 5.5. Proposed development location

5.3.2 Local Hydrology

The proposed development site is located within Hydrometric Area No. 14, also known as the Barrow catchment. The relevant sub-catchments and sub-basins are listed below for each section of the proposed Development.

<u>110kV substation with associated compound</u>

The proposed substation is located within sub catchment 14_1 (Barrow_SC_030) within the following river sub basins:

- Barrow_050

<u>Underground Collector Cable and Access Track</u>

The windfarm collector cable and access track are located within sub catchment 14_1 (Barrow_SC_030) within the following river sub basins:

- Cottoners Brook_010 and
- Barrow_050

<u>Underground Grid Connection Cable</u>

The western end of the 110kV Grid Connection is located within sub catchment 14_1 (Barrow_SC_030) with the remainder falling within sub-catchment 14_11 (Barrow_SC_020). The grid connection passes through the following river sub basins:

- Barrow_060,
- Clonygowan_010,
- Barrow_070, and
- Barrow_080.

5.3.2.1 Water crossings

There are a total of sixteen (16) no. water crossings required to facilitate the proposed development (see Figure 5.6 below).

The number of crossings related to each element of the proposed development includes:

- Four (4) crossings located along the route of the underground collector cable and access road,
- One (1) crossing at the new site entrance to the proposed 110kV Substation Four and,
- Eleven (11) crossings along the route of the 110kV underground grid connection cable.

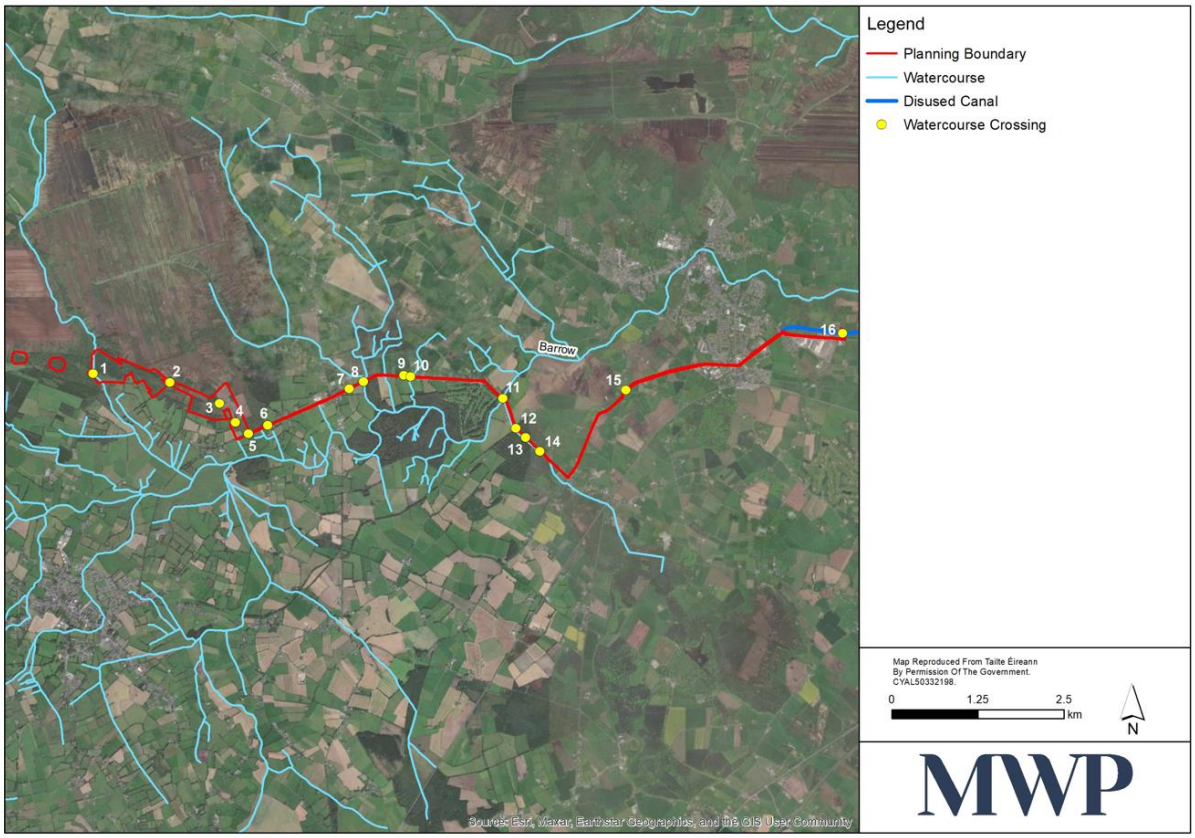

Figure 5.6. Watercourse crossing locations

As part of the construction activities, no instream works will be undertaken within any watercourse. Crossing No. 1 and No. 5 will be achieved by the addition of new clear span structures so as to leave the natural bed and banks undisturbed.

Crossings to be achieved by means of Horizontal Directional Drill (HDD) will require a service trench (launch pit) for the drill in the road either side of the watercourse.

For a full description of all water crossings and works to be carried out refer to Chapter 7 of this EIAR.

5.3.3 Designated Sites

The following compiles a list of nature conservation sites which lie within a potential zone of impact (ZOI) for later analysis which may or may not be significantly impacted upon by the proposed development. Each site is characterised in the context of its conservation interests. Following this, the potential effects associated with the proposal will be identified before an assessment is made of the likely significance of these effects.

5.3.3.1 Sites of International Importance

Natura 2000 sites are sites of international importance for nature conservation and are designated and protected under European legislation. Special Areas of Conservation (SAC) are designated under the Conservation of Natural Habitats and of Wild Fauna and Flora Directive 92/43/EEC ("Habitats Directive"). Special Protection Areas (SPA) are classified under Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds ("Birds Directive"). Both of these European Directives are transposed into Irish legislation under the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, SACs and SPAs are referred to as Natura 2000 sites or European sites.

The study area crosses the boundary of one designated site, the River Barrow and River Nore SAC. The grid route will cross the River Barrow via directional drilling. Additionally, the proposed grid route crosses a number of smaller watercourses which flow into the River Barrow further downstream. SAC and SPA sites within a 15km radius of the proposed development have been identified and listed in **Table 5.5** along with their Qualifying Features of Conservation Interest (QIs) and are shown in **Figure 5.7** below.

Table 5.5: Sites Designated for Nature Conservation within 15km.

Designated Site	Site code	Qualifying Features of Conservation Interest	Proximity and/or connection to proposed development site
River Barrow and River Nore SAC	002162	• Estuaries [1130] • 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]	There is a hydrological connection linking the proposed development site to this SAC via the drains/watercourses that drain the study area.

Designated Site	Site code	Qualifying Features of Conservation Interest	Proximity and/or connection to proposed development site
		• *Margaritifera margaritifera* (Freshwater pearl mussel) [1029] • *Austropotamobius pallipes* (White-clawed crayfish) [1092] • P*etromyzon 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] • *Trichomanes speciosum* (Killarney fern) [1421] • *Margaritifera durrovensis* (Nore pearl mussel) [1990]	
Mountmellick SAC	002141	• *Vertigo moulinsiana* (Desmoulin's whorl snail) [1016]	This SAC is approx. 1.8km southeast of the proposed development site with no ecological or hydrological connection between the two.
Slieve Bloom Mountains SAC	004160	• Northern Atlantic wet heaths with *Erica tetralix* [4010] • Blanket bogs (* if active bog) [7130] • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)* [91E0]	This SPA is situated approx. 5.4km southwest of the proposed development site with no ecological or hydrological connection between the two.
Slieve Bloom Mountains SPA	004160	• *Circus cyaneus* (Hen harrier) [A082]	This SPA is situated approx. 8.9km southwest of the proposed development site with no ecological or hydrological connection between the two.

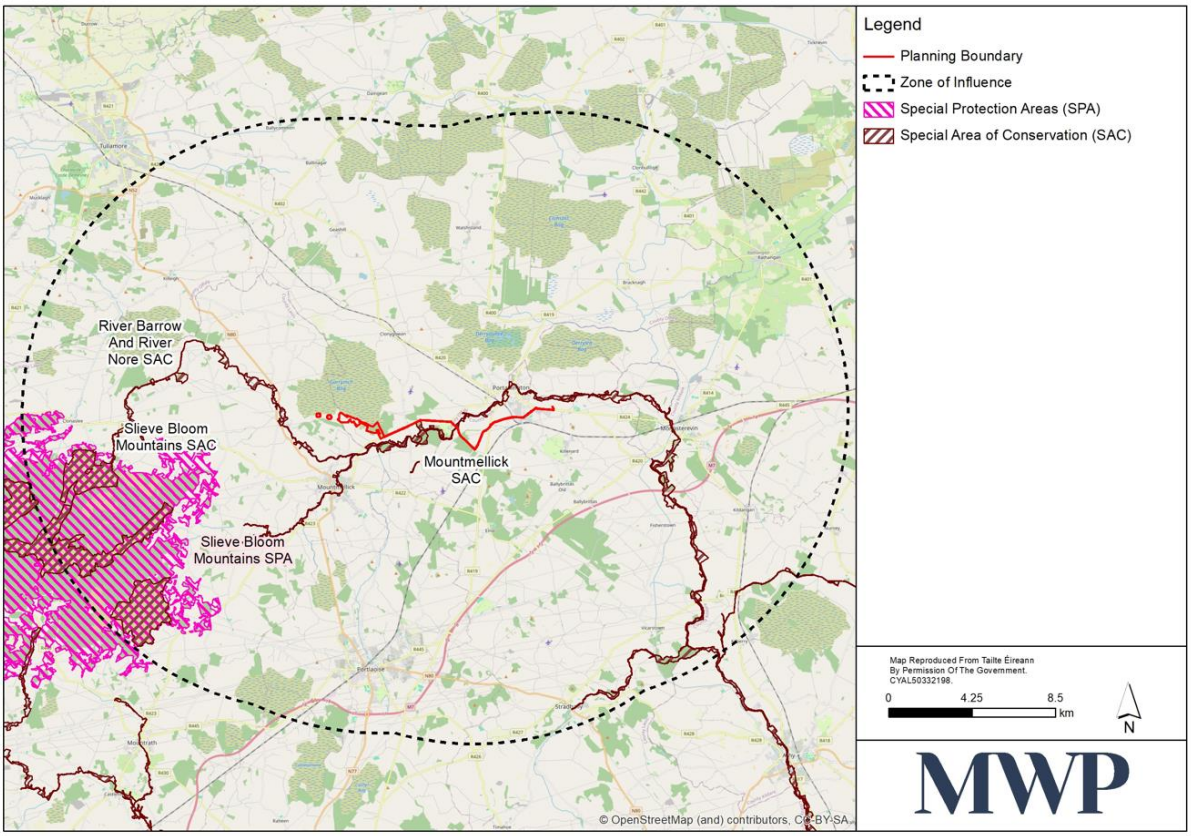

Figure 5.7. Sites of International Importance designated for nature conservation within the ZOI of the proposed development site

5.3.3.2 Sites of National Importance

In Ireland, sites of National Importance for nature conservation are designated as Natural Heritage Areas (NHAs) or proposed Natural Heritage Areas (pNHAs) under the Wildlife Act 1976, as amended. NHAs are areas considered important for the habitats present or which hold species of plants and animals whose habitat needs protection. A list of pNHAs was published on a non-statutory basis in 1995, but these have not since been statutorily proposed or designated. Prior to statutory designation, pNHAs are subject to limited protection including in the areas of agri-environmental farm planning schemes, certain forest service requirements pertaining to payment of afforestation grants and recognition of the ecological value of pNHAs by Planning and Licencing Authorities.

The proposed development site does not lie within the boundary of any NHA or pNHA site. Sites of national importance within the potential ZOI of the proposed development have been identified and listed in Table 5.6 and shown in Figure 5.7 below.

Table 5.6: Sites of national importance within the potential ZOI

Designated Site	Features of Interest	Site Summary	Distance from the proposed development site
Emo Court pNHA (000865)	None on NPWS website	Emo Court is an area within the Emo desmesne, 7km south of Portarlington, Co.Laois. It contains a large mixed woodland, a freshwater lake, parkland and amenity grassland which are surrounded by rich agricultural land and conifer plantations.	Approx. 2.84km south of site
Derries Wood pNHA (000416)	None listed on NPWS website	Derries Wood is situated less than 2km south-west of Ballybrittas, adjacent to the main Dublin- Portlaoise Road. Much of the site is disturbed bog habitat, lying in the former flood plain of the nearby River Barrow. Derries Wood is of conservation significance, particularly for the presence of populations of several rare insects, most notably *Criorhina ranunculi* (Diptera, Syrphidae) in Beechwood and *Chrysops caecutiens* (Diptera, Tabanidae) on old bog habitat.	Approx. 5.25km south of site
Grand Canal pNHA (002104)	None listed on NPWS website	The Grand Canal is a man-made waterway linking the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. The Grand Canal proposed Natural Heritage Area (pNHA) comprises the canal channel and the banks on either side of it. The canal system is made up of a number of branches- the Main Line from Dublin to the Shannon, the Barrow Line from Lowtown to Athy, the Edenderry Branch, the Naas and Corbally Branch and the Milltown Feeder. The Kilbeggan Branch is dry at present, but it is hoped to restore it in the near future. Water is fed into the summit level of the canal at Lowtown from Pollardstown Fen, itself a pNHA.	Approx. 5.4km east of site
Ridge of Portlaoise pNHA (000876)	None listed on NPWS website	The ridge of Portlaoise is an elongated raised ridge or esker formed of sand and gravel which was deposited when a mass of ice covered this area during the last period of glaciation. The esker runs through the eastern part of Portlaoise town and extends in a south-south-east to north-north-west direction. North of the town, the secondary road to Mountmellick runs along the top of the ridge, while south of Portlaoise the L26 road to Timahoe runs alongside it. Much of the esker is wooded. Open grassland on the esker is calcareous and typically species-rich. Nettle-leaved Bellflower (*Campanula trachelium*) is a rare species which is legally protected under the Flora Protection Order of 1987.	Approx. 7.27km south of site
The Great Heath of Portlaoise pNHA (000881)	None listed on NPWS website	The Great Heath of Portlaoise, otherwise known as the Great Heath of Maryborough, is located by the main Portlaoise to Monasterevin road about 6km north of Portlaoise. Much of the proposed Natural Heritage Area (NHA) is made up by The Heath Golf Club. The main vegetation is that of an acidic grassland. The flatter central areas have accumulated peat, which has since been cut away, but the vegetation still reflects an organic soil. There are two small wetlands within the site, Bog Lough, lies between the golf course and the road and a fen in front of the Catholic Church in the western end of the site. Here calcareous springs feed the area and the vegetation is consequently markedly different from the rest of the site. Between these areas is winter wet grassland which constitutes an important part of the site.	Approx. 7.37 km south of site
Clonreher Bog NHA (002357)	• Peatlands [4]	Clonreher Bog NHA is located 6km south of the town of Mountmellick in the townlands of Clonreher, Rossnagad and Clonsoghey, Co.Laois. It is situated just west of the Mountmellick to Portlaoise road (N80). This site comprises a raised bog that includes both areas of high bog and cutover bog. The site is bounded by the N80 to the east and the abandoned railway line (Mountmellick Branch) to the west. It can be accessed from bog tracks off the N80, to the north-east and south-east of the site. Clonreher Bog NHA is a site of considerable conservation significance comprising as it does a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site	Approx. 7.43km south of site

Designated Site	Features of Interest	Site Summary	Distance from the proposed development site
		supports a good diversity of raised bog microhabitats and its southerly location, is of ecological interest. Ireland has a high proportion of the total E.U. resource of raised bog (over 50%) and so has a special responsibility for its conservation at an international level.	
Raheen Lough pNHA (000917)	None listed on NPWS website	Raheen Lough lies 10km north of Mountmellick in Co. Offaly. It is set in pasture grazed by cattle and sheep. There is an inflowing stream, and the absence of a surface outfall may indicate that there is underground drainage. This may help to explain the fluctuating water levels that sometimes inundate the immediate shore. The basin is stoney bottomed and shallow. The water appears to be clean, supporting the pollution intolerant Alternate Water-milfoil (*Myriophyllum alterniflorum*). However, its main interest lies in the variety and numbers of wildfowl and waders that it attracts. In this it has a particularly important role because open water bodies are infrequent in the area.	Approx. 7.49km north of site
Slieve Bloom Mountains pNHA (000412)	None listed on NPWS website	The Slieve Bloom Mountains Nature Reserve is, at over 2,300 hectares, Ireland's largest state owned Nature Reserve. It was established in 1985, so that it could be managed in such a way as to ensure the conservation of the mountain blanket bog ecosystem. In addition, the Nature Reserve is designated a Ramsar Wetland Site and a Council of Europe Biogenetic Reserve. Much of the greater upland area has been designated as a Special Area of Conservation (SAC). The primary interest of the SAC is mountain blanket bog. The Slieve Bloom Mountains are also designated a Special Protection Area (SPA), of special conservation interest for the hen harrier, a rare bird of prey[4].	Approx. 9.75km southwest of site
Rock Of Dunamase pNHA (000878)	None listed on NPWS website	This site, otherwise named the 'Fort of the Plain', starts on a prominent limestone outcrop 8km east of Portlaoise. It is one in a string of small limestone outcrops in the region. Surrounding the ruined fort, the grassland present has developed in the absence of invasion by scrub. The more interesting aspects, from the botanical point of view, are the large limestone boulders and the areas of short turf on the very shallow limestone soil. The Rock of Dunamase is an interesting botanical site including meadow grassland, shallow limestone soil, pasture and hazel scrub. It is also important archaeologically, geologically and historically.	Approx. 8.9km south of site
Dunamase Woods pNHA (001494)	None listed on NPWS website	Two small, but prominent hills lie to the west of, and within 1km of, the Rock of Dunamase in Co. Laois. In both cases, unlike the Rock, drift deposits cover underlying limestone. The main vegetation feature of the hills is woodland. The larger area (about 9ha) is found on the western most hill, where the main woodland tree is pedunculate oak (*Quercus robur*), and the size of these trees bear witness to the age of the woodland. The smaller woodland to the east, known as 'Beech Wood' is essentially a similar mix of native pedunculate oak and ash, with hazel (*Corylus avellana*) and non-native species, as the name suggests, particularly beech (*Fagus sylvatica*). These two woodland blocks are not large, there origin has not been studied, but it is likely that they are historical plantings rather than fragments of ancient woodland. The preponderance of non-native trees detracts from the naturalness of both woodland blocks. However few woodlands occur in Co. Laois, especially those dominated by pedunculate oak, a feature of our most prized woodlands.	Approx. 11.17km south of site

[4] https://www.slievebloomsnaturereserve.ie/

Designated Site	Features of Interest	Site Summary	Distance from the proposed development site
Kilteale Hill pNHA (000867)	None listed on NPWS website	This small limestone outcrop lies about 3km north-west of Stradbally in Co. Laois. It is one in a chain of such outcrops which includes the more westerly Rock of Dunamase. . The site primarily consists of a hazel (*Corylus avellana*) wood with ash (*Fraxinus excelsior*), blackthorn (*Prunus spinosa*) and elder (*Sambucus nigra*) also present. Patches of gorse (*Ulex* spp.) and bracken (*Pteridium aquilinum*) scrub are also interspersed. Kilteale Hill is indicative of climax vegetation for a basic soil. The site serves as an example of Hazel woodlands which formerly vegetated many of the Midland region hillocks.	Approx. 11.3km south of site
Hawkswood Bog NHA (002355)	• Peatlands [4]	Hawkswood bog is located 5 km south of Tullamore, in the townlands of Hawkswood and Derrybeg, Co. Offaly. The site comprises a raised bog that includes both areas of high bog and cutover bog and adjoins Clonard Wood NHA (574) to the west. It can be accessed from the local road to the south of the site. This raised bog is at the southern extreme of the range of raised bogs in Ireland and is in close proximity to Screggan Bog NHA (921) and Pallis Lough NHA (916). Much of the high bog has vegetation typical of a Midland Raised Bog. Numerous snipe have been recorded on the bog. Hawkswood Bog NHA is a site of considerable conservation significance comprising as it does a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats, including hummocks, lawns and pools. Its southern location adds further interest.	Approx. 12.86km northwest of site
Annaghmore Lough Fen pNHA (000413)	None listed on NPWS website	Situated about 10km south of Tullamore, on the border of Laois and Offaly below the Slieve Blooms, Annaghmore Lough Fen is a Natural Heritage Area (NHA). All that remains of Annaghmore Lough itself is a small remnant pool, barely 2ha and only a couple of centimetres deep. It is not clear whether the lake shrinkage has been purely the result of the natural process of sediment accumulation, or whether this has been accelerated by drainage. However, the area once occupied by the lake, is now a peat accumulating, calcareous fen.	Approx. 12.3km west of site
Clonad Wood pNHA (000574)	None listed on NPWS website	Clonad Wood is an area of deciduous woodland situated on low-lying agricultural land bordering the Clodiagh River, 5km south of Tullamore in Co. Offaly. The rare alder buckthorn (Frangula alnus) and bird cherry (Prunus padus) are found in the woodland, while Irish whitebeam (Sorbus hibernica) is also abundant. This woodland was described by Praeger in the last century as being one of the few remnants of true original forest. Although much of the original site has by now been planted, resulting in fragmentation into small areas there are still tracts of relic broadleaf forest which contain an interesting flora.	Approx. 13.5km northwest of site
Stradbally Hill pNHA (001800	None listed on NPWS website	This site lies about 2km south-east of Stradbally in a chain of limestone hills, which are occasionally indented by caves. Stradbally Hill is an important woodland site containing many mature oaks and hazel. Extensive stands of mature oak on mineral soil are unusual in the county and the country as a whole.	Approx. 14.6km south of site

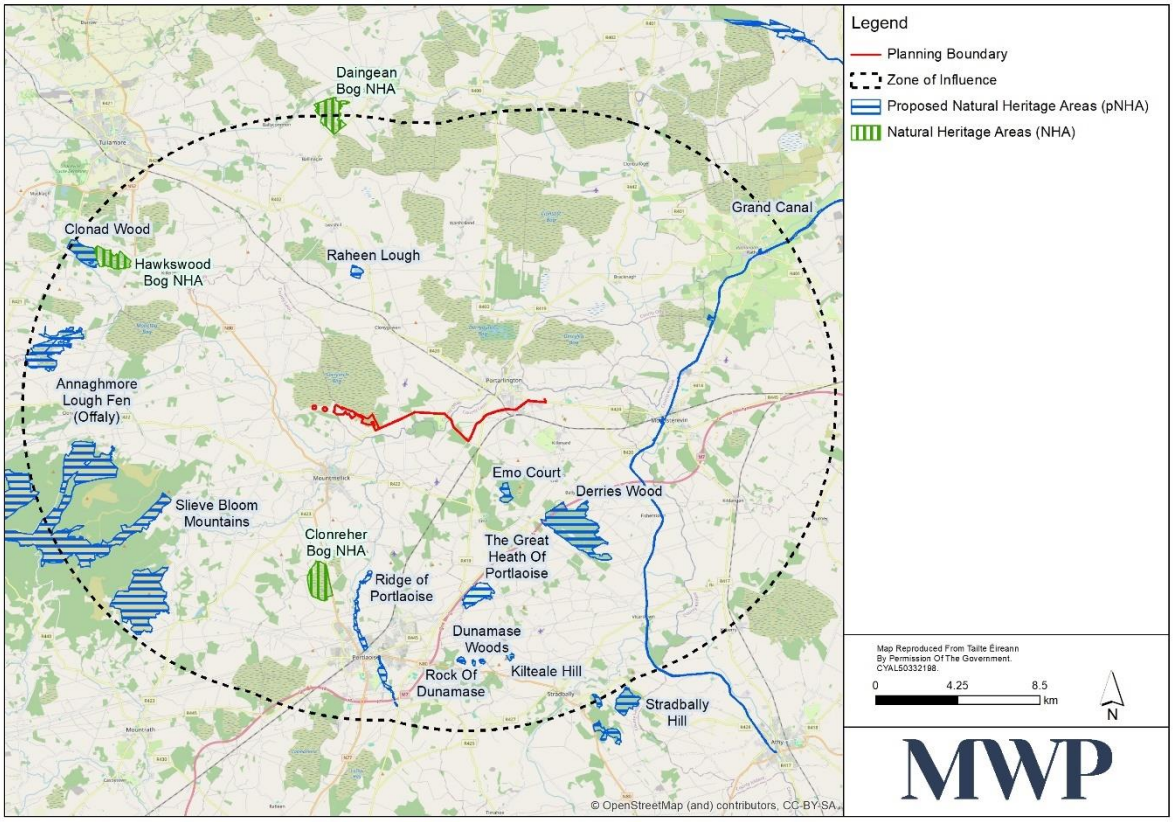

Figure 5.8. NHAs and pNHAs located within the ZOI of the proposed development site

5.3.3.3 Additional Sites

Ramsar Sites

The Ramsar Convention on Wetlands of International Importance, especially as Waterfowl Habitat, is an international treaty that was established for the conservation and sustainable use of wetlands. The Convention is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. A key commitment of Ramsar Contracting Parties is to identify and place suitable wetlands onto the List of Wetlands of International Importance. Ireland presently has 45 sites designated as Wetlands of International Importance.

An on-line search was undertaken to search for Ramsar sites potentially located within the ZOI of the proposed development. There are no Ramsar sites within a 15km radius of the proposed development site[5].

Important Bird and Biodiversity Areas (IBAs)

Important Bird and Biodiversity Areas (IBAs) are sites selected as important for bird conservation because they regularly hold significant populations of one or more globally or regionally threatened, endemic or congregator bird species or highly representative bird assemblages. The European IBA programme aims to identify, monitor and protect key sites for birds all over the continent. It aims to ensure that the conservation value of IBAs in Europe (now numbering more than 5,000 sites or about 40% of all IBAs identified globally to date) is maintained,

[5] https://rsis.ramsar.org/

and where possible enhanced. The programme aims to guide the implementation of national conservation strategies, through the promotion and development of national protected-area programmes[6].

An on-line search was undertaken to search for IBA sites potentially located within the ZOI of the proposed development. There are no IBA sites within a 15km radius of the proposed development site[7].

5.3.4 Habitats

All habitats are classified according to Fossitts A Guide to Habitats in Ireland, (2000). The proposed development is shown in **Figure 5.9** below and **Table 5.7** lists each habitat with the location and description of each. A habitat map is presented in **Figure 5.10**, showing all habitats discussed.

[6] https://datazone.birdlife.org/site/mapsearch
[7] BirdLife Data Zone

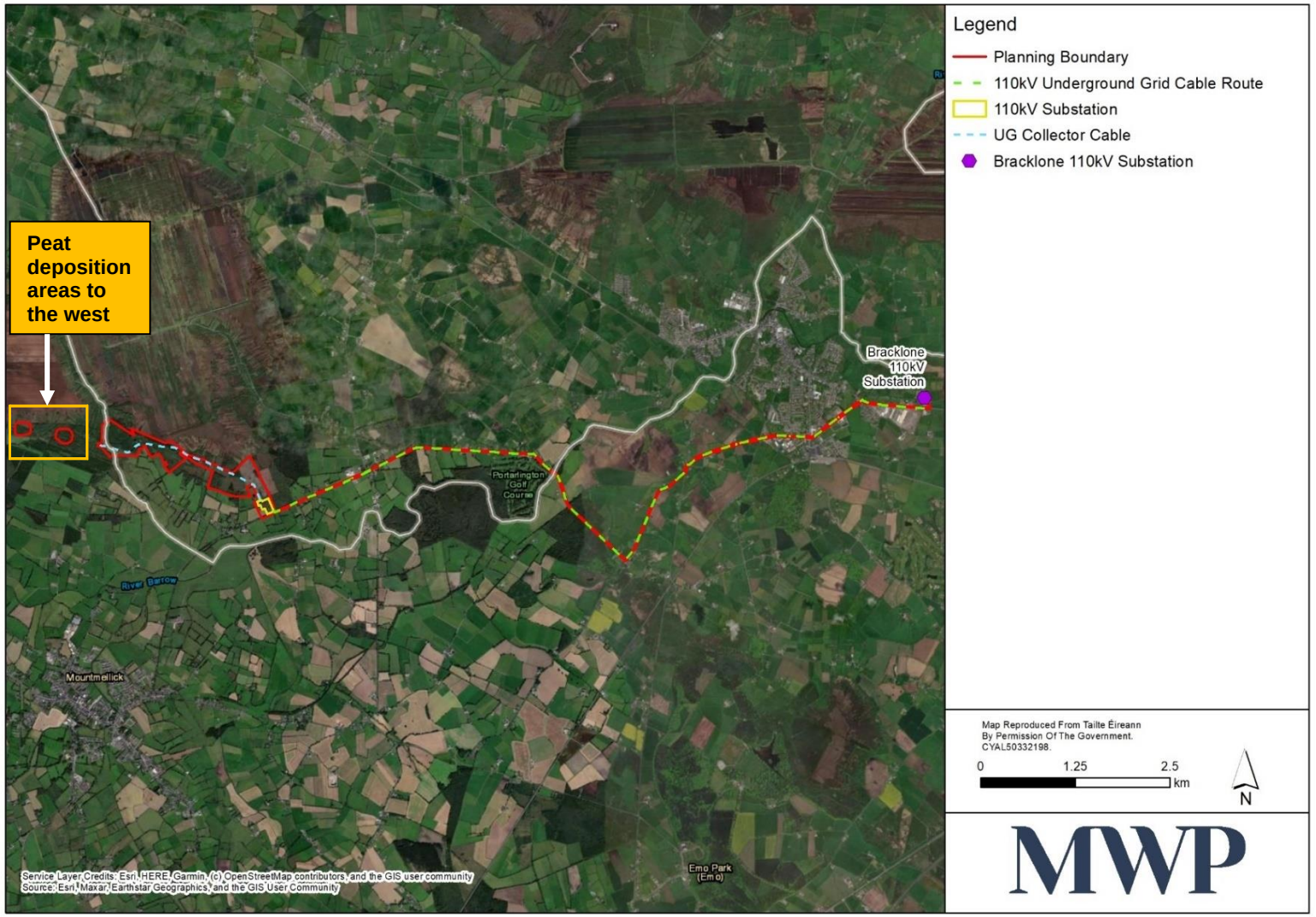

Figure 5.9. Three sections of the proposed development

Table 5.7: Habitats at the Proposed Development Site

Habitat type and code	Location of Habitat and Description	
Other artificial lakes and ponds (FL8)	**Location:** • Peat deposition area (furthest area west) **Habitat Description:** A total of three ponds are in close proximity to one another at the western peat deposition area within an area of cutover bog [recolonising]. All ponds are situated just outside the redline site boundary.	
Mixed Broadleaved Woodland (WD1)	**Location:** • Underground wind farm collector cable and access track **Habitat Description:** This Ash plantation is located at the most western portion of the underground wind farm collector cable and assess road bordering the Upper Forest Road. Birch is also present, with and an understory consisting predominantly of bramble, bracken and nettles.	
Depositing/ lowland river (FW2)	**Location:** • Underground wind farm collector cable and access track • 110kV underground grid cable route **Habitat description:** The watercourses draining the site are classified as 'Low land / depositing rivers (FW2). Cottoner's Brook at Upper Forest Road is situated at the western end of the grid route, it appears to have been modified (deepened). The River Barrow (EPA code 14B01) receives all surface waters draining the site and is a drained river. It is considered that all watercourses in the study area have been modified to some degree.	

Habitat type and code	Location of Habitat and Description	
Conifer plantation (WD4)	**Location:** • Peat deposition area • Underground wind farm collector cable and access track **Habitat Description:** Conifer plantations are a common habitat within the site and the wider area. These plantations vary in age where some are mature, and others have been replanted. The underground collector cable and access track only passes through this habitat on a few occasions. This habitat is also present at both peat deposition areas to the west.	
Scrub (WS1)	**Location:** • Underground wind farm collector cable and access track • 110kV substation **Habitat Description:** Scrub is a common habitat bordering other established habitats as well as forming mosaics with wet grassland, cutover bog and dense bracken. The underground wind farm collector cable and access track passes through this habitat on a number of occasions. This habitat also occurs alongside a few other habitats such as wet grassland and bog woodland at the 110kV substation area.	
Cutover bog (PB4)	**Location:** • Underground wind farm collector cable and access track **Habitat Description:** Occurs more outside of the survey area to the north of the site. The underground wind farm collector cable and access track only passes through this habitat for a short distance. Mostly bare ground with obvious signs in the distance of peat harvesting.	

Habitat type and code	Location of Habitat and Description	
Cutover bog [Recolonising] (PB4 [R])	**Location:** • Underground wind farm collector cable and access track **Habitat Description:** This habitat is common to the north and east of the site and also mosaics with other habitat type such as scrub and wet grassland. This peat was historically cut and now enough time has passed for plants to recolonise. The underground wind farm collector cable and access track passes through this habitat on a few occasions. This habitat is also present at the peat deposition areas.	
Mixed broadleaf/conifer woodland (WD2)	**Location:** • Underground wind farm collector cable and access track **Habitat Description:** The underground wind farm collector cable and access track passes through this habitat on a few occasions in the northwest portion of the site.	
Scrub (WS1)/ Dense bracken (HD1)	**Location:** • Underground wind farm collector cable and access track • 110kV substation • 110kV underground grid cable route **Habitat Description:** This habitat of dense bracken and scrub is present along the underground collector cable and access track just north of the 110kV substation. It also occurs within the 110kV substation area and approx. 130m of the underground 110kV grid route before reaching the regional road R423 to the south.	

Habitat type and code	Location of Habitat and Description	
Spoil and bare ground (ED2)	**Location:** • Underground wind farm collector cable and access track **Habitat Description:** This area in the mid-section of the underground collector cable and access track was classified as wet grassland (GS4) in 2023. In April 2024, this habitat corresponds to disturbed ground surrounded by new drains.	
Mosaic – Cutover bog (PB4)/ Scrub (WS1)/ Wet grassland (GS4)	**Location:** • Underground wind farm collector cable and access track **Habitat Description:** This mosaic is present at the mid-section of the underground collector cable and access track. Enough time has passed since peat harvesting for the cutover bog to recolonise and for scrub and wet grassland to establish. Common species such as gorse, bramble, birch and willow, molinia grass and crossed leaved heath. The collector cable and access track passes through this habitat on two occasions and a portion of this area will be used for peat deposition.	
Drainage ditches (FW4)	**Location:** • Underground wind farm collector cable and access track • 110kV substation **Habitat Description:** This habitat is a common feature throughout the proposed development site as it is often associated with bogs and commercial forests. The wind farm collector cable and access track passes through this habitat on a number of occasions. This habitat also occurs alongside hedgerows and treelines.	

Habitat type and code	Location of Habitat and Description	
Bog woodland (WN7)/ Scrub (WS1)	**Location:** • Peat deposition area (furthest area west) • 110kV substation **Habitat Description:** This habitat occurs in a small portion of the peat deposition furthest to the west alongside cut over bog. The majority of this habitat type occurs in the northeastern corner of the 110kV substation area and at the start of the underground 110kV grid route (approx. 30m). Parts of this habitat are waterlogged and generally wet with heather, molina grass, Scott's pine and birch all present.	
Scrub (WS1)/ Wet grassland (GS4)	**Location:** • Underground wind farm collector cable and access track • 110kV substation **Habitat Description:** This habitat occurs alongside cutover bog in the mid-section of the underground wind farm collector cable and access track and alongside bog woodland in the 110Kv substation area. Parts are waterlogged with rushes, willow, birch and gorse all present.	
Improved agricultural grassland (GA1)	**Location:** • 110kV substation **Habitat Description:** This habitat occurs at the 110kV substation area and is a common feature within the greater landscape to the south of the proposed development site. This particular field is quite wet at the north and eastern parts.	

Habitat type and code	Location of Habitat and Description	
Treeline/Hedgerow (WL1/WL2)	**Location:** • Underground wind farm collector cable and access track • 110kV substation • 110kV underground grid cable route **Habitat Description:** This habitat is a common feature of field boundaries and bordering tracks and public roads. This habitat also occurs alongside drainage ditches.	
Drainage ditches/ Treeline/ Hedgerow (FW4/ WL1/WL2)	**Location:** • Underground wind farm collector cable and access track • 110kV substation **Habitat Description:** This habitat is common throughout the underground wind farm collector cable and access track and around the perimeter of the 110kV substation area. Water levels may vary depending on the level of rainfall.	
Buildings and artificial surfaces (BL3)	**Location:** • Underground wind farm collector cable and access track • 110kV underground grid cable route **Habitat Description:** This habitat is a common throughout the route of the underground wind farm collector cable and access track and is the most common habitat along the 110kV underground grid cable route.	

Habitat type and code	Location of Habitat and Description	
Buildings and artificial surfaces (BL3)	**Location:** • 110kV underground grid cable route **Habitat Description:** The habitat is present crossing the River Barrow along the 110kV underground grid cable route.	

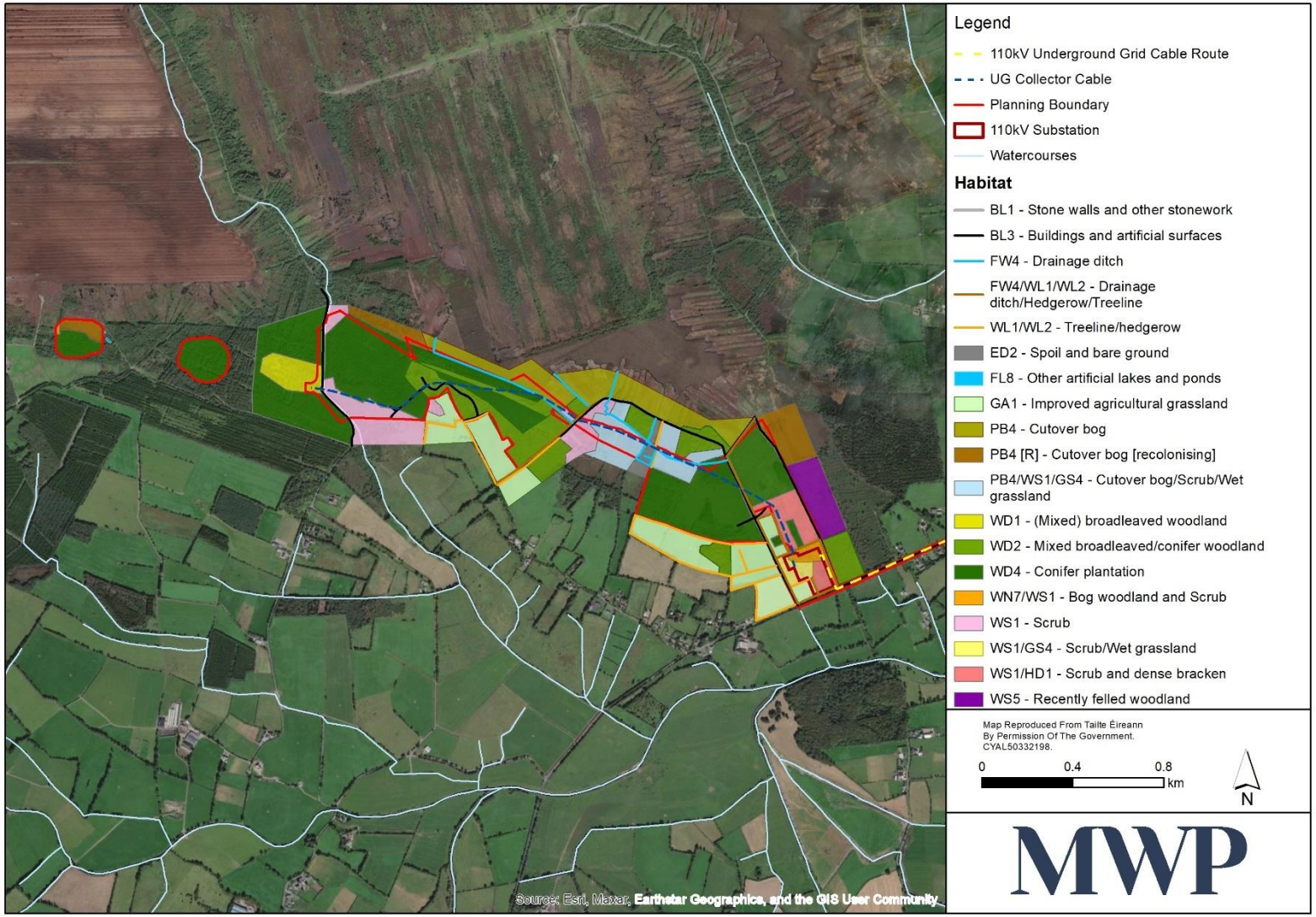

Figure 5.10. Habitat map

5.3.5 Rare and Protected Flora

5.3.5.1 Desk Study

An on-line search of the NBDC database[10] for species of conservation interest recorded within the hectads N41, N50 and N51 was carried out. Results of a data request from NPWS for the hectads was also reviewed. A total of two Flora (Protection) Order (FPO) species have been previously recorded, marsh saxifrage (*Saxifraga hirculus*) in hectad N51 and lesser centaury (*Centaurium pulchellum*) in hectad N50. These species are afforded legal protection in Ireland. Additionally, marsh saxifrage has a further level of protection from the Habitats Directive and is listed in Annex II and Annex IV. All records of species listed under Habitats Directive and Flora (Protection) Order (FPO) are listed below in Table 5.8.

Table 5.8: Records of Rare and Protected Flora

Species Name	Status	Level of Protection	Species description	10km grid square (portion of proposed development site within square			Species Record data set
				N41 (West)	N51 (East)	N50 (small portion of grid route south)	
Large white-moss *(Leucobryum glaucum)*	Ireland Red List 2012: Least concern	Annex V of the Habitats Directive	Species has a broad ecological range, but largely confined to acid humus and peat. The main habitats include acid woodland, damp and wet heathland, moorland, and various types of mire from lowland valley bogs and fens to upland blanket bog, where its hummocks are colonised by other bryophytes such as *Kurzia pauciflora*, *Odontoschisma sphagni* and *Polytrichum strictum*. In woodland it grows on the ground and over old logs and stumps, sometimes also on boulders and the lower parts of tree trunks.[8].	✓			NBDC
Lesser centaury (*Centaurium pulchellum*)	Threatened Species: Endangered	Flora Protection Order 2022	Flowers June to September. This small, pink-flowered annual without a basal rosette is found on sandhills and sandy places usually near the coast. It is recorded from 5 counties from Cork to Dublin. Recently it has been seen in 4 sites; 3 in Wexford and 1 in Dublin. Apparently declining, though it may be under-recorded due to confusion with *Centaurium erythraea Rafn* (Curtis & McGough, 1988).			✓	NPWS
Marsh saxifrage *(Saxifraga hirculus)*	Ireland Red List 2016: Near Threatened	Annex II, Annex IV of Habitats Directive and Flora Protection Order 2022	Flowers August to September. Occurs in wet bogs in the north and west of Ireland. It has been recorded from a total of 8 sites on the island: from 2 sites in Mayo, from 2 in Antrim and from one each in Tipperary, Laois, Offaly and Westmeath. Since 1970 it has been seen only in a single site each in Mayo and Antrim. The decline of this species is due to the drainage and exploitation of its peatland habitat. The site at which this saxifrage occurs in County Mayo is surrounded by exploited peatland and the mineral flush in which the species grows is believed to be drying out as a result of workings in the area (Curtis & McGough, 1988).		✓		NPWS

[8] https://www.britishbryologicalsociety.org.uk/wp-content/uploads/2020/12/Atlas-of-British-and-Irish-Bryophytes-V2-111.pdf

5.3.5.2 Field Survey Results

Records for marsh saxifrage and lesser centaury exist in Hectads N50 and N51. The portion of the proposed development within these hectads is the 110kV underground grid cable route. The proposed 110kV underground grid cable route will follow the exiting road network all the way to Bracklone 110kV substation in Portarlington. The artificial nature of the habitat along 110kV underground grid cable route would not support these two species.

Large white-moss can be found in a broad range of habitats such as the ones that occur along the underground wind farm collector cable and access road track. This species was not encountered during site visits but may be present within the study area.

5.3.6 Bats

5.3.6.1 Desk Study

Permitted Dernacart Wind Farm[9]

Surveys were carried out in 2018 and 2019 at the now permitted wind farm site. Below in Table 5.9 is a summary of the surveys and the results.

Table 5.9. Summary of bat surveys and findings of permitted Derncart wind farm

Survey type	Year	Survey description	Results
Habitat assessments	2018	Walkover surveys to search for potential bat habitat were conducted throughout the survey period, with a focused bat habitat assessment survey.	Overall, based on the habitat types within the wind farm site, it was assessed as having moderate suitability for foraging bats.
Preliminary Roost Assessment and Dusk Emergence Surveys	2018	A number of trees and three buildings were surveyed for possible roosting. The buildings comprised two abandoned houses and one corrugated barn.	No potential bat roost features observed on trees and one confirmed bat roost (building 3) for which a single soprano pipistrelle emerged during the dusk survey indicating it is a transitory roost.
Transect surveys	2018	Five dusk surveys were undertaken (one per month) between May and September 2018 which followed two transect routes.	A total of three bat species were recorded during the five surveys. • Common pipistrelle on 5/5 nights • Soprano pipistrelle on 4/5 nights • Leisler's bat on 3/5 nights
Hibernation Roost Survey	2019	A hibernation roost survey was conducted at two buildings which comprised searching for visual signs of bat usage and deployment of automated static bat detector units for 2 weeks in Jan and Feb.	No visual evidence of winter bats at either building and no activity recorded during the automated static detector survey conducted.
Automated static bat surveys	2018	Static units were deployed with in the wind farm site at five sampling points for 10 nights in June, July, and August. A sixth sampling point was added in September.	In total, 16,094 bat passes were recorded and five species were recorded. Below they are listed at most frequently recorded to least frequent: • Common pipistrelle • Soprano pipistrelle • Leisler's bat • Pipistellus sp. • *Myotis* sp

[9] Dernacart Wind Farm EIAR (Planning Ref 20/78, ABP-310312-21), Biodiversity Chapter 2

Survey type	Year	Survey description	Results
	2019	Static units were deployed with in the wind farm site at five sampling points for 10 nights in August and September.	In total, 20,363 bat passes were recorded and six species were recorded. Below they are listed at most frequently recorded to least frequent: • Common pipistrelle • Soprano pipistrelle • Pipistellus sp. • Leisler's bat • *Myotis* sp • Brown long-eared bat
Roost survey at Kilnahown Bridge	2019	A survey of the Kilnahown Bridge which crosses the River Barrow along the grid route was undertaken by Caroline Shiel, licensed bat specialist in September 2019.	The bridge was found to have No. 2 roosting Daubenton's bats. Although there were roosting bats the bridge was determined that this bridge structure had limited roosting spaces and therefore could not support a maternity roost.

NBDC

The National Biodiversity Data Centre's online mapper[10] includes a Bat Habitat Suitability Index (BHSI) layer derived from an analysis of the habitat and landscape associations of Irish bats compiled in Lundy et al. (2011). The index evaluation ratings range from 0 to 100 with 0 being the least favourable, and 100 the most favourable, for bats. Index evaluations are available for each species and an overall rating is also available for all species in combination. As the ratings are mapped to a 2 km grid square resolution, multiple ratings are available for any search area that extends beyond this 2 km scope. In order to ensure that the BHSI ratings for the proposed site and its surroundings are fully described, the reference area, to which the ratings listed in Table 5.10, below relate, comprises the area that encompasses the proposed development site, the lands immediately adjacent and the wider geographical area. With regard to the area within the proposed development site, as can be seen from the ratings listed in Table 5.10, below, the BHSI rating for all bat species ranges from 24 to 34.78.

Overall, the proposed development site is 'low – moderate' value to bats of all species as only one rating is above 30 and the remaining three are with in the 20 range.

These ratings, while not predictive, provide meaningful metrics that characterise the probable value of the area within and surrounding the proposed development site to bat species. They are an indicator as to the likelihood that different bat species are, or are not, likely to, typically, be a significant presence in the area within and around the proposed development site. This likelihood then, in turn, indicates the probability that bats may use the proposed site.

Table 5.10: BHSI Rating for all hectads

Bat Habitat Suitability Index Rating for all Bat Species	
Hectad	**Rating**
N41 (west)	24
N41 (east)	34.78
N51	28.22
N50	27.89

[10] https://maps.biodiversityireland.ie/Map

Table 5.11 presents bat species records for the three hectads overlapped by the proposed development. Records are from NBDC and Information received from the NPWS data request for rare and protected species.

Table 5.11. Bat records from NBDC and NPWS

Species Name	Common name	10km grid square (portion of proposed development site within square)			Data set	Level of protection
		N41 (West)	N51 (East)	N50 (small portion of grid route south)		
Plecotus auritus	Brown Long-eared Bat		✓	✓	NBDC	Annex IV of the Habitats Directive, Wildlife Acts
Myotis daubentonii	Daubenton's Bat	✓	✓		NBDC	Annex IV of the Habitats Directive, Wildlife Acts
Nyctalus leisleri	Leisler's bat	✓ ✓	✓	✓	NBDC NPWS	Annex IV of the Habitats Directive, Wildlife Acts
Myotis nattereri	Natterer's Bat	✓			NBDC	
Pipistrellus pipistrellus	Common Pipistrelle	✓	✓	✓	NBDC	Annex IV of the Habitats Directive, Wildlife Acts
Pipistrellus pygmaeus	Soprano pipistrelle	✓ ✓	✓	✓	NBDC NPWS	Annex IV of the Habitats Directive, Wildlife Acts

Bat Conservation Ireland (BCI)

Records for the following species are retained by BCI for locations within a 10 km radius of two points. The start of the underground wind farm collector cable and access track and the end of the underground 110kV grid route at Bracklone substation in Portarlington:

- Brown long-eared bat,
- Common pipistrelle,
- Daubenton's bat,
- Leisler's bat,
- Natterer's bat,
- Pipistrellus spp. (45kHz/55kHz),
- Soprano pipistrelle,
- Nathusius's pipistrelle,
- Whiskered bat and,
- Unidentified bat.

Roost Sites

A review of roost site data received from BCIreland determined that there are no records of roosts held for the area encompassed within the proposed development site. Records for a total of 11 roost sites are retained for the area within a 10 km radius of the proposed development site, six single species roosts and five multi-species roost. These are summarised in **Table 5.12** below and distributions of the roost locations are illustrated in **Figure 5.11**. To protect the confidentiality of the data, the locations of the roost sites are blurred to a resolution of 1 km.

However, as the purpose of the figure is to illustrate the distribution of bat roosts relative to the proposed development site this lack of specificity does not impair the value of the information illustrated in the figure in the context of the proposed development.

Table 5.12. Roost site records retained by BCIreland for 10 km radius of the proposed development site

Roost site records retained by BCIreland	
No. Species	No. roosts
Single-species roost site records	6
Multi-species roost site records	5

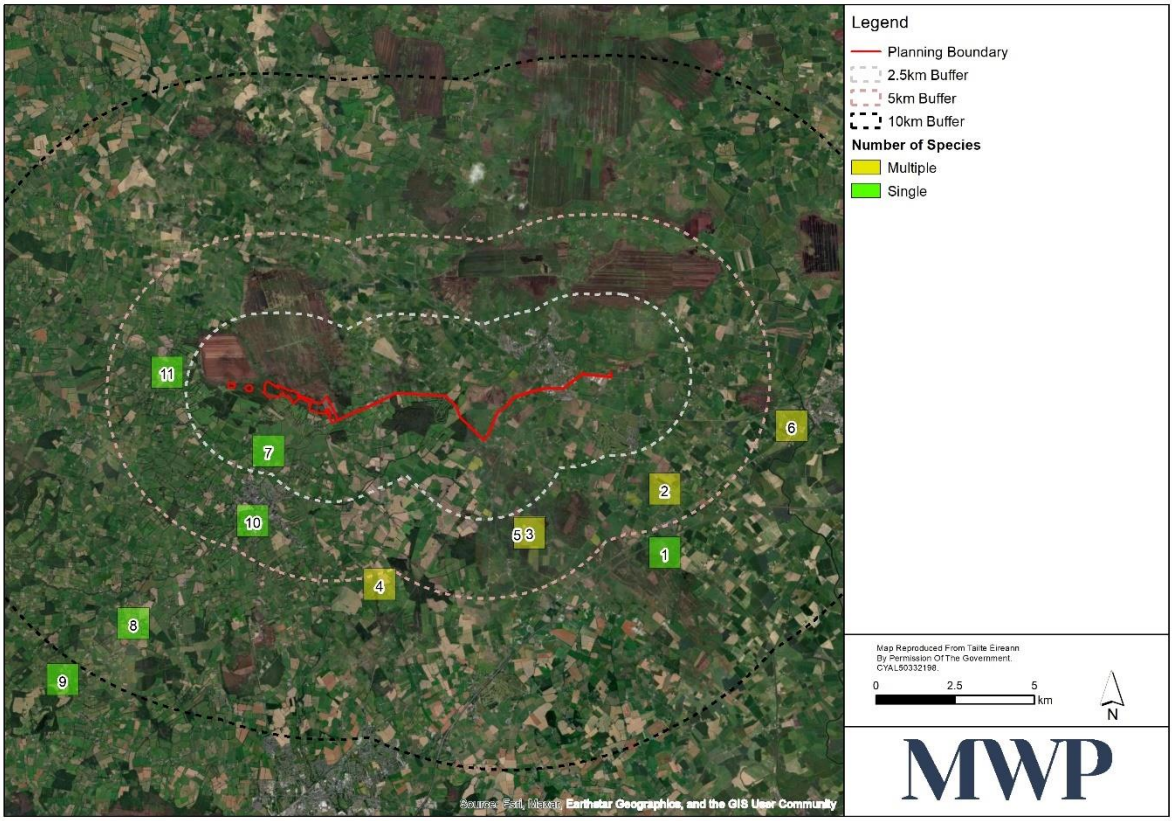

Figure 5.11. Roost locations retained by BCIreland

As presented in **Figure 5.11** above there is one roost within 2.5km, five roosts situated between 3km and 5km, and the rest of the roost locations exceeding 5km, one of which is greater than 10km from the proposed development site.

5.3.6.2 Field Survey Results

5.3.6.2.1 July 2023

Passive Automated Bat Surveys Summary

Of the nine resident species present in Ireland, five were recorded. The most common species were Common pipistrelle and soprano pipistrelle, followed by brown long-eared bat, Leisler's bat and *Myotis* spp. The main habitat types the units were placed were scrub, on the edge of a conifer plantation and on a roadside within a hedgerow.

Bat Roost Suitability

A previous study that informed the Biodiversity Chapter of the EIAR for the permitted Dernacart Wind Farm found that 2 Daubenton's bats were roosting in Kilnahown Bridge in 2019. During the site visit in July this bridge was observed from the bankside and appeared to have bat roosting potential supporting the previous findings in 2019. The grid route from the previous substation options in Upper Forest Lane to Portarlington was driven and all water crossings were checked for bat roost potential. Most of these crossings were unnamed minor streams and the majority of which were running through a pipe or a single stone arch, none of these structures had bat roost potential.

5.3.6.2.2 April 2024

Passive Automated Bat Surveys Results

Over the course of the 10 nights of detector deployment a total of 19,095 bat passes were recorded. The number of bat passes of each species, including those bat passes to which a species or genus could not be attributed, that were recorded at each sampling point during the survey period, are provided in Table 5.13. In each case, the percentage of the total number recorded that each species represents is included. The sampling points are ranked lowest to highest, by levels of activity, in Table 5.14. The percentage of the total activity recorded at each sampling point is included. The highest level of activity was recorded at SP4 (29.85%) followed by SP3 (25.92%); the lowest level was recorded at SP2 (3.57%). Cells highlighted yellow indicate the largest number of bat passes recorded at a sampling point for each species; the cell highlighted green is the largest sampling point total over the survey period.

Common pipistrelle was the most frequently recorded species and the total number of bat passes attributed to this species (10,319) comprised 54.04% of the total (cell highlighted in orange below). Soprano pipistrelle was second most frequently recorded species, the total number of bat passes attributed to this species (5,331) comprised 27.92% of the total. Leisler's bat (2,340 bat passes) was the next most frequently recorded species. The remaining species calls were much lower in numbers, and all had less than 200 calls recorded: Nathusius' pipistrelle (182 bat passes), brown long-eared bat (115 bat passes), bats from the genus Myotis (101 bat passes). Bat passes generated by bats to which a species or genus could not be attributed comprise 3.70% of the total number of bat passes recorded. Nightly and hourly averages of bat passes for each SP are listed in Appendix 7 in Volume 3 of this EIAR.

Table 5.13. Number of bat passes of each species recorded at each sampling point during survey

Sampling Point (SP)	Myotis spp.	Leisler's bat	Nat pipistrelle	Common pipistrelle	Soprano pipistrelle	Brown long-eared bat	NoID	Total	%
SP1	0	266	5	279	232	0	32	814	4.26
SP2	14	263	4	274	118	0	9	682	3.57
SP3	24	304	112	2,885	1510	4	111	4,950	25.92
SP4	13	541	9	3,710	921	65	441	5,700	29.85
SP5	4	279	5	288	67	1	45	689	3.61
SP6	8	158	14	1,743	1,318	2	29	3,272	17.14
SP7	12	204	6	809	872	12	14	1,929	10.10
SP8	26	325	27	331	293	31	26	1,059	5.55
Total	101	2,340	182	10,319	5,331	115	707	19,095	
%	0.53	12.25	0.95	54.04	27.92	0.60	3.70		

Table 5.14. Levels of activity at each sampling point (SP) ranked highest to lowest

SP	Total	%
4	5,700	29.85
3	4,950	25.92
6	3,272	17.14
7	1,929	10.1
8	1,059	5.55
1	814	4.26
5	689	3.61
2	682	3.57

To determine the level of bat activity it is important to look at the nightly and hourly averages of bat calls recorded. A study by Mathews et al. 2016 divided the level of nightly bat activity into the three brackets below:

- Low = <3 bat passes;
- Medium = 3 - 49 bat and
- High = >50 bat passes[11].

Based on the levels listed above common and soprano pipistrelle activity would be considered high as it often exceeded 50 and sometimes went above 200 per night. Leisler's bat would be considered medium as this species nightly average was usually less than 30 and only exceeded 50 per night on one occasion. For, Nathusius' pipistrelle, brown long-eared bat and genus Myotis their nightly averages are considered low due to most nights bat passes do not exceed 1 and seldom exceeded more than three. The levels of activity recorded, strongly suggest that the proposed development site is within the foraging range of local populations of common and soprano pipistrelle bat. With regard to Nathusius' pipistrelle, brown long-eared bats and bats from genus Myotis, the combined total of these species calls equates to 2.1% of total of all calls recorded, and overall, this level of activity is considered to be low for these species.

Most bat activity was recorded at SP4 with 54.04% of all data. The location SP4 was within an area of mixed woodland comprising conifer trees and broadleaf species of trees and facilitates commuting and foraging and may provide roosting habitat for bats.

Bat Roost Inspection Surveys – Trees

Two mature oak trees were identified as having low to medium potential for roosting bats. (See **Plate 5.1** and **Plate 5.2** below in **Table 5.15**) Tree 1 is located within a hedgerow adjacent to the 110kV substation location and Tree 2 is situated within the boundary of the 110kV substation. See **Figure 5.12** below.

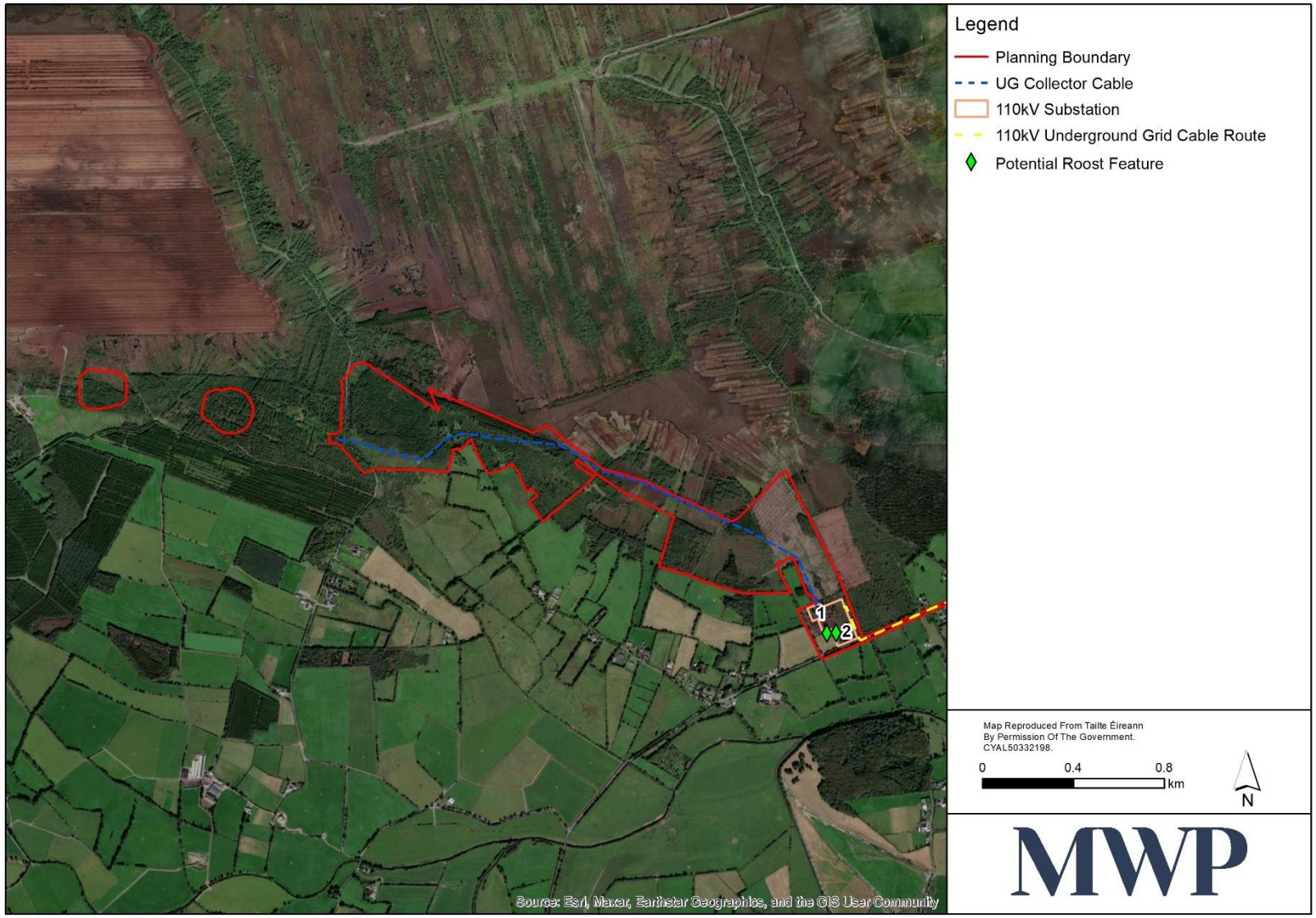

Figure 5.12. Location of trees with potential for bat roosting

Table 5.15: Tree 1 and Tree 2 potential bat roost

Tree 1 Coordinates (ITM)		Tree 2 Coordinates (ITM)	
X	Y	X	Y
647449	710246	647497	710245

Plate 5.1. Tree 1

Plate 5.2. Tree 2

5.3.7 Other Mammals

5.3.7.1 Desk Study

Permitted Dernacart Wind Farm[9]

Species recorded during surveys for permitted Dernacart Wind Farm comprise pine marten, red squirrel, fallow deer, fox and rabbit. Additionally, there a total of nine badger setts and two potential setts were observed within the study area, none of which are directly within the proposed development footprint. As such, no main setts were present; those recorded are considered to be subsidiary or outlier setts.

Data Request Results -NPWS

Information received from the NPWS data request for rare and protected species was reviewed. A number of protected native non-volant mammal species (land-based mammals that cannot fly) are recorded from the three hectads overlapping the proposed development (see Table 5.16 below).

Table 5.16 Non-volant mammal records in the study area

Species Name	Common name	10km grid square (portion of proposed development site within square			Level of protection
		N41 (West)	N51 (East)	N50 (small portion of grid route south)	
Non-volant mammals					
Lutra lutra	Otter	✓	✓		Annex II & IV, Habitats Directive, Wildlife Acts
Meles meles	Badger	✓	✓	✓	Wildlife Acts
Martes martes	Pine marten	✓		✓	Annex V, Wildlife Acts Habitats Directive
Mustela erminea subsp. hibernica	Stoat		✓		Wildlife Acts
Sciurus vulgaris	Red squirrel	✓	✓	✓	Wildlife Acts
Lepus timidus subsp. hibernicus	Irish mountain hare	✓	✓	✓	Wildlife Acts
Erinaceus europaeus	Hedgehog	✓	✓		Wildlife Acts
Dama dama	Fallow deer	✓	✓	✓	Wildlife Acts

5.3.7.2 Field Surveys Results

Of the eight terrestrial mammals listed in the table above for which previous records exist, five were recorded within the proposed development site. Fallow deer were the most frequently recorded species followed by pine marten, red squirrel, stoat and badger. One additional mammal observed was fox. This species appeared on the footage from five of the six camera traps.

The species encountered during the survey period are listed in **Table 5.17**. Shown below in **Plate 5.3** to **Plate 5.10** are some of the mammals captured on camera traps. Horse and cattle prints were regularly observed along the underground wind farm connector cable route within commercial forestry and wooded areas.

Table 5.17: Non-volant mammal recorded within the study area

Species Name	Common name	Evidence on site	Observation Details
Non-volant mammals			
Lutra lutra	Otter	No	N/A
Meles meles	Badger	Yes	• Badger activity recorded at camera trap locations 4, 5 and 6. • Snuffle holes observed in various locations within wooded areas. • Latrine observed camera trap location 5 in April 2024. • A sett with three entrance/exits was observed in the western portion of the proposed development site close to the collector cable route. **See Figure 5.13** in **Section 5.3.7.2.1** below for location.
Martes martes	Pine marten	Yes	• Pine marten activity recorded at camera trap locations 1, 3 and 4. • A few scats observed within conifer planation in the western portion of the proposed development site.
Mustela erminea subsp. hibernica	Stoat	Yes	• Stoat activity captured on camera trap location 1.

Species Name	Common name	Evidence on site	Observation Details
			• Heard calling (chittering) from hedgerow when surveyors walked back to car. • One visual record of stoat crossing a track to an area of scrub.
Sciurus vulgaris	Red squirrel	Yes	• Red Squirrel activity captured on camera trap locations 1 and 4.
Lepus timidus subsp. hibernicus	Irish mountain hare	Yes	• Hare droppings found in proposed substation area.
Erinaceus europaeus	Hedgehog	No	N/A
*Dama dama**	Fallow deer*	Yes	• Fallow Deer activity captured on all six camera trap locations. • Droppings observed frequently throughout the site. • Two deer disturbed during walkover survey in October 2023.

*Fallow deer are a non-native invasive species

Plate 5.3. Pine marten - Camera Trap 2

Plate 5.4. Red squirrel - Camera Trap 1

Plate 5.5. Badger Camera Trap 4

Plate 5.6. Camera Trap 6

Plate 5.7. Male (buck fallow deer) - Camera Trap 2

Plate 5.8. Young fallow deer – Camera Trap 4

Plate 5.9. Stoat Camera Trap 2

Plate 5.10. Fox - Camera Trap 6

5.3.7.2.1 Badger Observations

As mentioned in Table 5.17 above badger was recorded at three of the six camera trap locations (4, 5 and 6). These locations are shown in Figure 5.13 below. Camera trap 6 was set up overlooking one of three sett entrances (area circled in blue), this entrance was the furthest entrance from the underground connector cable and access track, approx. 23m away. Camera trap 6 was deployed for 10 days and badger activity was recorded each night of either one individual or sometimes with up to three badgers in one shot. Activities recorded included digging fresh spoil, dragging out old bedding, foraging and play. The middle entrance is situated approx. 13m from the collector cable and the remaining entrance is located within the boundary of the underground collector cable and access track. Although camera traps were not set up at the other two sett entrances, there was evidence of fresh spoil and digging at each.

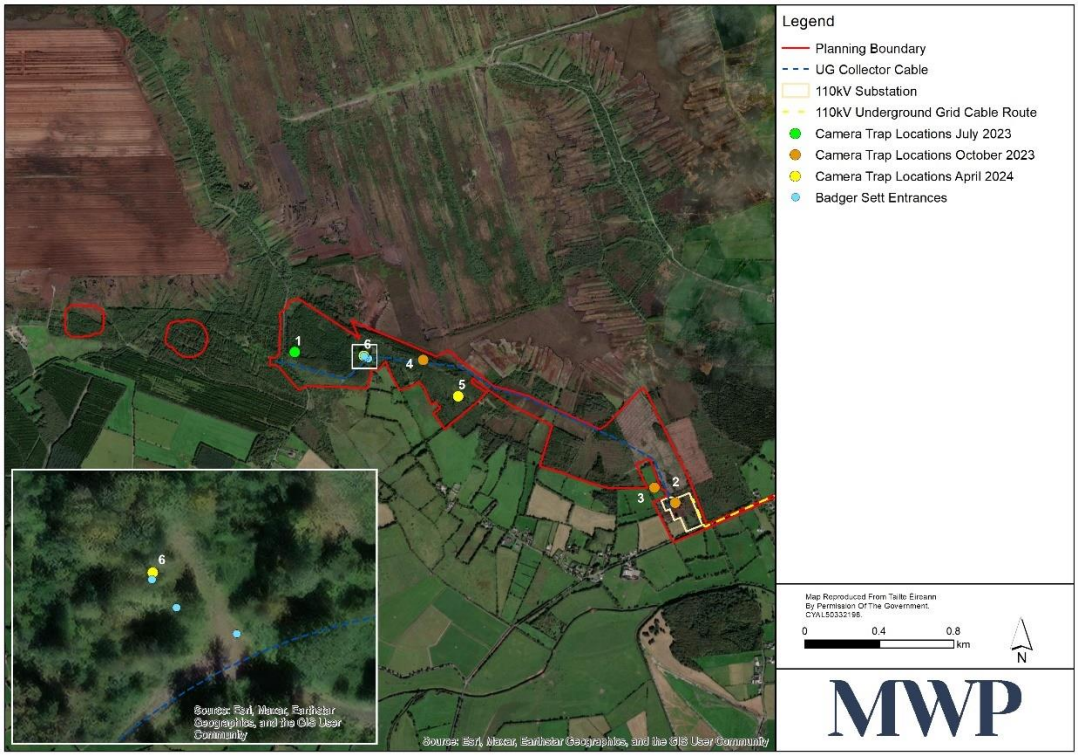

Figure 5.13. Camera trap locations and Badger sett entrances

5.3.8 Birds

5.3.8.1 Desk study

Dernacart Wind Farm Report[9]

A summary of all bird surveys and results for the permitted Dernacart Wind Farm are presented in Table 5.18 below. Overall, there were three Target species observed to have breeding territories within the study area, namely, kestrel (*Falco tinnunculus*), snipe (*Gallinago gallinago*) and woodcock (*Scolopax rusticola*). Additionally, there were a number of non-target species considered to be breeding within the study area, the majority of these were passerines and are common and widespread.

Table 5.18. Bird survey summary

Survey type	Year(s)	Species recorded	Results Summary
Vantage Point	2018 - 2019	**Target Species:** • Grey heron • Sparrowhawk • Lapwing • Golden plover • Curlew • Woodcock • Snipe • Kestrel • Merlin • Peregrine	The same 10 Target Species recorded during the breeding season were also recorded during the winter season. Kestrel was the most frequently recorded species throughout the whole survey period. During the breeding season surveys, two and five breeding pairs were recorded within the survey area in 2018 and 2019 respectively. Of the other remaining Target Species, it was determined there were two breeding territories in the area for Woodcock and two breeding territories in the area for Snipe.

Survey type	Year(s)	Species recorded	Results Summary
Moorland Breeding Bird	Breeding seasons 2018 & 2019	**Target Species:** • Buzzard • Kestrel • Snipe • Woodcock The remaining species comprise non-target species with the majority being passerines.	A total of 196 and 408 breeding bird territories recorded in 2018 and 2019, respectively. A total of 43 species considered to be breeding within the survey area were recorded across both survey seasons. The majority of these are common and widespread species; the most abundant breeding species was blackbird with an estimated 31 territories in 2018 and 36 territories in 2019. Wren was the next most abundant species with an estimated 26 and 33 territories in 2018 and 2019, respectively. Of the total number of species, 12 (28%) are recognised as being of conservation importance in Ireland. There were no species listed as Annex 1 recorded breeding within the survey area.
Breeding Wader	Breeding seasons 2018 & 2019	**Target Species:** • Snipe • Woodcock	The dedicated breeding wader surveys recorded Woodcock and Snipe. Both these species are likely breeding within the proposed site.
Monthly Wintering Wader Census	Winter season 2018/19	**Target species:** • Grey heron • Lapwing • Snipe	The wader species recorded were Grey Heron, Lapwing and Snipe. The survey in December recorded the highest number of waders (10) with a peak count of five for Lapwing and Snipe.
Hen Harrier Winter Roost Checks	Winter season 2018	N/A	No hen harriers were recorded during the winter roost checks.

NBDC

The bird records for those species of highest conservation concern from the three 10km grid squares (N41, N50 and N51) where the proposed development will be located are presented below in Table 5.19.

Table 5.19 Records of bird species of highest conservation concern in the study area (from the Bird Atlas 2007-11, Balmer et al., 2013)

Species	Hectad	Winter Atlas 07-11	Breeding Atlas 07-11	Conservation Status
Black-headed Gull (*Larus ridibundus*)	N41	Present	Absent	BOCCI Amber Listed
Brambling (*Fringilla montifringilla*)	N50	Present	Absent	BOCCI Amber Listed
Common Coot (*Fulica atra*)	N41 N51 N50	Absent Absent Present	Confirmed Possible Possible	BOCCI Amber Listed
Common Kestrel (*Falco tinnunculus*)	N41 N51 N50	Present Present Present	Confirmed Possible Possible	BOCCI Red Listed
Common Kingfisher (*Alcedo atthis*)	N51	Absent	Possible	Annex I EU Birds Directive, BOCCI Amber Listed
Common Linnet (*Carduelis cannabina*)	N41 N51 N50	Present Absent Present	Confirmed Probable Probable	BOCCI Amber Listed
Common Pochard (*Aythya ferina*)	N41	Present	Absent	BOCCI Red Listed
Common Sandpiper (*Actitis hypoleucos*)	N50	Absent	Possible	BOCCI Amber Listed
Common Snipe (*Gallinago gallinago*)	N41 N51	Present Present	Possible Probable	BOCCI Red Listed
Common Starling (*Sturnus vulgaris*)	N41 N51	Present Present	Confirmed Confirmed	BOCCI Amber Listed

Species	Hectad	Winter Atlas 07-11	Breeding Atlas 07-11	Conservation Status
	N50	Present	Confirmed	
Common Swift (*Apus apus*)	N41	Absent	Possible	BOCCI Red Listed
	N51	Absent	Probable	
	N50	Absent	Probable	
Eurasian Teal (*Anas crecca*)	N41	Present	Absent	BOCCI Amber Listed
	N51	Present	Absent	
Eurasian Wigeon (*Anas penelope*)	N41	Present	Absent	BOCCI Amber Listed
Eurasian Woodcock (*Scolopax rusticola*)	N41	Present	Possible	BOCCI Red Listed
	N51	Absent	Possible	
European Golden Plover (*Pluvialis apricaria*)	N41	Present	Absent	Annex I EU Birds Directive , BOCCI Red Listed
	N51	Absent	Present	
Goldcrest (*Regulus regulus*)	N41	Present	Confirmed	BOCCI Amber Listed
	N51	Present	Confirmed	
	N50	Present	Confirmed	
Great Crested Grebe (*Podiceps cristatus*)	N41	Absent	Confirmed	BOCCI Amber Listed
Grey Wagtail (*Motacilla cinerea*)	N41	Absent	Confirmed	BOCCI Red Listed
	N51	Absent	Confirmed	
	N50	Absent	Present	
Hen Harrier (*Circus cyaneus*)	N41	Present	Absent	Annex I EU Birds Directive, BOCCI Amber Listed, SCI of SPA within Zone of
House Martin (*Delichon urbicum*)	N41	Absent	Confirmed	BOCCI Amber Listed
	N51	Absent	Confirmed	
	N50	Absent	Confirmed	
House Sparrow (*Passer domesticus*)	N41	Present	Confirmed	BOCCI Amber Listed
	N51	Present	Confirmed	
	N50	Present	Confirmed	
Little Egret (*Egretta garzetta*)	N51	Present	Absent	Annex I EU Birds Directive
Mallard (*Anas platyrhynchos*)	N41	Present	Confirmed	BOCCI Amber Listed
	N51	Present	Confirmed	
	N50	Present	Confirmed	
Meadow Pipit (*Anthus pratensis*)	N41	Present	Confirmed	BOCCI Red Listed
	N51	Present	Possible	
	N50	Present	Probable	
Merlin (*Falco columbarius*)	N51	Present	Absent	Annex I EU Birds Directive, BOCCI Amber Listed
Mute Swan (*Cygnus olor*)	N41	Present	Probable	BOCCI Amber Listed
	N51	Present	Confirmed	
	N50	Present	Confirmed	
Northern Lapwing (*Vanellus vanellus*)	N41	Present	Confirmed	BOCCI Red Listed
	N51	Absent	Probable	
	N50	Absent	Present	
Peregrine Falcon (*Falco peregrinus*)	N51	Present	Absent	Annex I EU Birds Directive
Redwing (*Turdus iliacus*)	N41	Present	Absent	BOCCI Red Listed
	N51	Present	Absent	
	N50	Present	Absent	
Sand Martin (*Riparia riparia*)	N41	Absent	Confirmed	BOCCI Amber Listed
	N51	Absent	Confirmed	
	N50	Absent	Possible	

Species	Hectad	Winter Atlas 07-11	Breeding Atlas 07-11	Conservation Status
Skylark (*Alauda arvensis*)	N41 N51 N50	Present Present Present	Probable Probable Possible	BOCCI Amber Listed
Spotted Flycatcher (*Muscicapa striata*)	N41 N51 N50	Absent Absent Absent	Possible Confirmed Confirmed	BOCCI Amber Listed
Stock Pigeon/dove (*Columba oenas*)	N41	Absent	Probable	BOCCI Red Listed
Swallow (*Hirundo rustica*)	N41 N51 N50	Absent Absent Absent	Confirmed Confirmed Confirmed	BOCCI Amber Listed
Tree Sparrow (*Passer montanus*)	N41 N50	Absent Present	Probable Possible	BOCCI Amber Listed
Tufted Duck (*Aythya fuligula*)	N41 N51	Present Absent	Probable Probable	BOCCI Amber Listed
Water Rail (*Rallus aquaticus*)	N51 N50	Present Absent	Confirmed Possible	BOCCI Amber Listed
Whooper Swan (*Cygnus cygnus*)	N41	Present	Absent	Annex I EU Birds Directive, BOCCI Amber Listed
Willow Warbler (*Phylloscopus trochilus*)	N41 N51 N50	Absent Absent Absent	Confirmed Confirmed Confirmed	BOCCI Amber Listed
Yellowhammer (*Emberiza citronella*)	N41 N51 N50	Present Present Present	Confirmed Probable Probable	BOCCI Red Listed

NPWS

Additional information provided by the NPWS from a data request is summarised in Table 5.20 below.

Table 5.20. Additional Information from NPWS Data Request

Hectad	Species	Details
N50	Peregrine falcon	Peregrine falcon nest sites – as recorded during the 2017 National Peregrine Survey (with information as to whether the sites were recorded as nest sites in the previous National Survey in 2002): • One occupied nest site (not known in 2002)
N51	Curlew	Curlew – records of nest locations or estimated centres of territory: • Hectad N51: one record in 2016
N50	Peregrine falcon	Peregrine falcon nest sites – as recorded during the 2017 National Peregrine Survey (with information as to whether the sites were recorded as nest sites in the previous National Survey in 2002): • Hectad N51: one occupied nest site (not known in 2002)

5.3.8.2 Field Survey Results

Four of the species listed in Table 5.19 above were recorded during site visits.

- October 2023 - whooper swan (x2) were observed flying over the proposed underground windfarm collector cable and access track heading northwest.

- October 2023 - snipe was heard calling on a few occasions during the site visit at the 110kV substation site and along proposed underground windfarm collector cable and access track. On two separate occasions, a single bird was flushed.
- October 2023 - woodcock was captured on camera trap 4.
- November 2023 - two kestrels were observed mobbing one another over a stand of conifer trees to the northeast of the proposed grid route.

The location of each observation listed above is shown below in **Figure 5.14** below.

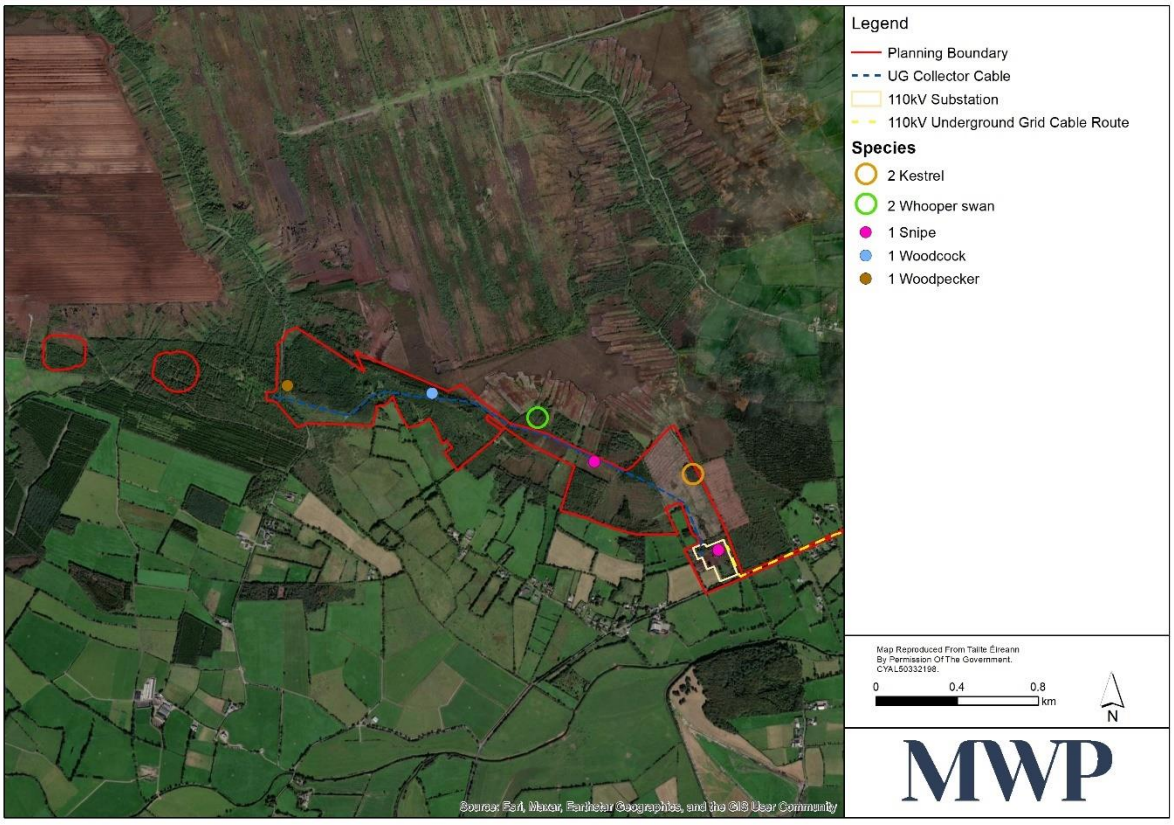

Figure 5.14. location of each bird observation during site visits

Below in **Table 5.21** is a summary of all bird species encountered during the site visits/camera traps. **Plate 5.11** and **Plate 5.12** below show great spotted woodpecker and woodcock recorded on camera trap location 1 and camera trap location 4, respectively (**Figure 5.13** for camera trap locations).

Table 5.21: Birds Encountered - site visits/camera traps

Species	Conservation Status	Observation
Blackbird (*Turdus merula*)	BOCCI Green Listed	Walkover survey
Buzzard (*Buteo buteo*)	BOCCI Green Listed	Walkover survey
Goldfinch (*Carduelis carduelis*)	BOCCI Green Listed	Walkover survey and on wildlife camera
Great tit (*Parus major*)	BOCCI Green Listed	Walkover survey and on wildlife camera
Great Spotted Woodpecker (*Dendrocopus major*)	BOCCI Green Listed	Wildlife camera
Jay (*Garrulus glandarius*)	BOCCI Green Listed	Wildlife camera
Kestrel (*Falco tinnunculus*)	BOCCI Red Listed	Walkover survey
Mistle thrush (*Turdus viscivorus*)	BOCCI Green Listed	Wildlife camera
Raven (*Corvus corax*)	BOCCI Green Listed	Walkover survey

Species	Conservation Status	Observation
Robin (*Erithacus rubecula*)	BOCCI Green Listed	Walkover survey
Snipe (*Gallinago gallinago*)	BOCCI Red Listed	Walkover survey
Whooper swan (*Cygnus cygnus*)	Annex I EU Birds Directive, BOCCI Amber Listed	Walkover survey
Woodcock (*Scolopax rusticola*)	BOCCI Red Listed	Wildlife camera
Wren (*Troglodytes troglodytes*)	BOCCI Green Listed	Walkover survey

Plate 5.11. Great spotted woodpecker – Camera Trap 1

Plate 5.12. Woodcock -Camera Trap 4

5.3.9 Amphibians and Reptiles

5.3.9.1 Desk Study

Dernacart Wind Farm Report[9]

The only amphibian recorded during surveys as an adult common frog (*Rana temporaria*). Smooth newt (*Lissotriton vulgaris*) and lizard (*Zootoca vivipara*) were not recorded during any surveys.

NBDC and NPWS

Records for from all three hectads are presented in Table 5.22 below.

Table 5.22. Amphibian and Reptile records NBDC and NPWS

Species Name	Common name	10km grid square (portion of proposed development site within square			Data set	Level of protection
		N41 (West)	N51 (East)	N50 (small portion of grid route south)		
Rana temporaria	Common frog	✓ ✓	✓ ✓	✓ ✓	NBDC NPWS	Annex V Habitats Directive, Wildlife Acts
Lissotriton vulgaris	Smooth newt		✓ ✓	✓	NBDC NPWS	Wildlife Acts

Species Name	Common name	10km grid square (portion of proposed development site within square			Data set	Level of protection
		N41 (West)	N51 (East)	N50 (small portion of grid route south)		
Zootoca vivipara	Common Lizard			✓	NBDC	Wildlife Acts

5.3.9.2 Field Survey Results

Although there are suitable habitats within the proposed development site such as drainage ditches and ponds, no amphibians or common lizard were observed during the surveys carried out in 2023 and 2024.

5.3.10 Macro-invertebrates

5.3.10.1 Desk Study

Dernacart Wind Farm Report[9]

Aquatic surveys of the River Barrow were completed in 2019. No freshwater pearl mussel (which are known not to be present along this stretch) or white-clawed crayfish were present. Surveys for Q-values using macroinvertebrate communities were also conducted and the aquatic macroinvertebrate compositions at sites investigated during the current survey, biological water quality within the Barrow ranges from 'Moderate' (upstream and immediately south of the proposed wind farm site) to 'Good' (Kilnahown Bridge along the proposed cable route). Water quality within the smaller tributaries of the Barrow which drain the permitted wind farm site ranges from 'Bad'- 'Poor' (Q1- Q2), which is based on a general habitat quality assessment since sufficient numbers of macroinvertebrate groups were not present.

NBDC and NPWS

NBDC holds records of marsh fritillary *Euphydryas aurinia* butterfly within hectads N41 and N50. This species is listed under Annex II of the EU Habitats Directive. NBDC and the NPWS both holds records of white-clawed crayfish *Austropotamobius pallipes* within all hectads and NBDC and the NPWS both holds records of Desmoulin's Whorl Snail in hectads N51 and N50.

Table 5.23. All available macroinvertebrate records from NBDC and NPWS

Species Name	Common name	10km grid square (portion of proposed development site within square)			Level of protection
		N41 (West)	N51 (East)	N50 (small portion of grid route south)	
Euphydryas aurinia	Marsh Fritillary	✓		✓	Annex II Habitats Directive
Austropotamobius pallipes	Freshwater White-clawed Crayfish	✓	✓	✓	Annex II and V, Habitats Directive
Vertigo moulinsiana	Desmoulin's Whorl Snail		✓	✓	Annex II Habitats Directive

5.3.10.2 Field Study Results

Desmoulin's Whorl Snail was not observed during site visits. Marsh fritillary was not observed during site visits. The food plant for this species (devil's bit scabious) is present in parts of the site where wet grassland habitat does occur, however, these areas are sparse and scattered and not considered to support the species.

Other invertebrates observed were Comma butterfly (*Polygonia c-album*) and Fox moth (*Macrothylacia rubi*), see Plate 5.13 and Plate 5.14 below. Neither of these species are listed as protected species through Irish or EU law.

Plate 5.13. Comma butterfly

Plate 5.14. Fox moth

5.3.11 Fish and fish Habitats

5.3.11.1 Desk Study

Dernacart Wind Farm Report[9]

Electro-fishing surveys were conducted at 11 sites at watercourses draining the wind farm site an along the grid route to Portarlington Town. Three of these sites were on the River Barrow. Two upstream of the proposed grid route and one downstream at Kilnahown Bridge which the grid route will cross. A total of eight fish species were recorded at the three sampling points along the River Barrow which as listed below:

- Atlantic salmon,
- Brown Trout,
- Brook lamprey,
- Minnow,
- Three-spined stickleback,
- Tone loach,
- Dace and
- Roach

Brown trout and Three-spined stickleback were also recorded at one of the other sampling points which was a much smaller watercourse upstream from Kilnahown Bridge which crosses the River Barrow.

NBDC

NBDC holds records of four fish species which are listed in Table 5.24 below.

Table 5.24: Fish records in the study area

Species Name	Common name	10km grid square (portion of proposed development site within square)			Level of protection/status
		N41 (West)	N51 (East)	N50 (small portion of grid route south)	
Gasterosteus aculeatus	Three-spined Stickleback	✓			None listed
Barbatula barbatula	Stone Loach	✓	✓		None listed
Phoxinus phoxinus	Minnow		✓		None listed
Cyprinus carpio	Common Carp			✓	Medium Impact Invasive Species

5.3.11.2 Field Survey Results

Results

The watercourses draining the proposed development site flow over low gradient land and are classified as 'Low land / depositing rivers (FW2)' using Fossitt (2000) criteria. The River Barrow (EPA code 14B01) receives all surface waters draining the proposed development area. It is considered that all watercourses in the study area have been modified to some degree. The River Barrow is a drained river, and it appears that the Cottoner's Brook has also been deepened.

At its western extent, the proposed grid connection cable crosses the 2nd order Cottoner's Brook (EPA code 14C15) ca. 2km upstream of its confluence with the River Barrow. The Cottoner's Brook is a sluggish river of ca. 2m wide with well vegetated, stable banks. Its bed comprises a large proportion of peat silt. The 2nd order Clonygowan Stream (Site 4) and the 1st order Rathmore Stream (Site 6), though classified as lowland /depositing rivers could also be referred to as drainage ditches taking account of the fact that they have been altered to drain the adjacent lands, by deepening and widening. The Clonygowna Stream had some fast-flowing riffles but was generally sluggish. These channels, like others in the study area have considerable silt deposits along their lateral margins. There was no water in the channels at Site 3 on the Garryinch Stream and Site 5 at an un-named stream. The 5th order River Barrow (Site 7) is a large watercourse with its bed comprised mostly of finer materials such as gravel, sand and silt.

Photographs of each sampling site are presented below in Plate 5.15 to Plate 5.21.

Plate 5.15. Site 1 on Cottoner's (Brook), classified as a 'Lowland Depositing River (FW2)'

Plate 5.16. Site 2 on Cottoner's Brook (EPA code 14C15)

Plate 5.17. Site 3 at source of EPA segment code 14_1130 (does not exist at grid route intersection).

Plate 5.18. Site 4 on the Clonygowan Stream.

Plate 5.19. Site 5 on EPA river segment 14_1715.

Plate 5.20. Site 6 on the Rathmore Stream, a heavily modified waterbody.

Plate 5.21. Site 7 on the River Barrow at Kilnahown Br. (EPA station 14B010700).

Visual aquatic surveys were carried out on 3rd August 2023 along the grid connection route. The salmonid habitat rating at the aquatic survey sites is given in Table 5.25, these ratings are a function of the physical characteristics at the survey sites mentioned in the River Crossings Section 5.3.2 above. Apart from Cottoner's Brook and the River Barrow, the watercourses in the study area have little/no potential for salmonids. Owing to its size Cottoner's Brook likely supports a population of brown trout. The River Barrow is the most important watercourse for salmon as it has some suitable salmonid spawning, nursery and holding areas. The Clonygown and Rathmore Streams may also have a small population of brown trout. The River Barrow, Cottoner's Brook, Clonygown and Rathmore Streams likely support brook lampreys, and possibly European eel. Other species likely present in these channels include three-spine stickleback and minnow.

Table 5.25: Salmonid habitat rating at the aquatic survey sites.

Site	Watercourse	Spawning		Nursery		Holding		Overall evaluation
		Habitat grade[1]	fluvial cover[2] (≈%)	Habitat grade[1]	fluvial cover[2] (≈%)	Habitat grade[1]	fluvial cover[2] (≈%)	
1	Cottoner's Brook	3-4	20	3	30	3-4	5	Poor
2	Cottoner's Brook	3	15	2	20	3	5	Poor
3	Garryhinch	n/a	n/a	n/a	n/a	n/a	n/a	Unsuitable
4	Clonygowan	2-3	15	2-3	40	3	10	Marginal
5	Un-named	n/a	n/a	n/a	n/a	n/a	n/a	Unsuitable
6	Rathmore	4	10	4	5	4	5	Marginal
7	River Barrow	2	15	2-3	15	1-2	35	Suboptimal

Following DCAL's advisory leaflet 'The Evaluation of habitat for Salmon and Trout'

[1]Grade 1 is optimal habitat and habitat quality reduces with increases in Grade (Grade 4 = poor)

[2] Fluvial cover relates to river substrate under water and available to fish

5.3.12 Invasive Species

Dernacart Wind Farm Report[9]

- Giant hogweed was recorded within the study area, approximately 350m from proposed access tracks close to Turbines 7 and 8 and approximately 250m from the proposed wind farm site at its closest point[11].
- The medium-impact Jenkin's spire snail (*Potamopyrgus jenkinsi*) was recorded at two of the aquatic survey sites.
- European rabbit was also noted during surveys carried out.

5.3.12.1 Desk Study

Searches of the NBDC for Invasive species was carried out for Hectads N41, N51 and N50. All existing species records for the hectads are listed in **Table 5.26** below along with level of impact list for each, 11 of which are species listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015).

Table 5.26: NBDC Records for Invasive Species

Common Name	Species Name	Hectad	Level of Impact	Listed under the Third Schedule
Bird				
Greylag Goose	*Anser anser*	N41	Not listed	Yes
Bony fish				
Common Carp	*Cyprinus carpio*	N50	Medium Impact Invasive Species	Yes
Flowering plant				
Canadian Waterweed	*Elodea canadensis*	N51 N41	High Impact Invasive Species	No
Japanese Knotweed	*Fallopia japonica*	N51 N50	High Impact Invasive Species	Yes
Sycamore	*Acer pseudoplatanus*	N51 N41 N50	Medium Impact Invasive Species	No
Canadian Fleabane	*Conyza canadensis*	N41	Medium Impact Invasive Species	No
Cherry Laurel	*Prunus laurocerasus*	N41 N50	High Impact Invasive Species	No
Rhododendron	*Rhododendron ponticum*	N41 N50	High Impact Invasive Species	Yes
Butterfly-bush	*Buddleja davidii*	N50	Medium Impact Invasive Species	No
Himalayan Honeysuckle	*Leycesteria formosa*	N50	High Impact Invasive Species	No
Salmonberry	*Rubus spectabilis*	N50	Medium Impact Invasive Species	Yes
Traveller's-joy	*Clematis vitalba*	N50	Medium Impact Invasive Species	No
Mollusc				
Budapest Slug	*Tandonia budapestensis*	N51	Medium Impact Invasive Species	No

[11] Turbines 7 and 8 of the permitted Dernacart wind Farm are situated southwest of the proposed underground wind farm collector cable and access track and are outside the study area this chapter pertains to.

Common Name	Species Name	Hectad	Level of Impact	Listed under the Third Schedule
Common Garden Snail	*Cornu aspersum*	N51	Medium Impact Invasive Species	No
Jenkins' Spire Snail	*Potamopyrgus antipodarum*	N51	Medium Impact Invasive Species	No
Wrinkled Snail	*Candidula intersecta*	N51	Medium Impact Invasive Species	No
Terrestrial mammal				
American Mink	*Mustela vison*	N51 N41	High Impact Invasive Species	Yes
Bank Vole	*Myodes glareolus*	N50	Medium Impact Invasive Species	No
Brown Rat	*Rattus norvegicus*	N51	High Impact Invasive Species	Yes - Offshore islands only
Eastern Grey Squirrel	*Sciurus carolinensis*	N51 N41 N50	High Impact Invasive Species	Yes
European Rabbit	*Oryctolagus cuniculus*	N51 N50	Medium Impact Invasive Species	No
Fallow Deer	*Dama dama*	N51	High Impact Invasive Species	Yes
Greater White-toothed Shrew	*Crocidura russula*	N41	Medium Impact Invasive Species	No
Sika Deer	*Cervus nippon*	N50	High Impact Invasive Species	Yes

5.3.12.2 Field Survey Results

Fauna

One mammal species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011, (as amended) was recorded within the study area, namely fallow deer. Fallow deer was common throughout the study area.

Flora

Two non-native tree species were observed within the proposed development site namely, beech (*Fagus sylvatica*) and sycamore (*Acer pseudoplatanus*). Sycamore is Medium Impact invasive species in Ireland but regularly occurs among native species within hedgerows and beech is now naturalised in Ireland and occurs along with native species within parts of the site. Specific locations of these species were not recorded due to their occurrence within hedgerows and wooded areas along with native species.

One plant species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011, (as amended) was recorded along the 110kV underground grid route, namely Himalayan balsam which was recorded on one occasion along the riverbank of the River Barrow beside Kilnahown Bridge. Rhododendron is also listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011, (as amended) and was recorded along the grid route but all infestations were either within residential gardens or within wooded areas outside of the ZOI.

All non-native and invasive species recorded are listed in Table 5.27 along with level of impacts and the location for each. The location of each entry listed in Table 5.27 and shown below in Figure 5.15.

Table 5.27 Non-native species survey results

Site	Species	Level of Impact	Comments	ITM	
				X	Y
Peat Deposition area and Underground wind farm collector cable and access track route					
1	Cherry laurel	High	Situated approx. 130m northeast of the Turbine 5 of Dernacart Wind Farm.	644998	711403
2	Butterfly bush	Medium	A few metres to the west of the collector route to the north of the proposed substation.	647288	710567
3	Butterfly bush	Medium	Within a hedgerow along field boundary to west of grid route, north of the proposed substation.	647270	710519
4	Butterfly bush	Medium	A few metres west of site two other stands of butterfly bush situated close to drainage ditch.	647250	710511
110kV underground Grid route					
5	Snowberry	Low	Within a hedgerow along the western boundary of substation location.	647579	710287
6	Cherry laurel	High	Along grid route to the south of substation across the mail road.	647612	710221
7	Rhododendron	High	Along grid route to the south bounding a private residential garden alongside cherry laurel.	647907	710345
8	Cherry laurel	High	Along grid route to the south bounding a private residential garden alongside rhododendron.	647907	710345
9	Winter heliotrope	Low	Along grid route to the north within grassy verges.	647921	710361
10	Cherry laurel	High	Along grid route to the north bounding a private residential garden.	648905	710801
11	Cherry laurel	High	Along grid route to the north bounding a private residential garden.	648994	710851
12	Cherry laurel	High	Along grid route to the north bounding a private residential garden.	649128	710907
13	Cherry laurel	High	Along grid route to the north bounding a private residential garden.	650748	710999
14	Cherry laurel	High	Along grid route to the north bounding a private residential garden.	650826	710993
15	Cherry laurel	High	Along grid route to the north bounding a private residential garden.	650928	710987
16	Cherry laurel	High	Along grid route to the south bounding a private residential garden.	650966	710979
17	Cherry laurel	High	Along grid route to the east bounding a private residential garden.	651049	710960
18	Cherry laurel	High	Along grid route to the south bounding Portarlington Golf club.	651250	710752
19	Himalayan Balsam	High	On the riverbank along the River Barrow to the north of the grid route.	651280	710743
20	Cherry laurel	High	Within a wooded area to the east of grid route to.	651778	710023
21	Rhododendron	High	Within a wooded area to the west of grid route.	651916	709843
22	Snowberry	Low	Bordering a wooded area to the west of grid route.	651959	709835
23	Rhododendron	High	Within a wooded area to the east of grid route.	651963	709801
24	Cherry laurel	High	Along grid route to the east bounding a private residential garden.	652269	709628
25	Butterfly bush	Medium	Along grid route to the east within a private residential garden.	652329	709694
26	Fuchsia	Low	Along grid route to the west bordering agricultural shed and yard.	652380	709805
27	Cherry laurel	Medium	Along grid route to the east bounding a private residential garden.	652650	710446
28	Old man's beard	Low	Along grid route to the south within a hedgerow.	652898	710628

Site	Species	Level of Impact	Comments	ITM	
				X	Y
29	Old man's beard	Low	Along grid route to the north within a hedgerow.	652973	710697
30	Cherry laurel	Low	Along grid route to the south bounding a private residential garden.	653378	711002

Some examples of the species listed in the table above are shown in **Plate 5.22** to **Plate 5.25** below.

Figure 5.15. Non-native species locations

Plate 5.22. Site 1 – butterfly bush

Plate 5.23. Site 5 & 6 - (Rhododendron and Cherry Laurel)

Plate 5.24. Site 18 - Himalayan balsam

Plate 5.25. Site 28 - Old man's beard

5.3.13 Human Activity

A common feature throughout the proposed development site and environs are feeding bins set up for grey partridge. They were observed at the peat depositions areas to the west and along the underground collector cable and access route that passes through wooded areas (see Plate 5.26 and Plate 5.27).

Plate 5.26. Feeder bin

Plate 5.27. Feeder bin

Illegal dumping was a common sight within the cutover bog and surrounding areas. Along with general domestic refuse, there were larger household items and appliances such as furniture, washing machines and fridges. Garden and hedge clippings were discarded (See Plate 5.28 and Plate 5.29). During a site visit in April 2024, a fire was started at the site (see Plate 5.30 and Plate 5.31 below. It is unclear whether this was a planned burning or an act of vandalism.

Plate 5.28. Illegal dumping of refuse

Plate 5.29. Illegal dumping of garden clippings

Plate 5.30. Fire on site

Plate 5.31. Fire on site

5.4 Identification and Evaluation of Key Ecological Receptors

The habitats and associated flora, fauna and other ecological features or resources identified in Section 5.3 are now evaluated on the basis of their local, national and international conservation importance using the evaluation criteria described in Section 5.2.3 above. Secondly, on the basis of these evaluations an assessment will then be made as to which of these habitats or species are considered sensitive ecological receptors that may effected upon during the proposed construction, operation or decommissioning phase of the proposed development.

An evaluation of the designated sites to identify those that are key ecological receptors (KERs) is also presented below.

5.4.1 Designated Sites

SAC and SPA

With regard to European Sites, a screening for appropriate assessment was prepared by Bealtaine Ecology, to determine, on the basis of a preliminary assessment and objective criteria, whether the proposed development, alone or in-combination with other plans or projects, could have significant effects on a Natura 2000 site in view of the site's conservation objectives. The screening for appropriate assessment report concluded that the River Barrow and River Nore SAC (002162) cannot be excluded, and further assessment was carried out in a Natura Impact Statement. A summary of the assessment is presented in Table 5.28 below.

Table 5.28 Selection of Sites of International Importance in the potential ZOI of the proposed development as KERs

Site designated for nature conservation	Distance from designated site to Proposed Development	KER (Yes/No)	Assessment of pathways for Effect/Rationale for inclusion or exclusion
River Barrow and River Nore SAC (002162)	There is a hydrological connection linking the proposed development site to this SAC via the drains/watercourses that drain the study area or watercourses	Yes	There is a hydrological connection linking the study area to this SAC.

Site designated for nature conservation	Distance from designated site to Proposed Development	KER (Yes/No)	Assessment of pathways for Effect/Rationale for inclusion or exclusion
	the proposed grid route crosses as these watercourses ultimately flow into the River Barrow which is associated with the SAC.		
Mountmellick SAC (002141)	This SAC is approx. 1.85km southeast of site	No	There is no hydrological connection nor is there any other pathway between the proposed development and this SAC.
Slieve Bloom Mountains SAC (004160)	This SPA is situated approx. 6.6km southwest of site.	No	There is no hydrological connection nor is there any other pathway between the proposed development and this SAC.
Slieve Bloom Mountains SPA (004160)	This SPA is situated approx. 9.7km southwest of site	No	This SPA is designated for Hen harrier. • This species was not recorded during the site visits. • This species was not recorded during survey carried out for the now permitted Dernacart Wind Farm in 2018 and 2019. • NPWS: there were no records of known nests received from the data request. • NBDC: This species is present in one of the three Hectads (N41) during winter. No breeding records exist from NBDC data set. • Core foraging range from nest site during breeding season for hen harrier is 2km and distance between alternative nest sites generally within 1km. As this SPA is situated 9km away from the proposed development site and outside the core foraging range for Hen harrier and therefore determined to be outside the ZOI.

NHA and pNHA

A total of 15 sites of National Importance were identified in the desk study as being within the potential ZOI, 14 pNHAs and one NHA. Each are listed below:

- Emo Court pNHA (000865),
- Derries Wood pNHA (000416),
- Grand Canal pNHA (002104),
- Ridge of Portlaoise pNHA (000876),
- The Great Heath of Portlaoise pNHA (000881),
- Clonreher Bog NHA (002357),
- Raheen Lough pNHA (000917),
- Slieve Bloom Mountains pNHA (000412),
- Rock Of Dunamase pNHA (000878),
- Dunamase Woods pNHA (001494),

- Kilteale Hill pNHA (000867),
- Hawkswood Bog NHA (002355),
- Annaghmore Lough Fen pNHA (000413),
- Clonad Wood pNHA (000574),
- Stradbally Hill pNHA (001800).

Each of the 15 sites listed above have no hydrological connection to the proposed development site and no other pathway exists between each site and the proposed development site. Therefore, these sites are not key ecological receptors will not be assessed any further in this chapter.

5.4.2 Habitats and Flora

Table 5.29 presents an evaluation of the importance value of the habitats identified within the receiving environment of the subject site, and rationale for inclusion, or exclusion as a KER.

Table 5.29 Evaluation of habitats as KERs

Habitat type	Extent/Location within study area	Ecological value relative to study area (NRA, 2009)	Overall Approx Area of Loss (Ha/Km)	Rationale	Key Ecological Receptor (Yes/No)
Other artificial lakes and ponds (FL8)	Three ponds in regenerating cutover bog close to one of the peat deposition areas.	Locally important (Lower value)	No loss	Steep sided deep ponds with little/no vegetation and limited carrying capacity for invertebrates and other fauna. .	No
Mixed Broadleaved Woodland (WD1)	This habitat occurs in the western portion of the proposed development sit at the start of throughout the proposed underground wind farm collector cable and access track.	Local Importance (Higher Value)	0.12ha	Has a mixture of deciduous trees, of value to wide variety of species including birds, mammals, bats, and invertebrates.	Yes
Depositing/lowland river (FW2)	The watercourses draining the site are classified as 'Low land / depositing rivers (FW2). These include Cottoner's Brook	Local Importance (Higher Value)	No loss	Cottoner's Brook likely supports a population of brown trout. The River Barrow is the most important watercourse as it has some suitable salmonid spawning, nursery and holding areas.	Yes
River Barrow	The River Barrow is the receiving waterbody for all	International importance	No loss	River Barrow is within the Natura 2000 network	Yes

Habitat type	Extent/Location within study area	Ecological value relative to study area (NRA, 2009)	Overall Approx Area of Loss (Ha/Km)	Rationale	Key Ecological Receptor (Yes/No)
	surface drainage associated with the proposed development site.				
Conifer plantation (WD4)	This habitat occurs frequently throughout the proposed underground wind farm collector cable and access track and in the wider area.	Local Importance (Lower Value)	3.015ha	Intrinsically low biodiversity value. Depleted flora on forest floor.	No
Scrub (WS1)	This This habitat occurs frequently throughout the proposed underground wind farm collector cable and access track and in the wider area and alongside other habitats.	Local Importance (Higher Value)	0.66ha	Of local value to wide variety of species including birds, mammals, bats, and invertebrates.	Yes
Cutover bog (PB4)	Only a very small portion of the proposed underground wind farm collector cable and access track passes through this habitat .	Local importance (Lower value)	0.22ha	Very open habitat with little vegetation and diversity. Not directly impacted.	No
Cutover bog [Recolonising] (PB4 [R])	The majority of this habitat is at the peat deposition area of T4 of the permitted Dernacart Wind Farm.	Local Importance (Higher Value)	0.44ha	Habitat has mixture of flora valuable to wide variety of species including birds, mammals, and bats.	Yes
Mixed broadleaf/conifer woodland (WD2)	The proposed underground wind farm collector cable and access track passes through this habitat few times in the west of the proposed development site.	Locally important (Higher value)	0.463ha	This habitat provides a corridor for mammals between conifer plantations and is also where the badger sett is situated.	Yes
Scrub (WS1)/Dense bracken (HD1)	The proposed underground wind farm collector cable and access track passes through this habitat once. This habitat also occurs again at the 110kV substation area.	Locally important (Higher value)	1.31ha	Of local value to wide variety of species including birds, mammals, bats, and invertebrates.	Yes

Habitat type	Extent/Location within study area	Ecological value relative to study area (NRA, 2009)	Overall Approx Area of Loss (Ha/Km)	Rationale	Key Ecological Receptor (Yes/No)
Spoil and bare ground (ED2)	This area in the mid-section of the proposed underground wind farm collector cable and access track.	Local importance (Lower value)	0.381ha	Highly modified habitat with little vegetation and diversity.	**No**
Mosaic – Cutover bog (PB4)/ Scrub (WS1)/ Wet grassland (GS4)	This mosaic is present at the mid-section of the proposed underground wind farm collector cable and access track.	Locally important (Higher value)	2.53ha	Habitat has mixture of flora valuable to wide variety of species including birds, mammals, and bats	**Yes**
Drainage ditches (FW4)	This habitat is a common feature throughout the proposed underground wind farm collector cable and access track and 110kV substation area and often associated with hedgerows.	Locally important (lower value)	0.24km	Semi-natural habitat. Subject to regular maintenance. Unstable ecological conditions.	**No**
Bog woodland (WN7)/Scrub (WS1)	A small fragment of bog woodland occurs alongside scrub in the northeastern corner of the 110kV substation area and small portion of the peat deposition furthest to the west.	Locally important (Higher value)	0.63ha	Habitat has mixture of flora valuable to wide variety of species including birds, mammals, and bats.	**Yes**
Scrub (WS1)/Wet grassland (GS4)	This habitat occurs alongside cutover bog in the mid-section of the proposed underground wind farm collector cable and access track and alongside bog woodland in the 110kV substation area.	Locally important (Higher value)	0.723ha	Habitat has mixture of flora valuable to wide variety of species including birds, mammals, amphibians and bats.	**Yes**
Improved agricultural grassland (GA1)	This habitat occurs at the 110kV substation area.	Local importance (lower value)	0.116ha	Highly modified and managed habitat with low species diversity and limited biodiversity value.	**No**
Treeline/Hedgerow (WL1/WL2)	This habitat is a common feature along field	Locally important	0.155km	Semi-natural habitat. Of value to wide variety of species,	**Yes**

Habitat type	Extent/Location within study area	Ecological value relative to study area (NRA, 2009)	Overall Approx Area of Loss (Ha/Km)	Rationale	Key Ecological Receptor (Yes/No)
	boundaries and bordering tracks and public roads.	(higher value)		and act as wildlife corridors within the landscape.	
Buildings and artificial surfaces (BL3)	This habitat is a common throughout the proposed underground wind farm collector cable and access track and is the most common habitat along the 110kV underground grid cable route.	Local importance (Lower value)	N/A	Artificial habitat. No intrinsic ecological value.	No
Stone walls and other stonework (BL1)	The habitat is present crossing the River Barrow along the 110kV underground grid cable route.	Locally important (Lower value)	N/A	This habitat at Kilnahown Bridge provides roosting potential for bats, there will be no works carried out in relation to this habitat and therefore is not a KER.	No

5.4.2.1 Rare and Protected Flora

None of the three protected species identified in Section 5.3.5, which comprise marsh saxifrage, lesser centaury and large white-moss are considered KER's due to their habitat requirements, footprint and size/scale of the proposed development.

5.4.3 Fauna

Table 5.30 presents an evaluation of the importance value of the fauna identified within the receiving environment of the subject site and rationale for inclusion or exclusion as a KER.

Table 5.30 Evaluation of fauna within the study area

Species	Legislative Protection	Ecological value (NRA, 2009a)	Key Ecological Receptor	Rationale
Mammals				
Bats	Annex IV of the EU Habitats Directive, Wildlife Acts	Local Importance (Higher value)	Yes	Suitable foraging and some potential tree roost habitats affected.
European Otter	Wildlife Acts, Annex II & IV of EU the Habitats Directive	Local Importance (Lower value)	Yes	No evidence of foraging or dwellings. Watercourses on site of limited value with regard to sustenance of otter. The Cottoner's Brook and the River Barrow in the potential ZOI of the proposed

Species	Legislative Protection	Ecological value (NRA, 2009a)	Key Ecological Receptor	Rationale
				development Barrow are considered to support otter.
Badger	Wildlife Acts	Local Importance (Higher value)	**Yes**	Badgers active within the proposed development site.
Pine marten	Wildlife Acts, Annex V of EU Habitats Directive	Local Importance (Lower value)	**No**	This species is sufficiently widespread and resilient to project impacts and will remain viable and resilient even at the local scale.
Stoat	Wildlife Acts	Local Importance (Lower value)	**No**	This species is sufficiently widespread and resilient to project impacts and will remain viable and resilient even at the local scale.
Red Squirrel	Wildlife Acts	Local Importance (Lower value)	**No**	This species is sufficiently widespread and resilient to project impacts and will remain viable and resilient even at the local scale.
Irish Mountain hare	Wildlife Acts	Local Importance (Lower value)	**No**	This species is sufficiently widespread and resilient to project impacts and will remain viable and resilient even at the local scale.
Hedgehog	Wildlife Acts	Local Importance (Lower value)	**No**	Although not recorded during surveys, this species is widespread and considered present in the study area but is resilient to project impacts and will remain viable and resilient even at the local scale.
Fallow Deer	Wildlife Acts	Local Importance (Lower value)	**No**	Non-native invasive species that causes damage to native habitats.
Fox	None	Local Importance (Lower value)	**No**	No protected and resilient to project impacts.
Birds				
Birds (general)	Wildlife Acts, Annex I EU Birds Directive,	Local Importance (Lower value)	**No**	A few species including snipe, kestrel and woodcock were observed on site but not in significant numbers. Additionally, habitats within and surrounding the proposed development site of no particular important value as breeding and foraging habitat for the bird species recorded.
Amphibians and Reptiles				
Amphibians and Reptiles	Wildlife Acts	Local Importance (Lower value)	**No**	Habitats at the proposed development site are of limited value for these species. Group not adversely affected by project impacts.
Macro-invertebrates				
Marsh Fritillary	Annex II of EU Habitats Directive	Local Importance (Lower value)	**No**	The food plant of this species (devil's bit scabious) only occurs in small areas and fragments considered insufficient to sustain a viable population of this species.
Desmoulin's Whorl Snail	Annex II of EU Habitats Directive	Local Importance (lower value)	**No**	No suitable habitats affected.
Aquatic macroinvertebrates (general)	Various	Local Importance (Lower value)	**No**	Assemblages dominated by pollution tolerant taxa. Water quality adversely affected by peat silt. Not a sensitive ecological receptor.
White-clawed crayfish	Annex II and V, EU Habitats Directive	Local Importance (Higher value)	**Yes**	This species was not recorded at the proposed development site, but records do exist of this species within all three hectads encompassing the site. This species is most likely limited to the Cottoners brook and the River Barrow if it occurs within the ZOI.

Species	Legislative Protection	Ecological value (NRA, 2009a)	Key Ecological Receptor	Rationale
Freshwater pearl mussel	Annex II and V, EU Habitats Directive	Local Importance (Lower value)	**No**	No records and unsuitable habitat in the potential ZOI.
Fish				
Atlantic Salmon	Annex II and V, EU Habitats Directive	Local Importance (Higher value)	**Yes**	This species is sensitive to water quality impacts and likely limited to the Cottoner's Brook and the River Barrow, which could potentially be affected by pollution. Protected species and a conservation interest of the River Barrow and River Nore SAC.
Fish (general)	Various (e.g. trout, three-spined stickleback, minnow, stone loach)	Local Importance (lower value)	**No**	Potential for water quality impacts but not at a level that affects these species bot afforded protection.

5.4.4 Invasive alien species

All invasive alien species within and adjacent to the proposed development are identified as KERs as they have the potential to have negative ecological effects if spread during works required to construct the proposed development.

5.4.5 Do-Nothing Scenario

The proposed development site is situated in an area where a well-established pattern of mixed land use pertains. These comprise predominantly low-intensity agriculture, local small scale peat extraction, commercial forestry. If the proposed development does not progress beyond the planning application stage, it is likely that the current land-use practices within the site and within the wider landholding, will continue.

5.5 Potential Impacts of the Project

5.5.1 Construction Phase

Key elements of the civil works and activities associated with the construction phase of the proposed development are outlined in the following subsections. Further details are provided in the CEMP.

<u>Wind Farm Collector Cable and Access Track</u>

The construction of the proposed collector cable and access track will principally comprise of the following civil works and activities:

- Pre-commencement activities including site investigation work and pre-construction surveys
- Felling of any areas of coniferous forestry plantation necessary to facilitate construction works;
- Site preparation including fencing (for ecology, water and archaeological exclusion zones if necessary),
- Construction of new watercourse crossing at Cottone's Brook;
- Earthworks and drainage infrastructure associated with construction of collector cable and new access road;
- Cable trenching and ducting;
- Cable laying;
- Reinstatement of the cable collector track.
- Aggregate placement, grading and compaction for new access track

110kV Substation

Key elements of the civil works and activities associated with the construction phase of the substation are as follows:

- Pre-commencement activities including site investigation work and pre-construction surveys
- Site preparation including fencing (for ecology, water and archaeological exclusion zones if necessary),
- Construction of site entrances and sections of internal access roads necessary to facilitate access to the temporary construction compound;
- Installation of site drainage systems;
- Construction of temporary construction compound including site offices, parking, material laydown and storage areas, etc;
- Establishment of temporary storage of stockpiled overburden and surplus excavated materials within the material storage areas.
- Bulk earthworks for formation of access road and substation compound base;
- Substation compound base and equipment foundations;
- Cable trenching and cable laying;
- Construct of control building and install equipment within compound;
- Construction of permanent drainage system
- Aggregate placement, grading and compaction for substation access road
- Complete site works: lighting, security fencing, gates, signage;
- Reinstatement of temporary drainage system;
- Demobilise offices and tidy up site.

110kV Grid Route

- Pre-commencement activities including site investigation work and pre-construction surveys
- Cable trenching and cable laying;
- Construction of Joint Bays and communication chambers;
- HDD under watercourse crossings;
- Reinstatement of the public road.

Construction phase impacts potentially associated with the proposed development are listed in Table 5.31 below.

Table 5.31. Construction phase impacts potentially associated with the proposed development

Construction Phase Effect	Source
Habitat loss/alteration	Construction of underground collector cable, access track, 110kV substation and temporary site compound, vegetation clearance, excavations and groundworks, demolition work, movement of plant and machinery, storage of construction materials and spoil, ancillary site development works, installation of services and site landscaping. Construction activity also poses a risk of spread/introduction of invasive species to site (soil disturbance and general construction activity, plant/machinery, tools/equipment, workers clothing/footwear, imported building and other materials including soil and fill can all potentially be contaminated with IAPS infested soil, viable seed or other IAPS material). Treatment/management of invasive species also has potential for habitat impacts (potential use of chemical herbicides and/or risk of spread within the site).
Indirect water quality effects	Sediment/pollutant laden run-off may arise from exposed areas during groundworks/excavations from material storage areas, from construction vehicles/plant or from on-site temporary toilets and washing facilities. Leaching of fuels/oils, cementitious material etc. to groundwater in the event of accidental spillage. Potential use of chemical herbicides.
Direct species interference/disturbance/ displacement	Increased human presence/activity for duration of construction phase. Increased noise/vibration/lighting/use of chemical associated with construction works. Physical interference (injury/mortality).
Indirect species disturbance/displacement	Indirect water quality effects. Loss/fragmentation/direct or indirect alteration of foraging, commuting, breeding or resting habitat. Impacts on prey biomass.

5.5.2 Operational Phase

5.5.2.1 Substation Maintenance

During the operation, the developer or a service company will carry out regular maintenance of the substation. During the life of the project, it is envisaged that at least two permanent jobs will be created in the form of operator or maintenance personnel. In addition, operation and monitoring activities may be carried out remotely with the aid of computers connected via a telephone broadband link. However, routine inspection and preventive maintenance visits will be necessary to ensure the smooth and efficient running of the substation and require a minimal presence.

5.5.2.2 Grid Connection and Collector Cable maintenance

It is unlikely that the underground 110Kv grid cable or collector cable will require much maintenance during its operation but in the event a fault does occur, inspection of the fault can be carried out to determine what works to the ducting may be required.

Operational phase impacts potentially associated with the proposed development are listed in Table 5.32 below.

Table 5.32. Operational phase effects potentially associated with the proposed development

Operational Phase Effect	Source
Direct/indirect species disturbance/displacement	Increased lighting/noise and/or human presence on the site. Indirect alteration of foraging, commuting, breeding or resting habitat. Impacts on prey biomass. Indirect water quality effects.

5.5.3 Decommissioning

The grid cable and substation will remain a permanent part of the national grid infrastructure and therefore decommissioning is not foreseen.

Should decommission occur impacts would be similar to those outlined during the construction phase.

5.6 Assessment of Impacts and Effects

The potential impacts and effects of the proposed development on KERs are considered in this section. Where significant effects are identified mitigation measures are proposed before considering if significant residual effects are likely.

5.6.1.1 Impacts to Habitats

5.6.1.1.1 Construction Phase

Direct habitat loss and/or alteration will occur as a result of the construction of the underground wind farm collector cable and access track, the 110kV substation and approx. 160m of the 110kV Grid route between the 110kV substation and the regional road R423.

Table 5.35 below describes each of the habitats that have been identified as KERs, quantifies the areas of loss of each habitat required to facilitate the proposed development, where relevant, describes the predicted impacts on each habitat in the absence of mitigation, and characterises the significance of these unmitigated impacts. The grid route and substation most likely will not be decommissioned and remain and form a permanent part of the national grid. the Direct habitat loss effects for these KERs during the construction phase are assessed as Permanent, Likely, Not significant to slight, Negative effects.

Invasive alien plant species (IAPS)

Construction activity also generally poses a risk of spread/introduction of invasive alien plant species (IAPS) to Site (through soil disturbance, vegetation disturbance and general construction activity and movement of plant/machinery). Plant, machinery, tools/equipment, workers clothing/footwear and imported building and other materials including soil and fill can all potentially be contaminated with IAPS infested soil, viable seed or other IAPS material and therefore pose a risk of introduction of IAPS to the Site.

Without intervention, IAPS could be introduced to and/or spread within the Proposed Development site during construction works, where infestation may be accelerated in combination with proposed works. The introduction/spread and treatment/management of IAPS could have implications for habitats and native flora. The significance of the presence of IAPS infestations to habitats and flora in the context of proposed works during the construction phase of the Proposed Development is assessed as a Medium-term, Likely, Moderate, Negative effect.

As stated in Chapter 2 'Development Description', surface water runoff and discharges from construction working areas are likely during construction, although overall the quantity of surface runoff would not change as a result

of the construction work. It is noted that the exposed in-situ subsoil along the proposed trench route will be contained within the trench and therefore the potential for erosion and transport by water and wind action is low. Nonetheless, the proposed development involves excavation and soil movement so has the potential for suspended solids contamination of surface waters. Rainfall during excavation can cause runoff laden with fine sediment to be carried into watercourses. This can affect aquatic life by reducing the quality and availability of fluvial habitats of aquatic fauna, including spawning and rearing habitat for fish (salmon), impairing the ability of fish to find food items and displacement of aquatic organisms into less suitable areas. These impacts may affect water quality in the Cottoner's Brook and possibly but to a lesser extent the River Barrow.

Table 5.33. Potential effects on habitats identified as KERs and the significance of unmitigated effects (Habitat Loss)

CONSTRUCTION PHASE- Habitat Loss							
Habitat	Quality of Effect	Significance	Spatial Extent	Extent of loss ha/km	Duration	Other Relevant Criteria	Likelihood
Underground connector cable and access track							
Mixed Broadleaved Woodland (WD1)	Negative	Not significant	Localised	0.12ha	Permanent	Direct	Likely
Scrub (WS1)	Negative	Not significant	Localised	0.69ha	Permanent	Direct	Likely
Cutover bog [Recolonising] (PB4 [R])	Negative	Not significant	Localised	0.22ha	Permanent	Direct	Likely
Mixed broadleaf/conifer woodland (WD2)	Negative	Not significant	Localised	0.63ha	Permanent	Direct	Likely
Scrub (WS1)/ Dense bracken (HD1)	Negative	Not significant	Localised	0.43ha	Permanent	Direct	Likely
Mosaic – Cutover bog (PB4)/ Scrub (WS1)/ Wet grassland (GS4)	Negative	Not significant	Localised	0.84ha	Permanent	Direct	Likely
Treeline/Hedgerow (WL1/WL2)	Negative	Not significant	Localised	0.075km	Permanent	Direct	Likely
All Peat deposition Areas							
Bog woodland (WN7)/ Scrub (WS1)	Negative	Not significant	Localised	0.026ha	Permanent	Direct	Likely
Cutover bog [Recolonising] (PB4 [R])	Negative	Not significant	Localised	0.44ha	Permanent	Direct	Likely
Scrub (WS1)	Negative	Not significant	Localised	0.11ha	Permanent	Direct	Likely
Mosaic – Cutover bog (PB4)/ Scrub (WS1)/ Wet grassland (GS4)	Negative	Not significant	Localised	1.687ha	Permanent	Direct	Likely

CONSTRUCTION PHASE- Habitat Loss							
Habitat	Quality of Effect	Significance	Spatial Extent	Extent of loss ha/km	Duration	Other Relevant Criteria	Likelihood
110kV Substation							
Bog woodland (WN7)/ Scrub (WS1)	Negative	Not significant	Localised	0.597ha	Permanent	Direct	Likely
Scrub (WS1)/ Wet grassland (GS4)	Negative	Not significant	Localised	0.723ha	Permanent	Direct	Likely
Scrub (WS1)/ Dense bracken (HD1)	Negative	Not significant	Localised	0.88ha	Permanent	Direct	Likely
Treeline/Hedgerow (WL1/WL2)	Negative	Not significant	Localised	0.085km	Permanent	Direct	Likely
110kV underground grid route							
Bog woodland (WN7)/ Scrub (WS1)	Negative	Not significant	Localised	**0.028km**	Permanent	Direct	Likely
Scrub (WS1)/ Dense bracken (HD1)	Negative	Not significant	Localised	**0.13km**	Permanent	Direct	Likely

Table 5.34. Potential effects on habitats identified as KERs and the significance of unmitigated effects (Habitat Alteration/Disturbance)

CONSTRUCTION PHASE- Habitat Alteration/Disturbance						
Habitat	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Underground connector cable and access track						
Mixed Broadleaved Woodland (WD1)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
Depositing/lowland river (FW2) Cottoner's Brook	Negative	Moderate	Localised	Temporary to Short-term	Direct and Indirect	Likely
Scrub (WS1)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
Cutover bog [Recolonising] (PB4 [R])	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
Mixed broadleaf/conifer woodland (WD2)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
Scrub (WS1)/ Dense bracken (HD1)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely

CONSTRUCTION PHASE- Habitat Alteration/Disturbance						
Habitat	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Mosaic – Cutover bog (PB4)/Scrub (WS1)/ Wet grassland (GS4)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
Bog woodland (WN7)/ Scrub (WS1)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
Scrub (WS1)/ Wet grassland (GS4)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
Treeline/Hedgerow (WL1/WL2)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
All Peat deposition Areas						
Bog woodland (WN7)/ Scrub (WS1)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
Cutover bog [Recolonising] (PB4 [R])	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
Scrub (WS1)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
Mosaic – Cutover bog (PB4)/Scrub (WS1)/ Wet grassland (GS4)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
110kV Substation						
Scrub (WS1)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
Scrub (WS1)/ Wet grassland (GS4)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
Treeline/Hedgerow (WL1/WL2)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
110kV underground grid route						
Bog woodland (WN7)/ Scrub (WS1)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
Scrub (WS1)/ Dense bracken (HD1)	Negative	Not significant	Localised	Temporary to Short-term	Direct and Indirect	Likely
River Barrow Depositing/lowland river (FW2)	Negative	Moderate	Localised	Short-term	Direct and Indirect	Likely

5.6.1.1.2 Operational Phase

During the operational phase of the proposed development, significant effects on habitats are not anticipated. Once the construction phase has ceased large scale works will no longer be required. No additional habitat loss is required as part of the operational phase. There may be some interference with habitats during the operational phase if repairs are required. Impacts on habitats and fauna during the operational phase will be less in scale and magnitude as any such works will be shorter in extent. Habitat interference effects are assessed as **temporary, negative** and **not significant.**

5.6.1.2 Impacts to Fauna

5.6.1.2.1 Construction Phase

Table 5.35 describes the potential construction phase impacts on faunal KERs at the proposed development site and characterises the significance of these unmitigated impacts. Water quality impacts as described in the previous section may affect fauna within Cottoner's Brook and to a lesser extent the River Barrow, thereby potentially affecting salmon, crayfish and otter.

Table 5.35. Potential impacts on faunal species identified as KERs during the construction phase and the significance of the impact

KER- Species	Element of proposed development potentially causing an impact	Ecological value (NRA, 2009a)	Unmitigated Impacts	Significance of unmitigated impacts (EPA, 2022)
Bats	• Underground wind farm collector cable and access track • Underground 110kV grid route.	Local Importance (Higher value)	Loss of potential Roosting Habitat No bat roosts were identified within the site during baseline surveys. However, the proposed development will result in the loss of Potential Roosting Features (No. 2 'low- Moderate' category trees). The removal of trees identified as PBRs will impact on the habitat resource available for tree-roosting species.	The potential loss of PBRs on bats is assessed as **Permanent, Moderate to Significant, Negative Effects**.
			Foraging Habitat Loss/Alteration Loss of scrub, woodland, hedgerow and treeline which provide foraging opportunities for bats. Linear features such as hedgerow, treeline and woodland edge also act as potential commuting corridors for bats. Similar habitat of equivalent ecological value is abundantly available in the lands surrounding the proposal site.	Loss/alteration of bat foraging/commuting habitat via vegetation removal) is assessed as **Permanent, Moderate, Negative Effects**

KER- Species	Element of proposed development potentially causing an impact	Ecological value (NRA, 2009a)	Unmitigated Impacts	Significance of unmitigated impacts (EPA, 2022)
			<u>Disturbance/Displacement</u> A variety of bat species use the site for foraging, commuting and potentially resting/breeding. Direct/indirect disturbance and/or displacement effects on bats could arise as a result of increased lighting, noise/vibration, human activity, loss/alteration of habitat and/or mortality/physical injury of roosting (resting) bats. Potential to occur in Kilnahow Bridge over the River Barrow. With regard to foraging activity, it is not expected that construction activity will take place during night-time. As bats only utilise the site for foraging at night, they are unlikely to be active when construction work is taking place. Foraging activity will also only take place during the bat active period (typically April to October, although feeding can take place on warmer nights in March – Collins, 2016). However, foraging bats could be subject to disturbance/ displacement effects via other sources such as construction lighting.	Potential direct/indirect disturbance/displacement effects assessed as **Temporary to Short-term, Slight to Moderate, Negative Effects**
European Otter	Downstream of: • Underground wind farm collector cable and access track • 110kV substation • Underground 110kV grid route.	Local Importance (Higher value)	<u>Habitat Loss/Alteration</u> No otter breeding or resting sites were identified. There will be no direct habitat loss/direct alteration of Cottoner's Brook, the River Barrow or any other watercourse in relation to the proposed development. There will be work carried out at water crossings which can impact water quality downstream, so there is some potential for secondary effects <u>Disturbance/Displacement</u> Direct disturbance and/or displacement effects to otter could potentially ensue as a result of increased noise, lighting and human activity during the construction phase.	Potential habitat loss/alteration effects assessed as **Permanent, Slight, Negative effects.** Potential indirect disturbance and/or displacement effects on otter are assessed as **Temporary to Short-term, Slight, Negative Effects.**

KER- Species	Element of proposed development potentially causing an impact	Ecological value (NRA, 2009a)	Unmitigated Impacts	Significance of unmitigated impacts (EPA, 2022)
			There is potential for indirect disturbance and/or displacement effects to otter via potential water quality impacts and/or indirect alteration of foraging/commuting habitat.	
Badger	• Underground wind farm collector cable and access track	Local Importance (Higher value)	Badgers occur on-site. The mixed woodland and conifer plantations within and surrounding the site provides foraging, commuting and breeding/resting habitat for badger. <u>Habitat Loss /Loss or damage of existing breeding/resting sites</u> One 3-entrance badger sett was identified within the boundary of the site. There will be a requirement for heavy construction work in this area, and one entrance may be blocked and lost to facilitate the works. <u>Loss/alteration of suitable foraging/breeding/resting habitat</u> There will be loss/alteration of suitable badger foraging/ breeding/resting habitat facilitate the development. <u>Disturbance/Displacement</u> Direct/indirect disturbance and/or displacement effects could occur as a result of increased noise, vibration, lighting, human activity, use of chemicals, barriers to foraging areas and/or damage/disturbance/injury of badger or damage to the sett.	Loss/closure of existing badger sett entrance is assessed as a **Permanent, Moderate, Negative Effect.** Habitat loss/alteration effects assessed as **Permanent, Moderate, Negative Effects.** Disturbance and/or displacement effects assessed as **Temporary to Short-term, Moderate, Negative Effects.** Disturbance/displacement effects as a result of potential exclusion from sett in advance of sett entrance closure are assessed as **Temporary, Slight, Negative Effects.**
White-clawed crayfish and	Downstream of: • Underground wind farm collector cable and access track	Local Importance (Higher value)	<u>Habitat Loss/habitat alteration</u> There will not be any direct habitat loss but work carried out at water crossings which can impact water quality	Potential habitat loss/alteration effects assessed as **Permanent, Slight, Negative effects.**

KER- Species	Element of proposed development potentially causing an impact	Ecological value (NRA, 2009a)	Unmitigated Impacts	Significance of unmitigated impacts (EPA, 2022)
	• 110kV substation • Underground 110kV grid route.		downstream, so there is some potential for secondary effects. **Disturbance/Displacement** Direct/indirect disturbance and/or displacement effects could potentially ensue as a result of negative impacts to water quality.	Potential disturbance/ displacement effects are assessed as **Temporary to Short-term, Slight, Negative Effects**.
Atlantic salmon	Downstream of: • Underground wind farm collector cable and access track • 110kV substation • Underground 110kV grid route.	Local Importance (Higher value)	**Habitat Loss/habitat alteration** There will not be any direct habitat loss but work carried out at water crossings which can impact water quality downstream, so there is some potential for secondary effects. **Disturbance/Displacement** Direct/indirect disturbance and/or displacement effects could potentially ensue as a result of negative impacts to water quality.	Potential habitat loss/alteration effects assessed as **Permanent, Moderate, Negative effects.** Potential disturbance/ displacement effects are assessed as **Temporary to Short-term, Slight, Negative Effects**.

5.6.1.2.2 Operational Phase

During the operational phase of the proposed development, significant effects on fauna are not anticipated. Once the construction phase has ceased large scale works will no longer be required. No additional habitat loss is required as part of the operational phase. There may be some interference with habitats during the operational phase if repairs are required. In general, impacts on habitats and fauna during the operational phase will be less in scale and magnitude as any such works will be shorter in extent. Habitat interference effects are assessed as **temporary, negative** and **not significant.**

Bats

Although there were no roosts identified on site, the established hedgerows and treelines which occur within the site are used by foraging/commuting and potentially roosting bats.

It is considered that disturbance or displacement effects to bats as a result of increased noise and human activity during the operational phase of the proposed development are assessed as **Short-term, Not significant, Negative Effects**.

Badger

The identified badger sett discussed in **Section 5.3.7.2.1** above is situated close to an existing forest track which will form part of the underground wind farm connector cable and access track. During the operational stage of the project the access track will form a connection between the Dernacart Wind Farm and the 110kV substation. There may be maintenance works carried out from time to time, most likely during daytime hours. As the access track is within 30m of the sett there may be some minor disturbance. Potential disturbance/ displacement effects on badgers as a result of increased noise levels/human activity at the site are assessed as **Temporary, Not significant, Negative Effects.**

5.6.2 Cumulative Impacts and Effects

Cumulative effects is defined by CIEEM (2018) as; "*Additional changes caused by a proposed development in conjunction with other developments or the combined effect of a set of developments taken together*".

The proposed development will facilitate the export of electricity from the permitted Dernacart Wind Farm (Planning Ref ABP-310312-21) to the Bracklone 110kV substation (Planning Ref. 20/638).

The permitted Dernacart Wind Farm is located to the west of the proposed development and has not yet been constructed. The effects of the Dernacart Wind Farm on the receiving water environment were assessed as part of the EIAR undertaken for the permitted wind farm. The EIAR concluded that, with the implementation of appropriate mitigation, there would be no significant effects on hydrology and geohydrology. Mitigation measures to be implemented are outline in Chapter 14 of the Wind Farm EIAR. The majority of the wind farm (T1-T4, T7 and T8) is located in a separate catchment area (Barrow_SC_010) to the proposed development assessed in this chapter. Only two turbines (T5 and T6) are located within the Barrow_SC_030 catchment area where the underground collector cable, access track and substation are to be located.

The consented Bracklone 110kV substation is to be located at the end of the grid connection route in the Barrow_SC_020 sub-catchment. The only portion of the proposed development that falls within this catchment area is a portion of the underground grid connection cable. An NIS was undertaken as part of the planning application for the Bracklone substation. The NIS concluded that following the implementation of mitigation measures, the construction and operation of the Bracklone 110kV substation would not have any adverse effects to the integrity of any European site (i.e. the hydrological connection to the River Barrow And River Nore SAC). A drainage plan was also compiled as part of Bracklone substation project to prevent any significant impacts on hydrology and hydrogeology.

With exception of the Dernacart Wind Farm and the Bracklone substation, for which the cumulative impacts have already been assessed, there are no other plans or projects in close proximity to cumulatively impact hydrology and hydrogeology. The potential cumulative water quality and quantity effects of the proposed development during the construction and operational phase will not have significant effects on downstream watercourses. This is due to the fact the proposed development is mainly located in a separate sub catchment area (Barrow_SC_030) to these two projects. In addition, the implementation of environmental protection measures and drainage design of the proposed development described in Section 5.7 and the measures in the EIAR for the Dernacart Wind Farm and the Bracklone substation mitigation measures will prevent any significant cumulative effects

5.7 Mitigation Measures

5.7.1 Mitigation by Design

Site design was carried out with cognisance to ecological features to minimise the impact of the proposed development on ecological receptors. Ecological design considerations are outlined as follows:

- The proposed 110kV substation layout has allowed for the retention of the perimeter hedgerows and treelines the majority of which are mature and well-established. This has minimised the loss of these important habitat features within the site, maintained habitat connectivity between the site and the wider landscape in terms of wildlife corridors and minimised the number of mature trees required to be felled.
- The site layout has been designed insofar as possible to allow for a 20m setback buffer between the development footprint and the from any drainage network and watercourses.

- The 110kV underground grid route is almost entirely confined to the existing road network, diverging slightly from it at water course crossings. This mitigation by design effectively limits, and avoids along most of the proposed development, intrusion into ecologically sensitive habitats by having its footprint located on largely artificial habitats and habitats of low value (roads and associated verges). It is acknowledged that some treelines and hedgerows occur adjacent to the road network used to facilitate the proposed development, and the potential exists for damage to tree roots via excavation. This impact is not considered significant however because the ground beneath roads is usually compacted and thus, not well penetrated by roots.
- The active construction area will generally be only along a 100m stretch of any roadway at any one time. This feature of the proposed development will ensure that the scale of any impacts will be minor, especially considering its linear character.
- The option of underground directional drilling (HDD) and over-bridge in road solutions to cross watercourses avoids the requirement for instream works. This means there will be no direct interactions with any watercourse, so that fluvial habitats will not be disturbed by machinery, and watercourses will not need to be diverted, or sections of streams /rivers dried out to enable trenching.

5.7.2 Mitigation by Management – Construction Phase

5.7.2.1 Construction and Environmental Management Plan (CEMP)

A detailed CEMP will be developed by the appointed contractor prior to construction works commencing. This will detail construction practices and environmental management measures which will be implemented to ensure that best practice measures are adhered to, with minimum impact on the surrounding environment. The contractor's detailed CEMP will ensure that the Proposed Development will be carried out in accordance with any planning conditions applicable.

All mitigation measures outlined in this document are to be incorporated into the final CEMP and implemented on-site. The CEMP will be submitted to Laois County Council and Offaly County Council for agreement and approval prior to the commencement of any construction activity.

The CEMP will include, but is not limited to, the following environmental controls:

- Water Quality/Sediment and Erosion Control
- Noise, Vibration, Dust and Air Control
- Management of Construction and Demolition Waste
- Fuel and Oils Management
- Management of Concrete, and
- Emergency Response Plan

The CEMP will take cognisance of the following Best Practice Guidance:

- CIRIA C692: Environmental Good Practice on Site, (Audus *et al.*, 2010)
- CIRIA C532: Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams *et al.*, 2001)
- CIRIA C753 – The SUDS Manual; CIRIA C698 – Site handbook for the construction of SUDS, and
- Bat Conservation Trust (2023). Guidance Note 08/23. Bats and Artificial Lighting at Night.

5.7.2.2 Project Ecologist/Ecological Clerk of Works (ECoW)

A suitably qualified and experienced Project Ecologist/ECoW will be employed during the construction phase of the project. Duties will include the review of all method statements, delivery of toolbox talks, undertaking of all required pre-construction surveys for protected species and monitoring of works throughout the construction phase to ensure that works are taking place in compliance with the CEMP and that the requirements of the Conditions of Planning and all environmental controls and EIAR mitigation is implemented in full. As part of toolbox talks, contractor staff and other site personnel, as relevant, will be made aware of the procedure to follow if a protected species or their resting or breeding site is encountered.

The appointed ECoW will be awarded a level of authority and will be allowed to stop construction activity if there is potential for adverse environmental effects other than those predicted and mitigated for in the EIAR. The appointed ECoW will have demonstrated professional experience in managing large-scale construction works affecting ecological receptors identified within the EIAR.

5.7.2.3 General Protection of Water Quality

Temporary Site Compound/Parking

- Parking will only take place within designated parking areas.
- The site compound including designated parking areas will be located at least 50m from any watercourse/waterbody.
- A designated wash down area within the site compound will be used for cleaning of any equipment or plant, with the safe disposal of any contaminated water.

Construction Runoff and Sediment Control

Best practice mitigation measures will be implemented with regard to runoff and sediment control as follows:

- Erosion control, where runoff is prevented from flowing across exposed ground and becoming polluted, and sediment control, where runoff is slowed to allow suspended sediment to settle, are important elements in runoff and sediment control. Erosion and sediment controls are to be implemented prior to any site clearance works commencing.
- Clean water runoff will be intercepted and diverted away from construction site runoff to avoid cross-contamination of clean water with soiled water.
- All topsoil stripping close to sensitive areas will be carried out during periods of dry weather and all stockpiling will be kept as far as possible from surface water features.
- The area of exposed ground will be minimised. The amount of material excavated is to be kept to a minimum. Excavations will only be carried out following installation of appropriate sediment controls measures which will slow run-off and trap suspended sediment, particularly if working during prolonged wet weather or if working during an intense rainfall event.
- The drainage system will be inspected regularly during construction, in particular after heavy rainfall/storm events, to check for blockages/drainage issues. Where any drainage issues are identified, these will be addressed on the same day to ensure water quality protection.

Construction Wheel-wash Facilities

- Wheel wash facilities are to be provided at the entrance/exit for the site. All construction vehicles leaving or entering the site will be required to drive through the wheel wash area.

- Runoff generated at the vehicle washdown area will discharge to the drainage system for treatment and attenuation.

Management of Fuel/Oil etc

The management of fuel/oil and other chemicals on site will have regard to the following elements:

- Chemicals will be bunded and where applicable, stored within double-skinned tanks/containers with the capacity to hold 110% of the volume of chemical contents. Ancillary equipment such as hoses and pipes will be contained within the bund. Bunds will be located on flat ground a minimum distance of 50 m from any watercourse or other water- conducting features, in a designated, secure, impermeable storage area.
- Measures will be implemented throughout the construction stage to prevent contamination of the soil from oil and/or petrol leakages. All plant will be regularly inspected for leaks to ensure it is fit for purpose. All taps, nozzles and valves will be fitted with a lock system that will be regularly checked for signs of damage.
- Where required, refuelling of plant on-site will only be carried out at a designated area within the site compound. Only designated trained operators will be authorised to refuel plant on site. Rigid and articulated vehicles will be fuelled off site as will all site vehicles (jeeps, cars and vans).
- Controls will be regularly inspected and maintained. Regular cleaning and servicing of bunds, gullies, pipe work, and oil interceptors will be carried out to ensure the system is operating at its optimum.
- Procedures and contingency plans will be set up to deal with emergency accidents or spills. An emergency spill kit containing oil boom and absorbers will be kept on site in the event of an accidental spill/emergency. All crews will be trained in the use of spill kit equipment. All emergency procedures and equipment will be in place prior to the commencement of any works.
- The Local Authority will be informed immediately of any spillage or pollution incident that may occur on-site during the construction phase.

Management of Concrete

There shall be a requirement for concrete works at the site. Wet concrete is silty and very alkaline (high pH). It is important to prevent concrete from entering the aquatic environment, including groundwater.

The following measures will be implemented during construction of the development:

- A designated trained operator, experienced in working with concrete will be employed during the concrete pouring phase. There shall be no pouring of concrete during extreme/prolonged rainfall.
- Any small volumes of incidental wash generated from cleaning hand tools, cement mixers or other plant, as required, will be trapped on-site to allow sediment to settle out and reach neutral pH before the clarified water is released and allowed to percolate to ground. Settled solids will need to be appropriately disposed of off-site.
- Washout of concrete trucks will not occur at the site. Washout of plant is to be carried out in designated, contained, impermeable areas.

5.7.2.4 Management of Construction Waste

- Appropriate storage of all non-hazardous and hazardous wastes on-site will be undertaken to minimise potential for environmental impacts.

- Dedicated bunded storage containers will be provided for hazardous wastes which may arise such as batteries, paints, oils, chemicals etc, if required.
- In the event that any buried waste or potentially contaminated material is encountered, this will be segregated from clean, inert material, and then tested and classified.
- In the unlikely event of hazardous material being encountered, it will be transported for treatment/recovery or disposal in suitable facilities.
- All wastes are to be removed from site by appropriate licenced waste contractors to suitable waste facilities.

5.7.2.5 Storage of Materials

- The storage of materials, spoil, containers, stockpiles and waste, however temporary, should follow best practice at all times and be restricted to designated areas only. Material stockpiles should be kept to a minimum size, and be located on impermeable bases, where necessary. Storage of materials will be located away from any temporary drains and moving plant, machinery and vehicles.

5.7.2.6 Bio-security

The following measures are recommended in relation to Site bio-security and reducing the risk of introduction or spread of invasive species within the area.

- Prior to being brought to Site, validation should be provided by all suppliers that construction plant, machinery and vehicles are free from invasive species. Similarly, certification is to be obtained from suppliers that all raw materials to be imported to Site including soil, fill, sand, gravel and landscaping materials are free from invasive species.
- All vehicles, machinery and equipment/tools are to arrive to site clean and steam washed. Visual inspections are to take place. All Personal Protective Equipment (PPE) brought to site is to be clean and dry with any attached vegetation or debris removed.
- A schedule of regular site inspections for invasive species is to be prepared and undertaken for the duration of the construction works. These inspections are to encompass the IAPS growing season for the duration of the construction works programme to monitor existing IAPS growth, identify any new IAPS stands, inspect materials storage areas and monitor implementation of IAPS management measures on-site, where required e.g., fencing, signage etc.
- Where there is a requirement for IAPS control areas, all vehicles, equipment/tools, footwear etc used in these areas will be thoroughly cleaned in a designated area once works in that area are complete to prevent spread of IAPS. The use of tracked machinery within IAPS infested areas is to be prohibited. The use of tracked machinery within close proximity of IAPS infested areas is to be strictly controlled. This should be undertaken with direction from the ECoW.

5.7.2.7 Management of Alien Invasive Plant Species (IAPS)

- The extents of IAPS infestations on-site are extremely limited and localised. A pre-construction survey for IAPS is to take place in advance of the commencement of site works to inspect existing stands of IAPS for new growth and identify any new stands which may have emerged in the intervening period.
- A construction-stage IAPS management plan will be prepared and will incorporate the following management measures. The construction stage management plan should set out clear processes for the eradication, control and containment of each IAPS on-site and is to include a detailed implementation

and treatment schedule (including initial and follow-up treatments) in light of the construction schedule and the prevailing IAPS conditions on-site at the time.

- Where any IAPS is identified within/adjacent to the works footprint, fencing and/or advisory signage is to be erected around stands (minimum 7 m buffer in the case of Japanese knotweed).
- No non-essential ground maintenance or any other ground disturbance should take place within IAPS fenced areas. Where works are required within/adjacent to infested areas, the appointed contractor is to develop and implement an appropriate method statement with regard to managing IAPS on-site and ensuring bio-security compliance. This should be done in consultation with a suitably qualified specialist. Under no circumstances is any IAPS plant or rhizome material to be cut, dug out or in any other way disturbed without the advice of a suitably qualified specialist.
- Where application of herbicides is required to treat IAPS on-site, the proximity of ecological receptors is to be taken into account. Herbicide use is to be minimised as much as possible and targeted to the specific IAPS. Where use of herbicides is required, non-residual, aquatic approved herbicides are to be used. Herbicides are not to be used in windy or foggy weather, during or preceding rainfall or where rainfall is forecast within 12 hours or during particularly cold weather to reduce risk of spray drift, run-off or poor plant uptake. Herbicides are to be applied strictly in accordance with the manufacturer's recommendations and by competent, experienced and licenced personnel registered as a Professional Pesticides User.
- Monitoring of control measures should be undertaken approximately six to eight weeks after treatment to determine success of measures used.
- Large areas of disturbed/bare soil should be mulched, where appropriate, and seeded/planted at the earliest opportunity with native species to stabilise the soil and deter any subsequent reinvasion. Planting should be carried out with regard to '*Horticulture Code of Good Practice: To prevent the introduction and spread of invasive non-native species* (Kelly, 2012).
- Where off-site removal of IAPS material or infested soil is required, then the relevant NPWS licence will be required to be procured in advance of removal of IAPS material off-site and in accordance with the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477). Off-site removal of such material will be undertaken in accordance with licence conditions.
- All management and control measures implemented on-site during the construction phase are to be carried out in accordance with best practice guidance as set out in '*The Management of Invasive Alien Plant Species on National Roads (GE-ENV-01104)*' TII (2020), '*The Management of Noxious Weeds and Non-native Invasive Species on National Roads*' NRA (2010), '*Best Practice Management Guidelines Rhododendron Rhododendron ponticum and Cherry Laurel Prunus laurocerasus'* Maguire, *et al*., (2008), '*Best Practice Management Guidelines Japanese Knotweed Fallopia japonica*' Kelly, *et al*., (2015) and '*Managing Japanese Knotweed on Development Sites: the Knotweed Code of Practice*' UK Environment Agency (2006).

5.7.2.8 General Protection of Habitats

- The area of proposed works will be kept to the minimum necessary to minimise disturbance to habitats and flora. Vegetation removal within the Site is to be minimised and be restricted to those areas of vegetation which have been identified for removal (to be clearly marked by contractor staff prior to removal). Removal of vegetation from anywhere outside of marked areas will not be permitted.
- The footprint of the construction area, site compound and materials storage areas will be clearly marked out prior to commencement of works with reference to design drawings, under the supervision of the

project engineer and appointed ecologist, so that it is visible to all contractor staff and machine operators.

- The extent of access for all construction plant and machinery is to be clearly marked out.
- All operatives will be made aware of the proximity of the River Barrow and River Nore SAC (002162) to the Site as part of toolbox talks. Movement of construction plant/vehicles is to be minimised within the SAC boundary.

5.7.2.9 General Protection of Fauna

- Disturbance of fauna generally will be reduced by controlling the movement of construction vehicles and personnel.
- Construction materials and wastes are to be kept in designated areas to reduce risk of accidental injury/entrapment of any wildlife on-site.
- In accordance with Section 40 of the Wildlife Acts, vegetation removal, including tree removal, will be conducted outside of the restricted bird nesting period (March 1st to 31st August, inclusive). This will not only protect nesting birds, but a range of biodiversity.
- Where areas of dense vegetation are to be removed, such as within the conifer treeline, the ECoW will be present to oversee removal of vegetation and ensure any necessary mitigation measures are in place in the event that a previously unknown breeding or resting site of any protected mammal species is encountered during the works.
- Mammals and birds are mobile and so are expected to disperse from the area; however, young or hibernating animals are vulnerable to impacts during vegetation clearance. Prior to any vegetation clearance, the area will be checked by the ECoW to check for the presence of young or hibernating animals.
- Should any resting or breeding place of any protected species be discovered within the Site during the pre-construction or construction phases, the ECoW is to be informed immediately and the advice of NPWS sought. Any works in the area are to cease immediately and the area is to be cordoned off until the ECoW has authorised recommencement of works.
- All temporary construction lighting is to be switched off outside daylight hours. Construction lighting is to be directed inwards into the Site to reduce indirect alteration of adjacent habitats outside the Site and minimise nocturnal impacts on faunal species.
- To reduce the level of night-time disturbance to nocturnal fauna, construction activities should be restricted to standard construction hours. Construction work will not take place outside of these hours unless in exceptional circumstances.

5.7.2.10 Protection of Bats

Construction phase mitigation for bats is to be implemented in accordance with the following best-practice guidance for bats:

- Bat Mitigation Guidelines for Ireland Ver 2. Irish Wildlife Manuals, No 134 (Marnell et al., 2022)
- 'Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes' (NRA, undated)
- 'Guidelines for the Treatment of Bats During the Construction of National Road Schemes' (NRA, 2005b)

The principal construction phase mitigation measures for bats are outlined as follows:

5.7.2.10.1 Pre-construction Bat Surveys

There were no structures identified within the site boundary of the underground wind farm collector cable and access track and the 110kV substation area.

Two trees were identified in Section 5.3.6.2.2 above as Potential Bat Roost Feature (PBFs) and having 'low – moderate' bat roosting potential (Collins, 2016). Tree one is outside the boundary of the 110kV substation area and Tree two is situated within a hedgerow inside the 110kV substation area boundary.

Pre-construction roost surveys, including emergence/re-entry surveys, as required, of both trees considered to have any potential to accommodate roosting bats, are to be carried out at the site in advance of construction commencing.

Prior to the felling of any trees identified as PBRs, detailed physical inspections of the trees potential roost features (PRFs), using endoscope and high-powered torch, and/or dusk/dawn surveys will be undertaken by a bat specialist/suitably qualified ecologist to determine if roosting bats are present.

All bats and their roosts are afforded strict legal protection by the Wildlife Acts, 1976 and 2000 and the EU Habitats Directive (under S.I. 94 of 1997). In the event that a bat roost is identified, mitigation will be recommended by the appointed ecologist, as required, and as per best practice guidance. In the event that any trees or structures are identified as confirmed bat roosts at any stage prior to or during works, it will be necessary to obtain an NPWS Derogation Licence, prior to any felling/demolition activity, or disturbance and/or removal of bats and/or their roosts.

5.7.2.10.2 Tree-felling/Vegetation Removal

All tree-felling is to be conducted in a manner sensitive to bats, and in accordance with NRA (2005). Where mature trees require felling, they will ideally be felled between September and early November, in order to avoid the disturbance of any roosting bats. Tree felling will be completed by Mid-November at the latest because bats roosting in trees are very vulnerable to disturbance during their hibernation period (November – April). Once felled, trees will be left intact on-site for a minimum 24 hours prior to disposal to allow any bats which may be present to leave.

Any accumulations of ivy growing on structures should be removed in the autumn months and left on the ground for 24 hours to allow any residing bats to exit safely.

5.7.2.10.3 Bat-boxes (Loss of potential roost-sites)

To help mitigate for loss of potentially suitable tree roosting habitat, bat boxes will be erected prior to any tree felling to mitigate for loss of potential roost-sites. These should comprise a mix of bat-box designs to attract a variety of bat species (e.g., Miramare boxes are designed for woodland species such as brown long-eared bat, while other designs such as the Schwegler Woodcrete bat boxes are suitable for species such as common pipistrelle, soprano pipistrelle, Leisler's bats and brown long-eared bats, all of which were recorded within the site during baseline surveys.

The final number and type of bat boxes required will be determined by the species recorded and number of bats or roosts that are affected and/or the category and number of PBF trees proposed to be felled. A minimum of 20 bat boxes will be required to mitigate for loss of potential roost-sites. It is recommended that these bat boxes are located on suitable trees towards the periphery of the development site. Design and installation of the bat box scheme will be overseen by a bat specialist and/or the appointed ecologist and will follow guidance in NRA (2005).

5.7.2.10.4 Lighting

Appropriate lighting will be employed during the construction phase to minimise impacts on local bat populations. Use of lighting will be minimised and avoided, where possible. Construction lighting will be targeted to minimise/avoid light spill to enable the retention of dark-corridor connectivity within the landscape for commuting bats.

Any external lighting for the proposed development should conform to the following guidelines which should be strictly implemented during the construction phase of the proposed development.

- Bat Conservation Trust (2018). Guidance Note 08/18. Bats and Artificial Lighting in the UK - Bats and the Built Environment Series.
- Bats & Lighting. Guidance Notes for: Planners, engineers, architects and developers (BCI, 2010).

5.7.2.10.5 Landscape Recommendations

Where possible within the site, replanting with native plant species will be carried out to maximise biodiversity value for bats and other fauna. Planting of native species to form hedgerows and site boundaries will provide linear features and increase connectivity for foraging bats.

5.7.2.11 Protection of Otter

- A pre-construction survey for otter should be undertaken prior to the commencement of any works as per NRA (2006) guidance in order to identify any changes within the site. The pre-construction survey should be undertaken no more than 10-12 months in advance of construction. The survey should be supplemented by an additional survey immediately prior to site works commencing if a sufficient time period has elapsed since the pre-construction survey.
- All construction site works will be undertaken in accordance with best-practice guidance set out in NRA (2006) in relation to construction works and otter. Implementation of best-practice guidelines for otter will be overseen by the appointed ecologist.
- In the event of a previously unidentified otter breeding/resting place being encountered within or in proximity of the development site, all construction activity and site works will be undertaken in accordance with relevant best-practice guidance set out in NRA (2006) in relation to construction works and otter.

5.7.2.12 Protection of Badger

5.7.2.12.1 Pre-construction surveys

As per NRA (2005), the aim of badger pre-construction surveys is to ensure that mitigation measures stipulated in this document are still adequate to address any predicted impacts to badgers and their breeding or resting places. The pre-construction surveys will establish the status of the previously identified sett and also identify any new setts within the study area that might be created in the intervening period. Prior to the commencement of any works on-site and any measures being implemented, a pre-construction badger survey will be carried out to:

- Ascertain if the existing sett on-site continues to be used by badger and at what level and determine the current status of that sett (Main, Annex, Subsidiary or Outlier) based on the sett characteristics and degree of activity,
- Confirm that no new setts have been established in the intervening period since the baseline surveys.

The pre-construction survey will comprise a survey of all suitable badger habitat within a 50 m radius of the works area (150 m where piling or blasting will be undertaken). All areas must be systematically checked for signs of badger. The pre-construction surveys are to be undertaken by a suitably qualified ecologist. The initial pre-construction survey should take place no more than 10-12 months in advance of construction.

The survey will be supplemented by an additional survey immediately prior to site clearance to check for any changes on-site/presence of new setts. Any evaluation of current use should be undertaken immediately prior to carrying out works that might affect the location in question. If there is a delay between this evaluation and undertaking works, there is a risk that the status of the sett could have changed in the intervening period.

Pre-construction survey results should be reviewed by the appointed ecologist and any additional constraints relayed to the Developer/appointed Contractor and relevant documentation prepared. The steps to be taken with regard to the affected sett are to be confirmed by the appointed ecologist in consultation with the Developer/appointed Contractor and as per the mitigation measures outlined in this report.

5.7.2.12.2 General Guidelines for Site Works in the Vicinity of Badger Setts

The NRA (2005) guidance document outlines certain general provisions with regard to site works in the vicinity of badger setts. These provisions, outlined below, will be followed where possible.

- Badger sett tunnel systems can extend up to c. 20m from sett entrances. Therefore, no heavy machinery should be used within 30m of badger setts; lighter machinery (generally wheeled vehicles) should not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance should not take place within 10m of sett entrances.
- Breeding setts will not be interfered with or disturbed during the badger breeding season (December to June, inclusive). No active sett should be interfered with or disturbed during the breeding season as badgers are vulnerable at this time of year and any sett category may contain cubs. Closure of setts during the breeding season would require monitoring to demonstrate no sett activity.
- During the breeding season (December to June, inclusive), none of the works should be undertaken within 50m of active setts nor blasting or pile driving within 150m of active setts. Works closer to active setts may take place during the breeding season provided appropriate mitigation measures are in place, e.g., sett screening, restricted working hours, etc.

During the construction phase of the development, activities may pose a threat to badger setts. In order to comply with the above guidelines:

- Before any work starts on-site, all affected badger setts will be clearly marked, and the extent of bounds prohibited for vehicles. These 'Sett Protection Zones' should extend out 30m from all sett entrances of each affected sett and should be clearly demarcated on the ground with fencing and signage. Bunting is an option on a temporary basis. Hazard tape is inadequate as it is prone to deterioration and damage by wind or cattle etc. Scrub and vegetation should not be cleared from the sett area, unless under the direction of the appointed ecologist.
- Sett protection zones serve two main purposes:
    - they protect the sett (including all underground tunnels) from damage, and
    - in the case of active setts, they reduce badger disturbance.
- Construction activities within the vicinity of affected setts may commence once setts have been evacuated, as required, and destroyed.

- Where affected setts do not require destruction, construction works may commence once recommended alternative mitigation measures to address badger have been complied with, where necessary, and under the direction of the ecologist e.g., sett screening, restricted working hours etc.
- The use of noisy plant and machinery in the vicinity of active setts should cease at least two hours before sunset.
- No artificial lighting (either during or after construction) to be positioned where it would fall on a badger sett, or well used paths leading directly from it.
- Chemicals should be stored as far away from the setts as possible (minimum 30m distance).
- Where tree felling is required, trees should be felled away from setts and must not block badger paths. Badger paths should be cleared of felled timber and scrub, where possible.
- All contractors/operators/site staff should be notified of the presence of badger on-site and made fully aware of the procedures pertaining to each sett via toolbox talks, to be given by the appointed ecologist. All contractors and sub-contractors should be instructed to keep out of the sett protection zone.

The following measures are designed to reduce general disturbance of badgers:

- Construction activity should be avoided between dusk and dawn when badgers are most active to minimise disturbance.
- Any temporarily exposed pipe systems/trenches should be capped/covered at the end of each working day to prevent badgers from gaining access.
- All exposed trenches and holes should be provided with mammal exit ramps e.g., wooden planks or earth ramps when contractors are off site.
- Water sources for badgers should be safeguarded.
- An emergency procedure should be implemented by site workers if badger/badger setts are unexpectedly encountered. All work within 50m (150m for high noise/vibration activities) should cease until the appointed ecologist has inspected the site and determined the appropriate course of action.
- Temporary construction phase lighting is to be directed internally within the site i.e., away from the existing perimeter habitat features, in particular the mature hedgerow/treelines which form sections of the proposed development sites northern boundary, and the western landholding boundary, to reduce impacts on badger and other fauna moving along these features.

5.7.2.12.3 Monitoring to Determine Badger Usage/Activity Level

If, for whatever reason, a location cannot be ruled out as a badger sett, in order to determine whether it is indeed a badger sett and what its activity status is, the location will be monitored for a brief period e.g., five or more days as follows:

- Searches for evidence of recent activity
- Placement of sticks across the entrance(s) (to determine if animals are entering or leaving)
- Placement of sand pads at entrances (to identify footprints)

These methods can be supplemented, if required, with the use of appropriately located wildlife cameras to assist in monitoring the location. All possible entrances must be simultaneously monitored.

Whichever method is used, the sett will be checked regularly during the monitoring period to ensure the method's effectiveness and reliability. A written and photographic record will be kept of methods, duration, frequency and results of monitoring[12].

If monitoring is occurring in winter and there is a particularly cold weather event, an extended period of monitoring (minimum two weeks) may be required to effectively monitor the location for presence of badger.

5.7.2.12.4 Potential Loss of Breeding/Significant Setts

NRA (2005) states that 'where a breeding/significant sett(s) will be affected by the project and where surveys indicate that suitable alternative natural setts are not present, there may be a requirement to construct an artificial sett'.

Pre-construction surveys will determine the current status of the sett and determined the level of usage at the entrance/exit located within the site boundary. It is not envisaged that an artificial sett will need to be constructed as only one entrance/exit within the boundary will blocked up/destroyed, two other entrance/exits remain within the wooded area to the north of the site boundary.

5.7.2.12.5 Exclusion of Badgers from sett

Exclusion of badgers generally should only be carried out where development will unavoidably destroy a sett, its underground tunnel and chamber system, or its immediate surroundings making it unsuitable for continued occupancy (NRA, 2005).

The proposed development will destroy one entrance/exit making that part of the sett unsuitable for occupancy. There is also a possibility that the presence of new setts may arise within the pre-construction survey area (50m radius of all works areas, 150m in the case of piling/blasting) in the intervening period (NRA, 2005).

Disused/Inactive Setts

It may be the case that the active 3-entrance sett recorded during the current study will not be used at the time of the pre-construction survey. Exclusion of badgers from currently inactive or disused setts may take place during any season. A determination that a sett is inactive or disused will require a brief period of monitoring, as per the procedure set out in Section 5.7.2.12.3, above.

Where monitoring (minimum five-day period) has indicated that a sett is disused or inactive, and to prevent reoccupation of the sett, all sett entrances shall be lightly blocked with vegetation and a light application of soil (known as 'soft blocking'). The purpose of soft blocking is to confirm/verify that an apparently disused/inactive sett is not occupied by badgers (NRA, 2005).

If the sett entrance/exit remains undisturbed for a minimum of five days, it will be destroyed immediately using a mechanical digger, under the supervision of an experienced and suitably qualified ecologist (see Section 5.7.2.12.6, below). Should there be any delay in sett entrance/exit destruction, the soft-blocked entrance should be then hard-blocked, and the sett entrance destroyed as soon as possible under the supervision of the suitably qualified ecologist. Hard blocking is best achieved using buried fencing materials and compacted soil with further fencing materials laid across and firmly fixed to blocked entrances and surrounds (NRA, 2005).

If a sett entrance is deemed active after soft blocking, the measures outlined below will be implemented.

Active Setts

Exclusion of badgers from currently active setts is only to be carried out during the non-breeding season (July to November, inclusive) (NRA, 2005).

[12] https://www.nature.scot/doc/guidance-licensing-badgers-what-badger-sett

Inactive sett entrances will be soft and then hard-blocked, as described for disused/inactive setts above. Active entrances will have one-way gates installed (plus secure proofing around the sides of the gates). The gates will be tied open for three days prior to being set to allow badgers to exit but not return. Badger-resistant ground-covering (wire mesh) can be installed over the entire sett area, securely fixed to the ground, to prevent digging of new sett entrances. During the initial three days, sticks will be placed at arm's length within the gated tunnels to establish if badgers remain within the sett.

Gates will be left installed over a minimum period of 21 days (including period with gates tied open) before the sett is deemed inactive. The sett will be visited regularly throughout the exclusion process to check for signs of activity/occupancy and to check on the integrity of the exclusion materials and make good any damage. If it is apparent that badger(s), or other animals, have breached the exclusion/dug back in, necessary repairs will be made. Any activity at all will require the procedure to be repeated or additional measures taken. If no activity is observed, then sett destruction will commence immediately following the 21-day exclusion period (NRA, 2005).

5.7.2.12.6 Procedure for Sett Entrance Destruction

The destruction of a verified disused/inactive sett entrance or a successfully evacuated sett will only be conducted under the direct supervision of a suitably qualified ecologist who is to be present throughout the procedure.

Sett entrance destruction will be undertaken with a digger, such as a tracked 12–25-ton digger, commencing at c. 25m from the outer sett entrances and working towards the centre of the sett, cutting c. 0.5m slices in a trench to a depth of 2m. The excavator will be operated by a competent person who has been fully briefed on the procedures to be implemented. Hand digging can be utilised to assess the direction and number of tunnels.

Exposed tunnels will be checked continuously by the suitably qualified ecologist for recent badger activity and/or signs indicating the presence of any other mammals, with full attention paid to safety requirements. The sett will be destroyed from several directions, in the above manner, until only the central core of the sett remains. Badgers may still be in occupation despite best practices being employed. Suitable equipment should be on-hand to deal with any badgers found remaining within the sett or any badgers injured during sett destruction (NRA, 2005). Once it has been ensured that no badgers remain, the core will then also be destroyed, and the entire area backfilled, compacted (to discourage digging of new tunnels by badgers) and made safe.

In the unlikely event that badgers are found during the sett destruction process, all excavation will cease, and the badger(s) will be allowed to freely move away from the area. The ecologist present will decide when the excavation can re-commence.

Each sett excavation should be concluded within one working day, as badgers may re-enter exposed tunnels and entrances. Construction works should commence as soon after this process as possible to reduce the probability of animals returning to the area. Proofing with strong wire mesh may be necessary to prevent badgers from returning to a sett from which they have been excluded.

5.7.2.12.7 Measures to Prevent the Injury of Badgers during Exclusion/Sett destruction

Every precaution shall be taken to ensure that the sett entrance/exit being hard-blocked or destroyed is not occupied prior to these works commencing. All mitigation works, including hard-blocking and sett destruction, will be supervised by a suitably qualified ecologist to ensure that any signs of recent occupation by badgers are noted immediately and the required action taken. Prior to any sett hard-blocking or destruction procedure, all site personnel involved will be made aware that if badgers are discovered during the procedure, then no attempt should be made to handle the animals as they can be dangerous when frightened or potentially injured.

If, during any sett exclusion or destruction procedure, a badger is found to be occupying the sett that had been deemed inactive, works will cease and NPWS shall be contacted immediately.

In the event that a badger is found injured during any sett exclusion or destruction procedure, NPWS shall be contacted immediately, along with the ISPCA/local wildlife rescue/wildlife vet capable of treating the animal.

A report detailing badger exclusion procedures and sett destructions undertaken, and any other relevant issues, will be prepared by the suitably qualified ecologist and submitted to LCC/NPWS.

5.7.2.12.8 Summary of Mitigation Measures at Identified Setts which will be impacted by the Proposal

- Conduct pre-construction surveys.
- Conduct occupancy survey/appropriate monitoring in advance of closure.
- If sett deemed inactive/disused, then:
    - Soft blocking
    - Sett exclusion (if necessary)
    - Sett destruction
    - Monitoring/supervision
- If sett deemed active, then:
    - Soft blocking of inactive entrances, followed by hard blocking.
    - Installation of one-way gates plus proofing on active entrances (gates left in-situ for minimum 21- day period).
    - If no activity, sett destruction immediately after 21-day period.
    - Monitoring/supervision

5.7.2.13 Protection of Aquatic Species and Otter

Aquatic species identified as KERs comprise white-clawed crayfish and Atlantic salmon. The main negative impacts to these species and otter are in relation to any negative effects on water quality downstream from the proposed development. All water quality mitigation measures listed in Section 5.7.2.3 and within the CEMP will be implemented and ensure there are no negative impacts to water quality during the construction phase of the proposed development.

5.7.3 Operational Phase

5.7.3.1 Lighting

Underground wind farm collector cable and access track

Both badger and bats were recorded at this section of the proposed development and are species most sensitive to lighting. Once the underground collector cable and access route is constructed there will be no static lighting in place during the operational phase and this section of the proposed development will remain darkness as it exists at present.

The 110kV substation

The 110kV substation will mostly be unmanned with operation and monitoring activities being carried out remotely with the aid of computers connected via a telephone broadband link. This structure will have minimal lighting and where appropriate, external security lighting should be set on motion sensors and set to as short a possible a timer.

110kV Underground grid route

There will be no changes to the current lighting along this section of the proposed development and therefore will remain as it does at present.

5.8 Residual Effects

Residual effects are from impacts that remain, once mitigation has been implemented or, impacts that cannot be mitigated.

Provided all mitigation measures are implemented in full and remain effective throughout the construction operational, and decommissioning phase of the proposed development, no significant residual effects on the KERs are expected from the proposed development.

Table 5.36 below provides a summary of the predicted residual impacts for the KERs at the proposed development site.

Table 5.36. Predicted residual impacts for the KERs

Receptor	Construction phase effects (without mitigation)	Operational phase effects (without mitigation)	Mitigation Measures	Residual Effects
Habitats				
Mixed Broadleaved Woodland (WD1)	The proposal will require an overall 0.12ha loss of this habitat type. Direct habitat loss effects are assessed as **Permanent, Not significant, Negative effects.**	No impacts predicted.	N/a	No significant residual effects.
Depositing/lowland river (FW2)	Potential habitat alteration effects are assessed as **Temporary to Short-term, Moderate, Negative effects.**	No impacts predicted.	Implementation of CEMP Best Practice & Site Management	**Temporary, Not significant, Negative** residual effects. No significant residual effects.
River Barrow	Potential habitat alteration effects are assessed as **Temporary to Short-term, Moderate, Negative effects.**	No impacts predicted.	Implementation of CEMP Best Practice & Site Management	**Temporary, Not significant, Negative** residual effects. No significant residual effects.
Scrub (WS1)	The proposal will require an overall 1.31ha loss of this habitat type. Direct habitat loss effects are assessed as **Permanent, Not significant, Negative effects.**	No impacts predicted.	N/a	No significant residual effects.
Cutover bog [Recolonising] (PB4 [R])	The proposal will require an overall 0.44ha loss of this habitat type. Direct habitat loss effects are assessed as **Permanent, Not significant, Negative effects.**	No impacts predicted.	N/a	No significant residual effects.
Mixed broadleaf/conifer woodland (WD2)	The proposal will require an overall 0.463ha loss of this habitat type. Direct habitat loss effects are assessed as **Permanent, Not significant, Negative effects.**	No impacts predicted.	N/a	No significant residual effects.
Scrub (WS1)/ Dense bracken (HD1)	The proposal will require an overall 1.31ha loss of this habitat type. Direct habitat loss effects are assessed as **Permanent, Not significant, Negative effects.**	No impacts predicted.	N/a	No significant residual effects.

Receptor	Construction phase effects (without mitigation)	Operational phase effects (without mitigation)	Mitigation Measures	Residual Effects
Mosaic – Cutover bog (PB4)/ Scrub (WS1)/	The proposal will require an overall 2.53ha loss of this habitat type. Direct habitat loss effects are assessed as **Permanent, Not significant, Negative effects.**	No impacts predicted.	N/a	No significant residual effects.
Bog woodland (WN7)/ Scrub (WS1)	The proposal will require an 0.63ha loss of this habitat type. Direct habitat loss effects are assessed as **Permanent, Not significant, Negative effects.**	No impacts predicted.	N/a	No significant residual effects.
Scrub (WS1)/ Wet grassland (GS4)	The proposal will require an overall XX 0.723ha loss of this habitat type. Direct habitat loss effects are assessed as **Permanent, Not significant, Negative effects.**	No impacts predicted.	N/a	No significant residual effects.
Treeline/Hedgerow (WL1/WL2)	The proposal will require an overall 0.155km loss of this habitat type. Direct habitat loss effects are assessed as **Permanent, Not significant, Negative effects.**	No impacts predicted.	N/a	No significant residual effects.
Fauna				
Bats	The loss of potential bat roosts is assessed as **Permanent, Moderate to Significant, Negative Effects.** Loss/alteration of bat foraging/commuting habitat via vegetation removal) is assessed as **Permanent, Moderate, Negative Effects** Potential direct/indirect disturbance/displacement effects assessed as **Temporary to Short-term, Slight to Moderate, Negative Effects**	No significant impacts predicted.	No lighting along the access track of the underground collector cable and only minimal lighting at the 110Kv substation. Erect a minimum of No. 20 bat boxes.	Potential roost loss effects are assessed as **Permanent, Slight to Moderate, Negative residual effects.** Loss/alteration of bat foraging habitat effects are assessed as **Permanent, Slight to Moderate, Negative residual effects.** Potential disturbance/ displacement effects are assessed as **Temporary to Short-term, Slight, Negative residual effects.**

Receptor	Construction phase effects (without mitigation)	Operational phase effects (without mitigation)	Mitigation Measures	Residual Effects
				No significant residual effects
European Otter	Loss of minimal area of potential foraging habitat (field drains) assessed as a **Permanent, Slight, Negative Effect**. Potential disturbance/displacement effects (noise/ human activity/water quality/alteration of habitat) are assessed as **Temporary to Short-term, Slight, Negative Effects.**	No impacts predicted	Implementation of CEMP Best Practice & Site Management	Loss of habitat effects assessed as **Permanent**, **Imperceptible, Negative residual effects.** Potential disturbance/ displacement effects assessed as **Temporary to Short-term, Not significant, Negative residual effects** No significant residual effects.
Badger	Loss/closure of existing badger sett entrance/exit is assessed as a **Permanent, Moderate, Negative Effect.** Habitat loss/alteration effects assessed as **Permanent, Moderate, Negative Effects.** Disturbance and/or displacement effects assessed as **Temporary to Short-term, Moderate, Negative Effects.**	No significant impacts predicted.	Best Practice & Site Management Specific badger protection measures	Loss/closure of existing badger sett entrance/exit assessed as **Permanent, Slight, Negative residual effects**. Habitat effects assessed as Permanent, **Slight, Negative residual effects**. Potential disturbance/ displacement effects assessed as **Temporary to Short-term, Not-significant to Slight, Negative residual effects** No significant residual effects.
White-clawed crayfish	Potential habitat loss/alteration effects assessed **as Permanent, Slight, Negative effects.**	No impacts predicted.	Implementation of CEMP Best Practice & Site Management	Loss of habitat effects assessed as **Permanent, Imperceptible, Negative residual effects.**

Receptor	Construction phase effects (without mitigation)	Operational phase effects (without mitigation)	Mitigation Measures	Residual Effects
	Potential disturbance/ displacement effects are assessed as **Temporary to Short-term, Slight, Negative Effects.**			Potential disturbance/ displacement effects assessed as **Temporary to Short-term, Not significant, Negative residual effects** No significant residual effects.
Atlantic salmon	Potential habitat loss/alteration effects assessed as **Permanent, Moderate, Negative effects.** Potential disturbance/ displacement effects are assessed as **Temporary to Short-term, Slight, Negative Effects.**	No impacts predicted	Implementation of CEMP Best Practice & Site Management	Loss of habitat effects assessed as **Permanent, Imperceptible, Negative residual effects.** Potential disturbance/ displacement effects assessed as **Temporary to Short-term, Not significant, Negative residual effects** No significant residual effects.

5.9 Summary

Provided that the proposed development is constructed in accordance with the design, best practice and mitigation that is described within this report, significant effects on KERS are not anticipated at any geographical scale.

There will be no further changes to the environment during operation phase just some minor maintenance works when necessary, so effects during the operation phase are not significant.

Residual effects on biodiversity including effects on designated sites, habitats, flora, fauna and water quality are not considered significant.

The application of construction phase mitigation and protection measures will ensure that no significant residual ecological impacts either alone or in combination with other plans or projects, including the other elements of the Dernacart Wind Farm will arise from the proposed development.

5.10 References

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