6 BIODIVERSITY

6.1 INTRODUCTION

TOBIN was commissioned by Manogate Ltd to carry out the Biodiversity Impact Assessment for the proposed Ballyfasy Wind Farm in County Kilkenny (herein referred to as the proposed project[1]). This chapter should be read in conjunction with Chapter 2 (Description of the Proposed Project) of this EIAR.

6.2 BRIEF DESCRIPTION OF THE PROPOSED PROJECT

The proposed project, as detailed in Chapter 1 (Introduction) and Chapter 2 (Description of the Proposed Project) of this EIAR, comprises:

- A wind farm of 10 no. turbines, onsite 110 kilovolt (kV) substation and ancillary infrastructure such as turbine foundations, hardstanding areas, borrow pits and access roads. Design flexibility (i.e., tip height, rotor diameter and hub height) is being sought from An Coimisiún Pleanála for the turbine ranges and substation layout used by the proposed project;
- Grid Connection Options (GCO) (two options being considered). Design flexibility is being sought from An Coimisiún Pleanála for the GCO's; and
- Works along the proposed Turbine Delivery Route (TDR).

Two GCO's are being considered to connect the proposed wind farm to the national grid. Only one GCO will be constructed for the project. Proposed GCO One is a 12km long underground cable connection from the proposed onsite 110 kV substation to the consented Castlebanny Wind Farm 110 kV substation. Proposed GCO Two will connect the onsite 110 kV substation to the existing 110kV Great Island-Kilkenny Line via a loop in connection. Both GCO's have been fully assessed within this chapter. Along the proposed TDR, works will be required to allow the delivery of oversize loads, these areas are referred to as proposed TDR works areas. The design flexibility ranges have been fully considered within this assessment.

Further details on the proposed project are provided in Chapter 2 (Description of the Proposed Project). Various measures were implemented at the design phase of the proposed project to reduce potential ecological impact; this is discussed further in Section 6.11.

6.3 BRIEF DESCRIPTION OF THE PROPOSED PROJECT SITE

The proposed project (see Chapter 1 [Introduction] Figure 1-1) is located in County Kilkenny (approximate ITM co-ordinates: X 661313.4, Y 625632.7) between the villages of Listerlin (ca. 3 kilometres (km) northeast), Mullinavat (ca. 4 km west), Glenmore (ca. 5 km southeast), and Slieverue (ca. 9 km south). The proposed project is located ca. 31 km south of Kilkenny City, and ca. 12 km north of Waterford City.

The proposed wind farm study area is ca. 348.14 hectares (ha) in size, with a total footprint of ca. 53 ha for the proposed wind farm infrastructure. The existing land-use within the proposed wind farm site and surrounding area consists largely of agricultural land with areas of conifer

[1] Reference to the 'proposed project' refers to the whole development which includes the wind farm site and all associated infrastructure (e.g., grid connection and turbine delivery route).

plantations, which is primarily dense and mature with smaller areas of immature plantation, also present. The topography of the wind farm site varies from around 140 metres Ordnance Datum (mOD) to 220 mOD. The highest points are found in the north-east areas, while the southwest corner has the lowest elevation.

As previously outlined, two GCO's are being considered;

- Proposed GCO One is 12 km in length and mainly follows the public road network northwards via local roads L7499 and L3417, before crossing at the junction at Three Friars Cross (regional road R704), continuing north along the L3418 local road, before travelling west over agricultural grassland and conifer plantation and terminating at the consented Castlebanny 110 kV substation; and
- Proposed GCO Two (ca. 2.3 km) will connect into the existing 110 kV Great Island-Kilkenny overhead line which passes over the east of the proposed wind farm site. This grid connection option travels from the proposed onsite substation, along the proposed site access roads between turbines T3 and T4 heading east towards turbine T6 before connecting to existing overhead lines.

The proposed TDR follows the public road network for a approximately 28 km from the Port of Waterford to the proposed project following the national road N29 (Port Road), the N25 (Waterford bypass), the M9 motorway to Mullinavat, County Kilkenny before exiting to the regional road R704 and then travelling south at the junction at Three Friars Cross along the local L3417 road.

The proposed works along the proposed TDR to allow for the delivery of oversized components to the proposed wind farm site[2] are located in the townlands of Rathpatrick, Granny, Garrandarragh, Ballynoony West, Ballymartin, Smithstown and Bishopsmountain, County Kilkenny. Sections of minor widening of the local roads and additional works such as hedgerow trimming and temporary demounting of signage, etc. will also be required at 13 locations along the route (see Appendix 2-1).

6.4 PURPOSE OF THIS REPORT

The purpose of this Biodiversity Chapter is to:

- Describe the baseline ecological conditions of the proposed project and study area, collected through both desk study and field surveys;
- To determine the ecological value and sensitivity of the identified ecological receptors;
- Assess the effects of the potential impacts, including direct, indirect and secondary impacts which may result from the construction, operation and/or decommissioning phases of the proposed project;
- Assess the cumulative effects of the proposed project with other plans/projects;
- Set out the design, mitigation and compensation measures required, if any, to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;

[2] Reference to the 'proposed wind farm site' refers to the proposed turbines, on-site substation and ancillary infrastructure.

- Provide an assessment of the significance of any residual effects in relation to the effects on biodiversity and the legal and policy implications; and
- Identify appropriate enhancement measures and/or post-construction monitoring if required and how these could be delivered.

6.5 Relevant Legislation and Policy

6.5.1 Legislation

The following legislation is relevant to this chapter:

- The Habitats Directive 92/43/EEC, as amended;
- European Communities (Birds and Natural Habitats) Regulations 2011 – 2021 (S.I. No. 293 of 2021) as amended, with particular reference to the Third Schedule of the European Communities Regulations 2011 (S.I. No. 477 of 2011) which deals with invasive non-native species;
- The Inland Fisheries Acts 1959-2027, as amended;
- The EU Water Framework Directive (2000/60/EC);
- The EIA Directive 2011/92/EU, as amended by Directive 2014/52/EU;
- Wildlife Acts 1976 to 2023 (as amended), herein referred to as the Wildlife Act; and
- Flora (Protection) Order 2022 (S.I. No. 235 of 2022).

The relevant legislation is provided in more detail in Appendix 6-1.

6.5.2 Local Planning Policy

The relevant local planning policies have been extracted from the Kilkenny City and County Development Plan 2021 - 2027 (Volume 1 County, Chapter 9: Heritage, Culture and the Arts) and have been set out in Appendix 6-1 of this report. These policies are concerned with the protection and/or enhancement the ecology of County Kilkenny. In broad terms these objectives and policies aim to ensure correct measures are put in place to identify and protect natural heritage and important environmental features within Kilkenny County.

6.6 Methods

6.6.1 Study Area

The study area for the desk study and field surveys was identified through consideration of the nature of the proposed project, the size and location of the proposed project and the ecological features likely, or known, to be present (e.g., European or designated sites).

The study area used for the biodiversity assessment was defined by the zone of influence associated with the proposed project.

6.6.2 Zone of Influence

The '*zone of influence*' (ZoI) for a development is the area over which ecological features may be subject to significant effects due to the proposed project and associated activities. This is likely to extend beyond the proposed project, for example where there are ecological or hydrological links beyond proposed project site boundary. The ZoI will vary for different ecological features depending on their sensitivity to an environmental change (CIEEM, 2018).

The ZoI for the proposed project was identified through a review of the nature, size and location of the proposed project, the sensitivities of the ecological features, identification of sources and pathways and the known impacts and effects likely to arise as a result of the proposed project and the potential for cumulative effects.

The ZoI for the proposed project is described hereunder.

- The ZoI for habitat loss is confined to the proposed wind farm site and specifically to habitats within the footprint of turbines and associated infrastructure (i.e., access roads, hardstanding) where permanent habitat loss will occur. Permanent habitat loss is not associated with the GCO's;
- The ZoI for water quality impacts are confined to waterbodies present within or downstream of the proposed project and are not considered effective once the first waterbody of depositional nature is reached (i.e., lake water body; transitional water body). The ZoI for hydrological impacts for the proposed project is therefore defined as waterbodies within, adjacent to, or downstream of the proposed project until the Nore Estuary (Water Framework Directive [WFD] waterbody code: IE_SE_100_0400) and Middle Suir Estuary (IE_SE_100_0550) are reached;
- The ZoI for groundwater impacts is confined to the same ground waterbody as the proposed project, which in this case is Inistioge (IE_SE_G_076) and Mullinavat (IE_SE_G_155);
- The ZoI for air quality (i.e., dust impacts) for the proposed project is defined to be within the spatial limit of 50 m to 250 m (50 m from the proposed wind farm site and up to 250 m from the site entrance) (IAQM, 2024). As per the IAQM guidance, European sites are considered a 'high sensitivity receptor' and therefore, the ZoI for dust impacts to vegetation is defined to be 50 m surrounding all turbines and associated infrastructure (e.g., access roads and GCO's), areas of stockpiling, burrow pits and access roads utilised by machinery;
- The ZoI for disturbance to terrestrial mammals was defined with regard to the NRA guidance related to badger (NRA, 2005) and guidance related to otter (NRA, 2006) which state that noise impacts from construction works can impact breeding badger setts/otter holts within 150 m of a noise source (i.e., proposed infrastructure). Other protected mammal species potentially present at the locality (e.g., hedgehog [*Erinaceus europaeus*], fallow deer [*Dama dama*]) are likely to have a smaller ZoI, as impacts are predominantly associated with habitat damage and will therefore be captured within the 150 m survey buffer;
- The ZoI for potential impacts to bat species (e.g., collision risk, displacement) was determined using NatureScot guidance (2021) and defined as a 250 m buffer surrounding each turbine.

6.6.3 Consultation

Consultation with various state agencies and environmental Non-Governmental Organisations (NGOs) was undertaken in September 2023, October 2024 and May 2025 (Development Applications Unit (DAU) only) to inform this EIAR. The following organisations were consulted with respect to biodiversity:

- DAU of the National Parks and Wildlife Service (NPWS);

- Inland Fisheries Ireland (IFI);
- Bat Conservation Ireland (BCI); and
- Irish Wildlife Trust (IWT).

The following paragraphs set out the responses received in relation to Biodiversity from the above consultees. Further information on consultation responses is provided in Chapter 1 – (Introduction) of this EIAR. At the time of writing this chapter, no response was received from BCI and IWT.

IFI

A response was received from IFI on the 17th October 2023 and on the 18th November 2024 which highlighted a number of ecological concerns which included; ecological water quality and no deterioration of such, baseline ecological assessments (including fish species and biological surveys), management of materials to ensure no matter reaches surface waters, restriction on instream works during the period 1st July to 30th September, minimisation of water crossings, soil erosion, burrow pit locations and to ensure full environmental assessments are undertaken (e.g., EIAR, Natura Impact Statement [NIS], Construction Environmental Management Plan [CEMP]). In response to IFI concerns, TOBIN have undertaken a full suite of aquatic surveys (in 2023, 2024 and 2025), both within and downstream of the proposed project, in order to inform the planning application. TOBIN has also prepared this EIAR and associated ecological reports which fully assessed the receiving aquatic environment. Stringent mitigation measures will be implemented as part of the proposed project and have been outlined within this report (see Section 6.12.2) and within the NIS (submitted as part of this planning application [TOBIN, 2025]) which will ensure the protection of all hydrologically connected watercourses during all works associated with the proposed project.

DAU

A response was received from the DAU on the 20th November 2024 (reference: G Pre003462024) however the response related to archaeology only and no reference was made to ecological concerns. Further correspondence was made on the 27th May 2025, and a response was received on the 5th June 2025, whereby DAU acknowledged receipt and had no further comment on this consultation. No reference was made to ecological concerns by the DAU.

6.7 Baseline Data Collection

6.7.1 Desk Study

The ecological desk study for the proposed project included the following;

- Identification of all sites designated for nature conservation (i.e., Special Conservation Areas [SAC], Special Protection Areas [SPA], Natural Heritage Areas [NHA] and proposed NHA [pNHA]) within the study area of the proposed project (NPWS, 2025a);
- A species list for the proposed wind farm site was generated using the National Biodiversity Data Centre (NBDC) map viewer (NBDC, 2025). Only rare or protected species recorded during the past 10 years within the 10 km grid squares (hectad) S52 and S62, which encompass the proposed project, were evaluated;
- Article 17 habitats and species datasets (NPWS, 2019a; NPWS, 2019b), National Survey of Native Woodlands 2003-2008 (NPWS, 2008), Ancient and Long Established

Woodlands (NPWS, 2012a) and the Irish Semi-Natural Grassland Survey 2007-2012 (NPWS, 2012b) available from National Parks and Wildlife Services (NPWS) were studied to assess the presence of such within, and with connectivity to, the proposed wind farm site; and

- A review of aerial imagery basemaps of Open Street Map to determine broad habitats that occur within the study area (OSM, 2024).

6.7.2 Field Surveys

A range of ecological field surveys were undertaken within the study area in September 2022, September 2023, August 2024, April and August 2025 in order to inform the impact assessment of the proposed project. A summary of the surveys is provided hereunder.

6.7.2.1 Habitat Surveys

Initial habitat surveys were conducted on the 19th and 20th of September 2022 by TOBIN Ecologists within the study area of the proposed project (i.e., proposed project site boundary [refer to Chapter 1 (Introduction) Figure 1-1]). Additional habitat surveys were conducted on the 25th to 28th of September 2023. In 2024, up-to-date habitat surveys were undertaken on the 12th to 15th of August by TOBIN Ecologists. Surveys of proposed GCO One and the proposed TDR were undertaken on the 10th and 11th of April 2025 by TOBIN Ecologists.

Habitat surveys were undertaken following methodologies outlined within (Smith *et al.*, 2011) and (NRA, 2008b) guidelines. All habitats encountered during the multidisciplinary survey were classified in accordance with Fossitt (2000) with Annex I habitats identified using the '*Interpretation Manual of EU Habitats*' (EC, 2013). Flora species listed under the Flora Protection Order (FPO) and listed within the Red List were also searched for (NRA, 2008b; Government of Ireland, 2022, Jackson *et al.*, 2016).

Surveys for invasive non-native species (INNS) were carried out during all habitat surveys using guidance from the NBDC '*Ireland's Regulated Invasive Alien Plant Species*' (NBDC, 2025) and '*Field Guide to Invasive Species in Ireland*' (Early *et al.*, 2018).

Any mosses, lichens and/or liverworts encountered during habitat surveys were classified using '*Mosses and Liverworts of Britain and Ireland a field guide*' (BBS, 2010) and '*Lichens of Ireland Great Britain: A Visual Guide to their Identification*' (Whelan, 2024).

6.7.2.2 Mammals

Terrestrial mammal surveys were undertaken in conjunction with habitat surveys on the 19th and 20th of September 2022, 25th to 28th of September 2023 and 12th to 15th of August 2024.

Terrestrial mammal surveys were carried out in line with guidance in NRA (2008a). All signs and tracks were evaluated as they were encountered in the field (Bang *et al.* 2006). The survey area was defined by the ZoI described in Section 6.6.2.

Target surveys for specific protected mammal species (species identified as likely to be present during the desk study) was also undertaken during habitat surveys and is discussed hereunder.

6.7.2.2.1.1 Otter

Otter surveys were carried out following the NRA (2008a) guidelines to check for any evidence of otter activity such as holts (breeding and temporary), couches, slides, feeding remains and

territorial marking points (spraints) at waterbodies (including drains) within 150 m to any proposed infrastructure site to confirm otter presence in the area (as described in Section 6.6.2).

6.7.2.2.1.2 Badger

The presence and activity of badger was surveyed following the NRA (2005a) guidelines within 150 m of the proposed project (as described in Section 6.6.2). Any badger signs such as setts, tracks, latrines, snuffle holes and feeding signs were recorded.

6.7.2.2.1.3 Bat Surveys

All trees within the proposed project were assessed for bat roost potential using the Bat Tree Habitat Key (BTHK, 2018) and the classification system used is from Collins (2023).

An array of bat surveys were conducted within the proposed wind farm site (250 m buffer [as described in Section 6.6.2]) as follows:

- Habitat suitability assessment: Daytime walkover on the 16th and 17th July 2025 to identify the potential suitability of features foraging and commuting bats following NatureScot (2021) and Collins (2023) guidelines;
- Potential Roost Assessment (PRA) (as per Collins, 2023) on the 16th and 17th July 2025: Detailed search of buildings/structures for features (e.g., gaps in mortar, slipped tiles) which may be suitable for bat roosting which were then categorised according to their potential to support roosts and the conservation value of the roost resource. Surveys were conducted within 250 m buffer of turbine locations and 30 m surrounding proposed infrastructure (Figure 6-1);
- Ground Level Tree Assessment (GLTA) (as per Collins, 2023) on the 16th and 17th July 2025: Detailed assessment of tree features from the ground for Potential Roost Features (PRF) (e.g., splits, cracks, woodpecker holes) which may be suitable for bat roosting were surveyed (Figure 6-1). The trees were categorised according to their potential to support roosts and the conservation value of roost resource;
- Dusk Emergence Surveys (as per Collins, 2023) on the 11th September 2025: Dusk emergence surveys commenced 15 minutes before sunset and concluded 90 minutes after sunset. The surveys were determined by the results of the PRA. Surveyors with audio recorders (Batlogger M2) and Night Vision Aids (NVA) infra-red cameras were deployed at two buildings (B1 and B2) (Figure 6-2) to determine the presence/likely absence of roosting bats;
- Aerial/Close Inspection Surveys (as per Collins, 2023) on the 16th and 17th July and 9th September 2025: These surveys were determined by the results of GLTA. A total of 16 trees (Figure 6-3) were subject to aerial inspections by a team of certified tree climbers. Surveyors used ropes to undertake aerial PRA to catalogue what PRFs are present (if present) on trees recorded during the GLTA; and
- Automated Detector Surveys (Spring: 6th to 15th May 2025; Summer: 1st to 11th July 2025 and Autumn: 19th to 29th August 2025) (as per NatureScot, 2021 and Collins, 2023): Ten detectors (Wildlife Acoustics Song Meter Mini 2) were deployed at ground level at the proposed turbine locations (Figure 6-4) for a minimum of 14 nights per season.

Detailed bat survey methodology is provided in Appendix 6-5.

Figure 6-1: Potential Roost Assessment (PRA) and Ground Level Tree Assessment (GLTA) Survey Area

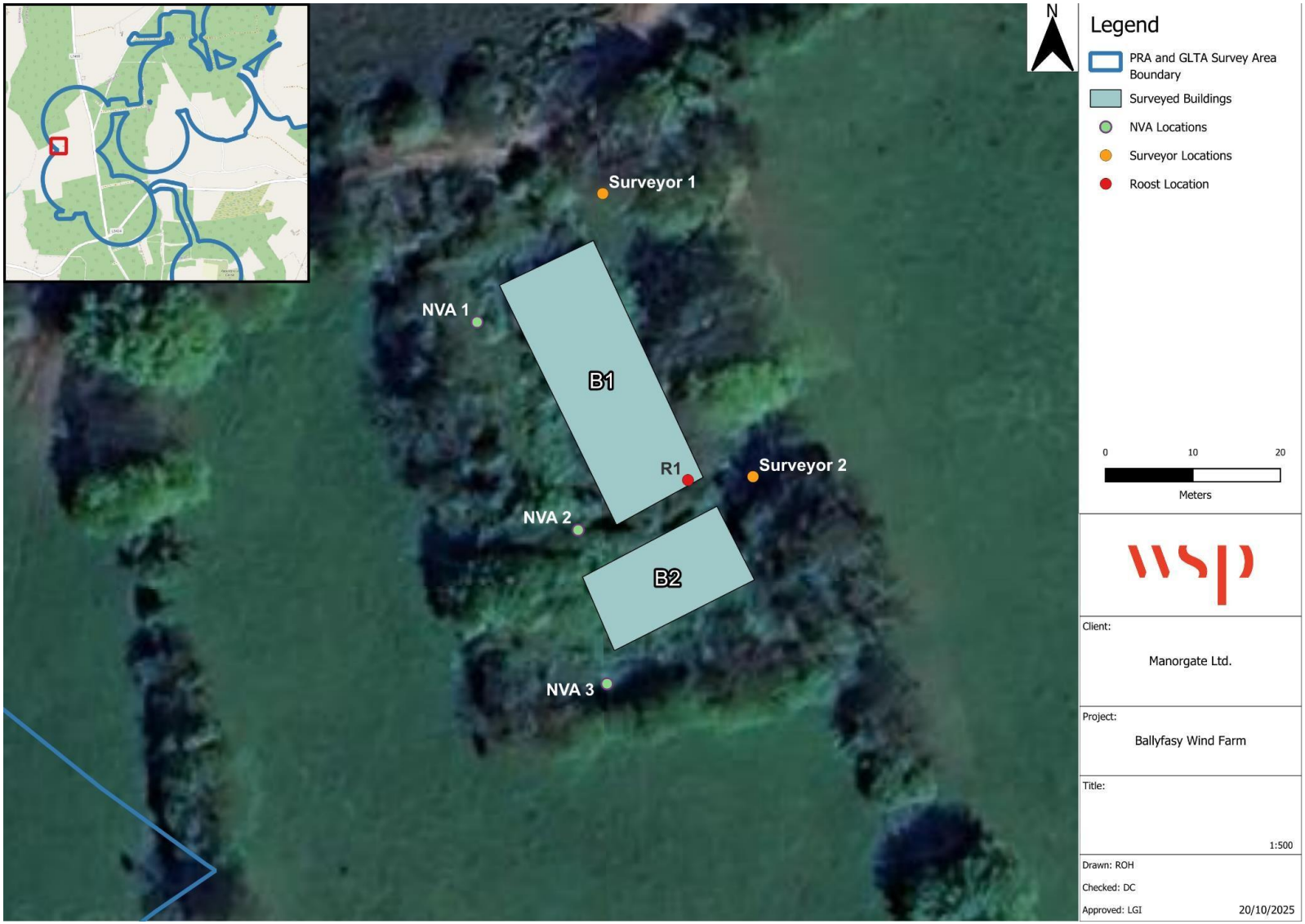

Figure 6-2: Dusk Emergence Bat Survey of Buildings

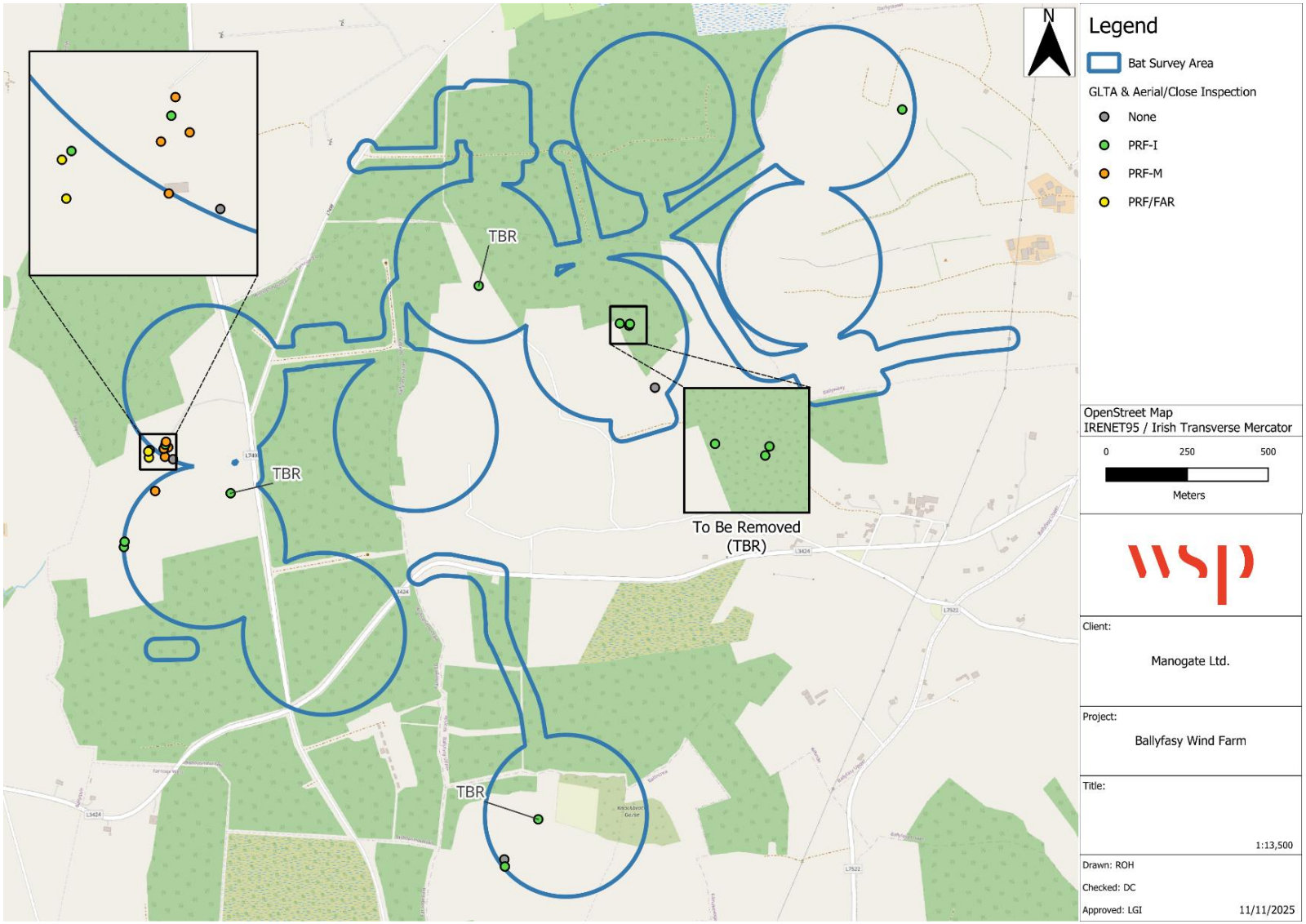

Figure 6-3: GLTA and Aerial/Close Inspection with Tree Survey Results

Figure 6-4: Locations of Bat Static Detectors

6.7.2.2.1.4 Pine Marten

Pine marten (*Martes martes)* surveys were carried out following the NRA (2008b) guidelines. Given the nocturnal nature of this species, a search of their suitable habitat (conifer and broadleaved woodland habitat) within 150 m of the proposed project (as described in Section 6.6.2) was carried out for the presence of activity such as scat and potential dens.

6.7.2.2.1.5 Red Squirrel

Red squirrel (*Sciurus vulgaris*) surveys were undertaken in suitable habitat (coniferous and broadleaved woodlands) following survey techniques outlined in NRA (2008b). Direct observation, drey counts and feeding remains were carried out in suitable habitats.

6.7.2.2.1.6 Other Mammals

Other protected mammal species such as red deer (*Cervus elaphus*), fallow deer, Irish stoat (*Mustela erminea hibernica*), Irish hare (*Lepus timidus hibernica*), west European hedgehog and pygmy shrew (*Sorex minutus*) may also occur within the proposed wind farm site. No species-specific surveys were undertaken for these protected species for which field signs are less frequent and/or reliable than other larger mammals. However, during all survey's attention was paid to search for activity signs such as searching soft muds for tracks, and scat. The ecological survey techniques were derived from NRA (2008b) guidance.

6.7.2.2.2 Amphibians and Reptiles

The common frog (*Rana temporaria*), smooth newt (*Triturus vulgaris*) and the common lizard (*Lacerta vivipara*) have a widespread distribution in Ireland. The following sections describe the survey methodologies undertaken for these species.

6.7.2.2.2.1 Common Frog

A common frog survey was carried out in suitable habitat within the proposed wind farm site, such as within tyre ruts, drainage ditches and small ponds following methodologies outlined in the NRA (2008b) and Reid *et al.* (2013) guidelines. No net dipping, which requires a licence, was carried out. The visual daytime searching survey included the searching of waterbodies for signs of frogs and/or tadpoles.

6.7.2.2.2.2 Common Lizard

The common lizard is widespread in Ireland and occurs in suitable habitats such as stone walls, dry banks, heathland and bog habitats (King *et al.*, 2011). When encountered, all suitable habitat (e.g., woodlands, heath, grassland) was searched for the presence of lizard during the field surveys.

6.7.2.2.2.3 Smooth Newt

A smooth newt survey, which included visual daytime searches for adults and juveniles (efts) and egg inspection, was carried out within suitable habitat (i.e., small pools and drainage ditches) within the proposed wind farm site, following methodologies outlined in the Meehan (2013) guidelines. The suitable survey sites were surveyed during the day by walking around the perimeter of the water body, stopping every 2 m to examine the water for newts of all life cycle stages Meehan (2013). No trapping or net dipping, which requires a licence, was carried out.

6.7.2.2.3 Invertebrates – Lepidoptera

6.7.2.2.3.1 Marsh Fritillary

Marsh fritillary (*Euphydryas aurinia*) surveys were carried out by TOBIN Ecologists on the 11th of August 2025 within the study area of the proposed project. Survey methodology followed the UK Butterfly Conservation Monitoring Scheme Methodology for Marsh Fritillary Larval Webs (UKBMS 2019). Larval surveys were carried out in sunny conditions during the optimal survey period (August to September) when colonies of individuals are known to construct conspicuous webs over devil's-bit scabious (*Succisa pratensis*) leaves and adjacent vegetation.

6.7.2.3 Aquatic Surveys

Aquatic surveys were conducted on the 19th and 20th of September 2022, on the 12th to 15th of August 2024 and on the 10th, 11th of April 2025 and 11th and 12th of August 2025 by TOBIN Ecologists, within the study area of the proposed project. Aquatic surveys consisted of biological river quality (aquatic macroinvertebrate species composition) as per McGarrigle *et al*., (2002), the presence/absence of protected aquatic species including that of white-clawed crayfish (*Austropotamobius pallipes*), Atlantic salmon (*Salmo salar*), lamprey species, freshwater pearl mussel (*Margaritifera margaritifera*), suitability of habitat for European eel (*Anguilla anguilla*) and the evaluation of aquatic habitats (both instream and riparian habitat).

6.7.2.3.1 Watercourse Surveys Site Selection

Representative survey locations (see Figure 6-5 and Figure 6-6) on watercourses within the within the ZoI of the project were selected for surveying within areas of suitable habitat, using expert judgement and consideration of the proposed project preliminary site layout, taking into account the following:

- Aquatic survey sites within the ZoI of the proposed project: aquatic survey sites along watercourses within the proposed works areas, including installation sites for turbines and road crossings, were, where feasible, selected. These sites were selected based on the proposed project site layout;
- Aquatic survey sites downstream of the proposed project: the morphology, gradient, size and flow type in terms of the potential downstream export of pollution and sedimentation through mixing zones, were considered during the selection of sites downstream of the proposed project. While survey sites downgradient of the proposed project may be influenced by external factors not related to the proposed project, downstream biota are nonetheless receptors for the proposed project, and acquisition of baseline information at these locations is considered relevant to provide a complete understanding of the receiving environment and aquatic sensitivities; and
- Aquatic survey sites upstream of the proposed project: representative control sites not impacted by the proposed project were also selected (i.e., typically sites located immediately upstream of the proposed project). These control sites represent watercourses of similar morphology, gradient, size and flow type as located within or downstream of the proposed project.

Aquatic survey sites were also selected based on safe accessibility, previous Q-value status from Environmental Protection Agency (EPA) surveys, stream order, and at locations which would provide a good representation of the overall aquatic ecology throughout the study area.

The project study area includes four watercourses which are outlined in Table 6-1 for the purpose of this report all waterbodies are referred to using WFD naming conventions.

Table 6-1: Waterbodies Within the Study Area of the Proposed Project

WFD River Waterbody	WFD Code	EPA Name	EPA Code
Arrigle_010	IE_SE_15A020100	Smithstown 15	15_1470
Arrigle_020	IE_SE_15A020250	Mullenhakill	15_637
Smartscastle Stream_010	IE_SE_16S070500	Smartscastle (Stream)	16_3474
Blackwater (Kilmacow)_020	IE_SE_16B020091	Ballyknockbeg	16_1485

Given that the footprint of the proposed wind farm site is located in the headwaters of several small streams and rivers (Arrigle_010 and Smartscastle Stream_010), tributaries were investigated at locations ca. 2.7 km downstream of the proposed wind farm site.

A baseline aquatic ecological assessment was carried out on the Arrigle_010, Arrigle_020, Smartscastle Stream_010 and Blackwater (Kilmacow)_020 within and downstream of the proposed wind farm site, including control sites not hydrologically connected to the proposed project. A total of 18 aquatic survey sites were selected within the project study area, on known watercourses mapped by the EPA/Ordnance Survey Ireland (OSI). All aquatic survey sites were accessed using public roadways, forest tracks, and across private lands where permitted.

Along the proposed GCO One, kick sampling was carried out at four watercourses (three of which were unmapped/unnamed watercourses which ultimately lead downstream to the Arrigle_020) and a visual aquatic assessment was carried out at two locations; one on the Arrigle_020 and one on an unmapped/unnamed watercourse which leads downstream to the Arrigle_020. The watercourses are crossed by the proposed GCO One (via horizontal directional drilling).

A further breakdown of aquatic survey sites is provided in Appendix 6-2. The aquatic survey locations are also illustrated in Figure 6-5 and Figure 6-6.

Legend

- Proposed Wind Farm Boundary
- Rivers

Aquatic Survey Locations

- CS
- KS
- KS|CS
- VA

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

Rev	Date	Description	By	Chkd.
A	13/11/2025	First issue	S.P	A.M

Client:
Manogate Ltd.

Project:
Ballyfasy Wind Farm

Title:
Figure 6-5:
Aquatic Survey Site Locations Within and Downstream of the Proposed Wind Farm Site

Scale @ A3: 1:25,000

Prepared by:	Checked by:	Date:
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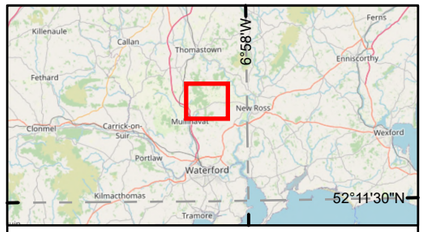
Map Ref: 11474-025-Aq.SL-P.App.BO-TOB-A

Draft: A



Legend

- Wind Farm Study Area
- Grid Connection Options
  - Option 1
  - Option 2
  - Unmapped stream GCO1
  - Rivers
- Aquatic Survey Locations
  - KS
  - KS|CS
  - VA

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	13/11/2025	First issue	S.P	A.M

Client:
Manogate Ltd.

Project:
Ballyfasy Wind Farm

Title:
Figure 6-6:
Aquatic Survey Site Locations
at the Proposed GCO One

Scale @ A3: 1:30,000

Prepared by:	Checked by:	Date:
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Map Ref: 11474-026-Aq.SL..GC0-P.App.BO-TOB-A

Draft: A

6.7.2.3.2 Biological Water Quality

An assessment of biological river quality (i.e., kick sampling) was undertaken on three river waterbodies, at a total of 13 aquatic survey sites (aquatic sites 1-4, 7-11 and 13, 15, 17 and 18) (see Figure 6-5). Two of the waterbodies traverse the proposed project site; Smartscastle Stream_010 and Arrigle_010 River, while the Blackwater (Kilmacow)_020 River runs along the western boundary. A visual assessment was carried out at aquatic sites 5, 6, 14 and 16; an unmapped/unnamed waterbody at GCO One, the Arrigle_010 along the GCO One and two sites on the Smartscastle Stream_010 (see Figure 6-5 and Figure 6-6).

Kick sampling, a semi-quantitative method for sampling benthic (or bottom dwelling) macroinvertebrates, was also undertaken within and downstream of the proposed wind farm site following methods outlined in Toner *et al.*, 2005. Macroinvertebrates (e.g., larvae and adult insects, crustaceans, snails) were examined from kick samples, with the type of species present and relative abundance providing an indication on the baseline ecological health of the waterbody (i.e., biotic index Q-value).

6.7.2.3.3 Protected Aquatic Species

An assessment of each waterbody at all aquatic survey site locations (i.e., aquatic sites 1-18) was undertaken on the suitability of the aquatic habitat for the following protected aquatic species; white-clawed crayfish, salmonids, with particular focus on Atlantic salmon, brook (*Lampetra planeri*), river (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*) and the critically endangered European eel.

6.7.2.3.3.1 White-clawed Crayfish Surveys

White-clawed crayfish surveys were carried out at a total of six aquatic survey sites (aquatic sites 2, 4, 7, 10, 11 and 12) on the 26th and 28th of September 2023 by TOBIN Ecologists at four sites; two locations on the Blackwater (Kilmacow)_020 River and two locations on the Smartscastle Stream_010. Surveys were also undertaken on the 12th and 15th of August 2024 at the Arrigle_010 River. Surveys were carried out under licence (C158/2028) from the NPWS. The surveys were conducted in August and September, at which time there is no 'berried' females or females with young hatchling still attached, and when crayfish are most active and present in shallow waters (Reynolds, 2006).

The surveys consisted of the assessment of suitable habitat, hand and visual searching and trapping as per Reynolds *et al.*, (2010), O'Connor *et al.*, (2009), Peay (2003). Refuge sites such as spaces under large boulders and crevices or burrows within the riverbanks were investigated by hand using gloves and small nets as required.

6.7.2.3.3.2 Freshwater Pearl Mussel

Freshwater pearl mussel (FWPM) surveys were undertaken on the Blackwater (Kilmacow)_020, Smartscastle Stream_010 and Arrigle_010 Rivers in optimal conditions in September 2024 by Ecofact Environmental Consultants Ltd (the full report can be found in Appendix 6-4). The methodology employed followed the NPWS guidance '*Margaritifera margaritifera* Stage 1 and Stage 2 survey guidelines' (Anon, 2004). The surveys, which were carried out under NPWS licence number C131/2024, were undertaken to establish the presence or absence of FWPM in watercourses via wading/bathyscope survey.

A total of 14 FWPM sites were surveyed; seven sites on the Arrigle_010 River, two sites on the Blackwater (Kilmacow)_020 River, four sites on the Smartscastle Stream_010 and one site on Oaklands_010 River (IE_SE_14O130860).

It is important to note that the Nore pearl mussel (*Margaritifera durrovensis*) is now considered to be an ecotype of the FWPM (*M. margaritifera*) rather than a separate species (Geist *et al*, 2018). Therefore, within this assessment, the name FWPM is used to cover both *M. margaritifera* and the *M. durrovensis*.

6.7.2.3.3.3 Atlantic Salmon

A fisheries assessment of river waterbodies was carried out on all waterbodies at a total of 17 aquatic survey sites (all sites with the exception of survey site 12 [crayfish only]) utilising elements of the approaches in the Fishery Assessment Methodology (O'Grady, 2006) and '*Ecology of the Atlantic Salmon*' (Hendry and Cragg-Hine, 2003) to broadly characterise the river sites (i.e. channel profiles, substrata etc.).

A broad appraisal/overview of the upstream and downstream habitat at each site was undertaken to evaluate the watercourses' ability to support salmonids.

6.7.2.3.3.4 Lamprey

An evaluation of potential lamprey habitats within the study area was carried out on all waterbodies at a total of 17 aquatic survey sites (all sites with the exception of survey site 12 [crayfish only]) using methodologies outlined in '*Ecology of the River, Brook, and Sea Lamprey*' (Maitland, 2003) and NPWS Irish Wildlife Manuals lamprey surveys (O'Connor, 2007).

A visual assessment on habitat suitability for lamprey such as slower flowing water, nursery areas of sandy silt beds, an assessment on potential barriers to migration, potential spawning areas, suitable hiding places and clean spawning gravels over stretches of running water were conducted. Juvenile lamprey habitat was identified from the descriptions given in Maitland (2003).

Scoop surveys were undertaken in suitable habitat to identify the presence or absence of the three lamprey species. This involved taking a sample of the silt (at the edge of the riverbank) with a hand net. The hand net was inserted into the sediment at a 45° angle, and a volume of silt was scooped into the net, and the sediment was checked for lamprey (ammocetes, juveniles and adults). Any lamprey caught were then identified using the field guide produced by Gardiner (2003).

6.7.2.3.3.5 European Eel

Suitability of habitat to support European eel within the study area of the proposed project was carried out on all waterbodies at a total of 17 aquatic survey sites (all sites with the exception of survey site 12 [crayfish only]) utilising elements of the approaches in the Fishery Assessment Methodology (O'Grady, 2006). A broad appraisal/overview of the aquatic habitat at each site was undertaken to evaluate the watercourses' ability to support European eel.

6.7.3 Limitations

6.7.3.1 Desk Study

No limitations were encountered during the desktop study.

6.7.3.2 Field Survey

Access was granted in all areas of the proposed wind farm site which were subsequently surveyed by TOBIN Ecologists and a team of third-party specialists (see Section 6.8). However, some small areas of the proposed wind farm site could not be fully surveyed on foot due to dense vegetation, primarily within conifer plantations. In so far as reasonably possible, and in accordance with best practice guidelines (CIEEM, 2018), these areas were instead surveyed and visually assessed from adjacent lands and/or from public roads using binoculars, where possible, and were supported by information obtained from a review of aerial photography and desktop study data.

Adverse weather conditions resulted in surveys being postponed for one day on the 27th of September 2023 due to an 'orange' weather warning in County Kilkenny. Surveys recommenced the following day on the 28th of September 2023. However, due to excessive rainfall amounts following the storm, crayfish survey could not be undertaken, the remaining crayfish survey of the Arrigle_010 River was undertaken in September 2024.

As previously stated in Section 6.7.2.3, two aquatic survey sites (5 and 6) were limited to visual assessments only within the proposed wind farm site where access was not possible due to dense conifer plantations/scrub and/or the waterbody was unsuitable (i.e., dry drain) for biological water quality and fisheries assessments. Notwithstanding the small areas of limitation, a comprehensive description of the baseline biodiversity of the study area, likely to be impacted by the proposed project, was captured and is presented herein. Sufficient data was gathered to reliably inform the impact assessment.

6.8 Project Team

This chapter was prepared by TOBIN Project Ecologist, Sarah Nolan (B.Sc., M.EngSc) and was senior reviewed by TOBIN Senior Ecologist, Áine Sands (B.Sc. MCIEEM). TOBIN Ecologists carried out habitat, protected flora and fauna, and aquatic surveys to inform the proposed project.

In addition, Ecofact Environmental Consultants carried out freshwater pearl mussel surveys and the associated report (see Appendix 6-4). WSP carried out bat surveys and prepared a baseline bat report and provided input to the bat impact assessment and mitigation (see Appendix 6-5).

6.8.1 TOBIN Ecologists

Further credentials of TOBIN Ecologists are provided hereunder.

Sarah Nolan BSc. (Hons) Earth & Ocean Science, M.EngSc. Water, Waste & Environmental Engineering

This chapter was prepared by Sarah Nolan who is a qualified Project Ecologist with nine years post-graduate experience in the environmental sector of which five years are within environmental consultancy. Sarah also carried out habitat, protected species and INNS surveys and aquatic surveys (biological water quality) for the proposed project. Sarah predominantly carries out Screenings for Appropriate Assessment, Natura Impact Statements and Preliminary Ecological Constraints Reports. Sarah is also responsible for the data analysis and report writing for the objective of No Net Loss of Biodiversity for a large infrastructure development in Ireland.

Áine Sands B.Sc. (Hons) Applied Ecology

Áine is a qualified Senior Ecologist with over 10 years post-graduate experience in ecology and environmental consultancy and holds Full CIEEM Membership. Áine has acted as Lead Ecologist for a number of large renewable energy projects, with a particular focus on wind farm development. Áine has a strong understanding of National and European legislation associated with biodiversity and is cognisant of relevant rulings by the Court of Justice of the European Union (CJEU). Áine's role in the project consisted of habitat, protected species and INNS surveys and senior review of the Biodiversity Chapter.

Sinéad O'Reilly B.Sc. (Hons) Zoology M.Res Freshwater Ecology

Sinéad O' Reilly, a Senior Ecologist with TOBIN, undertook the aquatic surveys and contributed to this chapter. She is a qualified and experienced environmental consultant with thirteen years' post-graduate experience in freshwater sciences and environmental consultancy in Ireland. Sinead has a strong technical background as a freshwater ecologist and has extensive field experience in freshwater habitats and species across Ireland. Sinéad's role in the project consisted of aquatic surveys (biological river quality and white-clawed crayfish surveys).

6.8.2 Third-Party Specialists

WSP

Bat surveys and corresponding report was prepared by Declan Corral, BSc Applied Bioscience and Zoology, who has over five years' postgraduate experience in ecological consultancy, voluntary work, and research in relation to bats. Declan's role in the project draws on his expertise in bat ecology, survey design, data management, and interpretation. He has considerable experience advising on impact assessment and mitigation for renewable energy projects, including wind farm developments across the UK and Ireland. The bat report was reviewed by Dr. Luis Gustavo Iemma, a Chartered Ecologist (CEcol) with extensive experience in ecology and environmental science. Luis holds a BSc, MSc, and PhD in Ecology and is a full member and Chartered Ecologist with CIEEM. His expertise spans environmental regulations, ecological assessment methodologies, and protected species surveys—including bats, otters, badgers, birds, amphibians, and hedgehogs.

Ecofact Environmental Consultants

The freshwater pearl mussel surveys were undertaken by licenced surveyor and Senior Environmental Scientist Dr. William O'Connor with assistance from Grace Walsh M.Sc. and Eoin McMahon of Ecofact Environmental Consultants. Ecofact Environmental Consultants Ltd. was established in 1999 by Dr. William O'Connor and has extensive experience relating to terrestrial, marine and freshwater environments.

6.9 Assessment Approach

The significance of potential effects has been evaluated using a systematic approach, based upon identification of the importance/value of receptors and their sensitivity to the proposed project activity, together with the predicted magnitude of the impact.

6.9.1 Important Ecological Features

For each effect, the assessment identifies ecological features sensitive to that effect and implements a systematic approach to understanding the impact pathways and the level of impacts on given receptors. To establish the value of important ecological features, adherence to the ecological valuation examples set out in the NRA guidelines (NRA, 2009) was made, using an importance scale ranging from international, national, county, local importance (high value), and local importance (low value).

Those ecological features identified as being of high local importance or greater, are carried forward in the ecological evaluation as Important Ecological Features (IEFs) when considering the potential for significant effects, as outlined in the NRA guidelines (NRA, 2009).

The ecological receptors tolerance, recoverability and population vulnerability was also considered when establishing the sensitivity.

6.9.2 Magnitude of Impacts

The impact assessment process involves the following steps:

- identifying and characterising potential impacts;
- incorporating measures to avoid and mitigate (reduce) these impacts;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects (if required); and
- identifying opportunities for ecological enhancement.

When describing impacts, reference has been made to the following characteristics, as appropriate:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

6.9.3 Significance of Effects

In determining the significance of effects, adherence was made to the NRA (2009) and CIEEM (2018) guidelines which requires the significance of an effect to be determined by effects on integrity or conservation status, regardless of the geographical level at which these would be relevant.

Integrity

The term integrity should be regarded as the *'coherence of ecological structure and function, across the entirety of a site, that enables it to sustain all of the ecological resources for which it has been valued''* and '*impacts resulting in adverse changes to those ecological structures and functions would be considered to be significant''* (NRA, 2009).

Conservation Status

The definitions for conservation status given in the EU Habitats Directive 92/43/EEC, in relation to habitats and species, are also used in the CIEEM (2018) and NRA (2009) guidance:

- For natural habitats, conservation status means the sum of the influences acting on the natural habitat and its typical species, that may affect its long-term distribution, structure and functions, as well as the long-term survival of its typical species, at the appropriate geographical scale; and
- For species, conservation status means the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations, at the appropriate geographical scale.

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status.

In summary, according to the NRA (2009) and CIEEM (2018 guidelines, if it is determined that the integrity and/or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e., local, county, national, international).

In some cases, an impact may not be significant at the geographic scale at which the ecological feature has been valued but may be significant at a lower geographical level. For example, a particular impact may not be considered likely to have a negative effect on the overall conservation status of a species which is considered to be internationally important. However, an impact may occur at a local level on this internationally important species. In this case, the impact on an internationally important species is considered to be significant at only a local, rather than international level.

6.10 EXISTING ENVIRONMENT

The following sections provide a description of the baseline conditions of the proposed project within the study area. This section is divided into the desk study (see Section 6.10.1) and the results of the field surveys (see Section 6.10.2).

6.10.1 Desk Study

6.10.1.1Sites Designated for Nature Conservation

In the following sections all sites of international and national importance within the study area are evaluated and are illustrated in Figure 6-7.

6.10.1.1.1 European Sites

The Birds Directive (2009/147/EC) and the Habitats Directive (92/42/EEC) put an obligation on EU Member States to establish the Natura 2000 network. The Natura 2000 network comprises sites of the highest biodiversity importance for rare and threatened habitats and species across the EU. In Ireland, the Natura 2000 network of European sites comprises Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), where SACs are selected for the conservation of Annex I habitats (including priority types, which occurrence is considered threatened) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats.

All European sites (i.e., SAC and SPA) with a source-pathway-receptor link to the proposed project were considered in this assessment. These European sites and their qualifying interests/special conservation interest are listed in Table 6-2, with the location of European sites illustrated in Figure 6-7.

The proposed project does not overlap with any European site. It is, however, hydrologically connected downstream to three European sites; a hydrological connection from the Blackwater (Kilmacow)_020 River and Smartscastle Stream_010 to the Lower River Suir SAC (site code: 002137) and a hydrological connection from both the Arrigle_010 and Arrigle_020 River to the River Barrow and River Nore SAC (002162) and the River Nore SPA (004233). Direct source-pathway-receptor links via these hydrological pathways have been identified from the proposed project to these European sites.

Additional SPAs (i.e., Wexford Harbour and Slobs SPA [004076], Saltee Islands SPA [004002], Poulaphouca Reservoir SPA [004063], Ballycotton Bay SPA [004022] and Cork Harbour SPA [004030]) were considered based on an assessment of SCI species core foraging and disturbance ranges (SNH, 2016; Goodship and Furness 2022).

All SPAs are considered in further detail in Chapter 7 (Ornithology) and within the project Natura Impact Statement (NIS) (TOBIN, 2025).

6.10.1.1.2 Natural Heritage Area

Natural Heritage Areas (NHA) are the basic wildlife designation in Ireland. These areas are considered nationally important for the habitats present, or which hold species of plants and animals designated for protection. Under Irish legislation in the form of the Wildlife Acts (as amended), NHAs are legally protected from damage from the date they are formally proposed for designation.

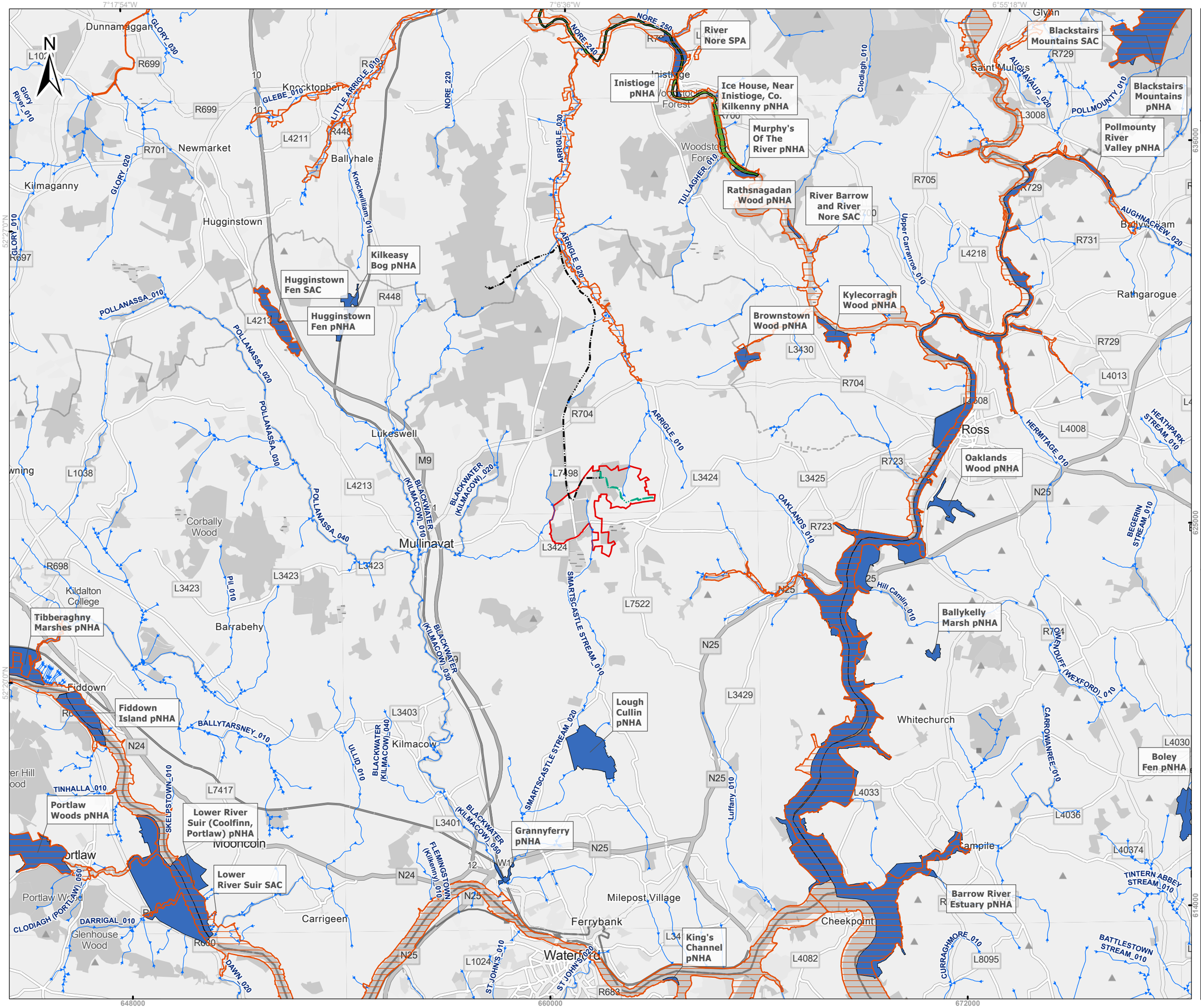
No Natural Heritage Areas (NHAs) were identified within the project study area and/or within the source-pathway-receptor link of the proposed project.

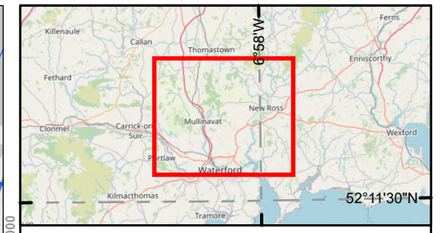
6.10.1.1.3 Other sites of Conservation Interest

Proposed Natural Heritage Areas (pNHA) were published on a non-statutory basis in 1995 and have not since been statutorily designated. Prior to statutory designation, pNHAs are subject to limited protection, including recognition of the ecological value of pNHAs by Planning and Licensing Authorities.

There are no pNHAs within the boundary of the proposed project. A source-pathway-receptor link was identified between the proposed project and two pNHAs; Lough Cullin (site code: 000406) and Grannyferry (000833) via a hydrological connection with Smartscastle Stream_010 and the Blackwater (Kilmacow)_020 River (Grannyferry pNHA only). These pNHAs are described further in Table 6-2 and illustrated in Figure 6-7.

No other sites of conservation interest (i.e., National Parks, Nature Reserves or RAMSAR sites) are present within the ZoI of the proposed project.





Legend

- Wind Farm Study Area
- Grid Connection Options
  - Option 1
  - Option 2
- Special Areas of Conservation (SACs)
- Special Protection Areas (SPAs)
- proposed Natural Heritage Areas (pNHAs)
- Rivers

0 2.5 5
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

Rev	Date	Description	By	Chkd.
A	13/11/2025	First issue	S.P	A.M

Client: Manogate Ltd.

Project: Ballyfasy Wind Farm

Title: Figure 6.7: Designated Sites for Nature Conservation Within the ZoI of the Proposed Project

Scale @ A3: 1:100,000

Prepared by:	Checked by:	Date:
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Map Ref: 11474-027-D.S-P.App.BO-TOB-A

Draft: A

Table 6-2: Summary of Designated Sites with a Source-Pathway-Receptor Link to the Proposed Project

Designated sites	Existing pathway and distance from Proposed Project	Qualifying Interests (* priority habitat) / Features of Importance
International sites – Special Areas of Conservation		
River Barrow and River Nore SAC Site code: 002162 (NPWS, 2025b)	Hydrological connection via the Arrigle_010 River and Arrigle_020 River at a downstream distance of ca. 2.7 km and ca. 406 m (GCO One crossing) respectively.	• [1140] Mudflats and sandflats not covered by seawater at low tide • [1170] Reefs • [1310] Salicornia and other annuals colonizing mud and sand • [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • [1130] Estuaries • [1410] Mediterranean salt meadows (*Juncetalia maritimi*) • 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation • [4030] European dry heaths • [6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels • [7220] * Petrifying springs with tufa formation (Cratoneurion) • [91A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles • [91E0] * Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) • [1016] Desmoulin's whorl snail (*Vertigo moulinsiana*) • [1029] Freshwater pearl mussel (*Margaritifera margaritifera*) • [1092] White-clawed crayfish (*Austropotamobius pallipes*) • [1095] Sea lamprey (*Petromyzon marinus*) • [1096] Brook lamprey (*Lampetra planeri*)

Designated sites	Existing pathway and distance from Proposed Project	Qualifying Interests (* priority habitat) / Features of Importance
		• [1099] River lamprey (*Lampetra fluviatilis*) • [1103] Twaite shad (*Alosa fallax*) • [1106] Atlantic salmon (*Salmo salar*) (only in fresh water) • [1355] Otter (*Lutra lutra*) • [1421] Killarney fern (*Trichomanes speciosum*)
Lower River Suir SAC Site code: 002137 (NPWS, 2017)	Hydrological connection via the Blackwater (Kilmacow)_020 River and Smartscastle Stream_010 at a downstream distance of ca. 18 km and 13 km respectively.	• [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • [3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation • [6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels • [91A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles • [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) • [91J0] *Taxus baccata* woods of the British Isles* • [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*) • [1092] White-clawed Crayfish *Austropotamobius pallipes)* • [1095] Sea Lamprey (*Petromyzon marinus*) • [1096] Brook Lamprey (*Lampetra planeri)* • [1099] River Lamprey (*Lampetra fluviatilis*) • [1103] Twaite Shad (*Alosa fallax fallax*) • [1106] Salmon (*Salmo salar*) • [1355] Otter (*Lutra lutra*)

Designated sites	Existing pathway and distance from Proposed Project	Qualifying Interests (* priority habitat) / Features of Importance
Proposed Natural Heritage Areas		
Lough Cullin pNHA Site code: 000406 (NPWS, 2009a)	Hydrological connection via the Smartscastle Stream_010 at a downstream distance of ca. 7.3 km.	• The only natural lake in County Kilkenny • Consists of wet grassland, areas of peat, fens and semi-natural vegetation (lake shore). • Flowering plants which are rare to Kilkenny / Waterford region. High population of snipe (*Gallinago gallinago*) with smaller numbers of curlew (*Numenius Arquata)*, lapwing (*Vanellus vanellus*) and mallard (*Anas platyrhynchos*). Breeding sedge warbler (*Acrocephalus schoenobaenus*) and reed bunting (*Emberiza schoeniclus*).
Grannyferry pNHA Site code: 000833 (NPWS, 2009b)	Hydrological connection via the Smartscastle Stream_010 at a downstream distance of ca. 16.3 km and the Blackwater (Kilmacow)_020 River at a downstream distance of ca 18 km.	• Reed-swamp, marshes and wet fields with a salt influence. Area of the FPO 2022 species, meadow barley (*Hordeum secalinum Schreb.)*

6.10.1.2National Parks and Wildlife Services

The desk study involved a review NPWS data of EU Habitats Directive Annex I habitats and Annex II, IV, and V species (Article 17 datasets [NPWS, 2019a; NPWS, 2019b]), National Survey of Native Woodlands 2003-2008 (NPWS, 2025a and Perrin *et al.*, 2008), Ancient and Long-Established Woodlands (NPWS, 2025a and Perrin *et al.*, 2010) and the Irish Semi-Natural Grassland Survey 2007-2012 (NPWS, 2025a and O'Neill *et al.*, 2013) within the proposed project. In addition, a sensitive data request was made on the 4th of October 2024 with the data received on the 9th July 2025 and an additional request made on the 29th of August 2025 with the data received on the 2nd of September 2025.

6.10.1.2.1 Article 17 Datasets

A review of Article 17 data on the distribution of EU Annex I habitats and Annex II, IV and V species (NPWS, 2019a; NPWS, 2019b), was undertaken to assess the potential for their existence within the proposed project. The spatial data for Article 17 assessments provides the best estimate of the habitat and species distribution in either 10 km or 50 km grid squares.

Habitats

Spatial data of the current distribution of the following Annex I habitats are shown to overlap the proposed wind farm site:

- [6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels;
- [3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachio*n vegetation;
- [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)*;
- [91A0] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles; and
- [4030] European dry heaths.

The distribution of the aforementioned habitats is indicative only, and their presence within the proposed wind farm site were further investigated during habitat surveys (discussed further in Section 6.7.2.1).

Species

Spatial data of the current distribution of the following Annex II, IV and V species are shown to overlap the proposed wind farm site:

- [5009] Soprano pipistrelle (*Pipistrellus pygmaeus*) (Annex IV);
- [1331] Leisler's bat (*Nyctalus leisleri*) (Annex IV);
- [1326] Brown long-eared bat (*Plecotus auratus*) (Annex IV);
- [1322] Natterer's bat (*Myotis nattereri*) (Annex IV);
- [1314] Daubenton's bat (*Myotis daubentoniid*) (Annex IV);
- [1309] Common pipistrelle (*Pipistrellus pipistrellus*) (Annex IV);
- [1357] Pine marten (*Martes martes)* (Annex V);
- [1334] Mountain hare (*Lepus timidus*) (Annex V);
- [1213] Common frog (*Rana temporaria*) (Annex V);
- [1106] Atlantic salmon (*Salmo salar*) (Annex II, V);

- [1103] Twaite shad (*Alosa fallax*) (Annex II, V);
- [1096] Brook lamprey (*Lampetra planeri*) (Annex II); and
- [1092] White-clawed crayfish (*Austropotamobius pallipes*) (Annex II, V).

The distribution of the aforementioned species is indicative only, and their presence within the proposed wind farm site were further investigated during ecological surveys (discussed further in Section 6.10.2.2).

6.10.1.2.2 National Survey of Native Woodlands 2003-2008

The National Survey of Native Woodlands (NSWS) in Ireland included the survey of 1,217 woodland sites across all 26 counties of the Republic of Ireland during 2003-2007 (Perrin *et. al.*, 2008). Spatial data of the results of the NSNW was assessed to determine the potential for the presence of native woodlands within the proposed wind farm site. No native woodlands are present within the proposed project, the nearest mapped woodland is located ca. 4 km northeast in Brownstown, County Kilkenny. There is no source-pathway-receptor link between the proposed project and this woodland.

6.10.1.2.3 Ancient and Long-Established Woodlands

Ancient woodland is those which have had a continuous history of coverage prior to the period of when planting and afforestation became common practice (mid-1600s) (Perrin *et. al.*, 2010). The spatial data of the collected ancient and long-established woodland (NPWS, 2012a) was assessed to determine the potential for the for the presence of such woodland within the proposed project. No ancient and long-established woodland is present within the proposed wind farm site, the nearest mapped woodland is located ca. 4km northeast in Brownstown, County Kilkenny (encompassing roughly the same area to that which was collected as part of the NSWS). There is no source-pathway-receptor link between the proposed project and this woodland.

6.10.1.2.4 Irish Semi-Natural Grassland Survey

The Irish Semi-Natural Grasslands Survey (ISGS) was undertaken over a period of six years (2007-2012) to carry out the botanical surveying and mapping of 1,192 grassland sites covering 23,188.1 ha of land in Ireland (O'Neill, 2013). The spatial data from the ISGS (NPWS, 2012b) was assessed for its presence within the proposed project. No semi-natural grassland was recorded within the proposed project, with the nearest area a significant distance of ca. 10 km southwest in Gracedieu East, County Waterford. There is no source-pathway-receptor link between the proposed project and this grassland.

6.10.1.2.5 NPWS Sensitive Data Request

A sensitive data request was made to the NPWS for the 10 km hectads S51, S52, S53, S61, S62 and S63 which encompassed the proposed project. The resulting data (relevance to the last 10 years) is presented in Table 6-3 which illustrates four 'Near Threatened', five 'Endangered', three 'Vulnerable' and one 'Least Concern' species as listed on Ireland's Red List (Wyse *et al.*, 2016). Seven species are protected under the Flora Protection Order (FPO) 2022, of which one is also protected under Annex II and IV of the EU Habitats Directive.

and one species protected under the Flora Protection Order (FPO) 2022 which is also listed as 'Vulnerable' on Ireland's Red List (Wyse *et al.*, 2016).

Table 6-3: Threatened and Protected Flora Species Recorded by the (NPWS Sensitive Data Request) for Hectads S52 and S62

Hectad	Species	Protection	Years Recorded
S51	Betony (*Stachys officinalis*)	FPO 2022, Near threatened	2015
S53	Small Cudweed (*Filago minima*)	Near threatened	2015
S52	No records in the last 10 years		
S61	Divided Sedge (*Carex divisa*)	FPO 2022, Endangered	2017, 2019, 2020, 2021
	Meadow Barley (*Hordeum secalinum*)	FPO 2022, Vulnerable	2017, 2018, 2019, 2020, 2021, 2022
	Devon Whitebeam (Sorbus devoniensis)	Endangered	2018
S62	Fragrant Agrimony (*Agrimonia procera*)	Near threatened	2020, 2021, 2022
S62	Meadow Barley (*Hordeum secalinum*)	FPO 2022, Vulnerable	2020, 2021, 2022
S62	Pale Flax (*Linum bienne*)	Near threatened	2020, 2022
S62	Weasel's-snout (*Misopates orontium*)	Endangered	2015
S63	Green-flowered Helleborine (*Epipactis phyllanthes*)	Endangered	2022
	Killarney Fern (*Trichomanes speciosum*)	EU Habitats Directive Annex II and IV, FPO 2022, least concern	2016
	Meadow Barley (*Hordeum secalinum*)	FPO 2022, Vulnerable	2021
	Meadow Saffron (*Colchicum autumnale*)	FPO 2022, Endangered	2019, 2020, 2021

6.10.1.3National Biodiversity Data Centre

A review of the NBDC database (NBDC, 2025) was conducted for the 10 km hectads S51, S52, S53, S61, S62 and S63 which encompass the proposed project. The NBDC website was reviewed in August 2025 for the presence of protected flora and fauna and INNS listed on the Third

Schedule of S.I No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011.

The results of this data review and their proximity to the proposed project is as follows; protected fauna (see Table 6-4), Third Schedule invasive flora species (see Table 6-5) and Third Schedule invasive fauna species (see Table 6-6). No protected flora species were recorded by the NBDC within hectads S51, S52, S53, S61, S62 and S63. Only data which has been recorded within the last 10 years has been considered.

A total of 20 protected fauna species were recorded by the NBDC (see Table 6-4), of which three were Annex II species (marsh fritillary, white-clawed crayfish and otter) and the remaining 17 are protected species under the Wildlife Act (as amended). Refer to Chapter 7 (Ornithology) for bird species present within the proposed wind farm site.

A total of nine INN flora species as listed on the Third Schedule were recorded by NBDC (see Table 6-5), which includes Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*) and common rhododendron (*Rhododendron ponticum*).

Table 6-4: Protected Fauna Records from the NBDC for Hectads S51, S52, S53, S61, S62 and S63

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
S51	Marsh Fritillary (*Euphydryas aurinia*)	30/05/2023	Wildlife Acts, EU Habitats Directive, Annex II	Previous recent record of the species is located approximately 3.7 km southwest of the TDR.
	Badger (*Meles meles*)	31/01/2016	Wildlife Acts	Previous recent record of the species is located approximately 3.6 km southwest of the TDR.
	Brown Long-eared Bat (*Plecotus auritus*)	30/06/2020	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 7.7 km southwest of the TDR.
	Common Frog (*Rana temporaria*)	15/02/2023	Wildlife Acts, EU Habitats Directive, Annex V	Previous recent record of the species is located approximately 0.8 km southwest of the TDR.
	Daubenton's Bat (*Myotis daubentonii*)	22/07/2022	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 6.4 km southwest of the TDR.
	Hedgehog (*Erinaceus europaeus)*	30/10/2023	Wildlife Acts	Previous recent record of the species is located approximately 0.1 km of the TDR.
	Leisler's Bat (*Nyctalus leisleri*)	22/08/2019	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 1.1 km northeast of the TDR.
	Nathusius's Pipistrelle (*Pipistrellus nathusii*)	02/08/2018	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 1.5 km northeast of the TDR.

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
	Pine Marten (*Martes martes*)	21/04/2023	Wildlife Acts, EU Habitats Directive, Annex V	Previous recent record of the species is located approximately 2.6 km north of the TDR.
	Pipistrelle (*Pipistrellus pipistrellus sensu stricto*)	18/06/2022	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 3.5 km southwest of the TDR.
	Pygmy Shrew (*Sorex minutus*)	04/06/2018	Wildlife Acts	Previous recent record of the species is located approximately 6.5 km southwest of the TDR.
	Red Squirrel (*Sciurus vulgaris*)	04/10/2018	Wildlife Acts	Previous recent record of the species is located approximately 4.3 km southwest of the TDR.
	Soprano Pipistrelle (*Pipistrellus pygmaeus*)	09/11/2022	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 1.1 km northeast of the TDR.
S52	Common Frog (*Rana temporaria*)	21/05/2020	Wildlife Acts, EU Habitats Directive, Annex V	Previous recent record of the species is located approximately 2.8 km southwest of the TDR.
	Freshwater White-clawed Crayfish (*Austropotamobius pallipes*)	21/08/2014	Wildlife Acts, EU Habitats Directive, Annex II and V	Previous recent record of the species is located approximately 1.2 km southwest of the TDR.
	Badger (*Meles meles*)	04/03/2023	Wildlife Acts	Previous recent record of the species is located 0.8 km northeast of the TDR.

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
	Red Squirrel (*Sciurus vulgaris*)	22/06/2022	Wildlife Acts	Previous recent record of the species is located 1.5 km southeast of the TDR.
	Hedgehog (*Erinaceus europaeus*)	12/11/2023	Protected Species: Wildlife Acts	Previous recent record of the species is located within 0.1 km of the TDR.
	Pine Marten (*Martes martes*)	23/08/2022	EU Habitats Directive, Annex V, Wildlife Acts	Numerous recordings throughout the hectad S52, however none are within the Proposed Project.
S53	Common Frog (*Rana temporaria*)	22/02/2023	Wildlife Acts, EU Habitats Directive, Annex V	Previous recent record of the species is located approximately 0.5 km south of GCO One.
	Badger (Meles meles)	29/03/2023	Wildlife Acts	Previous recent record of the species is located approximately 0.5 km south of GCO One.
	Brown Long-eared Bat (*Plecotus auritus*)	11/09/2020	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 5.3 km northwest of GCO One.
	Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*)	06/10/2022	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 1.7 km northwest of GCO One.
	Daubenton's Bat (*Myotis daubentonii*)	11/09/2020	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 4.6 km northwest of GCO One.
	Hedgehog (*Erinaceus europaeus*)	17/11/2023	Wildlife Acts	Previous recent record of the species is located approximately 0.7 km south of GCO One.

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
	Leisler's Bat (Nyctalus leisleri)	06/10/2022	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 5 km northwest of GCO One.
	Otter (*Lutra lutra*)	22/12/2022	Wildlife Acts, EU Habitats Directive, Annex II, IV	Previous recent record of the species is located approximately 5.5 km northwest of GCO One.
	Pine Marten (*Martes martes*)	11/06/2021	Wildlife Acts, EU Habitats Directive, Annex V	Previous recent record of the species is located approximately 0.2 km north of GCO One.
	Soprano Pipistrelle (*Pipistrellus pygmaeus*)	11/09/2020	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 7.5 km west of GCO One.
	Whiskered Bat (*Myotis mystacinus*)	08/07/2017	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 2.5 km south of GCO One.
S61	Common Frog (*Rana temporaria*)	09/02/2023	Wildlife Acts, EU Habitats Directive, Annex V	Previous recent record of the species is located approximately 0.3 km south of the TDR.
	Smooth Newt (*Lissotriton vulgaris*)	25/04/2018	Protected Species: Wildlife Acts	Previous recent record of the species is located approximately 3.5 km southeast of the TDR.
	Badger (*Meles meles*)	14/04/2023	Protected Species: Wildlife Acts	Previous recent record of the species is located approximately 3.8 km southeast of the TDR.

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
	Brown Long-eared Bat (*Plecotus auritus*)	29/07/2018	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 4.6 km southeast of the TDR.
	Hedgehog (*Erinaceus europaeus*)	27/08/2021	Wildlife Acts	Previous recent record of the species is located approximately 0.5 km southeast of the TDR.
	Leisler's Bat (*Nyctalus leisleri*)	18/08/2022	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 4.5 km southwest of the TDR.
	Otter (*Lutra lutra*)	29/01/2023	Wildlife Acts, EU Habitats Directive, Annex II and IV	Previous recent record of the species is located approximately 3 km east of the TDR.
	Pine Marten (*Martes martes*)	18/04/2023	Wildlife Acts, EU Habitats Directive, Annex V	Previous recent record of the species is located approximately 1.5 km south of the TDR.
	Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*)	30/06/2022	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 3.8 km south of the TDR.
	Pygmy Shrew (*Sorex minutus*)	19/04/2015	Wildlife Acts	Previous recent record of the species is located approximately 4 km south of the TDR.
	Red Squirrel (*Sciurus vulgaris*)	13/10/2022	Wildlife Acts	Previous recent record of the species is located approximately 3.5 km southeast of the TDR.

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
	Soprano Pipistrelle (*Pipistrellus pygmaeus*)	02/09/2022	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 1 km south of the TDR.
S62	Common Frog (*Rana temporaria*)	31/05/2018	Wildlife Acts, EU Habitats Directive, Annex V	Previous records of this species were located ca. 1.7 km north, ca. 5.3 km and ca. 7 km southeast of the Proposed Project.
	Badger (*Meles meles*)	31/12/2014	Wildlife Acts	Numerous recordings throughout the hectad S62 of which three individuals were recorded within the proposed wind farm site (west and northeast).
	Pine Marten (*Martes martes*)	01/05/2021	Wildlife Acts, EU Habitats Directive, Annex V	Numerous recordings throughout the hectad S62 of which three individuals were recorded within the proposed wind farm site.
	Hedgehog (*Erinaceus europaeus*)	17/07/2022	Wildlife Acts	Previous records of this species were located ca. 9 km east, ca. 1.4 km north, ca. 3.4 km south, ca. 3.7 km southeast, ca. 4.2 km east and ca. 5.5 km southeast of the Proposed Project.
S63	Common Frog (*Rana temporaria*)	15/02/2019	Wildlife Acts, EU Habitats Directive, Annex V	Previous recent record of the species is located approximately 0.7 km west of the proposed GCO One.
	Smooth Newt (*Lissotriton vulgaris*)	13/04/2020	Wildlife Acts	Previous recent record of the species is located approximately 5 km northeast of the GCO One.
	Common Lizard (*Zootoca vivipara*)	08/06/2016	Wildlife Acts	Previous recent record of the species is located approximately 3.5 km southeast of the proposed wind farm site.
	Badger (*Meles meles*)	15/04/2017	Wildlife Acts	Previous recent record of the species is located approximately 4.1 km east of the GCO One.

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
	Brown Long-eared Bat (*Plecotus auritus*)	21/06/2016	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 7.2 km west of the GCO One.
	Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*)	23/09/2018	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 6.7 km south of the GCO One.
	Daubenton's Bat (*Myotis daubentonii*)	04/06/2017	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 5 km northeast of the GCO One.
	Hedgehog (*Erinaceus europaeus*)	12/04/2023	Wildlife Acts	Previous recent record of the species is located approximately 0.5 km west of the GCO One.
	Leisler's Bat (*Nyctalus leisleri*)	23/09/2018	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 5.5 km east of the GCO One.
	Natterer's Bat (*Myotis nattereri*)	23/09/2018	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 7.5 km northeast of the GCO One.
	Otter (*Lutra lutra*)	23/07/2016	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 4.5 km northeast of the GCO One.
	Pine Marten (*Martes martes*)	27/07/2021	Wildlife Acts	Previous recent record of the species is located approximately 0.2 km south of the GCO One.
	Pygmy Shrew (*Sorex minutus*)	14/07/2014	Wildlife Acts	Previous recent record of the species is located approximately 5.5 km northeast of the GCO One.

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
	Red Squirrel (*Sciurus vulgaris*)	24/12/2022	Wildlife Acts	Previous recent record of the species is located approximately 0.7 km west of the GCO One.
	Soprano Pipistrelle (*Pipistrellus pygmaeus*)	23/09/2018	Wildlife Acts, EU Habitats Directive, Annex IV	Previous recent record of the species is located approximately 5.5 km east of the GCO One.

Table 6-5: Third Schedule (Regulation S.I. 477) Invasive Non-Native Flora Species as Recorded by the NBDC within Hectads S51, S52, S53, S61, S62 and S63

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
S51	Japanese Knotweed (*Fallopia japonica*)	06/09/2020	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 3 km southwest of the TDR.
	Common Rhododendron (*Rhododendron ponticum*)	06/04/2017	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 4.5 km southwest of the TDR.
	Three-cornered Garlic (*Allium triquetrum*)	18/04/2022	Medium Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 2 km south of the TDR.
S52	No record within the last 10 years			
S53	Giant Hogweed (*Heracleum mantegazzianum*)	10/07/2024	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 5 km northwest of GCO One.

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
	Himalayan Balsam (*Impatiens glandulifera*)	09/08/2024	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 5.5 km north of GCO One.
	Japanese Knotweed (*Fallopia japonica*)	17/06/2022	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 5.5 km west of GCO One.
	Common Rhododendron (*Rhododendron ponticum*)	26/04/2022	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 7 km west of GCO One.
	Spanish Bluebell (*Hyacinthoides hispanica*)	07/05/2017	Regulation S.I. 477	Previous recent record of the species is located approximately 6.5 km north of GCO One.
	Three-cornered Garlic (*Allium triquetrum*)	03/05/2021	Medium Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 5 km southwest of GCO One.
S61	American Skunk-cabbage (*Lysichiton americanus*)	13/07/2024	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 3.5 km southeast of the TDR.
	Common Cord-grass (*Spartina anglica*)	29/07/2014	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 3.5 km east of the TDR.
	Japanese Knotweed (*Fallopia japonica*)	23/08/2023	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 1 km northeast of the TDR.

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
	New Zealand Pigmyweed (*Crassula helmsii*)	07/09/2016	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 4 km southeast of the TDR.
	Common Rhododendron (*Rhododendron ponticum*)	30/04/2020	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 5.5 km southeast of the TDR.
	Spanish Bluebell (*Hyacinthoides hispanica*)	16/04/2022	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 3.5 km southeast of the TDR.
	Three-cornered Garlic (*Allium triquetrum*)	21/04/2024	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 1km southwest of GCO One.
S62	Common Rhododendron (*Rhododendron ponticum*)	08/03/2014	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 1 km northeast of the proposed wind farm site.
S63	Giant Hogweed (*Heracleum mantegazzianum*)	09/07/2015	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 7 km northeast of GCO One.
	Himalayan Balsam (*Impatiens glandulifera*)	08/08/2024	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 4.5 km southwest of GCO One.
	Japanese Knotweed (*Fallopia japonica*)	25/09/2016	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 2.5 km southeast of the TDR.

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
	Common Rhododendron (*Rhododendron ponticum*)	19/01/2025	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 2.5 km southeast of GCO One.
	Three-cornered Garlic (*Allium triquetrum*)	26/05/2019	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 5 km southeast of GCO One.

Table 6-6: Third Schedule (Regulation S.I. 477) Invasive Non-Native Fauna Species as Recorded by the NBDC within Hectads S51, S52, S53, S61, S62 and S63

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
S51	American Mink (*Neovison vison*)	13/03/2017	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 5 km southwest of the TDR.
	Grey Squirrel (*Sciurus carolinensis*)	18/10/2022	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 2 km southwest of the TDR.
S52	American Mink *(Mustela vison)*	27/05/2015	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 2 km northwest of the TDR.
	Brown Rat *(Rattus norvegicus)*	24/06/2014	High Impact Invasive Species, Regulation S.I. 477	Previous records of this species were located ca. 5.4 km southwest and ca. 4.8km northwest of the proposed project.

Hectad	Species	Date of Last Record	Designation	Proximity to the Proposed Project
S53	Wild Boar *(Sus scrofa)*	12/03/2017	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 0.7 km southeast of GCO One.
S61	American Mink *(Mustela vison)*	06/12/2016	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 5 km southwest of the TDR.
	Grey Squirrel (*Sciurus carolinensis*)	13/01/2023	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 3.5 km south of the TDR.
	Sika Deer (*Cervus nippon*)	04/10/2018	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 4 km south of the TDR.
S62	Brown Rat *(Rattus norvegicus)*	13/04/2014	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 6.5 km southeast of the proposed wind farm site.
	Eastern Grey Squirrel (*Sciurus carolinensis*)	18/12/2017	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 6.5 km southeast of the proposed wind farm site.
S63	Harlequin Ladybird (*Harmonia axyridis*)	08/07/2023	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 6.5 km northeast of GCO One.
	Wild Boar *(Sus scrofa)*	26/02/2014	High Impact Invasive Species, Regulation S.I. 477	Previous recent record of the species is located approximately 3.5 km northeast of GCO One.

6.10.1.4Aquatic Fauna

A desktop review of NPWS (NPWS, 2025a), NBDC (NBDC, 2025) and IFI was carried out to collate information on aquatic species and to identify features of aquatic ecological importance within the study area of the proposed project.

Arrigle_010 River (Nore Catchment [Nore_SC_130 sub-catchment])

The most recent IFI report of the Nore catchment (comprises the Arrigle_010 River) was undertaken in 2020 (Gordon *et al.*, 2021). However, survey sites were only conducted in tributaries (Little Arrigle River, Kings River, Nuenna, Dinin and Ballyroan) discharging from the north and west of the Nore catchment into the main River Nore channel, and not those in the south (i.e., Arrigle_010 River). However, species found may provide an indication as to those which would be present in the Nore_240 and potentially the Arrigle_010 River. Electrofishing surveys were carried out which concluded the following record of species as present; brown trout (*Salmo trutta*), salmon, European eel, lamprey sp., minnow (*Phoxinus phoxinus*), stone loach (*Barbatula barbatula*), three-spined stickleback (*Gasterosteus aculeatus*) and pike (*Esox Lucius*) with brown trout being the most abundant species at all sites followed by salmon (Gordon *et al.*, 2021).

Electrofishing surveys of the Arrigle_010 were also undertaken in 2020 by Triturus Environmental Ltd. on behalf of Blackthorn Ecology for the proposed Castlebanny Wind Farm in County Kilkenny (Triturus, 2020). Brown trout were the dominant species found during surveys, with salmon, lamprey sp., and European eel also recorded. Salmonid habitat quality and potential was variable throughout the Arrigle_010 ranging from 'Poor' to 'Good' (Triturus, 2020).

Blackwater (Kilmacow) 020 River & Smartscastle Stream 010 River (Suir Catchment [Blackwater[Kilmacow]_SC_010 sub-catchment])

The Blackwater (Kilmacow)_020 River and Smartscastle Stream_010 River discharge downstream into the Middle Suir Estuary (refer to Table 6-8 for the hydrological pathway). Similarly to the above, Triturus (2020) undertook fishery surveys on the Blackwater (Kilmacow)_010 River, whilst this is a tributary further north upstream of the proposed project, it may provide an indication to the fish species present within and downstream of the Blackwater (Kilmacow)_020 River. Overall, a low abundance of fish species were recorded at the three sampling sites along the Blackwater (Kilmacow)_010 River. Species included brown trout (most abundant), three-spined stickleback, a juvenile European eel, stone loach, and salmon (Triturus, 2020). No lamprey species were recorded, however the Blackwater (Kilmacow) sub-catchment, is known to support both river and brook lamprey (O'Connor, 2007).

Freshwater pearl mussel

The Suir catchment and western extent of the proposed wind farm site (encompasses T1 to T3 and T8 to T10) is present within a FWPM sensitive area whereby there are previous records of FWPM, but the current status is unknown (NPWS, 2020). FWPM is a qualifying interest of the hydrologically connected (ca. 17.9 km downstream) Lower River Suir SAC.

6.10.1.5Surface Water Features

The proposed project is situated within the South Eastern River Basin District sitting within both the Nore catchment (mid to eastern section of the proposed wind farm site and the proposed GCO One) (catchment ID: 904) and the Suir catchment (mid to western section of the proposed wind farm site and a small section of the proposed GCO One) (catchment ID: 905) (EPA, 2025). The proposed wind farm site is further divided into two sub-catchments; the Nore_SC_130 (mid to eastern section of the proposed wind farm site and the proposed GCO One) and the Blackwater [Kilmacow]_SC_010 (mid to western section of the proposed wind farm site and a small section of the proposed GCO One).

Surface water features present within, and hydrologically connected to, the proposed wind farm site and the proposed project as a whole, includes four WFD river waterbodies, as follows:

- Blackwater (Kilmacow)_020 River (WFD waterbody code: IE_SE_16B020091). This river runs along the northwestern boundary of the proposed wind farm site. This is a 1st order river waterbody which travels in a southerly direction towards Mullinavat, County Waterford. This waterbody flows downstream to the Middle Suir Estuary (IE_SE_100_0550);
- Smartscastle Stream_010 River (WFD waterbody code: IE_SE_16S070500). This river (waterbody category denoted by EPA as 'river' and not 'stream') traverses the middle portion of the proposed wind farm site. This is a 1st order river waterbody which travels in a southerly direction towards Grannagh, County Waterford. This waterbody flows downstream to the Middle Suir Estuary (IE_SE_100_0550);
- Arrigle_010 River (WFD waterbody code: IE_SE_15A020100) traverses the northeastern portion of the proposed wind farm site. This is a 1st order river waterbody which travels in a northerly direction towards Ballyduff, County Kilkenny. This waterbody flows downstream to the Nore Estuary (IE_SE_100_0400); and
- Arrigle_020 River (WFD waterbody code: IE_SE_15A020250) is traversed by the proposed GCO One at two locations, one of which is crossed by a bridge crossing along the local road L3418. An unmapped/unnamed tributary of the Arrigle_020 is also crossed by the proposed GCO One within an area of recently felled woodland.

6.10.1.6Groundwater Dependent Terrestrial Ecosystems

The proposed project is situated within two different WFD groundwater bodies; Inistioge groundwater body (GWB) (mid to eastern section of the proposed wind farm site) (WFD GWB code: IE_SE_G_076) and Mullinavat GWB (IE_SE_G_155) (mid to western section of the proposed wind farm site) (EPA, 2025). The hydrogeology of the proposed project is discussed in detail in Chapter 9 (Hydrology and Hydrogeology).

NPWS spatial data for the presence of groundwater dependant terrestrial ecosystems (GWDTE) and species dependent on such within the study area of the proposed project was examined (NPWS, 2019a). The distribution of alkaline fens overlaps both the Inistioge and Mullinavat GWB ca. 3.5 km northwest (as the crow flies) from the proposed project. An area of alluvial woodland is present within the Inistioge GWB ca. 3.9 km east of the proposed project.

Alkane fens have a 'High' contribution from groundwater with groundwater contribution important for this habitat as it is highly sensitive to change (Kilroy *et al.*, 2008). Alluvial forests

have a 'Low to Moderate' contribution from groundwater and a 'Moderate' sensitivity to changes in groundwater levels (Kilroy *et al.*, 2008).

6.10.2 Field Surveys

The findings of the ecological field surveys undertaken at the proposed wind farm site on the 19th and 20th of September 2022, 25th to 28th of September 2023, 12th to 15th of August 2024, 10th and 11th of April 2025 and the 11th and 12th of August 2025 are detailed in the following sections.

6.10.2.1Habitats

All habitats recorded within the proposed project are outlined hereunder and are illustrated on Figure 6-8 and Figure 6-9.

6.10.2.1.1 BC1 – Arable crops

Three small areas of arable crops (Fossitt code: BC1) are recorded in the east of the proposed wind farm site, which equate to a total area of 8 ha. The crop consists of wheat (*Triticum aestivum L.*), maize (*Zea mays*) and one which was unknown due to recent harvesting. Other species such as redshank (*Persicaria maculosa*), common knapweed (*Centaurea nigra*), thistle (*Cirsium sp.)* and broad-leaved dock (*Rumex obtusifolius*) are occasionally recorded. The arable crops are assessed to be of Local Importance (Lower Value) due to the low ecological value the habitat provides and will not be considered further within the assessment.

6.10.2.1.2 BL1- Stone walls and other stonework

There are two areas of stone walls and other stonework in the east of the proposed wind farm site, which equate to a total area of 0.01 ha. These areas consist of old ruins of buildings, with some covered in common ivy (*Hedera helix*). This habitat was also recorded at TDR works areas 10 (see Figure 6-10), 11 and 12 (see Figure 6-11) and 13 (see Figure 6-12).

Linear features of stone walls and other stonework area also recorded within the proposed project equating to a total length of 205.68 m and at proposed TDR works areas 10, 11 and 13 equating to a total length of 312.67 m. These stone walls are vegetated with grass species such as perennial rye grass (*Lolium perenne*) and false oat grass (*Arrhenatherum elatius*). Stone walls and other stonework are assessed to be of Local Importance (Lower Value) due to the low ecological value the habitat provides and will not be considered further within the assessment.

6.10.2.1.3 BL1/WL1 - Stone walls and other stonework/Hedgerows Mosaic

The majority of the field boundaries within the proposed wind farm site consist of a mosaic habitat of stone walls and hedgerows, equating to a total length of 3,774.94 m. This habitat is also recorded at proposed TDR works areas 10 to 12 (233.89 m). These habitats range in height from 1-3 m, densely vegetated with the stone wall beneath (see Plate 6-1). Commonly observed species include bracken (*Pteridium aquilinum*), bramble (*Rubus fruticosus*), common gorse (*Ulex europaeus*), false oat grass, cocksfoot (*Dactylis glomerata*) and common hawthorn (*Crataegus monogyna*). The stone walls and hedgerows mosaic are assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

Plate 6-1 Example of BL1/WL1 Habitat Observed within the Proposed Wind Farm Site

6.10.2.1.4 BL1/WL2 - Stone walls and other stonework/Treelines Mosaic

This habitat is recorded as a field boundary surrounding T10, equating to a total length of 1,552.92 m. This habitat is also recorded at proposed TDR works areas 9 and 10 (81.91 m). This mosaic habitat is gappy in nature and ranged in height from 2-8 m. Commonly observed species include common hawthorn, European ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*) and common gorse. The stone walls and treelines mosaic area assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

6.10.2.1.5 BL1/WS1 - Stone walls and other stonework/Scrub Mosaic

This habitat is recorded as a field boundary at T7 equating to a total length of 533.29 m and at the proposed GCO One (25.28m). This habitat is recorded at a height of 2.5 m and is densely vegetated with species commonly found in scrub including common gorse, bracken, bramble and common hawthorn. The stone walls and scrub mosaic are assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

6.10.2.1.6 BL2 /WL1 – Earth banks/Hedgerows Mosaic

In the east of the proposed wind farm site, near T6, field boundaries are bordered by a mosaic habitat of earth banks and hedgerows equating to a total length of 1,135.58 m. This mosaic habitat consists of vegetated earth banks at a height of 2 m and forms field boundaries. Typically observed species include bracken, cocksfoot, false oat grass, common gorse and yarrow (*Achillea millefolium*). The earth banks and hedgerows mosaic are assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment**.

6.10.2.1.7 FW1 – Eroding/upland rivers

Five eroding and upland rivers are recorded within the proposed project; three within the proposed project study area which are part of the WFD river waterbodies Blackwater (Kilmacow)_020 (located in the west along the wind farm boundary), Smartscastle Stream_010 (located in the south) and Arrigle_010 (located in the east) and at the proposed GCO One, the Arrigle_020 and an unmapped waterbody, which are both crossed by the proposed GCO One.

An unmapped waterbody was recorded just north of T8 and likely flows into the Smartscastle Stream_010. An additional unmapped waterbody is also recorded at the proposed GCO One and flows north before flowing south into the Arrigle_020. The waterbodies which are recorded as eroding/upland rivers all lead downstream to European sites; the Arrigle_010 and Arrigle_020 Rivers form part of the River Barrow and River Nore SAC and the Blackwater (Kilmacow)_020 and Smartscastle Stream_010 form part of the Lower River Suir SAC. For these reasons, this habitat is assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

6.10.2.1.8 FW4 – Drainage ditches

Drainage ditches totalling 4,680.08 m are recorded throughout the proposed wind farm site (including at proposed TDR works areas 10, 13 and 14 [Figure 6-10, Figure 6-12 and Figure 6-13) and ranged from being heavily vegetated and dry in composition (north of T1) to shallow drains with flowing water (north of T5). Drainage ditches totalling 65.29 m were also recorded along the proposed GCO One. Drainage ditches which are dry and heavily vegetated are assessed as being of Local Importance (Lower Value) and will not be considered further within this assessment. Those containing flowing water (1,289.15 m) are assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

6.10.2.1.9 FP2 – Non-calcareous spring

Flowing water and waterlogged soil from an underground spring are identified within an area of wet willow-alder-ash woodland. No mosses, marl or tufa formation is recorded, and the water flows on a muddy base into the woodland with soft rush (*Juncus effusus*) recorded intermittently. Conductivity testing was low, further confirming that this habitat is classified as a non-calcareous spring. It is located ca. 320 m west of the access road to T1 and T10. This habitat is assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

6.10.2.1.10 GA1 – Improved agricultural grassland

Improved agricultural grassland (GA1) is abundant throughout the proposed wind farm site, equating to a total area of 102.39 ha. This habitat is also present at the proposed GCO One (2.79 ha). These habitats are primarily dominated with perennial rye grass with other fields consisting of annual meadow grass (*Poa annua*). Other floral species recorded included meadow buttercup (*Ranunculus acris*), white clover (*Trifolium repens*), broad-leaved dock, nettle (*Urtica dioica L.)*, pineapple weed (*Matricaria discoidea*), dandelion (*Taraxacum officinale*), ribwort plantain (*Plantago lanceolata*) and creeping thistle (*Cirsium arvense*). Improved agricultural grassland is assessed to be of Local Importance (Lower Value) due to the low ecological value the habitat provides, and it will not be considered further within the assessment.

6.10.2.1.11 GS2 – Dry meadows and grassy verges

Two areas of dry meadows and grassy verges (GS2) are present within the proposed wind farm site, at T3 and the access road east of this turbine, equating to a total area of 0.74 ha. Grassy verges are also recorded at proposed TDR works areas 14 (184.71 m) (Figure 6-13). Species recorded included cocksfoot, broad-leaved dock, common knapweed, meadow buttercup, nettle and ribwort plantain. The areas of dry meadows and grassy verges are assessed to be of

Local Importance (Lower Value) due to the low ecological value the habitat provides and will not be considered further within the assessment.

6.10.2.1.12 GS4 – Wet grassland

Areas of wet grassland (GS4) are recorded intermittently during habitat surveys within the proposed project equating to a total area of 3.31 ha. Species recorded at this area include soft rush, perennial rye grass, fescues (*Festuca*), bent grass (*Agrostis stolonifera),* Yorkshire fog (*Holcus lanatus*) and bramble. The areas of wet grassland are assessed to be of Local Importance (Lower Value) due to the low ecological value the habitat provides. However, an area (0.52 ha) of wet grassland is recorded at T3 (see Plate 6-2) and is considered to be species rich, diverse and ungrazed containing additional species such as purple moor-grass (*Molinia caerulea*), tormentil (*Potentilla erecta*), sharp flowered rush (*Juncus acutiflorus*), birds-foot trefoil (*Lotus corniculatus*). The habitat at T3 is assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

Plate 6-2 Wet Grassland Habitat Recorded at T3

6.10.2.1.13 HD1/WS1 Dense bracken/Scrub Mosaic

A linear strip (45.89 m) of the mosaic habitat dense bracken and scrub is recorded southwest of T9 on the boundary of immature conifer plantation and improved agricultural grassland. The species observed include bracken, bramble, nettle, false oat grass and grey willow. This area of dense bracken/scrub is assessed to be of Local Importance (Lower Value) and will not be considered further within the assessment.

6.10.2.1.14 HH3 – Wet heath

An area of wet heath (HH3) is present directly adjacent (north) of T3 (see Plate 6-3) equating to a total of 1.2 ha. Species include ling heather (*Calluna vulgaris*), crossed leaved heath (*Erica tetralix*), purple moor-grass, tormentil, bog asphodel (*Narthecium ossifragum*), milkwort (*Polygala vulgaris*), devil's-bit scabious and *Sphagnum* sp., with rarely observed common gorse, bilberry (*Vaccinium myrtillus*) and soft shield fern (*Polystichum setiferum*). The area of wet heath is

undisturbed and wet underfoot and is unique in the context of the surrounding environment which predominantly consists of conifer plantations and improved agricultural grassland.

This habitat likely corresponds to the Annex I EU habitat classification 'wet heaths (4010)' (EC, 2013). The overall conservation status of this EU habitat type is 'Bad' (NPWS, 2019c) with threats/pressures likely from intensive livestock grazing, burning for agricultural purposes and/or expansion of forestry (NPWS, 2019d).

This area of wet heath did not meet the criteria for North Atlantic wet heaths with *Erica tetralix* (4010) as set out by Perrin *et al.*, 2014. In order to meet Annex I criteria, the habitat must contain ≥ 50 % of positive indicator species; for example, species such as liverwort species (e.g., *Diplophyllum albicans*), cottongrass (*Eriophorum angustifolium*), bog myrtle (*Myrica gale*), deegrass species (e.g., *Trichophorum germanicum*) and heath milkwort (*Polygala serpyllifolia*) which this area of wet heath does not contain. Furthermore, due to the influence of surrounding drainage and modification of the land for forestry and agricultural purposes, this habitat is considered to be degraded. Notwithstanding, the siting of proposed infrastructure within this area has been avoided.

This habitat is assessed to be of **County Importance and will be considered further within the assessment.**

Plate 6-3 HH3 Habitat Recorded at T3

6.10.2.1.15 WD1 – (Mixed) broadleaved woodland

Two areas of (mixed) broadleaved woodland (WD1) is recorded within the proposed wind farm site equating to a total of 2.08 ha; one area in the southwest surrounding a conifer plantation near T2 and another small area of woodland surrounded by conifers adjacent to T7 (see Plate 6-4). This habitat was also recorded at TDR works areas 11 and 12 (see Figure 6-11). The areas of woodland are dense in nature, with a height ranging from 6-10 m and an understory of bramble. Species recorded at these locations include downy birch (*Betula pubescens*), grey willow (*Salix*

cinerea), bramble, alder (*Alnus glutinosa*), common hazel (*Corylus avellana*) and blackthorn (*Prunus spinosa*). Species observed more rarely include sessile oak (*Quercus petraea*), common hawthorn (*Crataegus monogyna*) and beech (*Fagus sylvatica*). The areas of (mixed) broadleaved woodland are assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

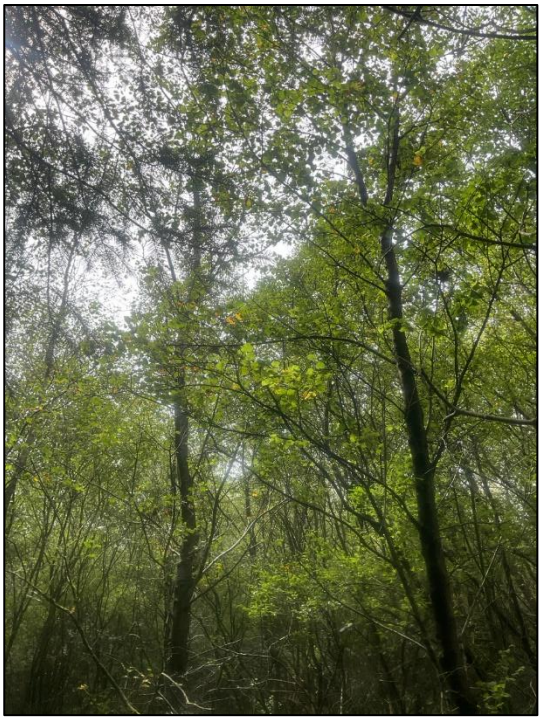

Plate 6-4 Example of WD1 Habitat Adjacent to T7

6.10.2.1.16 WD2 – Mixed broadleaved/conifer woodland

A very small area (ca. 0.15 ha) of mixed broadleaved/conifer woodland (WD2) is recorded in the southeast of the proposed wind farm site adjacent to the site entrance at the L3424. This woodland is dense, with a tree height of 10 m and a dense understory of bramble. Species recorded include grey willow, beech, Sitka spruce (*Picea sitchensis*) and bracken. This area of mixed broadleaved/conifer woodland was assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

6.10.2.1.17 WD4 – Conifer plantation

Conifer plantation (WD4) is the dominant habitat recorded throughout the proposed project equating to 209.24 ha, with an additional 0.01 ha recorded at proposed TDR works area 14 (see Figure 6-13) and 1.03 ha at the proposed GCO One. The proposed onsite substation and route of GCO Two is predominantly present within WD4 habitat. The plantations are dominated by Sitka spruce, with occasional species of lodge pole pine (*Pinus contorta*), grey willow, bramble and common gorse also recorded. The areas of conifer plantation area assessed to be of Local Importance (Lower Value) due to the low ecological value the habitat provides and will not be considered further within the assessment.

6.10.2.1.18 WS5 – Recently-felled Woodland

Recently-felled woodland is recorded within the proposed GCO One (0.81 ha). This habitat appears to be felled for some time with the recolonisation of species occurring. Species include perennial rye grass, common gorse, bramble, soft rush and downy birch. This area of recently-felled woodland is assessed to be of Local Importance (Lower Value) due to the low ecological value the habitat provides and will not be considered further within the assessment.

6.10.2.1.19 WL1 – Hedgerows

Hedgerows are recorded throughout the proposed wind farm site equating to a total length of 4,602.97 m. Hedgerows are also recorded at the proposed TDR works areas 10 (see Figure 6-10), 11 and 12 (see Figure 6-11) and 13 (see Figure 6-13) (101.94 m) and along the proposed GCO One (20.15 m). The hedgerows vary in structure from dense and unmanaged to gappy and scrub like. Typical hedgerow height is between 2-5 m. Hedgerows are also recorded along proposed TDR works areas where a total length of ca. 101.94 m will be subject to trimming/removal. Species commonly observed include common hawthorn, common gorse, bracken, grey willow, elder (*Sambucus nigra*) and bramble. The hedgerows range from dense and unmanaged with others being gappy and scrub like. Hedgerows are assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment**.

6.10.2.1.20 WL1/WS1 – Hedgerows and Scrub Mosaic

This mosaic habitat is recorded to the east of T6 equating to a total length of 148.10 m. This habitat is present in the form of field boundaries. Species commonly observed include bramble, common gorse, bracken and hawthorn. Hedgerows and scrub mosaic are assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment**.

6.10.2.1.21 WL2 – Treelines

Treelines are recorded intermittently throughout the proposed wind farm site (1,513.14 m), proposed TDR works areas 10 (see Figure 6-10), 13 (see Figure 6-12) and 14 (see Figure 6-13) (389.43 m) and along the proposed GCO One (448.34 m), equating to a total length of 2,608.44 m. The treelines recorded are predominantly dense, continuous and unmanaged with a height of 5 - 10 m. Treelines are also recorded along the proposed GCO One and at various proposed TDR works areas where ca. 389.43 m will be subject to trimming/removal at three locations. Species commonly observed include elder, grey willow, European ash and common hawthorn. The treelines recorded are unmanaged and vary from dense and continuous to gappy. Treelines are assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

6.10.2.1.22 WN6 Wet willow-alder-ash woodland

Two areas of wet willow-alder-ash woodland are recorded west of the access road to T1 and T10 and west of T6 equating to a total of 2.7 ha. These dense and unmanaged areas of woodland are dominated by grey willow, with alder frequently found, however no ash is recorded. Other species include bramble, soft rush, birch and sycamore. The woodland west of the access road (T1 and 10) is present on wet ground which may be due to the spring (see Section 6.10.2.1.9) located in this area. Wet willow-alder-ash woodland is assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

6.10.2.1.23 WS1 – Scrub

Areas of scrub (WS1) are recorded intermittently throughout the proposed project equating to a total area of 13.44 ha. The areas of scrub are dense, thick, overgrown and unmanaged varying in height from 2-5 m (see Plate 6-5). Species recorded at these areas include grey willow, bramble, bracken, common gorse and blackthorn. The areas are dense, unmanaged and overgrown and may provide refuge for wildlife in the local area. Due to this, this habitat is recorded as being **Local Importance (Higher Value) and will be considered further within the assessment.**

Plate 6-5 Example of WS1 Habitat Recorded Within the Proposed Project

6.10.2.1.24 WS3 – Ornamental/non-native shrub

This habitat (total length 46 m) was recorded at proposed TDR works areas 9 and 13 within residential properties. The species are non-native (e.g., acer sp., cherry laurel [*Prunus laurocerasus*], *virburnum* spp.). This habitat is assessed to be of Local Importance (Lower Value) and will not be considered further within the assessment.

6.10.2.1.25 Protected and Invasives Non-native Plant Species

No INNS listed on the Third Schedule (S.I. No. 477 of 2011) were identified within the footprint of the proposed project. Additionally, no FPO species or Red listed plant species were recorded within the proposed project during surveys.

7°4'48"W

52°11'30"N

6°58'W

52°22'12"N

662400

624000

N

BLACKWATER (KILMACOW)_020

ARRIGLE_010

SMARTSCASTLESTREAM_010

T1 T2 T3 T4 T5 T6 T7 T8 T9 T10

Legend

- Wind Farm Study Area
- Turbine locations

Grid Connection Options

- Option 1
- Option 2
- Rivers

Habitats

- BL1 - Stone Walls and other stonework
- BL2 - Earth banks
- BL3 - Buildings and artifical surfaces
- FW1 - Eroding/ upland rivers
- FW4 - Drainage ditches
- HD1 - Dense bracken
- WL1 - Hedgerows
- WL2 - Treelines
- BC1 - Arable crops
- BL1 - Stone walls and other stonework
- GA1 - Improved agricultural grassland
- GS2 - Dry meadows and grassy verges
- GS4 - Wet grassland
- HH3 - Wet heath
- WD1 - (Mixed) broadleaved woodland
- WD2 - Mixed broadleaved/ conifer woodland
- WD4 - Conifer plantation
- WN6 - Wet willow-alder-ash woodland
- WS1 - Scrub

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

Rev	Date	Description	By	Chkd.
A	13/11/2025	First issue	S.P	A.M

Client:
Manogate Ltd.

Project:
Ballyfasy Wind Farm

Title:
Figure 6-8:
Habitat Map of
the Proposed Project Site

Scale @ A3: 1:10,000

Prepared by:	Checked by:	Date:
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Map Ref: 11474-028-HAB-P.App.BO-TOB-A

Draft: A

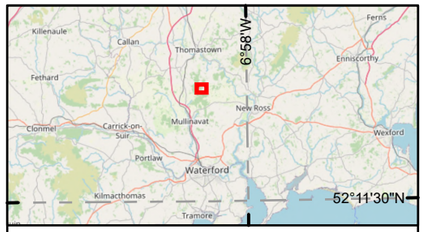
7°8'6"W

52°26'48"N

N

ARRIGLE_020

659200



Legend

Grid Connection Options
- Option 1
- Option 2
- Rivers

Habitats
- GA1 - Improved agricultural grassland
- GS4 - Wet grassland
- WD1 - (Mixed) broadleaved woodland
- WD4 - Conifer plantation
- WN6 - Wet willow-alder-ash woodland
- WS5 - Recently felled woodland
- BL1 - Stone Walls and other stonework
- BL2 - Earth banks
- FW1 - Eroding/ upland rivers
- FW4 - Drainage ditches
- WL1 - Hedgerows
- WL2 - Treelines
- WS1 - Scrub

0 150 300
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

Rev	Date	Description	By	Chkd.
A	13/11/2025	First issue	S.P	A.M

Client:
Manogate Ltd.

Project:
Ballyfasy Wind Farm

Title:
Figure 6-9:
Habitat Map of
the Proposed GCO one

Scale @ A3: 1:7,000

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Map Ref: 11474-029-HAB..GC0-P.App.BO-TOB-A

Draft: A

Legend

- TDR Works Areas
- BL1 - Stone Walls and other stonework
- FW4 - Drainage ditches
- WL1 - Hedgerows
- WL2 - Treelines

0 25 50
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

Rev	Date	Description	By	Chkd.
A	13/11/2025	First issue	K.K	A.M

Client:
Manogate Ltd.

Project:
Ballyfasy Wind Farm

Title:
Figure 6-10:
Habitat Map of
TDR Works Area 10
Sheet 1 of 4

Scale @ A3: 1:1,000

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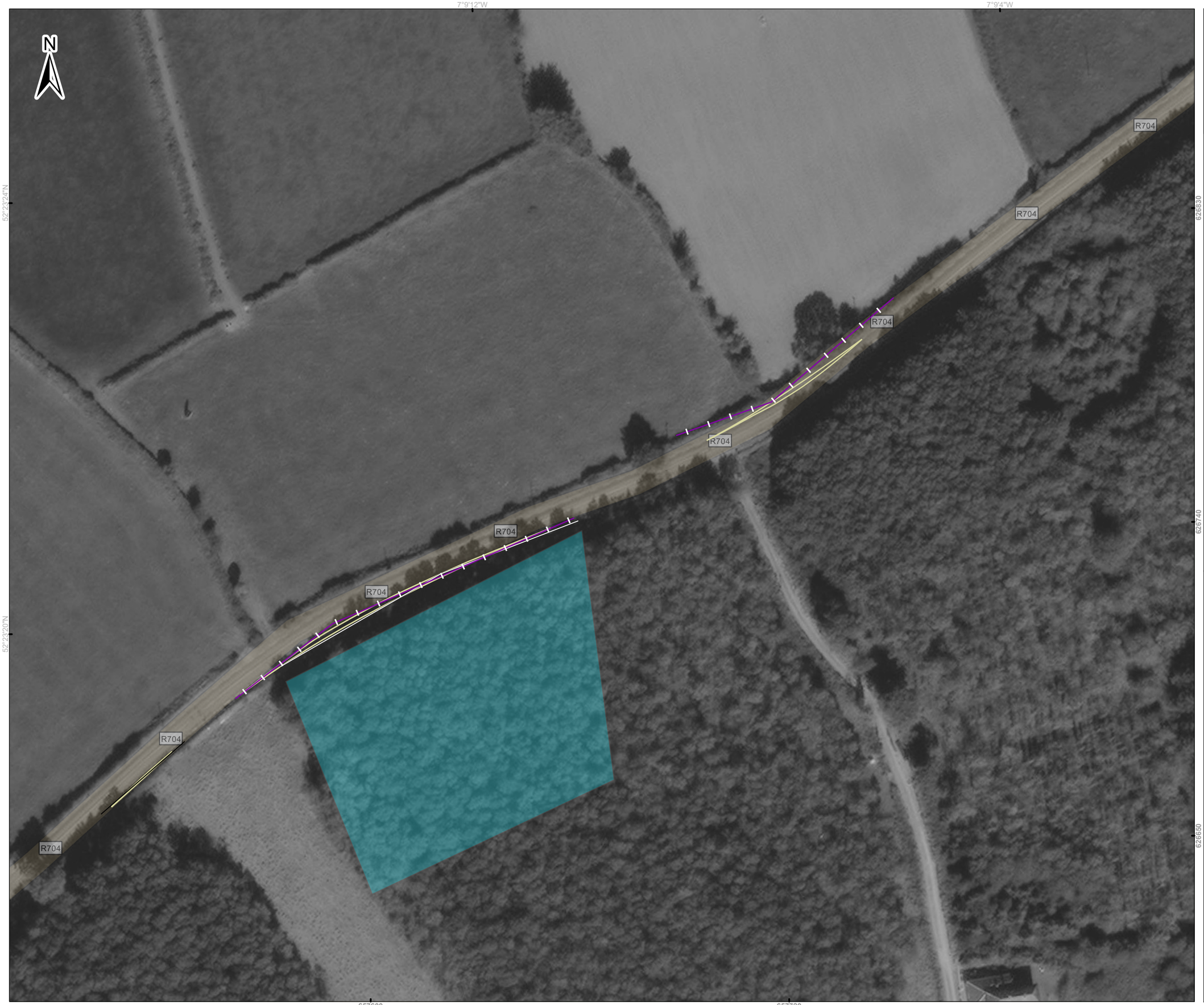
Map Ref: 11474-057-HAB-TDR-TOB-A

Draft: A



Legend

- TDR Works Areas
- BL1 - Stone Walls and other stonework
- BL3 - Buildings and artifical surfaces
- WL1 - Hedgerows
- WD1 - (Mixed) broadleaved woodland

0 25 50
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

Rev	Date	Description	By	Chkd.
A	13/11/2025	First issue	K.K	A.M

Client:
Manogate Ltd.

Project:
Ballyfasy Wind Farm

Title:
Figure 6-11:
Habitat Map of
TDR Works Area 11 and 12
Sheet 2 of 4

Scale @ A3: 1:1,000

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Map Ref: 11474-057-HAB-TDR-TOB-A

Draft: A

Legend

- TDR Works Areas
- BL1 - Stone Walls and other stonework
- FW4 - Drainage ditches
- WL1 - Hedgerows
- WL2 - Treelines
- WD4 - Conifer plantation

0 25 50
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

Rev	Date	Description	By	Chkd.
A	13/11/2025	First issue	K.K	A.M

Client:
Manogate Ltd.

Project:
Ballyfasy Wind Farm

Title:
Figure 6-12:
Habitat Map of
TDR Works Area 13
Sheet 3 of 4

Scale @ A3: 1:1,000

Prepared by:	Checked by:	Date:
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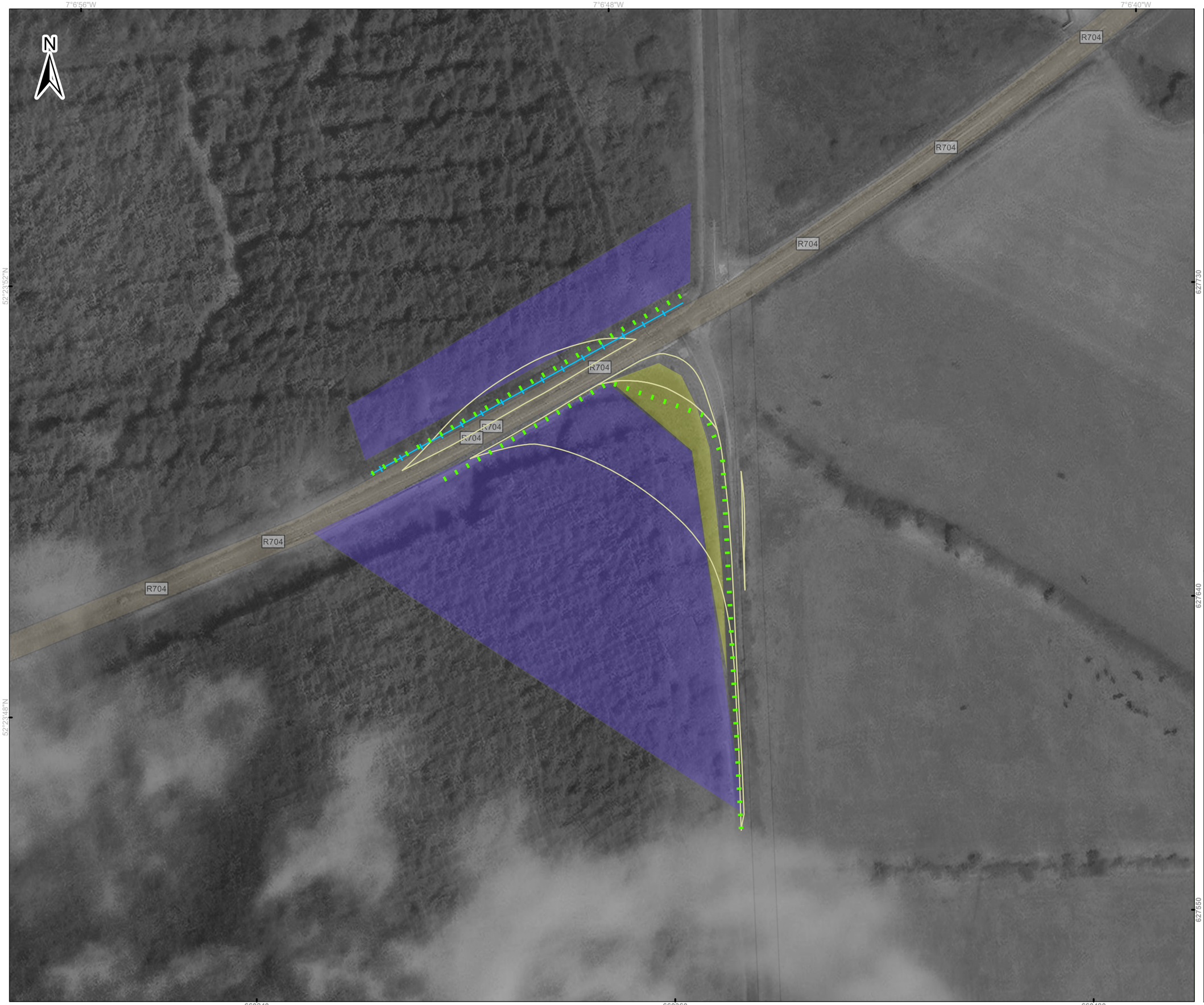
Map Ref: 11474-057-HAB-TDR-TOB-A

Draft: A



Legend

- TDR Works Areas
- FW4 - Drainage ditches
- WL2 - Treelines
- GS2 - Dry meadows and grassy verges
- WD4 - Conifer plantation

0 25 50
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

Rev	Date	Description	By	Chkd.
A	13/11/2025	First issue	K.K	A.M

Client:
Manogate Ltd.

Project:
Ballyfasy Wind Farm

Title:
Figure 6-13:
Habitat Map of
TDR Works Area 14
Sheet 4 of 4

Scale @ A3: 1:1,000

Prepared by:	Checked by:	Date:
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Map Ref:
11474-057-HAB-TDR-TOB-A

Draft:
A

6.10.2.2Species

All evidence of protected fauna species recorded within the study area are outlined hereunder.

6.10.2.2.1 Mammals

6.10.2.2.1.1Badger

Badger is protected under the Wildlife Acts (as amended). It is an offence under that legislation to intentionally kill or injure badger or to wilfully interfere with or destroy their breeding or resting places (setts).

The proposed wind farm site was extensively searched for signs of badger activity (i.e., setts, snuffle holes, scat and latrines). Badger activity was concentrated to the improved agricultural grasslands surrounding T6. Whilst activity was also recorded intermittently elsewhere within the proposed wind farm site, the area surrounding T6 showed the greatest amount of badger signs. Badger activity was in the form of a significant quantity of snuffle holes throughout the improved agricultural grassland (see Plate 6-6 and Figure 6-14) and as such it is determined that badger are predominantly foraging within the area surrounding T6.

Additional badger signs recorded throughout the proposed wind farm site included scat, which was predominantly recorded within conifer plantation. No badger setts were recorded within the proposed wind farm site.

The local badger population was assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

Plate 6-6 Example of Badger Activity (Snuffle Holes) Recorded Near T6

7°7'0"W
7°5'10"W
7°3'20"W
52°23'0"N
52°22'0"N
626000
624000
660000
662000
664000

N

T1
T2
T3
T4
T5
T6
T7
T8
T9
T10

Legend

- Wind Farm Study Area
- Turbine Locations

Grid Connection Options

- Option 1
- Option 2

Badger Activity

- Scat
- Snuffle hole

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

Rev	Date	Description	By	Chkd.
A	13/11/2025	First issue	S.P	A.M

Client:
Manogate Ltd.

Project:
Ballyfasy Wind Farm

Title:
Figure 6-14:
Badger Activity Recorded Within the Proposed Project near T6

Scale @ A3: 1:15,000

Prepared by:	Checked by:	Date:
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Map Ref: 11474-030-Badger..T6-P.App.BO-TOB-A

Draft: A

6.10.2.2.1.2Otter

Otter is protected under both the EU Habitats Directive and the Wildlife Acts (as amended). It is an offence under that legislation to intentionally kill or injure otter or to wilfully interfere with or destroy their breeding or resting places (holts/couches).

All streams and drainage ditches within the proposed project were surveyed for the presence of otter. No holts, spraints, slides, couches or other evidence of otter activity was recorded within the proposed project. However, aquatic survey site 11 (see Figure 6-5) adjacent to the proposed project and sites 13 to 16 along the proposed GCO One (see Figure 6-6) were noted to have commuting and foraging potential for otter. Aquatic survey sites 3, 9 and 10 (downstream of the Proposed project) (see Figure 6-5) were also noted to have commuting and foraging potential for otter.

NPWS data (NPWS, 2025a) illustrates the presence of otter habitat and freshwater commuting habitat primarily in the lower tributaries and main channels of the River Nore and River Suir, including their estuaries. However, otter freshwater commuting habitat was noted on the Arrigle_010 ca. 2.8 km downstream of the boundary of the proposed project which is also within the boundary of the River Barrow and River Nore SAC (NPWS, 2025a). Due to the presence of otter freshwater habitat within the Arrigle_010, which is a qualifying interest of the River Barrow and River Nore SAC, there is potential for otter to occur within the waterbodies of the proposed project.

For the aforementioned reasons, the local and downstream otter population was assessed to be of **International Importance and will be considered further within the assessment.**

6.10.2.2.1.3Pine Marten

Pine marten is protected under the Wildlife Acts (as amended). It is an offence under that legislation to intentionally kill or injure pine marten or to wilfully interfere with or destroy their breeding or resting places (dens).

Pine marten scat was recorded within the footprint of the proposed substation in the north of the proposed wind farm site (west of T4) in an area of conifer plantation. No other pine marten activity was recorded throughout the proposed project area. It is considered that pine marten infrequently utilises the area within the proposed project due to the lack of evidence recorded during surveys.

The local pine marten population was assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

6.10.2.2.1.4Fallow Deer

Fallow deer (*Dama dama)* is protected under the Wildlife Acts (as amended). It is an offence under that legislation to intentionally kill or injure fallow deer or to wilfully interfere with or destroy their breeding or resting places.

During field surveys, fallow deer droppings were recorded within the conifer plantation south of the access road between T4 and T7 and within the recently-felled woodland at the proposed GCO One. No live sightings of deer were observed. This species is protected under the Wildlife Acts (as amended).

The fallow deer population was assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment**.

6.10.2.2.1.5 Red Squirrel

Red squirrel (*Sciurus vulgaris*) is protected under the Wildlife Acts (as amended). It is an offence under that legislation to intentionally kill or injure red squirrel or to wilfully interfere with or destroy their breeding or resting places (dens/drey).

No evidence (e.g., dreys, feeding remains, scratch marks) of red squirrel was observed during surveys. However, due to the relationship between pine marten and red squirrel and due to the recording of red squirrel by the NBDC this species is likely to be present.

The red squirrel population was assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment**.

6.10.2.2.1.6 Bats

All bat species are protected under the Wildlife Acts (as amended) and the EU Habitats Directive (Annex IV). Bat species recorded during surveys included Leisler's bat (*Nyctalus leisleri*), Nathusius's pipistrelle (*Pipistrellus nathusii*), common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared bat (*Plecotus auratus*), *Pipistrellus* species, and *Myotis* species.

The results of the bat surveys undertaken by WSP is presented hereunder. The full report can be found in Appendix 6-5.

Habitat Suitability

The proposed wind farm site was determined to be of 'moderate' suitability (Collins, 2023) for foraging and commuting bats due to the presence of linear features such as hedgerows and treelines as well as suitable foraging habitat such as scrub and woodland edge associated with the coniferous plantation.

PRA

Two buildings (B1 and B2) are present within the PRA and GLTA survey area (refer to Figure 6-2) ca. 240 m and 220 m respectively southeast of T10. These buildings are stone ruins of a historic farmhouse which was assessed as having moderate suitability (Collins, 2023) to support bats during the active season (April to September inclusive) and during the hibernation season (October to March inclusive). A single bat dropping was found within a gap in the stonework of an external wall of B2 (refer to Figure 6-3:) on the 10th September 2025. A single, confirmed roost of an unknown bat species was identified within a cavity in the stonework of B2. However, due to the identification of a single bat dropping, this is assumed to be used by individuals or a low number of bats.

Aerial/Close Inspection & GLTA

A total of 16 trees that contain PRFs were identified during the GLTA within the PRA and GLTA survey area and were subject to aerial (close) inspection (refer to Figure 6-1). Three trees were found to contain PRF-M (suitable for multiple bats any may therefore be used by a maternity colony [Collins, 2023]) and 11 trees with PRF-I (only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats

[Collins, 2023]) features. The remaining two trees were assessed as not suitable to support roosting bats.

Dusk Emergence

B1 and B2 (refer to Figure 6-2) had a single dusk emergence survey undertaken on the 11th September 2025. No bats were recorded emerging or re-entering the buildings during the survey undertaken. Foraging and commuting activity of soprano pipistrelle, common pipistrelle, Leisler's bat, *Myotis* species and brown long-eared bat were recorded during the dusk emergence survey effort adjacent to the buildings survey. Bats were recorded foraging within the internal space of B2, accessing this via the open space which was once the window. However, no bats were recorded entering any PRFs.

It is noted that a significant limitation for dusk emergence surveys was encountered due to access restrictions until mid-September, therefore missing the peak of the active bat season (April to September inclusive) and limiting the number of surveys to one per feature. Therefore, it cannot be determined how bats utilise these buildings across the active season and to rule out the absence of roosting bats.

Bat Detector

Static detectors were deployed within the proposed wind farm site (refer to Figure 6-4) for a minimum of ten nights across three seasons (spring, summer and autumn). This amounted to 59 nights of deployment per location (ten nights in spring, 11 nights in summer and 11 nights in autumn). Over the whole survey period across all static detectors, the total number of bat passes recorded was 52,100. Seven species (or genera in difficult to identify species) were recorded during the study period, namely, Leisler's bat, Nathusius's pipistrelle, common pipistrelle, soprano pipistrelle, brown long-eared bat, *Pipistrellus* species, and *Myotis* species (Table 6-7).

Table 6-7: Total Bat Passes Per Species from Bat Detector Deployment

Bat Species	Passes (Number)	Percentage of Total (%)
Myotis sp.	704	1.4
Leisler's bat	15,556	29.9
Pipistrelle sp.	525	1.0
Nathusius's pipistrelle	511	1.0
Common pipistrelle	27,174	52.2
Soprano pipistrelle	7,282	14.0
Brown long-eared bat	348	0.7
Total	**52,100**	**100**

Bat Roosts

To determine the likelihood of potential roosts being present within or close to the proposed wind farm site, peaks in bat activity were compared to Species-Specific Emergence Times (S-SET) (Russ, 2012; Andrews, 2022). Around all but one detector (T3) there was overlap between bat activity for at least one of five species (*Myotis* sp., brown long-eared, Leisler's, soprano pipistrelle, common pipistrelle) and their expected emergence times for that species. Based on these results, it is possible that roosts for colonies or individual bats are within/proximal to the proposed wind farm site of five species: *Myotis* sp. (T2, T4), brown long-eared bats (T4, T5, T6), Leisler's bats (T1, T2, T4, T5, T6, T7, T8, T9, T10), soprano pipistrelle (T2, T8), common pipistrelle (T1, T2, T4, T5, T6, T7, T8, T10).

As detailed above, a single bat roost was identified in B2 (Plate 6-7). No further confirmed roosts were identified during surveys within the proposed wind farm site. However, due to the limitations encountered during surveys (refer to dusk emergence above and Appendix 6-5 for full details) trees and structures within the PRA and GLTA are suitable to support maternity colonies of all species recorded on site and cannot be ruled out.

Overall, high activity levels of Leisler's bat was recorded and the presence of Nathusius' pipistrelle, which, although recorded within County Kilkenny, has not been confirmed as roosting locally and is considered rare.

Given the limitations noted above, and considering bat activity levels and species recorded, the bat assemblage is assessed as being of **County Importance and will be considered further within the assessment**.

Plate 6-7 Roost Location in the Southeast Corner of B2 (Left) and Roost Access Point (Right)

6.10.2.2.2 Amphibians and Reptiles

6.10.2.2.2.1 Common Frog

Common frog is protected under the Wildlife Acts (as amended) and EU Habitats Directive (Annex V). Common frog was observed on three occasions within the proposed wind farm site; east (within wet grassland) and west (within the conifer plantation) of T8 and west (within ponded water located in the conifer plantation) of T4 (see Plate 6-8). It is likely that common frog occurs frequently throughout the proposed wind farm site, primarily within areas of ponded water/drainage ditches, which are their common breeding habitat (Reid *et al.*, 2013).

The common frog population was assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

6.10.2.2.2.2Common Lizard

Common lizard is protected under the Wildlife Acts (as amended). Whilst suitable habitat (i.e., woodlands, grasslands and heath) is present within the proposed wind farm site, no evidence of common lizard was recorded during field surveys. These findings were also supported by the desktop assessment whereby common lizard was not recorded by the NBDC within grid squares encompassing the proposed project. Common lizard will not be considered further within the assessment.

6.10.2.2.2.3Smooth Newt

Smooth newt is protected under the Wildlife Acts (as amended). Whilst suitable habitat (i.e., waterbodies, woodlands, grasslands and scrub) is present within the proposed wind farm site, no evidence of smooth newt was recorded during field surveys. These findings were also supported by the desktop assessment whereby smooth newt was not recorded by the NBDC within grid squares encompassing the proposed project. Smooth newt will not be considered further within the assessment.

Plate 6-8 Common frog recorded west of T4

6.10.2.2.3 Invertebrates – Lepidoptera

6.10.2.2.3.1 Marsh Fritillary

Marsh fritillary is the only legally protected butterfly species in Ireland under Annex II of the EU Habitats Directive and is listed under the Wildlife Acts (as amended).

Marsh fritillary surveys were undertaken in suitable habitat (e.g., calcareous grasslands, fens, bogs and heath habitat) which is present adjacent to T3 at the area of wet grassland and wet heath. This area was thoroughly searched for the presence of the marsh fritillary host plant, devil's-bit scabious, and the plant searched for any presence of larvae and/or webs. Whilst devil's-bit scabious was occasionally found in this habitat, no marsh fritillary larvae, webs and/or individuals were recorded. For this reason, this species will not be considered further in the assessment.

6.10.2.2.4 Other Faunal Species

Other faunal species which were identified to occur within proximity to or within the proposed project from the desktop study (see Section 0) included west European hedgehog and pygmy shrew which are protected under the Wildlife Acts (as amended). Whilst no evidence of these species was observed during field surveys, due to their common and widespread distribution in Ireland, these species are likely to occur within the proposed project.

Due to their protection under the Wildlife Acts (as amended) the population of other faunal species was assessed to be of **Local Importance (Higher Value) and will be considered further within the assessment.**

6.10.2.2.5 Aquatic Species

Aquatic surveys were carried out at the three WFD mapped waterbodies; Blackwater (Kilmacow)_020 River, Smartscastle Stream_010 and Arrigle_010 River, in addition to the assessment of any identified unmapped waterbodies and drainage ditches. A visual assessment of the Arrigle_020 River was carried out at the crossing points of the proposed GCO One (six

locations in total [includes unmapped streams]). The findings of the aquatic survey are discussed herein.

6.10.2.2.5.1 Biological Water Quality

Macroinvertebrate sampling was undertaken at 13 sites (aquatic sites 1-4, 7-11 and 13, 15, 17 and 18) within and downstream of the proposed project (see Figure 6-5).

A total of 30 taxa were recorded during macroinvertebrate sampling, with individual sites recording between two and 11 taxa in the single, kick sample taken at each site (please refer to Appendix 6-3). Overall, the macroinvertebrates observed consisted of the more pollution tolerant groups (half of the taxon richness), including Baetidae, Gammarus and Chironomidae. The Ephemeroptera and Plecoptera, indicators of good water quality, were rarely observed. Trichoptera were also present in low numbers within the proposed wind farm site, likely as a result of the lack of instream and marginal vegetation and sheltered habitats, however this taxon was present in higher numbers at the GCO One.

The biological water quality of the 13 sampled aquatic sites were: aquatic sites 1, 3, 7, 13, 17 and 18 were assigned a Q-value of Q3 'Poor' status (Moderately Polluted), aquatic sites 2, 4, 8-10 and 15 were assigned Q3-4 'Moderate' status (Slightly Polluted) and aquatic site 11 was assigned Q4 'Good' status (Unpolluted) (see Appendix 6-3). The results indicate that the overall biological water quality in the watercourses draining the proposed project is 'Poor' to 'Moderately Polluted'. The result illustrates that the watercourses do not provide adequate water quality to support a range of pollution sensitive mayfly and stonefly larvae.

A more detailed breakdown of the macroinvertebrates recorded during the kick sampling and their associated EPA class pollution sensitivity group is provided in Appendix 6-3.

6.10.2.2.5.2 Freshwater Pearl Mussel

FWPM is protected under Annex II and V of the EU Habitats Directive, the Wildlife Acts (as amended) and are included on the International Union for Conservation (IUCN) Red List as a critically endangered species (Byrne *et. al.*, 2009).

FWPM is acknowledged to be one of the most demanding species of high-water quality and high riverbed quality in the world (Atkinson *et al*, 2023) and requires fast flowing, well oxygenated, pristinely clean rivers with clean gravels and sand (Moorkens, 1999).

The results of the FWPM surveys undertaken by Ecofact Environmental Consultants Ltd. is presented hereunder. The full report can be found in Appendix 6-4.

Arrigle_010 (Nore_SC_130 sub-catchment)

FWPM surveys conducted by Ecofact concluded no suitable habitat is present within the Arrigle_010 River, both within and downstream of the proposed project. Locations at the River Barrow and River Nore SAC boundary were also examined which concluded no presence of FWPM. Moorkens *et. al.*, (1992) reported no live mussels within the tributary of the River Nore (this includes the Arrigle_010); the Arrigle_010 was included in the FWPM survey and the survey extended over 4 km along the river (which was estimated to be around 90% of the suitable habitat in the river). Based on the current survey and absence of any records from the Nore_SC_130 sub-catchment, the presence of FWPM in the Arrigle_010 and Nore_SC_130 is ruled out.

Smartscastle Stream_010 and Blackwater (Kilmacow)_020 (Blackwater[Kilmacow]_SC_010 sub-catchment)

No suitable habitat for FWPM was recorded within the Smartscastle Stream_010 and Blackwater (Kilmacow)_020 Rivers. The watercourses are deemed to be too small with unsuitable gradient and water quality to support the species, and the catchment overall is highly modified. Based on the current survey and absence of any records from the Blackwater[Kilmacow]_SC_010 sub-catchment the presence of FWPM in the Smartscastle Stream_010 and Blackwater (Kilmacow)_020 Rivers is ruled out.

Nore_SC_140 sub-catchment

A small area (ca. 539.42 m^2) of the proposed project is present within the Nore_SC_140 sub-catchment. No watercourses from this sub-catchment are present within or adjacent to the proposed project. No records of FWPM have been recorded within this sub-catchment, and this species was confirmed as absent during surveys of the Oaklands_010 River. Based on the current survey and absence of any records from the Nore_SC_140 sub-catchment the presence of FWPM in the ZoI of the proposed project is ruled out.

The FWPM surveys concluded the absence of the species within the sub-catchments and associated watercourses draining the proposed wind farm site and as such FWPM is not present within the ZoI of the proposed project. For this reason, FWPM will not be considered further in this assessment.

6.10.2.2.5.3 White-clawed Crayfish

White-clawed crayfish is listed on Annex II and Annex V of the Habitats Directive and is also protected under the Wildlife Acts (as amended). White-clawed crayfish is a qualifying interest

species of both the River Barrow and River Nore SAC and the Lower River Suir SAC which are hydrologically connected to the proposed project.

White-clawed crayfish surveys were carried out at a total of six sites (aquatic site 2, 4, 7, 10, 11 and 12 – refer to Figure 6-5) deemed to have suitable habitat, within the study area of the proposed project. Whilst suitable habitat (i.e., soft riverbanks, boulders, rock and debris for shelter/cover) was recorded as present within the survey sites, white-clawed crayfish were not recorded at any site during trapping and hand searching surveys.

Whilst this species was not identified during field surveys, the desktop study identified its presence within the grid squares encompassing the proposed project (see Table 6-4). In addition, this species is a qualifying interest of the two downstream European sites (refer to 6.10.1.1.1). Therefore, it is assumed that white-clawed crayfish are present within the ZoI of the proposed project. Considering the designation of white-clawed crayfish within the downstream European sites, the species was assessed to be of **International Importance and will be considered further in this assessment.**

6.10.2.2.5.4Salmonids and Other Fish Species

The suitability of waterbodies within and downstream of the proposed project were assessed for their potential to support salmonid species at all aquatic sites.

The Annex II species, Atlantic salmon, is a qualifying interest of both the downstream hydrologically connected Lower River Suir SAC and River Barrow and River Nore SAC.

It was determined from the aquatic surveys that suitable salmonid spawning habitat was present at aquatic site 4 (Arrigle_010), sites 8-10 (Smartscastle Stream_010) and site 11 (Blackwater [Kilmacow]_020) whereby heterogenous fluvial habitat ideal for spawning and early life stages of salmonids existed. These watercourses contained riffles, an instream mix of cobble and gravel base with dappled shade from over hanging banks or riparian vegetation provide good salmonid nursery habitat.

Substrate siltation was noted however at some watercourses; aquatic sites 1-3 (Arrigle_010) and aquatic site 7 (Smartscastle Stream_010). These first order streams were heavily silted over a low gradient that flowed through forestry plantations and agricultural lands. Heavy siltation of these waterbodies can prevent or disrupt alevin emergence and reduce the fitness of the fry and parr.

The upper reaches of the Blackwater (Kilmacow)_020 River, Smartscastle Stream_010 and Arrigle_010 River within the proposed project are considered to be of poor quality for spawning and nursery habitat due to poor water quality, channel modification, siltation, unsuitable substrate and fluvial habitat.

A juvenile brown trout parr was recorded during kick sampling at aquatic site 5, which provided a good indication of spawning and nursery conditions in this watercourse. Brown trout were also visible swimming and jumping within the Arrigle_010 River.

During aquatic surveys, it was noted that barriers to migration were present in the form of culverts on the Smartscastle Stream_010 (aquatic site 8 and 11) (see Plate 6-9), however both of these sites are directly adjacent to the proposed project so migrating salmonids may still be present within these waterbodies and downstream of the proposed project.

The aquatic surveys determined the potential for the waterbodies to support salmonids, with areas of spawning and nursery habitat noted. The habitat assessment included that of Atlantic salmon, which is a qualifying interest of River Barrow and River Nore SAC and the Lower River Suir SAC. Due to the significant distances to which Atlantic salmon can travel (a distance of 2,400 km recorded by Rikardsen *et. al.*, 2021) the presence of Atlantic salmon within the waterbodies hydrologically connected to the proposed project are considered that of the SAC population therefore Atlantic salmon was assessed to be of **International Importance and will be considered further in this assessment.**

Plate 6-9 Barriers to Migration on the Smartscastle Stream_010 (Aquatic Site 8 [L] and 11 [R])

6.10.2.2.5.5 Lamprey

There are three species of lamprey in Ireland, brook, river and sea lamprey, and all three species are protected under Annex II and V of the EU Habitats Directive. Habitat suitability for lamprey species was assessed at all river waterbodies within and downstream of the proposed project.

Aquatic surveys determined that the moderate flowing low gradient nature of watercourses in the study area of the proposed project provided suitable conditions for lamprey larvae, which require soft substrates into which they can burrow.

An area of 0.2 m^2 was surveyed for lamprey ammocetes in suitable sediment present along river edges at aquatic site 4 (Arrigle_010), aquatic sites 7 and 10 (Smartscastle Stream_010) and aquatic site 11 (Blackwater [Kilmacow]_020). Two lamprey ammocoetes were recorded at aquatic site 4 (Arrigle_010) ca. 2.7 km downstream of the proposed project (see Plate 6-10). The remaining sites did not contain lamprey ammocetes.

All species of lamprey are qualifying interests of both the downstream hydrologically connected Lower River Suir SAC and River Barrow and River Nore SAC. Due to the significant distances to which lamprey species can travel as part of their lifecycle, with ammocoetes found in headwaters over 100 km from upper tidal reaches (King, 2006) the presence of lamprey within the waterbodies hydrologically connected to the proposed project are considered that of the SAC population therefore population of brook, river and sea lamprey were assessed to be of **International Importance and will be considered further in this assessment**.

Plate 6-10 Lamprey Ammocetes Recorded at Aquatic Site 4

6.10.2.2.5.6 European Eel

European eel (*Anguilla anguilla*) is a 'Critically Endangered' species (Pike *et al.*, 2020) and considered to be the most threatened fish species in Ireland in a Red-listed publication (King *et al.*, 2011). The European eel also has protective status under the European Eel Regulation EC No. 1100/2007 to facilitate their recovery.

Watercourses in the study area of the proposed project were considered optimal for European eel given the often-low gradient and low energy profiles of the channels. The presence of instream refugia such as large boulders and cobble provided optimal eel habitat offering vital diurnal refugia for eel populations (Laffaille *et al.*, 2003).

Similarly to salmonids, the upper reaches of the Blackwater (Kilmacow)_020 River, Smartscastle Stream_010 and Arrigle_010 River offer unsuitable habitat due to poorer water quality, channel modification and barriers to migration.

European eel are likely to be impacted by barriers to migration inhibiting their ability to reach the upper reaches of the river waterbodies present within the proposed project. Nonetheless, the population of European eel were assessed to be of **Local Importance (Higher Value) and will be considered further in this assessment**.

6.10.3 Summary of Important Ecological Features

Following a review of the existing environment presented above, Important Ecological Features (IEFs) within the study area of the proposed project were evaluated in accordance with the evaluation criteria set out in Section 6.9. Table 6-8 details all IEFs for which detailed assessment is required (i.e., all features of Local Importance (Higher Level) or higher and/or subject to legal protection), the geographical context within which each is considered to be important and their legal status.

Table 6-8: Summary of Important Ecological Features Subject to Detailed Assessment

Ecological Feature	Scale at which feature is important (NRA, 2009)	Legal Status & Distribution Within the Proposed Project	Inclusion as Important Ecological Feature (Yes/No)
European Sites (SACs only)			
River Barrow and River Nore SAC [002162]	International	Legally protected under the EU Habitats Directive, transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011 (S.I. No 477 of 2011). A downstream hydrological connection (ca. 2.7 km) to this European site has been identified via the Arrigle_010 and Arrigle_020 rivers. The mapped extent of this river is situated within the eastern section of the proposed wind farm site and crossed by the proposed GCO One. A pathway for potential effects is present.	**Yes**
Lower River Suir SAC [002137]	International	Legally protected under the EU Habitats Directive, transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011 (S.I. No 477 of 2011). A downstream hydrological connection (ca. 17.9 km) to this European site has been identified via the Smartscastle Stream_010 and the Blackwater (Kilmacow)_020 River. The mapped extents of these rivers are situated within the centre and western sections of the proposed wind farm site respectively. A pathway for potential effects is present.	**Yes**
Other sites of Conservation Interest			
Lough Cullin pNHA [000406]	National	Non-statutory, but these sites will ultimately be designated as NHA and protected under the Wildlife Acts (as amended). Whilst pNHA are not legally protected, they are of significant for wildlife and habitats.	**Yes**

Ecological Feature	Scale at which feature is important (NRA, 2009)	Legal Status & Distribution Within the Proposed Project	Inclusion as Important Ecological Feature (Yes/No)
		A downstream hydrological connection (ca. 7.3 km) to this pNHA has been identified via the Smartscastle Stream_010. The mapped extent of this river is situated within the centre of the proposed wind farm site. A pathway for potential effects is present.	
Grannyferry pNHA [000833]	National	Non-statutory, but these sites will ultimately be designated as NHAs and protected under the Wildlife Acts (as amended). Whilst pNHA are not legally protected, they are of significant for wildlife and habitats. A downstream hydrological connection (ca. 16.3 km) to this pNHA has been identified via the Smartscastle Stream_010. The mapped extent of this river is situated within the centre of the proposed wind farm site. A pathway for potential effects is present.	**Yes**
Habitats			
BC1 – Arable crops	Local Importance (Lower Value)	Not a legally protected habitat. Modified and cultivated land which was considered to be of low ecological value to local wildlife in the area of the proposed wind farm site. One of the two borrow pits is present within this habitat, however, the borrow pits are temporary during the construction phase only and it will not result in the permanent loss of this habitat.	No
BL1 -Stone walls and other stonework	Local Importance (Lower Value)	Not a legally protected habitat. Man-made, built structure which were heavily vegetated. This habitat was considered to be of low ecological value to local wildlife in the area of the proposed project.	No

Ecological Feature	Scale at which feature is important (NRA, 2009)	Legal Status & Distribution Within the Proposed Project	Inclusion as Important Ecological Feature (Yes/No)
BL1/WL1 - Stone walls and other stonework/Hedgerows Mosaic	Local Importance (Higher Value)	Not a legally protected habitat. However, this habitat supports Wildlife Acts (as amended) protected species (e.g., badger, bird species). This habitat is located throughout the proposed wind farm site typically as field boundaries and within proximity to (100 m) associated infrastructure at T3, T7 and T9. This habitat is also recorded within the proposed GCO One, GCO Two and at proposed TDR works areas. This habitat will be directly impacted by the proposed project infrastructure.	**Yes**
BL1/WL2 - Stone walls and other stonework/Treelines Mosaic	Local Importance (Higher Value)	Not a legally protected habitat. However, this habitat supports Wildlife Acts (as amended) protected species (e.g., badger, bird species). This habitat is located throughout the proposed wind farm site typically as field boundaries and within proximity to (100 m) associated infrastructure at T10. This habitat is also recorded within the proposed GCO One and at proposed TDR works areas. This habitat will be directly impacted by the proposed project infrastructure.	**Yes**
BL1/WS1 - Stone walls and other stonework/Scrub Mosaic	Local Importance (Higher Value)	Not a legally protected habitat. However, this habitat supports Wildlife Acts (as amended) protected species (e.g., badger, bird species). This habitat is located at T7 where it forms a field boundary. This habitat will be directly impacted by the proposed project infrastructure.	**Yes**

Ecological Feature	Scale at which feature is important (NRA, 2009)	Legal Status & Distribution Within the Proposed Project	Inclusion as Important Ecological Feature (Yes/No)
BL2/WL1 – Earth banks/Hedgerows Mosaic	Local Importance (Higher Value)	Not a legally protected habitat. However, this habitat supports Wildlife Acts (as amended) protected species (e.g., badger, bird species). This habitat is located east of (within 100 m) T6 as a field boundary. This habitat will be directly impacted by the proposed project infrastructure.	**Yes**
FW1 – Eroding/upland rivers	International (cumulatively – for fisheries, habitats and protected fauna)	This habitat is likely to support populations of and spawning/breeding areas for: Atlantic salmon, lamprey species, brown trout, white-clawed crayfish and/or otter which are EU Habitats Directive and/or Fisheries (Consolidation) Act, 1959 protected species. This habitat is located within and downstream of the Proposed project as the Blackwater (Kilmacow)_020 River, Smartscastle Stream_010, Arrigle_010 and Arrigle_020 River and as such there is potential for impacts as a result of the proposed project	**Yes**
FW4 – Drainage ditches (dry)	Local Importance (Lower Value)	Not a legally protected habitat. This habitat was dry and heavily vegetated (e.g., north of T1) and was considered to be of low ecological value to local wildlife in the area of the proposed wind farm site.	No
FW4 – Drainage ditches (wet)	Local Importance (Higher Value)	Not a legally protected habitat. However, this habitat supports Wildlife Acts (as amended) protected species (e.g., common frog, badger). Drainage ditches evaluated as local importance (higher value) are located adjacent to T5 and west of T6.	**Yes**

Ecological Feature	Scale at which feature is important (NRA, 2009)	Legal Status & Distribution Within the Proposed Project	Inclusion as Important Ecological Feature (Yes/No)
		This habitat will be directly impacted by the proposed project infrastructure.	
FP2 – Non-calcareous spring	Local Importance (Higher Value)	Non-annex habitat type. This spring is located ca. 320 m west of the access road to T1 and T10 within an area of WN6 habitat. This habitat will not be directly impacted by the proposed project infrastructure.	**No**
GA1 - Improved agricultural grassland	Local Importance (Lower Value)	Not a legally protected habitat. Intensively managed or highly modified for agricultural purposes. This habitat was considered to be of low ecological value to local wildlife in the area of the proposed project. One of the two borrow pits is present within this habitat, however, the borrow pits are temporary during the construction phase only and it will not result in the permanent loss of this habitat.	No
GS2 - Dry meadows and grassy verges	Local Importance (Lower Value)	Not a legally protected habitat. Rarely mown/grazed or fertilised. This habitat was recorded near T3 and is considered to be of low ecological value to local wildlife in the area of the proposed project.	No
GS4 – Wet grassland	Local Importance (Lower Value)	Not a legally protected habitat. Small areas of wet grassland were recorded; however, none were species rich. This habitat is located southwest of T10, adjacent to a site access road leading to T2 and east of T8.	No
GS4 – Wet grassland	Local Importance (Higher Value)	Not a legally protected habitat. Species rich grassland adjacent to T3. This habitat will be directly impacted by the proposed project infrastructure.	Yes

Ecological Feature	Scale at which feature is important (NRA, 2009)	Legal Status & Distribution Within the Proposed Project	Inclusion as Important Ecological Feature (Yes/No)
HD1/WS1 - Dense bracken and Scrub Mosaic	Local Importance (Lower Value)	Not a legally protected habitat. Area of open vegetation dominated by bracken and bramble. This habitat is located southwest of T9 and was considered to be of low ecological value to local wildlife in the area of the proposed wind farm site.	No
HH3 – Wet heath	County Importance	A degraded area of wet heath. This habitat is unique and rare in the context of the surrounding environment (i.e., WD4 and GA1 habitats). This high-quality habitat is located adjacent to T3. There will be no direct habitat loss however there is potential for indirect impacts due to changes in drainage.	**Yes**
WD1 – (Mixed) broadleaved woodland	Local Importance (Higher Value)	Not a legally protected habitat. However, this habitat supports Wildlife Acts (as amended) protected species (e.g., badger, pine marten, bird species). This habitat is located south (within 100 m) of T1 and west of T2. This habitat will be directly impacted by the proposed project infrastructure.	**Yes**
WD2 – Mixed broadleaved/conifer woodland	Local Importance (Higher Value)	Not a legally protected habitat. However, this habitat supports Wildlife Acts (as amended) protected species (e.g., badger, pine marten, bird species). This habitat is located adjacent to the access road to T8. This habitat will not be directly impacted by the proposed project infrastructure.	No
WD4 – Conifer plantation	Local Importance (Lower Value)	Not a legally protected habitat. This is the dominant habitat within the Proposed project, consisting of densely planted non-native conifers. This habitat is	No

Ecological Feature	Scale at which feature is important (NRA, 2009)	Legal Status & Distribution Within the Proposed Project	Inclusion as Important Ecological Feature (Yes/No)
		considered to be of low ecological value to local wildlife in the area of the proposed wind farm site. The onsite substation and construction compounds are present within this habitat; therefore, the habitat will be directly impacted by the proposed project infrastructure.	
WN6 – Wet willow-alder-ash woodland	Local Importance (Higher Value)	Not a legally protected habitat. However, this habitat supports Wildlife Acts (as amended) protected species (e.g., badger, pine marten, bird species). This habitat is located west of the access road between T1 and T10 and at the access road near T6. This habitat will not be directly impacted by the proposed project.	No
WS5 – Recently-felled woodland	Local Importance (Lower Value)	Not a legally protected habitat. However, this habitat supports Wildlife Acts (as amended) protected species (e.g., badger, pine marten, bird species). This habitat is present within the proposed GCO One.	No
WL1 – Hedgerows	Local Importance (Higher Value)	Not a legally protected habitat. However, this habitat supports Wildlife Acts (as amended) protected species (e.g., badger, bird species). This habitat is located throughout the proposed project typically as field boundaries and within proximity to (100 m) associated infrastructure at T5, T6, T9 and T10. This habitat is also recorded within the proposed GCO One and at six proposed TDR works areas. Areas of hedgerow are likely to be directly impacted by the proposed project.	**Yes**
WL1/WS1 – Hedgerows and Scrub mosaic	Local Importance	Not a legally protected habitat. However, this habitat supports Wildlife Acts (as amended)	**Yes**

Ecological Feature	Scale at which feature is important (NRA, 2009)	Legal Status & Distribution Within the Proposed Project	Inclusion as Important Ecological Feature (Yes/No)
	(Higher Value)	protected species (e.g., badger, bird species). This habitat is located within the 100 m buffer of T10 and will be directly impacted by proposed project infrastructure.	
WL2 - Treelines	Local Importance (Higher Value)	Not a legally protected habitat. However, this habitat supports Wildlife Acts (as amended) protected species (e.g., badger, bird species). This habitat is located throughout the proposed project, but of particular interest, areas of treelines will be lost due to the installation of T5 and T8 and the access road to T10. Treelines will also be subject to removal/trimming at three proposed TDR works areas. This habitat will be directly impacted by the proposed project infrastructure.	**Yes**
WS1 - Scrub	Local Importance (Higher Value)	Not a legally protected habitat. However, this habitat supports Wildlife Acts (as amended) protected species (e.g., badger, pine marten, bird species). This habitat is located within the proposed hardstand and access road to T1 and will be directly impacted by the proposed project infrastructure.	**Yes**
WS3 – Ornamental/non-native shrub	Local Importance (Lower Value)	Not a legally protected habitat. This habitat consists of managed non-native shrubs within residential properties at two proposed TDR works areas.	No
Protected Species			
Amphibians			
Common frog	Local Importance	This species is protected under the Wildlife Acts (as amended). Common frog was observed on	**Yes**

Ecological Feature	Scale at which feature is important (NRA, 2009)	Legal Status & Distribution Within the Proposed Project	Inclusion as Important Ecological Feature (Yes/No)
	(Higher Value)	three occasions within the proposed wind farm site with suitable habitat also present (e.g., FW4, GS4). These habitats will be directly impacted by the proposed project infrastructure.	
Mammals			
Badger	Local Importance (Higher Value)	This species is protected under the Wildlife Acts (as amended). Extensive badger activity, in the form of snuffle holes, was recorded adjacent to T6. It is likely that badger frequent the entirety of the proposed wind farm site, primarily that surrounding T6 and may be impacted by the proposed project.	**Yes**
Pine marten	Local Importance (Higher Value)	This species is protected under the Wildlife Acts (as amended). Pine marten scat was recorded on one occasion within WD4 habitat at the proposed substation site (west of T4). It is likely that pine marten utilises the proposed wind farm site. WD4 habitats will be directly impacted by proposed project infrastructure.	**Yes**
Red squirrel	Local Importance (Higher Value)	This species is protected under the Wildlife Acts (as amended). Sightings or evidence of red squirrel was not recorded during field surveys; however, their presence was recorded by the NBDC (Table 6-4). There is potential for this species to be present within habitat (e.g., WD4, WD1) which will directly impacted by proposed project infrastructure.	**Yes**
Fallow deer	Local Importance (Higher Value)	This species is protected under the Wildlife Acts (as amended). Fallow deer droppings were recorded on one occasion within WD4 habitat south of the access road between T4 and T7. There is potential for this species to be	**Yes**

Ecological Feature	Scale at which feature is important (NRA, 2009)	Legal Status & Distribution Within the Proposed Project	Inclusion as Important Ecological Feature (Yes/No)
		present within habitat (e.g., WD4, WD1) which will directly impacted by proposed project infrastructure.	
Otter	International	This species is protected under Annex II and IV of the EU Habitats Directive and is also protected under the Wildlife Acts (as amended). There is potential for water quality impacts of downstream habitats utilised by this species, therefore there is potential for impact by the proposed project.	**Yes**
Bats			
Leisler's bat	County Importance	All bats are Annex IV European protected species in Ireland and are also protected under the Wildlife Acts (as amended). This bat species will encounter a high risk of turbine collisions (T2, T4, T5, T6, T7) during its entire active season (April to September inclusive). There is potential to impact on this species. For further information see Appendix 6-5.	**Yes**
Common pipistrelle	County Importance	All bats are Annex IV European protected species in Ireland and are also protected under the Wildlife Acts (as amended). Activity within the proposed project (as categorised by EcoBat [Lintott *et al.*, 2016]) per median levels of activity as 'low' with a maximum level of activity at 'moderate'. This is considered a high risk species for collisions with turbines (NatureScot, 2021).	**Yes**
Soprano pipistrelle	County Importance	All bats are Annex IV European protected species in Ireland and are also protected under the Wildlife Acts (as amended).	**Yes**

Ecological Feature	Scale at which feature is important (NRA, 2009)	Legal Status & Distribution Within the Proposed Project	Inclusion as Important Ecological Feature (Yes/No)
		Activity within the proposed project (as categorised by EcoBat [Lintott *et al.*, 2016]) per median levels of activity as 'low' with a maximum level of activity at 'moderate'. This is considered a high risk species for collisions with turbines (NatureScot, 2021).	
Nathusius' pipistrelle	County Importance	All bats are Annex IV European protected species in Ireland and are also protected under the Wildlife Acts (as amended). This bat species will encounter a high risk of turbine collisions (T2, T4, T5, T6, T7) during its entire active season (April to September inclusive). There is potential to impact on this species. For further information see Appendix 6-5.	**Yes**
Brown long-eared bat	County Importance	All bats are Annex IV European protected species in Ireland and are also protected under the Wildlife Acts (as amended). This species is considered low risk to turbine collisions but will be impacted by disturbance and habitat loss. There is potential to impact on this species. For further information see Appendix 6-5.	**Yes**
Myotis bats	County Importance	All bats are Annex IV European protected species in Ireland and are also protected under the Wildlife Acts (as amended). This species is considered low risk to turbine collisions but will be impacted by disturbance and habitat loss. There is potential to impact on this species. For further information see Appendix 6-5.	**Yes**
All other bat species	Local Importance (higher value)	No significant effects are anticipated as a result of the proposed project. For further information see Appendix 6-5.	No

Ecological Feature	Scale at which feature is important (NRA, 2009)	Legal Status & Distribution Within the Proposed Project	Inclusion as Important Ecological Feature (Yes/No)
Aquatic Species			
White-clawed crayfish	International	This species is protected under Annex II and Annex V of the EU Habitats Directive and is also protected under the Wildlife Acts (as amended). This species was not recorded during crayfish surveys. However, there is a downstream connection from the proposed project to both the River Barrow and River Nore SAC and the Lower River Suir SAC for which this species is a qualifying interest. There is potential for water quality impacts of downstream habitats utilised by this species, therefore there is potential for impact by the proposed project.	**Yes**
Freshwater pearl mussel	International	This species is protected under Annex II and Annex V of the EU Habitats Directive and is also protected under the Wildlife Acts (as amended). FWPM surveys concluded no presence of this species within the sub-catchment associated with the proposed project. Therefore, this species will not be impacted by the proposed project.	No
Salmonids & other fish species (including Atlantic salmon)	Local Importance (Higher Value) to International	This species is protected under on Annex II and Annex V of the EU Habitats Directive. Suitable salmonid habitat was recorded at certain survey sites (Section 6.10.2.2.5.4) within the study area of the proposed project. This species is also a qualifying interest of the downstream connected River Barrow and River Nore SAC and the Lower River Suir SAC. There is potential for water quality impacts of downstream habitats utilised by this species, therefore	**Yes**

Ecological Feature	Scale at which feature is important (NRA, 2009)	Legal Status & Distribution Within the Proposed Project	Inclusion as Important Ecological Feature (Yes/No)
		there is potential for impact by the proposed project.	
Lamprey species (brook, river, sea)	International	This species is protected under Annex II of the EU Habitats Directive. Lamprey ammocetes were recorded at aquatic site 4 (Arrigle_010 River), with all other sites concluding no presence of lamprey ammocetes. Lamprey species are also a qualifying interest of the downstream connected River Barrow and River Nore SAC and the Lower River Suir SAC. There is potential for water quality impacts of downstream habitats utilised by this species, therefore there is potential for impact by the proposed project.	**Yes**
European eel	Local Importance (Higher Value)	Critically endangered by the IUCN, Red listed species. Suitable habitat was noted in all watercourses within the study area of the proposed project.	**Yes**
Other faunal species protected under the Wildlife Acts (as amended)			
Other faunal species include west European hedgehog and pygmy shrew which are protected under the Wildlife Acts (as amended).	Local Importance (Higher Value)	Whilst these species were not recorded during field surveys, they were identified in the desktop study to occur within the study area. Suitable habitats (i.e., woodlands, hedgerows, grasslands) are present within the proposed project for this species, as such there is potential for them to be present.	**Yes**

As outlined in Table 6-8, a total of 34 features have been identified as IEF's and will be considered further within this impact assessment. The remaining 15 features are considered to either be outside the ZoI of the proposed project and/or of poor ecological value and as such are not considered to be an IEF and will not be considered further within this assessment.

6.11 Embedded Mitigation

Measures were implemented at the design phase of the proposed project to reduce the potential impact to ecological receptors. Embedded mitigation consists of:

- The micro-siting of turbines and associated infrastructure within habitat which is considered to be of low ecological value and the avoidance of high ecological value habitat. For example, the location of T3 was adjusted to ensure the hardstanding was not within the footprint of the high ecological value wet heath (located directly north of T3). Turbines were also micro-sited to minimise treeline and hedgerow loss;
- A 100 m bat buffer was included around each turbine in line with NatureScot guidelines (NatureScot, 2021) to avoid the collision of commuting/foraging bat in proximity to the turbines during operation;
- The use of existing access roads to avoid the creation of new access roads and subsequent habitat loss;
- Two onsite vehicle wheel washes will be present during the construction phase and have been included in the site layout design (see Chapter 1 (Introduction), Appendix 1-1);
- All turbines are located greater than 50 m from streams and/or rivers;
- All project construction compounds and temporary deposition areas have been sited greater than 50 m from streams and/or rivers;
- The use of clear span bridges for access to avoid any instream works; and
- The use of horizontal directional drilling (HDD) for any watercourse crossings by the grid connection cable.

The above embedded mitigation measures were considered within the Assessment of Effects.

6.12 Assessment of Effects and Mitigation Measures

Key activities associated with the proposed project (in the absence of mitigation), relevant to the assessment of ecological impacts and effects, are summarised below. This assessment also included the Do-Nothing Scenario, i.e., existing and future trends in land-use or activities that may impact or change biodiversity.

6.12.1 Do-Nothing Scenario

The 'Do-Nothing' scenario describes the circumstance whereby no development occurs. The proposed project predominantly comprises commercial conifer forestry and agricultural land. Both are examples of already heavily modified habitats from their existing, naturalised state which are intensively managed for both forestry and agricultural practices. If the proposed project does not proceed, there would continue to be changes in biodiversity or ecological value as a result of ongoing land management. It is considered that the area would continue to be used for forestry and agricultural purposes, which could lead to further land drainage, clearance and afforestation. These are considered to have a localised negative effect on ecological value/biodiversity of the area.

Furthermore, due to the more extreme nature of current weather patterns, it is also likely that drought and heavy rainfall will impact the ecological quality of the area.

It is not expected that the aforementioned changes would be influenced by whether the proposed project proceeds or not.

6.12.2 Construction Phase

The construction phase of the proposed project is anticipated to last approximately 24 months and is estimated to commence in Q1 of 2028.

The construction phase will result in habitat loss/disturbance to facilitate construction of infrastructure including excavation of cabling trenches during the installation of the underground grid connection. Felling of vegetation will also be undertaken to implement turbulence buffers and bat mitigation buffers around turbines. The following are potential impacts on biodiversity during the construction phase:

- Habitats loss (permanent and temporary);
- Habitat loss/fragmentation of resting, breeding and/or foraging sites;
- Disturbance/displacement to species;
- Habitat degradation as a result of water quality impacts;
- Habitat degradation as a result of dust deposition; and
- Risk of mortality.

Impacts associated with the construction phase on biodiversity, specifically IEFs, are discussed further below.

6.12.2.1European Sites

This section describes and assesses the potential for the proposed project to result in likely significant effects on designated sites for nature conservation i.e., SACs and SPAs, focusing on the habitats and species for which these sites are designated and their conservation objectives. The proposed projects potential effect on European sites and protected species has also been assessed separately in the NIS (submitted as part of this planning application [TOBIN, 2025]) in line with the requirements of Part XAB of the Planning Acts and the Birds Directive and Habitats Directive.

Considering the ZoI (see Section 6.6.2) in the absence of mitigation measures, the proposed project was assessed as having the potential to result in significant effects on the following. All SPAs are assessed in Chapter 7 (Ornithology):

- Lower River Suir SAC [002137]; and
- River Barrow and River Nore SAC [002162].

6.12.2.1.1 Potential Impacts

The potential impacts on the Lower River Suir SAC and River Barrow and River Nore SAC are:

- Habitat degradation as a result of water quality impacts;
- Habitat degradation as a result of dust deposition; and
- Disturbance/displacement to qualifying interest species.

6.12.2.1.1.1Habitat Degradation as a Result of Water Quality Impacts

The proposed GCO One is located adjacent (ca. 1 m) to the River Barrow and River Nore SAC. An additional source-pathway-receptor link is identified to the Lower River Suir SAC and the River Barrow and River Nore SAC via hydrological pathways with the Blackwater (Kilmacow)_020 River, Smartscastle Stream_010 River, Arrigle_010 River and Arrigle_020 River.

Construction activities, such as those along the proposed GCO One and other activities within the proposed wind farm site which are < 50 m from watercourses, pose a risks to water quality particularly through contaminated surface water entering a watercourse, which can contribute to the deterioration of water quality and physical alteration to the riverbed and bank morphology with the potential to alter erosion and deposition rates locally and downstream. Four river waterbodies (Blackwater (Kilmacow)_020 River, Smartscastle Stream_010 River, Arrigle_010 River and Arrigle_020 River) are present within or adjacent to the proposed project, which provide potential direct pathways to downstream European sites for contaminated water.

Potential water quality impacts from construction runoff include:

- Silt/sediment loading in construction runoff which can stunt aquatic plant growth, limit dissolved oxygen capacity and overall reduce the ecological quality of watercourses, with the most critical period associated with low flow conditions. Potential effects include reduce instream visibility for aquatic species, reduction in food biomass, clog or damage gills of salmonid fish, settlement of silt on spawning habitat;
- Activities within or close to the watercourse channels can also lead to increased turbidity through re-suspension of riverbed sediments and release of new sediments from earthworks;
- Chemical contaminants in the watercourse can also bind to silt which can lead to increased bioavailability of these contaminants;
- Spillage of concrete, grout or other cement-based products. Cement-based products are highly alkaline (releasing fine highly alkaline silt) and extremely corrosive and can result in significant impact to watercourses altering the pH, smothering the riverbed and physically damaging fish through burning and clogging of gills by the fine silt; and
- Accidental spillage of hydrocarbons.

During the construction phase, the abovementioned impacts have the potential to have a negative impact on water quality. For the proposed project in an extreme/worst-case scenario in the absence of mitigation, the negative impacts on the natural hydromorphology and/or water quality to a European site could have **likely, short-term, negative, significant effects on the integrity of European sites at an international geographic scale.**

6.12.2.1.1.2 Habitat Degradation as a Result of Dust Deposition

This impact is applicable to the River Barrow and River Nore SAC only considering the proximity of the SAC to the proposed project, primarily that of the proposed GCO One. Dust deposition arising from construction works, primarily that of excavation works, could negatively impact vegetation by coating foliage which can adversely affect photosynthesis and the structure and function of the habitat. The Institute of Air Quality Management guidelines (IAQM, 2024) outlines ecological receptor sensitivity based on the distance from the dust source whereby 'High' sensitivity is present at 20 m from the source and 'Medium' sensitivity at 50 m from the source. The greatest impact is from demolition and earth works (IAQM, 2024). In line with the ZoI for air quality impacts, dust deposition is considered to be effective within 50 m of any construction phase activities. At the closest point, the River Barrow and River Nore SAC is located ca. 1 m from the proposed GCO One, however works will be of minor excavation and will be conducted within the road only which would result in minimal dust creation. Any dust deposition is likely to occur primarily on non-sensitive habitat types (i.e., not dust sensitive) such as hedgerows and grassy verges, which are also not qualifying interests of the River Barrow and

River Nore SAC. For this reason, the deposition of dust will not result in significant effects at an any geographical scale.

6.12.2.1.1.3 Disturbance/Displacement to Qualifying Interest Species

This impact is applicable to the River Barrow and River Nore SAC only considering the proximity of the SAC to the proposed project. Increased human presence and/or noise and vibration associated with construction works has the potential to displace any fauna species from both breeding/resting places and from foraging habitat.

The River Barrow and River Nore SAC and the qualifying interest species, otter, is likely to be subject to some level of direct disturbance during the construction phase of the proposed GCO One which is ca. 90 m from the SAC boundary at the closest point. However, disturbance would be temporary and minor and will **not result in significant effects** on the conservation status of the local otter population at any geographical scale.

6.12.2.1.2 Mitigation Measures

6.12.2.1.2.1 Mitigation Measures to Prevent Habitat Degradation as a Result of Water Quality Impacts

All mitigation measures associated with sediment and pollution control are outlined in Chapter 9 (Hydrology and Hydrogeology) and within the Surface Water Management Plan (SWMP) will be implemented during the construction phase. These measures will ensure that there is no potential for the proposed construction works to result in a degradation of water quality, ensuring there is no potential for impacts to aquatic fauna and flora.

In addition to the mitigation measures outlined in Chapter 9 (Hydrology and Hydrogeology) and the SWMP, the IFI 2016 guidelines '*Guidelines on Protection of Fisheries During Construction Works and in Adjacent to Waters*' will also be adhered to. For example, at the bridge crossing locations, the foundations of the clear span bridges will be positioned at least 2.5 m from a watercourse (IFI, 2016). All temporary crossings of watercourses will ensure the passage of water, fish and macroinvertebrates and will ensure erosion and sedimentation do not occur (IFI, 2016). Any discharged water during the construction phase will be in the rage of pH 6-9 and will not alter the pH of receiving waters by+/- 0.5 units (IFI, 2016). Furthermore, suspended solids in any discharged waters will not exceed 25 mg/l (IFI, 2016).

No instream works will be undertaken during any phase of the proposed project.

6.12.2.1.2.2 Mitigation Measures to Prevent Disturbance/Displacement to Qualifying Interest Species

- Pre-construction confirmatory surveys prior to the commencement of any works will be carried out by a competent ecologist to identify any changes in otter activity or holt/couch locations within the proposed project (see Section 6.12.8.1.2.1). Otter surveys will be undertaken no more than 10—12 months in advance of the construction works as per the advice in the NRA *Guidelines for the Treatment of Otters during the Construction of National Road Schemes* (NRA, 2008a);
- Twilight working hours (i.e., time between dawn and sunrise and dusk and sunset), especially at the clear span bridge locations, will be restricted. Otter are crepuscular species and as such disturbance will be reduced by restricting the amount of twilight working hours;

- All construction lighting will be reviewed by the ECoW and will be directed away from watercourses to ensure a dark corridor is maintained; and
- As discussed, mitigation measures to prevent the degradation of water quality is outlined in Chapter 9 (Hydrology and Hydrogeology) is also applicable to prevent the disturbance/displacement of species (e.g., displacement of species due to unfavourable water quality as a result of construction impacts).

6.12.2.1.3 Significance of Residual Effects

Following the implementation of the mitigation measures outlined above (see Section 6.12.2.1.2), the proposed project will not result in any significant residual effects on European sites.

6.12.2.2 Proposed Natural Heritage Areas

In the case of pNHAs, the assessment considers whether the integrity (i.e., the coherence of ecological structure and function across the entirety of a site that enables it to sustain all of the biodiversity or ecological resources for which it has been valued [NRA 2009]) of the site(s) will be affected by the proposed project with reference to the ecological features of interest for which the site is proposed.

Considering the ZoI (see Section 6.6.2) in the absence of mitigation measures, the proposed project was assessed as having the potential to significantly affect:

- Lough Cullin pNHA [000406]; and
- Grannyferry pNHA [000833].

6.12.2.2.1 Potential Impacts

The potential impacts on Lough Cullin pNHA and Grannyferry pNHA are:

- Habitat degradation as a result of water quality impacts.

6.12.2.2.1.1 Habitat Degradation as a Result of Water Quality impacts

The proposed project does not overlap with any pNHA boundary. The only source-pathway-receptor link identified to the aforementioned pNHAs is via a hydrological connection from the Smartscastle Stream_010 and the Blackwater (Kilmacow)_020 River.

Lough Cullin pNHA contains south Kilkenny's only natural lake, which is fed from streams, including the Smartscastle Stream_010 (NPWS, 2009a). Grannyferry pNHA encompasses the lower reaches of the Blackwater (Kilmacow)_050 River and its associated riparian habitat (NPWS, 2009b).

Construction activities associated with the proposed project could pose a risk to watercourses leading to the deterioration of water quality and physical alteration to the hydromorphology of the Lough Cullin and Blackwater (Kilmacow)_050 River. Potential water quality impacts from construction phase runoff are discussed in Chapter 9 (Hydrology and Hydrogeology).

Potential water quality impacts could have **likely, short-term, negative significant effects on the integrity of the sites at a national geographic scale.**

6.12.2.2.2 Mitigation Measures

All mitigation measures discussed in Chapter 9 (Hydrology and Hydrogeology) and Section 6.12.2.1.2.1 are applicable to prevent the aforementioned impacts on the Lough Cullin and Grannyferry pNHAs.

6.12.2.2.3 Significance of Residual Effects

Following the implementation of the mitigation measures outlined above (see Section 6.12.2.1.2), the proposed project will not result in any significant residual effects on the two pNHAs.

6.12.2.3Habitats

Habitats identified as IEFs are outlined in Table 6-8 and are discussed hereunder. As per Section 6.6.2, the ZoI for impacts was considered for each of the IEFs and in the case of habitats, potential impacts are confined to habitat loss, within the footprint of infrastructure (e.g., hard stands, access roads], and dust deposition (within 50 m of the construction of all associated infrastructure). A summary table of IEF habitat loss is provided in Table 6-9.

Table 6-9: Short-term and Permanent IEF Habitat Loss

IEF Habitat	Short-term Loss[A] - Area (ha) or length (m)	Permanent Loss[B] - Area (ha) or length (m)	Associated Infrastructure
BL1/WL1 – Stone walls and other stonework/Hedgerows mosaic	308.16 m	994.36 m	Borrow pit, proposed TDR, bat buffer, hardstands at T1, T3, T7, T9, T10.
BL1/WL2 – Stone walls and other stonework/Treelines mosaic	81.91 m	296.27 m	Proposed TDR, bat buffer, hardstands at T8 and T10.
BL1/WS1 – Stone walls and other stonework/Scrub mosaic	25.28 m	298.46 m	Bat buffer, hardstand of T7 and proposed GCO One.
BL2/WL1 – Earth banks/Hedgerows mosaic	-	24.33 m	Bat buffer and hardstand at T6.
FW4 – Drainage ditches	-	340.05 m	Access roads and hard stands at T2, T4 and T5.
GS4 – Wet grassland	-	0.62 ha	Access roads and hardstand at T3.
WD1 – (Mixed) broadleaved woodland	-	0.32 ha	Bat buffer and hardstand at T7.
WL1 - Hedgerows	101.94m	1,182.11 m	Access roads, bat buffer, hardstands at T5, T6, T8, T9

IEF Habitat	Short-term Loss[A] - Area (ha) or length (m)	Permanent Loss[B] - Area (ha) or length (m)	Associated Infrastructure
			and T10, proposed GCO One, proposed TDR.
WL1/WS1 – Hedgerows/Scrub mosaic	20.15 m	77.48 m	Bat buffer at T10 and proposed GCO One.
WL2 - Treelines	1,074.08 m	293.21 m	Bat buffer, hardstand at T5, T9 and T10, proposed GCO One, proposed TDR.
WS1 - Scrub	-	1.86 ha	Access roads, bat buffer and hardstand at T1.

[A] includes borrow pits, construction compounds, proposed TDR works areas and proposed GCO One.
[B] includes loss due to permanent infrastructure (hardstands, access roads, clear-span bridges) and 100 m bat buffer.

6.12.2.3.1 Hedgerows

The following IEF hedgerow and hedgerow mosaic habitats will be considered in this section.

- BL1/WL1 - Stone walls and other stonework/Hedgerows Mosaic (3,571.62 m recorded within the proposed wind farm site and 233.89 m at proposed TDR works areas);
- BL2/WL1 – Earth banks/Hedgerows Mosaic (1,135.58 m within the proposed wind farm site);
- WL1 – Hedgerows (4,602.97 m within the proposed wind farm site, 101.94 m at proposed TDR works areas and 20.15 m at proposed GCO One); and
- WL1/WS1 – Hedgerows/Scrub Mosaic (148.10 m within the proposed wind farm site).

6.12.2.3.1.1 Potential Impacts

The potential impact to hedgerow habitat is:

- Habitat loss

6.12.2.3.1.1.1 Habitat Loss

Approximately 2,228.28 m of hedgerow and hedgerow mosaic habitat will be permanently lost within the proposed wind farm site (includes the 100 m bat buffer [refer to Section 6.12.2.4.7.2.1]) as follows:

- 994.36 m of BL1/WL1;
- 24.33 m of BL2/WL1;
- 1,182.11 m of WL1; and
- 77.48 m of WL1/WS1.

The loss, damage and/or fragmentation to hedgerow habitat will result in **likely, permanent, negative, significant effects at a local geographic scale.**

In addition, a total of 430.25 m of hedgerow and hedgerow mosaic habitat will be temporarily lost (i.e., borrow pits, TDR and proposed GCO One) within the proposed project as follows:

- 74.27 m of BL1/WL1;
- 81.91 m of BL2/WL1;

- 20.15 m of WL1/WS1; and
- 101.94 m of WL1.

The loss, damage and/or fragmentation to hedgerow habitat will result in **likely, short-term, negative, significant effects at a local geographic scale.**

6.12.2.3.1.2 Mitigation Measures

6.12.2.3.1.2.1 Mitigation Measures to Prevent Habitat Loss

- *Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes* (NRA, 2006) will be followed to ensure that any vegetation which is to be retained is given protection during the construction phase;
- All areas of hedgerows which are required to be retained as part of the proposed project will be demarcated to ensure that only habitat outside of these areas are subject to removal/fragmentation;
- If a tree is required to be felled, it will be assessed by an arborist/tree surgeon on how best to fell in order to avoid impact to the surrounding habitats and determine the proficient size of a root protection area (RPA). The RPA will be defined based upon the recommendation of a qualified arborist;
- The area within the RPA will not be used for vehicle/machinery parking or the storage of any materials (including soils, oils and chemicals). The storage of hazardous materials (e.g., hydrocarbons) or concrete washout areas will also not be undertaken within 5 m of any retained trees, hedgerows and treelines;
- A qualified arborist will assess the condition of, and advise on any repair works necessary to, any trees which are to be retained or that lie outside of the proposed project but whose RPA is impacted by the works. Any remedial works required will be carried out by a qualified arborist;
- A buffer zone of at least 5 m will be maintained between construction works and retained hedgerows to ensure that the RPA are not damaged; and
- Hedgerow and hedgerow mosaic habitat at the borrow pit, TDR and proposed GCO One will be replanted following the completion of the construction phase with native whips and advanced nursery stock and in keeping with the existing species in the area.

6.12.2.3.1.3 Significance of Residual Effects

Following the implementation of the mitigation measures outlined above (see Section 6.12.2.3.1.2), hedgerow and hedgerow mosaic habitat which will be temporarily lost at the borrow pit, TDR and proposed GCO One will be replanted following the construction phase, and the proposed project will not result in any significant residual effects at these locations.

A total 2,228.28 m of hedgerow and hedgerow mosaic habitat will be permanently lost, for which 1,022.93 m of hedgerow will be planted elsewhere within the proposed wind farm (refer to Section 6.12.6). There will therefore be a permanent loss of 1,205.35 m which will result in **permanent, significant residual effects at a local geographic scale.**

6.12.2.3.2 Treelines

The following IEF treeline and treeline mosaic habitats will be considered in this section.

- WL2 – Treelines (1,513.14 m recorded within the proposed wind farm site, 389.43 m at proposed TDR works areas and 448.34 m at proposed GCO One); and

- BL1/WL2 - Stone walls and other stonework/Treelines Mosaic (1,552.92 m).

6.12.2.3.2.1 Potential Impacts

The potential impact to treeline habitat is:

- Habitat loss

6.12.2.3.2.1.1 Habitat Loss

Approximately 589.48 m of treelines and treeline mosaic habitat will be permanently lost within the proposed wind farm site (includes the 100 m bat buffer [refer to Section 6.12.2.4.7.2.1]) as follows:

- 293.21 m of WL2; and
- 296.27 m of BL1/WL2.

The loss, damage and/or fragmentation to treeline habitat will result in **likely, permanent, negative, significant effects at a local geographic scale.**

To establish the proposed GCO One between the proposed project and the consented Castlebanny substation, a number of treelines and individual trees (448.34 m) will be impacted on a short-term basis (i.e., following felling for cable installation, the habitat can then be reinstated). Where the proposed GCO One generally follows the road network no treelines will be directly impacted although their root systems might be affected by the works. Approximately 389.43 m of additional treelines and treeline mosaic habitat will be trimmed/removed at three proposed TDR works areas. The loss, damage and/or fragmentation to treeline habitat will result in **likely, short-term, negative, significant effects at a local geographic scale.**

6.12.2.3.2.2 Mitigation Measures

All mitigation measures discussed in Section 6.12.2.3.1.2.1 are applicable to prevent the aforementioned impacts on treeline habitat. Furthermore, RPAs will be established at 52 locations along the proposed GCO One to ensure the protection of mature tree standards identified along the route (see Figure 6-15).

6.12.2.3.2.3 Significance of Residual Effects

Following the implementation of the mitigation measures outlined above and in Section 6.12.2.3.1.2.1 treeline and treeline mosaic habitat which will be temporarily lost at the TDR and proposed GCO One will be replanted following the construction phase and as such, the proposed project will not result in any significant residual effects at these locations.

A total of 589.48 m of treelines and treeline mosaic habitat will be permanently lost within the proposed wind farm site which will result in **permanent, significant residual effects at a local geographic scale.**

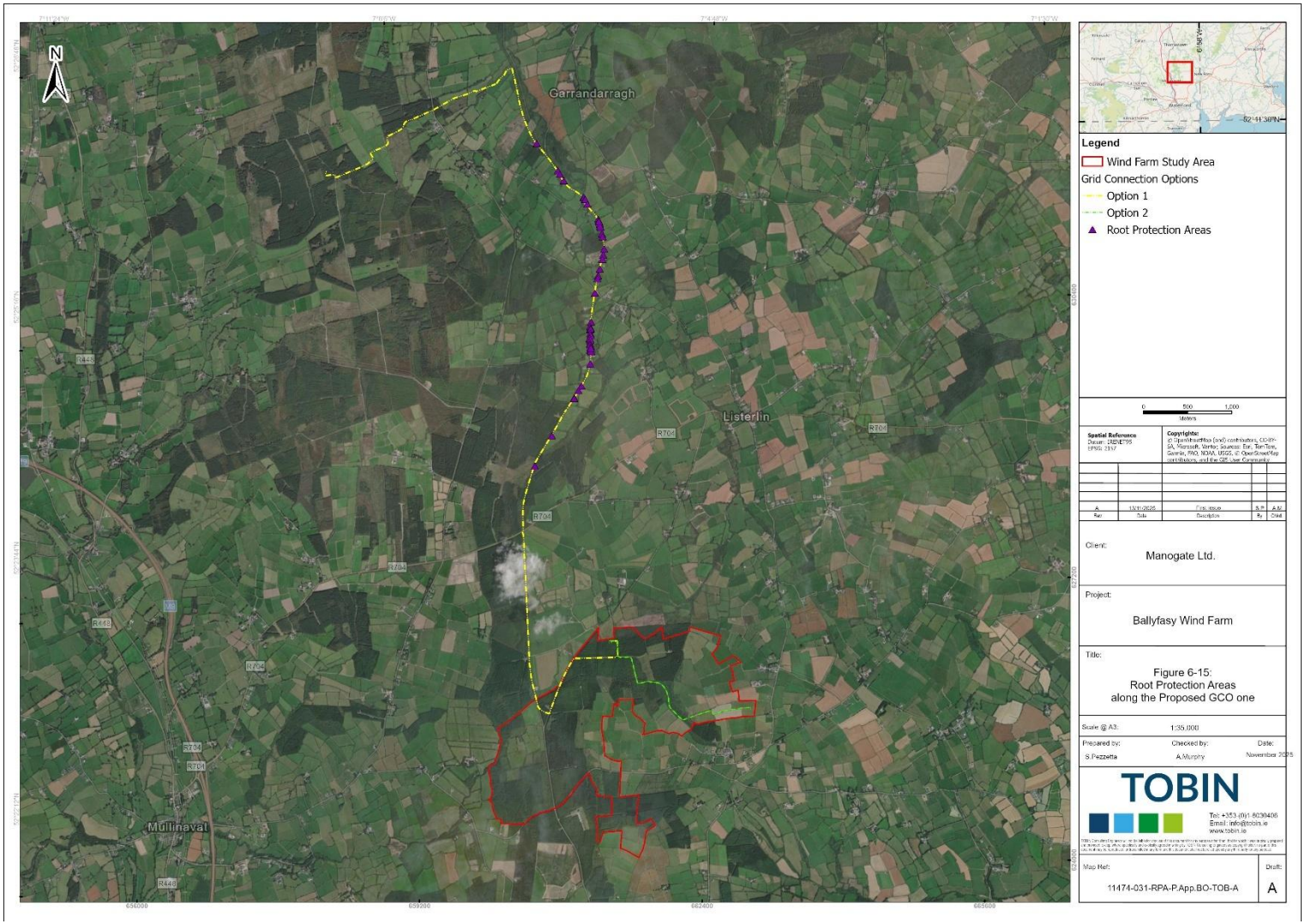

Figure 6-15: Root Protection Areas Along the Proposed GCO One

6.12.2.3.3 BL1/WS1 - Stone walls and other stonework/Scrub Mosaic

A total of 431.33 m of BL1/WS1 habitat is recorded within the proposed wind farm site and 25.28 m at the proposed GCO One.

6.12.2.3.3.1 Potential Impacts

The potential impact to BL1/WS1 habitat is:

- Habitat loss

6.12.2.3.3.1.1 Habitat Loss

Approximately 298.46 m of BL1/WS1 habitat will be permanently lost within the proposed wind farm site (includes the 100 m bat buffer [refer to Section 6.12.2.4.7.2.1]).

The loss, damage and/or fragmentation to BL1/WS1 habitat will result in **likely, permanent, negative, significant effects at a local geographic scale.**

6.12.2.3.3.2 Mitigation Measures

Where permanent loss will occur, mitigation at the site of the loss may not be possible due to the inclusion of 100 m bat buffers at all turbines. Where reinstatement is possible, mitigation measures discussed in Section 6.12.2.3.1.2.1 are applicable to prevent the aforementioned impacts on both BL1 and WS1 habitat, namely following NRA guidance (NRA, 2006) and the demarcation of areas which will be retained to ensure further loss does not occur. Where feasible, stone walls will be rebuilt.

6.12.2.3.3.3 Significance of Residual Effects

Following, the implementation of the mitigation measures outlined above and in Section 6.12.2.3.1.2.1, a permanent loss of 298.46 m of BL1/WS1 habitat will occur within the proposed wind farm site which will result in **permanent, significant residual effects at a local geographic scale.**

6.12.2.3.4 FW1 – Eroding/upland rivers

Two FW1 habitats have been recorded within the proposed wind farm site in the form of the Smartscastle Stream_010 River and the Arrigle_010 River. Additionally, the proposed GCO One will cross the Arrigle_020 River at two locations (in the townlands of Glenpipe and Cappagh) and unmapped FW1 habitat at four locations (in the townlands of Glenpipe and Cappagh) which lead downstream to the Arrigle_020.

6.12.2.3.4.1 Potential Impacts

The potential impacts to FW1 habitat are:

- Habitat degradation as a result of water quality impacts.

Further details on surface water impacts are outlined in Chapter 9 (Hydrology and Hydrogeology).

6.12.2.3.4.1.1 Habitat Degradation as a Result of Water Quality Impacts

The proposed project crosses both the Smartscastle Stream_010 River and Arrigle_010 River at two locations within the proposed wind farm site for access roads to T5 and T9. A proposed access road also crosses an unmapped waterbody located north of T8 and likely flows into the Smartscastle Stream_010.

The proposed GCO One crosses the Arrigle_020 and associated unmapped tributaries at a total of six locations. Construction activities pose a risk to watercourses, particularly through contaminated surface water entering a watercourse, which can contribute to the deterioration of water quality and physical alteration to the riverbed and bank morphology with the potential to alter erosion and deposition rates locally and downstream.

Potential water quality impacts from both sedimentation and pollutants have been outlined in Section 6.12.2.1.1.1.

During the construction phase, the potential for water quality impacts will result in **likely, short-term, negative, significant effects at a local geographic scale.**

6.12.2.3.4.2Mitigation Measures

All mitigation measures discussed in Chapter 9 (Hydrology and Hydrogeology) and Section 6.12.2.1.2.1 will be implemented and are applicable to prevent the aforementioned impacts on FW1 habitat. All watercourse crossings along the proposed GCO One will be crossed via horizontal directional drilling (HDD) which is a trenchless method to remove direct impact to the aforementioned watercourses. Mitigation measures applicable to HDD are:

- A competent and experienced Contractor will be appointed to undertake the horizontal directional drilling works;
- The Contractor will prepare a directional drilling Method Statement which will outline the standard approach for the construction. The Method Statement will include a contingency plan for frac-out and for excessive ground settlement;
- The Contractor will undertake the directional drilling in accordance with industry best practice including British Standard EN 16191:2014 Tunnelling machinery, safety requirements and CIRIA C648 '*Control of water pollution from linear construction projects Technical Guidance*' (CIRIA, 2006);
- The contractor will ensure that all personnel working on site are trained in pollution incident control response. A regular review of weather forecasts of heavy rainfall is required, with the Contractor required to prepare a contingency plan for before and after such events;
- Weather conditions will be considered when planning construction activities to minimise the risk of runoff from site;
- There will be no storage of fuels within 30 m of the watercourse;
- Provision of exclusion zones and barriers (silt fences) between any excavated material and any surface water features will be installed to prevent sediment washing into the receiving water environment. Silt fences will be installed and the contractor will ensure that silt fences are regularly inspected and maintained during the construction phase;
- If dewatering is required as part of the works (e.g., in trenches for underground cabling or in wet areas), water must be treated prior to discharge;
- To prevent loss of bentonite or 'frac-out' from occurring, a series of actions will be implemented; the drill fluids operator will monitor drill fluid density, viscosity and solids content on an ongoing basis, to ensure that the fluid does not increase in viscosity, requiring additional pressure to maintain mobility;
- In critical cases, viscometers will be used to measure drill fluid gel strength and shear strength. Filtrate can also be measured to calculate the amount of filter cake building up on the internal wall of the bore. Any increases in pump pressure experienced by the drill operator will be investigated immediately to prevent the risk of pressure build up within

the annulus. In some circumstances, dependant on the drilling equipment used, the pilot drill borehole assembly will be fitted with a down hole pressure monitor to measure pressure in the annulus between the drill and the bore wall. This will give an early indication of pressure build up in the hole and allow the drill operator to prevent a 'frac-out'. If there is a risk of a 'frac-out' a number of measures will be implemented including:
    - pumping a pill of drilling fluid with a higher density to the risk zone; and
    - circulate and pump loss circulation material (typically cork or manufactured inert polymers) to the risk zone to seal the risk zone, grouting of the risk zone, and, or launch a packer before the risk zone.
- The Contractor will implement procedures to maximise the recirculation or reuse of drilling fluid to minimise waste disposal;
- Disposal of drilling fluids will be the responsibility of the Contractor to an approved and licenced waste facility;
- Monitoring of the drilling operations will be undertaken at all times by the Contractor. The monitoring will include visual inspection of the pits and monitoring of the volume of returns flowing back to the entry pit. The monitoring personnel will be in constant communication with the drilling rig operator and thus will be able to immediately cease drilling if necessary;
- Buffer strips of natural uncleared vegetation shall be preserved between construction activity. Reception pits will be situated outside of the riparian zone. A buffer zone width for smaller channels (<10 m) of 20 m or greater will be maintained.

Further details are outlined within the SWMP.

6.12.2.3.4.3Significance of Residual Effects

Following the implementation of the mitigation measures outlined above and in Chapter 9 (Hydrology and Hydrogeology), the proposed project will not result in any significant residual effects on FW1 habitats.

6.12.2.3.5 FW4 – Drainage ditches

A total of 4,669.70 m of FW4 habitat, of which 1,278.88 m were considered to be of higher value, are recorded within the proposed project.

6.12.2.3.5.1Potential Impacts

The potential impacts to FW4 habitat are:

- Habitat loss; and
- Habitat degradation as a result of water quality impacts.

6.12.2.3.5.1.1 Habitat Loss

Approximately 340.05 m of FW4 habitat will be permanently lost within the proposed wind farm site.

The loss, damage and/or fragmentation to FW4 habitat will result in **likely, permanent, negative, significant effects at a local geographic scale.**

6.12.2.3.5.1.2 Habitat Degradation as a Result of Water Quality Impacts

Construction phase activities will take place adjacent to FW4 habitats including the diversion of the FW4 habitat at T4. Some drainage ditches were present within areas of heavily overgrown scrub/hedgerows which could not be accessed; therefore, it is assumed that these habitats may

also be hydrologically connected to river waterbodies elsewhere within the proposed wind farm site i.e., Blackwater (Kilmacow)_020 River, Smartscastle Stream_010 River and the Arrigle_010 River.

Potential water quality impacts from both sedimentation and pollutants have been outlined in Section 6.12.2.1.1.1.

During the construction phase, the potential for water quality impacts will result in **likely, short-term, negative, significant effects at a local geographic scale.**

6.12.2.3.5.2 Mitigation Measures

6.12.2.3.5.2.1 Mitigation Measures to Prevent Habitat Loss

All areas of FW4 habitat which are required to be retained as part of the proposed project will be demarcated to ensure that only habitat outside of these areas are subject to removal.

6.12.2.3.5.2.2 Mitigation Measures to Prevent Habitat Degradation as a Result of Water Quality Impacts

Mitigation measures which will be implemented and are applicable to prevent habitat degradation as a result of water quality impacts are discussed in Chapter 9 (Hydrology and Hydrogeology) and Section 6.12.2.3.1.2.

6.12.2.3.5.3 Significance of Residual Effects

Following the implementation of the mitigation measures outlined above and in Chapter 9 (Hydrology and Hydrogeology), the proposed project will not result in any significant residual effects on FW4 habitats.

6.12.2.3.6 GS4 – Wet Grassland

A total of 0.52 ha of GS4 habitat assessed as Local Importance (Higher Value) is recorded at T3.

6.12.2.3.6.1 Potential Impacts

The potential impacts to GS4 habitat are:

- Habitat loss.

6.12.2.3.6.1.1 Habitat Loss

Approximately 0.62 ha of GS4 habitat will be permanently lost within the proposed wind farm site.

The loss, damage and/or fragmentation to GS4 habitat will result in **likely, permanent, negative, significant effects at a local geographic scale.**

6.12.2.3.6.2 Mitigation Measures

6.12.2.3.6.2.1 Mitigation Measures to Prevent Habitat Loss

All areas of GS4 habitat at T3 which are required to be retained as part of the proposed project will be demarcated to ensure that only habitat outside of these areas are subject to removal. This area is adjacent to HH3 (see Section 6.12.2.3.7) and demarcation of the area will be done under guidance and supervision of the Ecological Clerk of Works (ECoW).

6.12.2.3.6.3 Significance of Residual Effects

Following the implementation of the mitigation measures outlined above in Section 6.12.2.3.7.3, the proposed project will result in a permanent loss of 0.62 ha of GS4 habitat at T3 which will result in a **permanent, significant residual effect at a local geographic scale.**

6.12.2.3.7 HH3 – Wet Heath

A total of 1.2 ha of HH3 habitat is recorded within the proposed wind farm site.

6.12.2.3.7.1Potential Impacts

The potential impacts to HH3 habitat are:

- Habitat loss/damage;
- Habitat degradation as a result of dust deposition; and
- Habitat degradation as a result of changes to surface water drainage.

6.12.2.3.7.1.1 Habitat Loss/Damage

There will be no direct loss of habitat as a result of the proposed project, however the construction of T3 will occur directly adjacent to this habitat and as such there is potential for habitat damage if there was the movement of construction phase machinery/personnel within this area.

During field surveys this habitat was noted to be of high quality and is unique in the context of the surrounding environment. This habitat was also considered to be a degraded example (i.e., influence by surrounding drainage and land modification) of the Annex I habitat wet heath. The proposed project would lead to further degradation of this habitat if construction phase machinery were present within this habitat.

The damage to HH3 habitat would result in **likely, long-term, negative, significant, negative effects at a local geographic scale.**

6.12.2.3.7.1.2 Habitat Degradation as a Result of Dust Deposition

Dust deposition arising from construction works, primarily that of excavation works at T3 which is directly adjacent to this habitat, could negatively impact vegetation by coating foliage which can negatively affect photosynthesis and the structure and function of the habitat. Wet heath habitat is considered a highly sensitive receptor to dust impacts (IAQM, 2025; APIS, 2025).

The deposition of dust within the habitat will result in **likely, short-term, negative, significant effects at a local geographical scale.**

6.12.2.3.7.1.3 Habitat Degradation as a Result of Changes to Surface Water Drainage

The area of wet heath is situated in a low depression of land whereby surface water from the surrounding area drains in a south to westerly direction into this area of wet heath. As such, the construction of T3 has the potential to impact upon surface water drainage if the installed drainage system was to discharge directly to this area further, leading to greater ponding of water. Such ponding of water has the potential to change the habitat type thereby inhibiting the ability of some recorded floral species (e.g., heather species) to exist. Changes to surface water drainage will result in **likely, long-term, negative, significant effects at a local geographical scale.**

6.12.2.3.7.2 Mitigation Measures

6.12.2.3.7.3 Mitigation Measures to Prevent Habitat Loss/Damage

To ensure that no direct impact occurs within the footprint of the HH3 habitat, the entire area of wet heath (which is adjacent to T3) will be fenced off to ensure no construction phase vehicles, machinery, personnel and/or works take place within this area of habitat, including personnel and machinery undertaking conifer felling as part of the bat buffer at T3. Demarcation of the area will be done so under guidance and supervision of the ECoW.

6.12.2.3.7.3.1 Mitigation Measures to Prevent Dust Deposition

Mitigation measures associated with construction dust are outlined in Chapter 14 (Air Quality and Climate) whereby a Dust Management Plan will be implemented. Further specific mitigation measures associated with dust deposition are outlined below.

- Public roads utilised as part of the proposed project will be regularly inspected for dust deposition and sprayed regularly with water during dry weather periods to minimise the release of dust into the air. The abstraction of water for dust suppression practices will follow IFI Guidelines (2016), waterbodies within and downstream of the proposed project will not be used for dust suppression purposes;
- Material handling systems and stockpiling of materials will be designed and laid out to minimise exposure to wind. Water spraying (or similar dust suppression methods) will be used as required if particularly dusty activities associated with the construction works are necessary during dry and/or windy periods;
- Exposed earthwork activities will also be monitored and sprayed accordingly to reduce dust creation;
- During movement of dust-generating materials both on and off-site, trucks will be covered with tarpaulin which are secured in place at all times; and
- The speed of vehicles, heavy goods vehicles (HGV) and machinery within leading into the proposed wind farm site will be limited to 20 km/hr to decrease the suspension of dust into the air and surrounding environment.

6.12.2.3.7.3.2 Mitigation Measures to Prevent Changes to Surface Water Drainage

In order to prevent additional surface water from entering this habitat, drainage at T3 will be directed to flow westerly away from this area (refer to the SWMP for further details). This will ensure no change to the habitat type as a result of surface water.

6.12.2.3.7.4 Significance of Residual Effects

Following the implementation of the mitigation measures outlined above the proposed project will not result in any significant residual effects on HH3 habitat.

6.12.2.3.8 WD1 – (Mixed) broadleaved woodland

A total of 2.08 ha of WD1 habitat is recorded within the proposed wind farm site (includes the 100 m bat buffer [refer to Section 6.12.2.4.7.2.1]).

6.12.2.3.8.1 Potential Impacts

The potential impacts to WD1 habitat are:

- Habitat loss

6.12.2.3.8.1.1 Habitat Loss

Approximately 0.32 ha of WD1 habitat will be permanently lost within the proposed wind farm site (includes the 100 m bat buffer [refer to Section 6.12.2.4.7.2.1]).

The loss, damage and/or fragmentation to WD1 habitat will result in **likely, permanent, negative, significant effects at a local geographic scale.**

6.12.2.3.8.2 Mitigation Measures

Mitigation measures outlined in in Section 6.12.2.3.1.2.1 are applicable to prevent the short-term habitat loss to WD1 habitat. However, the permanent loss of 0.32 ha cannot be mitigated for at the site of the loss and will be mitigated for through enhancement measures whereby 2.39 ha of WD1 will be planted at the temporary construction compounds and deposition areas within the proposed wind farm site (refer to Section 6.12.7.1).

6.12.2.3.8.3 Significance of Residual Effects

Following the mitigation and enhancement measures proposed, the proposed project will not result in any significant residual effects on WD1 habitat.

6.12.2.3.9 WS1 – Scrub

A total of 10.2 ha of WS1 habitat has been recorded within the proposed wind farm site.

6.12.2.3.9.1 Potential Impacts

The potential impacts to WS1 habitat are:

- Habitat loss

6.12.2.3.9.1.1 Habitat Loss

Approximately 1.86 ha of WS1 habitat will be permanently lost within the proposed wind farm site (includes the 100 m bat buffer [refer to Section 6.12.2.4.7.2.1]).

The loss, damage and/or fragmentation to WS1 habitat will result in **likely, permanent, negative, significant effects at a local geographic scale.**

6.12.2.3.9.2 Mitigation Measures

Mitigation measures outlined in in Section 6.12.2.3.1.2.1 are applicable to prevent the short-term habitat loss to WS1 habitat. However, the permanent loss of 1.86 ha of WS1 habitat cannot be mitigated for.

6.12.2.3.9.3 Significance of Residual Effects

A total of 1.86 ha of WS1 habitat will be permanently lost within the proposed wind farm site, which will result in a **permanent, significant residual effect at a local geographic scale.**

6.12.2.4 Protected Species

6.12.2.4.1 Common Frog

Common frog was recorded on three occasions (see Section 6.10.2.2.2.1) near T4 and T8. Suitable habitat is present throughout the proposed wind farm site (i.e., wet grassland, drainage ditches and ponded water).

6.12.2.4.1.1 Potential Impacts

The potential impact to common frog includes:

- Habitat loss and fragmentation;
- Habitat degradation as a result of water quality impacts; and
- Risk of mortality.

6.12.2.4.1.1.1 Habitat Loss and Fragmentation

The loss or reduction of suitable habitat (e.g., FW4, GS4, WD4) for common frog is likely to occur as a result of the proposed project. As previously outlined, 340.05 m of FW4 habitat and 0.62 ha of GS4 will be permanently lost/impacted as a result of the proposed project.

However, considering the availability of alternative suitable habitat in the surrounding area the loss/fragmentation to supporting habitat for common frog will **not result in significant effects** on the conservation status of the local common frog population at any geographical scale.

6.12.2.4.1.1.2 Habitat Degradation as a Result of Water Quality Impacts

Construction phase activities pose a significant risk to watercourses (including FW4) particularly through contaminated surface water entering a watercourse, which can contribute to the deterioration of water quality and physical alteration to the habitat. The runoff of sediment or pollutant laden runoff to suitable common frog habitat will result in the deterioration of habitat and water quality making it unfavourable/unsuitable for the species.

Water quality impacts will **not result in significant effects** on the conservation status of the local common frog population at any geographical scale.

6.12.2.4.1.1.3 Risk of Mortality

The proposed project has the potential to cause direct mortality to adults, juveniles and their eggs especially when the construction phase occurs within suitable habitat (e.g., FW4 and GS4) during the common frog spawning season (February to June).

The mortality of common frog will result in **likely, permanent, negative, significant effects at a local geographical scale.**

6.12.2.4.1.2 Mitigation Measures

6.12.2.4.1.2.1 Mitigation Measures to Prevent the Risk of Mortality

Pre-construction confirmatory surveys and ongoing monitoring will be carried out (further details are outlined in Section 6.12.8 and 6.12.8.1.2.3) if construction phase activities are to take place within supporting habitat (e.g., FW4 and GS4) during the spawning season (February to June).

6.12.2.4.1.3 Significance of Residual Effects

Following the implementation of the mitigation measures outlined above and in Section 6.12.8, the proposed project will not result in any significant residual effects on common frog.

6.12.2.4.2 Badger

Badger activity (i.e., snuffle holes) was primarily recorded in the GA1 habitat surrounding T6, with additional signs (i.e., scat) recorded throughout the proposed wind farm site. Badger are likely to regularly commute and forage within the proposed wind farm site.

6.12.2.4.2.1 Potential Impacts

The potential impact to badger includes:

- Loss/fragmentation of resting, breeding and/or foraging sites; and
- Disturbance/displacement.

6.12.2.4.2.1.1 Loss/Fragmentation of Resting, Breeding and/or Foraging sites

The loss/fragmentation of suitable resting, breeding and/or foraging sites (e.g., GA1, WL1, BL2, WD1, WD4) for badger is likely to occur within the proposed wind farm site. It is known that a local badger population forage within the area surrounding T6. It is important to reiterate that badger setts were not recorded during field surveys with areas surrounding turbines thoroughly checked for their presence and as such commuting and foraging sites are only considered to be impacted.

Due to the availability of alternative habitat in the surrounding area the loss/fragmentation of suitable resting and/or foraging sites for badger will **not result in significant effects** on the conservation status of the local badger population at any geographical scale.

6.12.2.4.2.1.2 Disturbance/Displacement

In addition to disturbance/displacement impacts from the loss/fragmentation of habitat, increased human presence and/or noise and vibration associated with construction works has the potential to displace badger from the surrounding area.

Whilst no setts were recorded within the proposed wind farm site, breeding badger are likely to use the area for foraging and therefore disturbance to these species will have the potential to affect foraging success.

Due to the availability of alternative foraging habitat in the surrounding area, and the mobile nature of the species disturbance/displacement effects during construction will **not result in significant effects** on the conservation status of the local badger population at any geographical scale.

6.12.2.4.3 Otter

No otter signs (i.e., holts, spraints, slides, couches) were recorded during field surveys however, there is potential for indirect impacts to this species during the construction phase of the proposed project, primarily through the construction of the clear span bridges.

6.12.2.4.3.1Potential Impacts

The potential impact to otter includes:

- Water quality impacts on feeding resources; and
- Disturbance/displacement.

6.12.2.4.3.1.1 Water Quality Impacts on Feeding Resources

Construction phase activities pose a risk to watercourses (including FW4) particularly through contaminated surface water entering a watercourse, which can contribute to the deterioration of water quality and physical alteration to the habitat. A deterioration of water quality could impact upon prey sources for otter. Chanin (2003) notes that '*Otters are not directly affected by water quality and will forage in conditions that seem extremely unpleasant to humans, however, where deterioration in water quality leads to a deterioration in food supply there will clearly be an indirect effect*'.

The deterioration in feeding resources for otter will result in **likely, short-term, negative significant effects at a local to international geographical scale.**

6.12.2.4.3.1.2 Disturbance/Displacement

Increased human presence and/or noise and vibration associated with construction works has the potential to displace otter who may utilise the study area for commuting and foraging. Otter are mostly crepuscular, if construction works occur during this time there is potential for disturbance/displacement to otter. However, as no otter signs were identified within the study area of the proposed project, it will **not result in significant effects** on the conservation status of the local otter population at any geographical scale.

6.12.2.4.3.2 Mitigation Measures

6.12.2.4.3.2.1 Mitigation Measures to Prevent Water Quality Impacts on Feeding Resources

Mitigation measures outlined in Chapter 9 (Hydrology and Hydrogeology) will be implemented and are applicable to prevent water quality impacts to supporting habitat for otter.

6.12.2.4.3.3 Significance of Residual Effects

Following the implementation of the mitigation measures outlined in Section 6.12.2.1.2.1 the proposed project will not result in any significant residual effects on otter.

6.12.2.4.4 Fallow Deer

Fallow deer droppings were recorded during field surveys. It is likely that this species frequents the proposed wind farm site.

6.12.2.4.4.1 Potential Impacts

The potential impact to fallow deer includes:

- Loss/fragmentation of resting, breeding and/or foraging sites; and
- Disturbance/displacement.

6.12.2.4.4.1.1 Loss/Fragmentation of Resting, Breeding and/or Foraging sites

Fallow deer utilise woodlands including conifer plantations and will graze on agricultural lands (Langbein *et al.*, 2009). The proposed project will result in the loss of 20.1 ha of WD4 and 8.26 ha of GA1 habitat. Whilst habitat within the proposed wind farm site will be lost, suitable alternative habitat in the wider surrounding area is available for fallow deer.

The loss/fragmentation to supporting habitat for fallow deer will **not result in significant effects** at any geographical scale.

6.12.2.4.4.1.2 Disturbance/Displacement

In addition to disturbance/displacement impacts from the loss/fragmentation of habitat, increased human presence and/or noise and vibration associated with construction works has the potential to displace fallow deer from the proposed wind farm site. However, as deer are mobile species they are likely to move to alternative foraging sites during the construction phase, which exist in abundance within the wider landscape.

Disturbance impacts to fallow deer during the construction phase will **not result in significant effects** at any geographical scale.

6.12.2.4.5 Pine Marten

Pine marten scat was recorded within the footprint of the proposed substation in the north of the proposed wind farm site (west of T4) in an area of conifer plantation. No other pine marten activity was recorded throughout the proposed project.

6.12.2.4.5.1 Potential Impacts

The potential impact to pine marten includes:

- Loss/fragmentation of resting, breeding and/or foraging sites; and
- Disturbance/displacement.

6.12.2.4.5.1.1 Loss/Fragmentation of Resting, Breeding and/or Foraging sites

Pine marten are arboreal, inhabiting woodlands including that of conifer plantations. The proposed project will result in the permanent loss of 20.1 ha of WD4. Considering the small area of habitat loss and the availability of similar alternative habitat within the wider, surrounding area, the loss of 9.56 % of available resting/foraging habitat will **not result in significant effects** on the conservation status of the local pine marten population at any geographical scale.

6.12.2.4.5.1.2 Disturbance/Displacement

In addition to disturbance/displacement impacts from the loss/fragmentation of habitat, increased human presence and/or noise and vibration associated with construction works has the potential to displace pine marten from the surrounding area. However, as pine marten are mobile species they are likely to move to alternative resting/foraging sites during the construction phase, which exist in abundance within the wider landscape.

Disturbance/displacement impacts to pine marten during the construction phase will **not result in significant effects** on the conservation status of the local pine marten population at any geographical scale.

6.12.2.4.6 Red Squirrel

Evidence of red squirrel was not recorded during field surveys, however, their presence was recorded by the NBDC (Table 6-4). They have the potential to utilise the conifer plantation present within the proposed project.

6.12.2.4.6.1 Potential Impacts

The potential impact to red squirrel includes:

- Loss/fragmentation of resting, breeding and/or foraging sites; and
- Disturbance/displacement.

6.12.2.4.6.1.1 Loss/Fragmentation of Resting, Breeding and/or Foraging sites

Red squirrel are arboreal, inhabiting woodlands including that of conifer plantations. The proposed project will result in the permanent loss of 20.1 ha of WD4 and 0.32 ha of WD1. Red squirrel preferred habitat is deciduous and mixed woodland containing species which provide a variety of tree seeds as a feeding resource (Lawton *et al.*, 2020). However, due to the competition with the non-native grey squirrel (*Sciurus carolinensis*), red squirrel persists longer in extensive conifer plantations where grey squirrel survival is lower (NPWS, 2008).

Considering the small area of habitat loss within the proposed wind farm site, especially that of native woodland, and the availability of similar alternative habitat within the wider, surrounding

area, the loss of 9.56 % (WD4) and 15.59 % (WD1) of available resting/foraging habitat will **not result in significant effects** on the conservation status of the local red squirrel population at any geographical scale.

6.12.2.4.6.1.2 Disturbance/Displacement

In addition to disturbance/displacement impacts from the loss/fragmentation of habitat, increased human presence and/or noise and vibration associated with construction works has the potential to displace red squirrel from the surrounding area. However, as red squirrel are mobile species they are likely to move to alternative resting, breeding and/or foraging sites during the construction phase, which exist in abundance within the wider landscape. Furthermore, no evidence of red squirrel (e.g., dreys, feeding remains, scratch marks) were found during surveys (Section 6.10.2.2.1.5).

Disturbance/displacement impacts to red squirrel during the construction phase will **not result in significant effects** on the conservation status of the local red squirrel population at any geographical scale.

6.12.2.4.7 Bats

The following bat species were recorded as IEFs during the survey work undertaken:

- Leisler's bat;
- Common pipistrelle;
- Soprano pipistrelle;
- Nathusius' pipistrelle.;
- Brown long-eared bat; and
- *Myostis* species.

6.12.2.4.7.1Potential Impacts

The potential impact to Leisler's bat, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, brown long-eared bat and *Myotis* species includes:

- Loss or damage to commuting and foraging habitat;
- Loss of, or damage to, roosts; and
- Displacement of individuals or populations.

6.12.2.4.7.1.1 Loss or Damage to Commuting and Foraging Habitat

The construction phase will result in the short-term and permanent loss of habitats (e.g., hedgerows, treelines, scrub, wet grassland [refer to Section 6.12.2.3]) which are of value for foraging and commuting bats. Furthermore, the loss of habitat (847.74 m of hedgerows and 333.95 m of treelines) within the 100 m bat buffer of T1, T3, T5 to T10, which were recorded during surveys as being utilised by bat species, will also occur. However, suitable foraging and commuting habits will be retained throughout the proposed wind farm site and is available within the surrounding area.

The loss/damage to commuting/foraging habitat during the construction phase will result in **likely, long-term, negative, significant effects on the conservation status of the local bat population at the local geographical scale.**

6.12.2.4.7.1.2 Loss of, or Damage to, Roosts

Tree felling will be required during the construction phase of the proposed project, including

those within the 100 m bat buffer. This will result in the loss of suitable roosting habitat within six PRF-I (Figure 6-3). Although no roosts have been identified within the five PRF-I trees to be lost, bats are transient in nature and utilise a number of roosting sites across the year (Voigt et al., 2020; Andrews, 2022)

The roost identified in B2 will not be directly impacted by the proposed project and is considered to be used by individual bats as opposed to a larger colony of bats (i.e., maternity roost).

The loss of, or damage, to roosts during the construction phase will **not result in significant effects** on the conservation status of the local bat population at any geographical scale.

6.12.2.4.7.1.3 Displacement of Individuals or Populations

Activities associated with the construction phase which result in the increase in noise level and/or use of artificial lighting, have the potential to disturb/dissuade bats from foraging within the surrounding habitats, primarily if the works are undertaken at night and/or around dusk and dawn when bats are active. However, due to the availability of suitable habitat in the wider area the displacement of individuals and populations during the construction phase will **not result in significant effects** on the conservation status of the local bat population at any geographical scale.

6.12.2.4.7.2 Mitigation Measures

6.12.2.4.7.2.1 Mitigation Measures to Prevent the Loss/Damage to Commuting and Foraging Habitat

Where possible trees, scrub and hedgerows will be retained, notably in areas adjacent to access tracks and other associated infrastructure of the proposed project with the exception of those within the 100 m bat buffer around turbines. All retained habitat will be demarcated by the ECoW. Mitigation measures outlined in Section 6.12.2.3.1.2.1 relating to the retention of hedgerow and treeline habitat is applicable.

Furthermore, pre-felling inspections will be carried out by an ECoW of all trees to be felled, to confirm the presence/absence of bats no more than 48 hours prior to trees being felled.

6.12.2.4.7.3 Significance of residual effects

Following the implementation of the mitigation measures outlined above and in Section 6.12.2.3.1.2.1, the proposed project will not result in any significant residual effects on Leisler's bat, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle brown long-eared bat and *Myotis* species.

6.12.2.4.8 Other Faunal Species Protected Under the Wildlife Acts (as amended)

Species such as west European hedgehog and pygmy shrew were recorded by the NBDC (Table 6-4) and are likely to be present within the proposed wind farm site, or at least on occasion, considering their widespread and common distribution across the country.

6.12.2.4.8.1 Potential Impacts

The potential impact to other faunal species includes:

- Loss/fragmentation of resting, breeding and/or foraging sites; and
- Disturbance/displacement.

6.12.2.4.8.1.1 Loss/Fragmentation of Resting, Breeding and/or Foraging sites

The proposed wind farm site contains suitable resting, breeding and foraging habitat for other faunal species. However, considering the abundance of alternative suitable habitat available within the wider landscape of the proposed project, the loss of habitat **will not result in significant effects on the conservation status of other faunal species at any geographical scale.**

6.12.2.4.8.1.2 Disturbance/Displacement

In addition to disturbance/displacement impacts from the loss/fragmentation of habitat, increased human presence and/or noise and vibration associated with construction works has the potential to displace other faunal species from the surrounding area. However, considering the abundance of alternative suitable habitat within the wider landscape the proposed project, the loss of habitat **will not result in significant effects on the conservation status of other faunal species at any geographical scale.**

6.12.2.4.9 White-clawed Crayfish

Whilst no white-clawed crayfish were recorded during crayfish surveys, this species is a qualifying interest of the downstream connected River Barrow and River Nore SAC and the Lower River Suir SAC.

6.12.2.4.9.1Potential Impacts

The potential impact to white-clawed crayfish include:

- Habitat degradation as a result of water quality impacts.

6.12.2.4.9.1.1 Habitat Degradation as a Result of Water Quality Impacts

Construction phase activities pose a significant risk to watercourses particularly through contaminated surface water entering a watercourse, which can contribute to the deterioration of water quality and physical alteration to the habitat. The runoff of sediment or pollutant laden runoff to watercourses (i.e., Blackwater (Kilmacow)_020, Smartscastle Stream_010 Arrigle_010) which lead downstream to suitable, white-clawed crayfish habitat will result in the deterioration of water quality making it unfavourable/unsuitable for the species.

The runoff of sediment or pollutant laden runoff to suitable, white-clawed crayfish habitat will result in **likely, short-term, negative, significant effects at an international geographical scale.**

6.12.2.4.9.2Mitigation Measures

Mitigation measures outlined in Chapter 9 (Hydrology and Hydrogeology) will be implemented and are applicable to prevent water quality impacts to supporting habitat for white-clawed crayfish.

6.12.2.4.9.3Significance of Residual Effects

Following the implementation of the mitigation measures outlined in Chapter 9 (Hydrology and Hydrogeology) the proposed project will not result in any significant residual effects on white-clawed crayfish.

6.12.2.4.10 Salmonids and Other Fish Species

The suitability of waterbodies for salmonids and other fish species was assessed within the proposed project which determined variable suitability throughout the study area for the various life stages of salmonids and other fish species. Furthermore, Atlantic salmon is a

qualifying interest of the downstream connected River Barrow and River Nore SAC and the Lower River Suir SAC.

6.12.2.4.10.1 Potential Impacts

The potential impact to salmonids include:

- Habitat degradation as a result of water quality impacts.

6.12.2.4.10.1.1 Habitat Degradation as a Result of Water Quality Impacts

Construction phase activities pose a risk to watercourses particularly through contaminated surface water entering a watercourse, which can contribute to the deterioration of water quality and physical alteration to the habitat. The runoff of sediment or pollutant laden runoff to watercourses (i.e., Blackwater (Kilmacow)_020, Smartscastle Stream_010, Arrigle_010 and Arrigle_020) will result in the deterioration of water quality making it unfavourable/unsuitable for salmonids and other fish species including that of Atlantic salmon. Atlantic salmon in particular require good water quality, temperature below 18 °C, dissolved oxygen at a minimum of 6 mg/L, neutral pH range and suspended solids between 25-80 mg/L (Cowx and Fraser, 2003).

The runoff of sediment or pollutant laden runoff to suitable salmonid and other fish species (including Atlantic salmon) habitat will result in **likely, short-term, negative, significant effects at a local to international geographical scale.**

6.12.2.4.10.2 Mitigation Measures

Adherence to mitigation measures outlined in Chapter 9 (Hydrology and Hydrogeology) are applicable to prevent water quality impacts to supporting habitat for Atlantic salmon. In addition, IFI 2016 guidelines '*Guidelines on Protection of Fisheries During Construction Works and in Adjacent to Waters*' will be followed. The foundations of the clear span bridges will be positioned at least 2.5 m from a watercourse (IFI, 2016). All temporary crossings of watercourses will ensure the passage of water, fish and macroinvertebrates and will ensure erosion and sedimentation do not occur (IFI, 2016). Any discharged water during the construction phase will be in the rage of pH 6-9 and will not alter the pH of receiving waters by+/- 0.5 units (IFI, 2016). Furthermore, suspended solids in any discharged waters will not exceed 25 mg/l (IFI, 2016).

6.12.2.4.10.3 Significance of Residual Effects

Following the implementation of the mitigation measures outlined in Chapter 9 (Hydrology and Hydrogeology) and Section 6.12.2.4.10.2 the proposed project will not result in any significant residual effects on salmonids and other fish species.

6.12.2.4.11 Lamprey Species

The presence of lamprey species and suitable habitat was assessed during aquatic surveys. Lamprey ammocoetes were recorded on the Arrilge_010 River (aquatic site 5). Furthermore, lamprey species are a qualifying interest of the downstream connected River Barrow and River Nore SAC and the Lower River Suir SAC.

6.12.2.4.11.1 Potential Impacts

The potential impact to lamprey species include:

- Habitat degradation as a result of water quality impacts.

6.12.2.4.11.1.1 Habitat Degradation as a Result of Water Quality Impacts

Construction phase activities pose a risk to watercourses particularly through contaminated surface water entering a watercourse, which can contribute to the deterioration of water quality and physical alteration to the habitat. The runoff of sediment or pollutant laden runoff to watercourses (i.e., Blackwater (Kilmacow)_020, Smartscastle Stream_010, Arrigle_010 and Arrigle_020) will result in the deterioration of water quality making it unfavourable/unsuitable for lamprey species. High water quality levels are required for the adult freshwater phase of lamprey similar to that of Atlantic salmon with suspended solids impeding spawning success and dissolved oxygen (Maitland, 2003).

The runoff of sediment or pollutant laden runoff to suitable lamprey habitat will result in **likely, short-term, negative, significant effects at a local to international geographical scale.**

6.12.2.4.11.2 Mitigation Measures

Mitigation measures outlined in Chapter 9 (Hydrology and Hydrogeology) will be implemented and are applicable to prevent water quality impacts to supporting habitat for lamprey species. In addition, IFI 2016 guidelines '*Guidelines on Protection of Fisheries During Construction Works and in Adjacent to Waters*' will be followed. The foundations of the clear span bridges will be positioned at least 2.5 m from a watercourse (IFI, 2016). Any discharged water during the construction phase will be in the rage of pH 6-9 and will not alter the pH of receiving waters by+/- 0.5 units (IFI, 2016). Furthermore, suspended solids in any discharged waters will not exceed 25 mg/l (IFI, 2016).

6.12.2.4.11.3 Significance of Residual Effects

Following the implementation of the mitigation measures outlined in Chapter 9 (Hydrology and Hydrogeology) and Section 6.12.2.4.11.2 the proposed project will not result in any significant residual effects on lamprey species.

6.12.2.4.12 European Eel

All waterbodies within the study area of the proposed project, with the exception of the upper reaches, were considered suitable for European eel.

6.12.2.4.12.1 Potential Impacts

The potential impact to lamprey species include:

- Habitat degradation as a result of water quality impacts.

6.12.2.4.12.1.1 Habitat Degradation as a Result of Water Quality Impacts

Construction phase activities pose a significant risk to watercourses particularly through contaminated surface water entering a watercourse, which can contribute to the deterioration of water quality and physical alteration to the habitat. The runoff of sediment or pollutant laden runoff to watercourses (i.e., Blackwater (Kilmacow)_020, Smartscastle Stream_010, Arrigle_010 and Arrigle_020) will result in the deterioration of water quality making it unfavourable/unsuitable for European eel (e.g., potential for increased suspended sediment which can clog or damage fish gills [Cowx and Fraser, 2003]).

The runoff of sediment or pollutant laden runoff to suitable European eel habitat will result in **likely, short-term, negative, significant effects at a local geographical scale.**

6.12.2.4.12.2 Mitigation Measures

Mitigation measures outlined in Chapter 9 (Hydrology and Hydrogeology) and Section 6.12.2.4.10.2 will be implemented and are applicable to prevent water quality impacts to supporting habitat for European eel.

6.12.2.4.12.3 Significance of Residual Effects

Following the implementation of the mitigation measures outlined in Chapter 9 (Hydrology and Hydrogeology) and Section 6.12.2.4.12.2 the proposed project will not result in any significant residual effects on European eel.

6.12.3 Operational Phase

The operational phase of the proposed project will last approximately 35 years. Impacts associated with the construction phase on biodiversity, specifically IEFs, are discussed further below.

6.12.3.1European Sites

The proposed projects potential effect during the operational phase on European sites has also been assessed separately in the NIS (submitted as part of this planning application) in line with the requirements of Part XAB of the Planning Acts and the Birds Directive and Habitats Directive.

Two European sites are present within the ZoI of the proposed project; the Lower River Suir SAC and the River Barrow and River Nore SAC (SPAs are assessed in Chapter 7 (Ornithology)). The NIS concluded '*In the absence of mitigation, the potential risks to the Lower River Suir SAC, the River Barrow and River Nore SAC and the River Nore SPA is the potential reduction in water quality and a reduction in available food biomass due to water quality degradation. However, following the application of the detailed mitigation measures, potential adverse effects would be avoided, and it can be determined that there would be no risk of adverse effects on the qualifying interest and special conservation interest species, or on overall site integrity in light of the conservation objectives for the Lower River Suir SAC, the River Barrow and River Nore SAC, the River Nore SPA, Wexford Harbour and Slobs SPA, the Saltee Islands SPA, Poulaphouca Reservoir SPA, Ballycotton Bay SPA and Cork Harbour SPA.*

There would be no adverse effects on the integrity of any European sites during the development and operation of the proposed project, either alone or in-combination with any other plans or projects'.

6.12.3.1.1 Potential Impacts

The potential impacts on the aforementioned European sites during the operational phase is limited to:

- Habitat degradation as a result of water quality impacts.

6.12.3.1.1.1Habitat Degradation as a Result of Water Quality Impacts

As previously stated in Section 6.12.2.1.1.1, a hydrological pathway is present to the Lower River Suir SAC and the River Barrow and River Nore SAC via the Blackwater (Kilmacow)_020 River and Smartscastle Stream_010 River and the Arrigle_010 and Arrigle_020 River respectively. During routine maintenance of turbines, oils and lubricants may be used, which if not appropriately used or disposed of have the potential to enter nearby watercourses and/or drainage ditches. This could lead to the degradation of water quality. However, the likelihood

for events like this to occur are extremely low. Furthermore, embedded within the design of the proposed project, a Sustainable Drainage System (SuDS) will have been installed during the construction phase (refer to the SWMP in Appendix 2-8) SuDS will ensure that any surface water arising from the proposed project during the operational phase will be contained and treated to ensure it can be dispersed from the proposed project without any impact on existing downstream activities.

Water quality impacts will **not result in significant effects** to the integrity of the European sites at any geographical scale.

6.12.3.2pNHA

Two pNHA's were identified within the ZoI of the proposed project; Lough Cullin pNHA and Grannyferry pNHA.

6.12.3.2.1 Potential Impacts

The potential impacts on the aforementioned pNHA's during the operational phase is limited to:

- Habitat degradation as a result of water quality impacts.

6.12.3.2.1.1Habitat Degradation as a Result of Water Quality Impacts

As previously stated in Section 6.12.2.2.1.1, a hydrological pathway is present to Lough Cullin and Grannyferry pNHA via the Smartscastle Stream_010 and Blackwater (Kilmacow)_020 River (Grannyferry pNHA only). During routine maintenance of turbines, oils and lubricants may be used, which if not appropriately used or disposed of have the potential to enter nearby watercourses and/or drainage ditches. This could lead to the degradation of water quality. However, the likelihood for events like this to occur are extremely low. Furthermore, imbedded within the design of the proposed project, a Sustainable Drainage System (SuDS) will have been installed during the construction phase. SuDS will ensure that any surface water arising from the proposed project during the operational phase will be contained and treated to ensure it can be dispersed from the proposed project without any impact on existing downstream activities.

Water quality impacts will **not result in significant effects** on the integrity of pNHA's at any geographical scale.

6.12.3.3Protected Species

Potential impacts to protected species during the operational phase of the proposed project is limited to bats only. As previously stated, please refer to Chapter 7 (Ornithology) for the full assessment on bird species.

6.12.3.3.1 Bats

The following bat species were recorded during the survey work undertaken:

- Leisler's bat;
- Common pipistrelle;
- Soprano pipistrelle;
- Nathusius' pipistrelle;
- Brown long-eared bat; and
- *Myotis* species.

6.12.3.3.1.1 Potential Impacts

The potential impacts to Leisler's bat, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, brown long-eared bat and *Myotis* species includes:

- Collision mortality, barotrauma and other injuries;
- Displacement of individuals or populations

6.12.3.3.1.1.1 Collision Mortality, Barotrauma and Other Injuries

During the operational phase, the greatest risk to bat species is that of collision and subsequent mortality. Leisler's bat, common pipistrelle, soprano pipistrelle and Nathusius' pipistrelle are considered high collision risk species. Median levels of activity for these species recorded across the proposed project as a whole was considered 'Low' with the exception of Nathusius' pipistrelle which was 'Low/ Moderate'. With peaks in activity considered to be 'Medium' for both common and soprano pipistrelle and 'High' for Leisler's bat and Nathusius' pipistrelle.

Based on median activity levels the proposed project wide collision risks for all high-risk species is considered 'Low' with the exception of Nathusius' pipistrelle which is considered 'Medium' risk based on median activity levels for the proposed project.

Based on peaks in activity for these species, the risk level varies per species and turbine location however, for common pipistrelle and soprano pipistrelle they are 'Medium' risk and Leisler's bat and Nathusius' pipistrelle are considered 'High' risk. Some turbine locations (T2, T4, T5, T6, T7). scored higher median and peak activity levels for Leisler's bat and Nathusius' pipistrelle.

Low collision risk species, *Myotis* species and brown long-eared bat, where also recorded. Activity of *Myotis* species within the proposed wind farm site had a median activity level considered 'Low' with some detectors, located at T1 and T10. recording 'Low/Moderate' activity levels and T10 recording 'Moderate/ High'. With the exception of T10, peaks of activity tended to remain within 'Moderate' activity levels with T10 being considered 'High'.

Brown long-eared bat activity across the proposed wind farm site was more varied, ranging in median activity levels from 'Low/Moderate' to 'Moderate/High', with peak activity levels considered 'High'.

The mortality of bat species during the operational phase will result in **likely, long-term, negative, significant effects on the conservation status of the local bat population at a local to County geographic scale.**

6.12.3.3.1.1.2 Displacement of Individuals or Populations

Windfarms have been shown to create avoidance behaviour in the utilisation of habitats for foraging and commuting during the operational phase, both in the immediate area of the windfarm and up to 1 km surrounding, with greatest effects to Leisler's bat, common pipistrelle, brown long-eared bat and *Myotis* species (Barre, 2018; Tolvanen, 2023). Furthermore, operational phase lighting has the potential to further displace species due to the overspill of light into surrounding habitats.

The displacement of individuals or populations during the operational phase will result in **likely, long-term, negative, significant effects on the conservation status of the local bat population at a local geographic scale.**

6.12.3.3.1.2 Mitigation Measures

6.12.3.3.1.2.1 Mitigation Measures to Prevent Collision Mortality, Barotrauma and Other Injuries

Various measures will be implemented which will lower the risk of bat fatalities throughout the lifespan of the proposed project, which are discussed herein.

6.12.3.3.1.2.2 Feathering of Turbine Blades

Turbines will operate in a manner which restricts the rotation of the blades as far as is practicably possible below the manufacturer's specified cut-in speed. This is achieved by feathering the blades during low wind speeds; the angle of the blades is rotated to present the slimmest profile possible towards the wind, ensuring they do not rotate or 'idle' when not generating power. Automatic 'feathering' of idling blades will be implemented (through Supervisory Control and Data Acquisitions [SCADA]) to reduce rotation speed of blades to below 1 RPM while idling.

Turbine blades spinning in low wind can kill bats, however bats cannot be killed by feathered blades which are not spinning (Horn *et al.*, 2008). The feathering of turbine blades combined with increased cut-in speeds have been shown to reduce bat fatalities from 30 % to 90 % (SNH, 2021; Wellig S.D., 2018; Rydell J., 2010; Arnett *et al.*, 2011 and Baerwald *et al.*, 2009).

As such, the feathering of blades to prevent 'idling' during low wind speeds is a requirement for all turbines and will be implemented.

6.12.3.3.1.2.3 Cut-in speeds/Curtailment

Increasing the cut-in speed above that set by the manufacturer can reduce the potential for bat/turbine collisions. A study by Arnett et al., (2011) showed a 50 % decrease in bat fatality can be achieved by increasing the cut-in speed by 1.5 m/s.

The feathering of turbine blades combined with increased cut-in speeds has been shown to reduce bat fatalities from 30 % to 90 % (Adams *et al.*, 2021, Arnett *et al.*, 2011; Baerwald *et al.*, 2009). The most recent of studies showed a 63% decrease in fatalities (Adams *et al.*, 2021).

Species with elevated risk of collision (Leisler's bat, soprano and common pipistrelle) in particular would benefit from increasing the cut-in speed of turbines T2, T4, T5, T6, T7, T8. This will be designed for each of the aforementioned turbines utilising bat activity data recorded, temporal data and weather data (wind speed, time after sunset, month, temperature and precipitation).

6.12.3.3.1.2.4 Buffer Zones

A 100 m buffer zone which is established during the construction phase will be maintained throughout the operational phase of the proposed project. Habitats which are present within the buffer zone are hedgerows and treelines (including all mosaic types), woodland habitat (WD1) and scrub, which will be continuously managed over the life time of the proposed project.

6.12.3.3.1.2.5 Monitoring

Operational bat monitoring will be undertaken for a minimum of three years from the first year of operation. This will aim to determine the effectiveness of the curtailment program and an adaptive mitigation strategy through the windfarm's operation. Further detail is outlined in Section 6.12.8.1.3.2.

6.12.3.3.1.2.6 Mitigation Measures to Prevent the Displacement of Individuals or Populations

Operational lighting will be reviewed by the ECoW to prevent the overspill of light into adjacent habitats of value to foraging and commuting bats.

6.12.3.3.2 Significance of Residual Effects

6.12.3.3.2.1 Residual Effects Due to Collision Mortality, Barotrauma and Other Injuries

Following the implementation of the mitigation measures outlined above in Section 6.12.3.3.1.2.1, there is potential for the likelihood of incidental bat deaths related to collision mortality, barotrauma and other turbine related injuries. This will result in **long-term, negative, significant residual effects on the conservation status of the local bat population at a local geographic scale.**

6.12.3.3.2.1 Residual Effects Due to the Displacement of Individuals or Populations

Following the implementation of the mitigation measures outlined above in Section 6.12.3.3.1.1.2, it is anticipated that the displacement of individuals and populations of bats local to the proposed project will occur during the operational phase, with a reduction in bat activity within the proposed project and immediate surrounding habitats. This will result in **long-term, negative, significant residual effects on the conservation status of the local bat population at a local geographic scale.**

6.12.4 Decommissioning Phase

The proposed project is expected to be operational for 35 years. Following this period, the wind turbines may be replaced with a new set of machines, subject to planning permission being obtained, or the site will be decommissioned fully, with the exception of the electricity substation and site roads and drainage. Please refer to Chapter 2 (Description of the Proposed Project) for full details on the decommissioning phase.

6.12.4.1 Potential Impacts

Activities associated with the decommissioning phase are not predicted to exceed those assessed for the construction phase (Section 6.12.2) and are expected to be of a similar type and magnitude to those anticipated during the construction phase, but generally of a shorter duration and scale. In the case of complete decommissioning of the proposed project, whereby new machines are not erected, the potential impact of habitat loss will no longer be applicable.

6.12.4.2 Mitigation Measures

The mitigation measures implemented during the construction phase, will be applied during the decommissioning works, refer to Section 6.12.2. As discussed above, in the case of turbine removal and complete decommissioning of the proposed project, the footprint of the infrastructure sites will be reinstated with the habitat of the surrounding environment (e.g., improved agricultural grassland or conifer plantation) to ensure the proposed project site is returned to its pre-existing state prior to the proposed project.

6.12.5 Cumulative Effects

Information on the relevant projects within the vicinity of the proposed project is described in Chapter 1 (Introduction). The information was sourced from a search of the local authorities planning registers (KCC, 2025), the EIA portal (EIA, 2025), planning applications (MyPlan,

2025), EIAR documents and planning drawings which facilitated the identification of past and future projects, their activities and their potential environmental impacts. All projects listed in Chapter 1 (Introduction) of this EIAR were reviewed as part of the cumulative effects assessment. Projects with the potential for cumulative effects are described further below.

6.12.5.1Projects

Castlebanny Wind Farm (An Coimisiún Pleanála Reference: PA10.309306)

Springfield Renewables Limited (Ltd.) applied for planning for the construction of a wind farm at Castlebanny, County Kilkenny located ca. 2 km north of the proposed project.

Chapter 6 - Biodiversity of the Castlebanny Wind Farm EIAR (TOBIN, 2021) set out potential impacts to key ecological receptors including habitats, protected species and European sites. The EIAR concluded '*The proposed Castlebanny Wind Farm is predicted to have significant negative effects on the local distribution and abundance of broadleaf woodland, field boundary habitats, and mature trees. These negative effects are counterbalanced to a greater or lesser extent by significant positive effects on the local distribution and abundance of scrub, heath, semi-natural grassland, disturbed or bare ground habitats, some mammal groups, reptiles/amphibians and some invertebrate groups. This is due to the programme of habitat restoration and enhancement that is proposed, which is of value especially considering the intensity of land use in the study area and surrounding landscape. Otherwise, the proposed wind farm will have little effect on most ecological features when mitigation is fully implemented*'.

The EIAR detailed mitigation measures which would be implemented during all phases of the development. However, there is potential for cumulative effects from Castlebanny Wind Farm and the proposed project to Leisler's bat and Nathusius' pipistrelle which could result in **long-term, negative, cumulative effects to the conservation status of the local bat population.**

Ballymartin Wind Farm (An Coimisiún Pleanála Reference: PL10.208178)

Ballymartin Wind Farm is fully operational and is located adjacent to the proposed wind farm site. The initial Environmental Impact Statement (EIS) was completed in 2003 and noted habitat loss, disturbance and potential water quality impacts. Ballymartin Wind Farm was commissioned in the absence of recording bat activity levels therefore it is not possible to determine the species present or their activity levels. However, considering the relatively similar habitats and proximity to the proposed project it can be assumed that the bat assemblage and activity levels are similar to those recorded within the PRA and GLTA survey area. Utilising this precautionary approach of 'worst effects', it is considered that the cumulative impacts associated with Ballymartin Wind Farm and the proposed project would result in **long-term, negative, cumulative effects to the conservation status of the local bat population .**

Smithstown Wind Farm (Kilkenny County Council: 07/2141)

Smithstown Wind Farm is fully operational and is located adjacent to the proposed wind farm site. The EIS concluded no significant effects. Due to the adjacent location of Smithstown Wind Farm from the proposed project, which is within the core sustenance zones (CSZ) (BCT, 2020) for many of the species recorded during the surveys undertaken for the proposed project, it is considered that bat species utilising the proposed project area could theoretically also forage/commute between these wind farms. It is considered that the cumulative impacts associated with Rahora Wind Farm and the proposed project would result in long-term, negative, cumulative effects to the conservation status of the local bat population.

Rahora Wind Farm (An Coimisiún Pleanála Reference: PL10.206373)

An application was made in 2003 by Ecopower Developments Ltd. (planning authority 03/1117 [refused but overturned by An Coimisiún Pleanála]) for the development of a wind farm in the townlands of Rahor, Ballallog, Guillkagh More, Brownstown, County Kilkenny. Rahora Wind Farm is fully operational and is located ca. 2 km northeast of the proposed wind farm site. An EIS was submitted in 2003 and concluded no significant effects. The inspectors report (dated 28th May 2004) stated no operational phase impacts to ecology (threatened or legally protected). No bat activity assessment was undertaken for the Rahora Wind Farm. Due to the distance (2 km) of Rahora Wind Farm from the proposed project, which is within the CSZ for many of the species recorded during the surveys undertaken for the proposed project, it is considered that bat species utilising the proposed project area could theoretically also forage/commute between these wind farms. It is considered that the cumulative impacts associated with Rahora Wind Farm and the proposed project would result in **long-term, negative, cumulative effects to the conservation status of the local bat population.**

Beallough Wind Farm (An Coimisiún Pleanála Reference: PL93.245176)

Beallough Wind Farm is fully operational and is located ca. 18 km southwest from the proposed project. Beallough Wind Farm consists of two turbines and thus is of a small scale and is located at a significant distance with no source-pathway-receptor link present to the proposed project. For these reasons, **no significant cumulative impacts are expected to occur with the proposed project.**

Ballyhale Flood Relief Scheme (An Coimisiún Pleanála Reference: JA10.317082)

An application was made by Kilkenny County Council in 2023 for a flood relief scheme (FRS) along Ballyhale River, in Ballyhale, County Kilkenny ca. 11 km northwest of the proposed project. This project is present within the same sub-catchment (Nore_SC_130) to that of the proposed project and leads downstream to the River Barrow and River Nore SAC. The Biodiversity Chapter of the EIAR concludes '*The overall impact on the ecology of the proposed project will result in a long-term moderate positive not significant residual impact on the ecology of the area and locality overall. This is primarily as a result of the creation of an improved waterflows and limiting of livestock access to the watercourse, to the west of the village, standard construction and operational controls, improved fish passage through the site and a sensitive native landscaping strategy*'. Therefore, it is determined that **no significant cumulative impacts are expected to occur with the proposed project.**

Other Smaller Developments:

There are a number of small projects and applications in the area surrounding the proposed wind farm site that involve the construction or extension of small residential properties and/or agricultural infrastructure (e.g., application no's: 22127, 23241, 23153). Due to the lack of connectivity, and nature and scale of these small developments there will be no significant effects on any designated sites and therefore there is **no significant cumulative impacts expected to occur with the proposed project.**

6.12.6 Proposed Compensation Measures

The proposed project will result in the permanent loss of the following IEF habitats within the proposed wind farm site:

- 994.36 m of BL1/WL1 – Stone walls and other stonework/Hedgerows mosaic;
- 296.27 m of BL1/WL2 – Stone walls and other stonework/Treelines mosaic;
- 298.46 m of BL1/WS1 – Stone walls and other stonework/Scrub mosaic;
- 24.33 m of BL2/WL1 – Earth banks/Hedgerows mosaic;
- 1,182.11 m of WL1 – Hedgerows;
- 77.48 m of WL1/WS1 – Hedgerows/Scrub mosaic;
- 293.21 m of WL2 – Treelines;
- 340.05 m of FW4 – Drainage ditches (wet);
- 0.32 ha of WD1 – (Mixed) broadleaved woodland;
- 1.86 ha of WS1 – Scrub; and
- 0.62 ha of GS4 – Wet grassland.

In total, for the proposed project this equates to a permanent loss of 2,228.28 m of hedgerows (including all mosaics) and 589.48 m of treelines (including all mosaics). To compensate for the loss of hedgerow and hedgerow mosaic habitats, a total of 1,022.936 m of hedgerow will be planted along the access road to T2 and surrounding the proposed onsite substation (Figure 6-16). This will be carried out using native whips and advanced nursery stock which are in keeping with the species present in the existing environment (e.g., common hawthorn, bramble, elder). As previously discussed in Section 6.12.2.3.1.3, a permanent loss of 1,205.35 m cannot be compensated for. Similarly, as discussed in Section 6.12.2.3.2.3, the permanent loss of 589.48 m of treelines (including all mosaics) cannot be compensated for.

6.12.7 Proposed Biodiversity Enhancement Measures

To enhance the existing habitat within the proposed wind farm site the following measures will be implemented:

- Woodland planting of native trees (WD1 – [Mixed] broadleaved woodland) (2.39ha);
- The creation of a pond within an area of wet grassland east of T8;
- Protection of the area of wet heath adjacent to T3 utilising deer fencing; and
- The retention of land for the purposes of enhancement (1.76 ha).

Further details on proposed enhancement measures are provided herein and are show in Figure 6-16.

6.12.7.1 Woodland Planting

Native broadleaved woodland (WD1) will be planted at the two temporary construction compounds and deposition areas within the proposed wind farm site equating to a total of 2.39 ha. This habitat will consist of 75-100% broadleaved woodland and 0-25% conifer. Native saplings and mature standards will be planted; the mature standards will decrease the time lag in the woodland maturation, and the saplings provide structural diversity. Native species include alder, birch, hazel, oak, willow, rowan (*Sorbus aucuparia*), wych elm (*Ulmus glabra*), aspen (*Populus tremula*), Scots pine (*Pinus sylvestris*) and yew (*Taxus baccata*).

6.12.7.2 Pond Creation

It is proposed that an ephemeral (i.e., seasonal) pond will be located in an area of wet grassland east of T8. The pond is referred to as ephemeral, rather than permanent, as it will not be naturally fed by a spring or other source and will rely on rainfall for supply, as such it is anticipated that it is dry out at certain times of the year. The pond will be ca. 229 m^2 and

irregularly shaped to mimic a naturally formed habitat. Details on the pond creation are outlined below. The full construction and creation of the pond will be overseen by the ECoW.

6.12.7.2.1 Digging the Pond

While digging the pond, all topsoil must be removed from the area to reduce the likelihood of high nutrient substrate from entering the pond. High nutrient content can cause algal blooms in waterbodies. The margins of the pond should be shallow (max 20 cm water depth) to allow easy safe access for hedgehogs and other small mammals. The pond should gradually reach a maximum depth of 1 m, with stepped topography and some smaller depressions also created, which will provide a diversity of habitat types for macroinvertebrates and macrophytes. Islands can be created in the topography to provide nesting habitat for waterfowl and/or to create diversity in hydromorphology.

6.12.7.2.2 Lining the Pond

When creating a permanent pond, there are a number of options for pond lining (see Table 6-10). It recommended that the naturally formed gley subsoils are used.

Table 6-10: Pond Liner Types and Advantages and Disadvantages.

Liner Type	Advantages & Disadvantages
Gley subsoils: poorly draining wetland soils.	This is the most economical and sustainable option for pond liner as the substrate is natural and will likely be found within the project site during construction (refer to Chapter 8 [Land, Soils and Geology]).
Bentonite Clay: this clay is mixed with water to create a paste; the paste is then added to the pond bed. Once dry, this will create an impermeable surface to hold water in the pond.	This is a mid-range expense option. It is more expensive than obtaining gley soils on site but cheaper than some other pond liners discussed below. However, should the pond dry out during periods of drought, the sun may cause the surface to crack which could result in the water eventually permanently draining from the pond. However, this is still a viable option as a pond liner.
Geosynthetic (Bentonite) Clay Liner (GCL): this option consists of two layers of Textile Geosynthetics (synthetic/natural polymers) stitched together enclosing a layer of natural or processed solium bentonite.	This option is more durable than the above-mentioned bentonite clay powder However, it is more expensive and is extremely heavy, it will need to be lifted by a forklift onto the pond bed during construction. There are also some synthetic substances involved in the composition of this liner, which is less sustainable.
EPDM Pond Liner: this liner is 100% rubber; it is also recommended to use geosynthetic fleece to underlay the rubber liner.	This option has high flexibility and elongation to fit around the contours of a pond. It is puncture and weather resistant if covered correctly and exposure to sharp rocks is avoided. The liner edges must be appropriate covered with rocks and logs to avoid sun damage as this exposure can cause cracking and drying which will reduce the lifespan of the liner. With care, the liner could last 30-50 years.

6.12.7.2.3 Pond Arrangement and Planting

The pond must have some rocks and logs along the sides; to provide safe exits for hedgehogs and other small animals, should they enter the waterbody. The logs will also provide additional habitat and coverage for macroinvertebrates that colonise the pond.

A fine gravel can be added to the hollows in the pond bed as the substrate. Sand can also be used, however, it must be chemical free. Builder's sand contains chemicals that would negatively impact the aquatic life in a pond. It is not advised to plant any new plants within the pond as the substrate will eventually become colonised by species from the surrounding environment via the movement of animals to and from the waterbody. No fish should be introduced to the. Stickleback fish have been known to colonise waterbodies in the most remote locations as they are transported under the feet of birds visiting the waterbody.

6.12.7.2.4 Adding Water

As the pond cannot be sourced by a natural means (i.e., spring or watercourse) the water can also be tankered to the pond. Rainwater is best as it will not contain any chemicals that will impact aquatic life in the pond. It is possible that the pond could dry up from time to time, however as monitoring is an important aspect of pond management, water levels can be observed and additional water added if needs be. Allowing for the pond to dry during drought periods will keep populations of diving beetles and sticklebacks lower in the pond throughout the year. This species negatively impacts frog populations by predating on frog spawn.

6.12.7.2.5 Monitoring and Management

The pond should be checked every couple of months to observe its progress, some gentle management is required. Once the pond becomes naturally colonised with aquatic plants, these plants should not be allowed to cover more than two thirds of the pond's surface. Some of the vegetation must be removed by hand from the water's surface should it occupy more than two-thirds of it. Excess vegetation on a pond surface can block out sunlight or result in an excess of nutrients within the pond, which can in-turn, increase algal blooms.

Some sporadic minor algal blooms in the pond are normal; however, intervention will be required if significant algal blooms are occurring. The excess algae must be removed from the pond by hand or with any tool (e.g., pitchfork). Algae being removed from the pond should be rinsed in a bucket of the pond water to release macroinvertebrates from the algae which can then be returned to the pond.

6.12.7.3Wet Heath

The construction of T3 is adjacent to an area of high ecological value wet heath (HH3) which is unique and rare in the context of the surrounding area. Deer fencing (2 – 2.4 m high) will be erected around the area of wet heath (total length of 501.29 m) to prevent the negative impact of overgrazing, trampling, loss of species diversity and the subsequent conversion of wet heath to grassland (Wicklow Uplands Council, 2022).

6.12.7.4Retained Lands for Biodiversity

An area of land (ca. 1.76 ha) east of T2 will be retained for the purposes of biodiversity enhancement. This habitat is currently scrub (WS1) and the area will be fenced off, retained and the habitat allowed to naturalise to prevent the expansion of agricultural practices and/or conifer plantation in this area. This will ensure the area remains at a higher ecological value habitat which is of benefit to wildlife in the locality.

Legend

- Wind Farm Study Area
- Turbine locations

Grid Connection Options

- Option 1
- Option 2
- Rivers

Proposed measures

- Proposed hedgerows (Compensation)
- Proposed deer fencing (Enhancement)
- Retention of lands for enhancement
- Proposed pond (Enhancement)
- Proposed WD1 – (Mixed) broadleaved woodland (Enhancement)

0 250 500
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

Rev	Date	Description	By	Chkd.
A	13/11/2025	First issue	S.P	A.M

Client:
Manogate Ltd.

Project:
Ballyfasy Wind Farm

Title:
Figure 6-16:
Proposed Compensation and Enhancement Measures

Scale @ A3: 1:10,000

Prepared by:	Checked by:	Date:
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Draft: A

6.12.8 Proposed Monitoring

6.12.8.1.1 Core Responsibilities of Ecological Clerk of Works

The applicant will appoint a contractor to construct the proposed project, and the contractor will be required to provide a suite of specialists, including the ECoW, as part of their delivery team.

The role of the ECoW is defined by British Standard BS 42020:20131 as the 'person who has the ecological qualifications, training, skills and relevant experience to undertake appropriate monitoring and to provide specialist advice to 'development' site personnel on necessary working practices required to i) safeguard ecological receptors on site and ii) aid compliance with any consents and relevant wildlife legislation related to the works.' The requirements of the ECoW role is typically largely fulfilled by a single individual with support and assistance provided by technical specialists and senior colleagues when required. The ECoW (individual or team of individuals) must therefore have appropriate qualifications, training and experience to meet the requirements of the role and in addition, where needed, can access support from senior ecologists within the company with the required qualifications, training and experience.

The ECoW will have the power to 'Stop Works' at any time they deem it necessary to do so.

The ECoW will be responsible for monitoring compliance with the mitigation measures and construction phase monitoring requirements relating to ecology/biodiversity as set out in the project EIAR, CEMP etc. The ECoW will be responsible for the day-to-day management and interaction with the project Environmental Manager. The ECoW will have authority over the content of routine reports and will act independently in determining instances of non-compliance with the consents and licenses or any breaches of environmental legislation.

The role of the ECoW includes tasks such as, but not limited to, the following:

- Pre-construction confirmatory surveys for badger, otter and common frog;
- Consultation with NPWS and application for otter and common frog derogation licences, if required;
- Monitoring and exclusion of badger setts;
- Monitoring and exclusion of otter holts;
- Relocation of amphibians;
- Review of construction phase lighting plans;
- Nest checks during bird breeding season;
- Supervision of works in ecologically sensitive areas as required to ensure compliance with environmental legislation and the requirement of the schedule of works and EIAR;
- Preparation of Method Statements for ecological tasks such as those described above;
- Input to, and review of, construction method statements to ensure adequate protection of biodiversity is addressed during works; and
- Ensuring the measures outlined in Section 6.12.7 (biodiversity enhancement) are implemented during the lifetime of the project.

The ECoW will also document activities using photographs and record information to registers/logs. The Environmental Manager and ECoW will work as a team and will be in contact daily with the ECoW relaying any identified concerns or issues on site to the Environmental Manager.

6.12.8.1.2 Pre-construction Confirmatory Biodiversity Surveys

The pre-construction confirmatory surveys will be carried out in suitable habitat, in advance of the construction works by the appointed ECoW.

6.12.8.1.2.1Otter

A pre-construction confirmatory otter survey will be undertaken no more than 10—12 months in advance of the construction works as per the advice in NRA (2008) guidelines, particularly at the location of the clear-span bridges. In the event that a new holt (established within the interim period) is identified within the footprint of the works during the pre-construction confirmatory survey and the following mitigation measures will be applied in accordance with the NRA *Guidelines for the Treatment of Otters during the Construction of National Road Schemes* (NRA, 2008a).

- No wheeled or tracked vehicles (of any kind) will be used within 20 m of active, but non-breeding, otter holts (NRA, 2008a). Light work, such as digging by hand or scrub clearance will also not take place within 15 m of such holts, except under licence.
- No works will be undertaken within 150 m of any holts at which breeding females or cubs are present. Following consultation with NPWS, works closer to such breeding holts may take place provided appropriate mitigation measures are in place, e.g. screening and/or restricted working hours on site (NRA, 2008a). Breeding may take place at any season, so activity at a holt will be determined on a case-by-case basis by the ECoW.
- Prohibited working area associated with otter holts will be fenced and appropriate signage erected under guidance of the ECoW;
- If holts are found to be inactive prior to construction, exclusion of holts and their subsequent destruction may be carried out during any season under licence with the NPWS. To prevent the reoccupation of holts the entrances will be soft blocked (using vegetation and a light application of soil) for a period of five days (NRA, 2008a).
- If holts are found to be active, otters will be evacuated from the holts prior to any closures. Otters with cubs however will not be evacuated until the otters have vacated the holt themselves naturally. Once the otters have left the holt, the entrance will then be soft blocked. In some cases, the installation of one-way gates on the entrances to the holt may be required and a monitoring period of 21 days will be carried out to ensure the otters have left the holt prior to removal (NRA, 2008a). All works will be done under licence with the NPWS.

The pre-construction confirmatory otter surveys and any mitigation required will be implemented by the ECoW prior to starting site clearance and any construction works.

6.12.8.1.2.2Badger

A pre-construction confirmatory badger survey will be carried out prior to site clearance or works commencing. In the event that a new sett (established within the interim period) is discovered within the footprint of the construction works appropriate measures will be carried out following industry methods and NRA *Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes* (NRA, 2005).

- No construction machinery will be used within 30m of badger setts. Lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance. Light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances (NRA, 2005). However, during the breeding season (December to June

inclusive) no works will be undertaken within 50m of active setts. The areas will be clearly demarcated by the ECoW;

- Night-time working will be restricted as far as practicable within 150m of a sett. As badgers are nocturnal, disturbance will be reduced by restricting the amount of night-time working within the ZoI of a sett. Night-time, in terms of badger nocturnal activity, is defined as beginning one hour before sunset and lasting to one hour after sunrise;
- Where the destruction of active badger setts cannot be avoided exclusion and destruction will be carried out under the supervision of an appropriately qualified ECoW and under the provision of a derogation licence from the NPWS. Evacuation and destruction will be undertaken from 1 July to 30 November. Badger setts requiring exclusion and removal will require a monitoring period of at least five days prior to any construction works commencing in order to confirm activity status. To exclude or remove an active badger sett outside of this period, inactive entrances will be soft and hard-blocked with one-way gates installed on active entrances. One-way gates will be tied open for three days before being set to exclude and then monitored for a period of at least 21 days before the sett is deemed inactive and destroyed immediately following the 21-day period. If at any time during the monitoring period the sett becomes active, the exclusion process/programme must commence again from day one of the 21-day monitoring period. For inactive setts, entrances will be soft-blocked (lightly blocked with vegetation and soil) and if all entrances remain undisturbed for a period of five days the sett will be destroyed immediately. This can be undertaken at any time of the year for inactive setts.
- Destruction of a successfully evacuated badger sett will only be carried out under the supervision of a suitably qualified and experienced ECoW. The possibility of badgers remaining within a sett will always be considered. All works will be carried out under the provision of a derogation licence from NPWS.

The survey works and any mitigation required will be implemented by the ECoW prior to starting site clearance and any construction works.

6.12.8.1.2.3Common Frog

The Irish Wildlife Manual: National Frog Survey of Ireland 2010/11 states *'Common frogs are among the earliest amphibians to breed as winter gives way to spring. Adults migrate to breeding ponds (unless they hibernated there) usually in February or early March, depending on latitude, altitude and local weather conditions'*.

Common frog will be surveyed during the appropriate season (February to June) in advance of any works by the ECoW at drainage ditches, slow flowing streams and pools where the common frog may spawn. Suitable breeding habitat such as pools and drainage ditches within the proposed project were noted during the baseline surveys and will inform the pre-construction confirmatory survey. If frogs and/or frog spawn are identified, they will be translocated by hand or net by the ECoW under a derogation licence from the NPWS to suitable nearby habitat (which will be identified prior to carrying out the survey) that will not be impacted by the proposed project.

6.12.8.1.3 Pre-construction Bat Monitoring

6.12.8.1.3.1 Pre-construction Bat Survey

If vegetation removal is to be undertaken 18 months after initial surveys were carried out (September 2025 GLTA), updated, pre-construction surveys will be required by a suitably qualified ecologist. This survey would aim to identify the need for further surveys for bats, confirming that previously identified tree features are present as well as identifying new PRFs that may have formed in the interim.

6.12.8.1.3.2 Post-construction Bat Monitoring

Operational bat monitoring will be undertaken for a minimum of three years from the first year of operation. This will aim to determine the effectiveness of the curtailment program and an adaptive mitigation strategy through the windfarm's operation. Monitoring will include bat activity monitoring following the methodology outlined in Section 6.7.2.2.1.3. In addition to this carcass searches will be used to measure the success of the curtailment and mitigation in place. These will be undertaken following best practice guidance as outlined in NatureScot, 2021 utilising suitably trained and experience carcass search teams that utilise dog searches.

6.12.8.1.3.3 Monitoring Curtailment

If, following the initial three years of post-construction surveys, bat activity increases above the baseline and/or remains consistently high and carcass searches indicate fatalities are occurring, increased cut-in speeds will continue. This will subsequently be monitored in years 5, 7, 10, 15, 20, 25 and 30 with further review after each monitoring period.

Alternatively, if it is found that the results of bat activity surveys and fatality searches confirm that the level of bat activity at turbine locations is low then consent will be sought from Kilkenny County Council (in consultation with NPWS) for the cessation in the requirement for these cut-in speeds/curtailment measures, or a reduction on the timing restrictions for these measures.

Where post construction acoustic surveys are undertaken, they will utilise full spectrum automatic detectors deployed, as a minimum, for one complete bat activity season.

An assessment of static data gathered during operational surveillance will be completed using the online analysis tool Ecobat as recommended by SNH (2021) as a minimum, or other equivalent guidance as dictated by up-to date standards and practices.

6.12.8.1.3.4 Bat Fatality Monitoring

Although curtailment is a mitigation proven to lower bat fatalities, it is recommended that the scheme be monitored for bat fatalities for the first three years of operation (post-construction surveys) and subsequently in years 5, 7, 10, 15, 20, 25 and 30 as part of the additional curtailment monitoring schedule. A comprehensive onsite fatality monitoring programme is to be undertaken following published best practice (e.g., SNH 2021 or equivalent at the time of operation). Turbines T2, T4, T5, T6, T7 will be included in all searches (highest recorded bat activity).

Bat fatality monitoring will be carried out as follows:

- Carcass removal trials to establish levels of predator removal of possible fatalities. This will be done following best recommended practice and with due cognisance of published effects such as predator swamping, whereby excessive placement of carcasses increases predator presence and consequently skews results. At the time of writing (2025),

predation trials set using trail cameras following guidance set out in (Smallwood, 2010) provides the most accurate results;

- Turbine searches for fatalities will be undertaken with the use of conservation dogs following best practice in terms of search area (minimum radius hub height) and at intervals selected to effectively sample fatality rates as determined by carcass removal trials in. At the time of writing (2025), the typical search area surrounding the turbine bases follow (Edkins, 2014) *Impacts Of Wind Energy Developments On Birds And Bats: Looking Into The Problem*, who recommends the 'search width should be equal to the maximum rotor tip height', e.g., turbines at the proposed project have a max tip height of 180 m thus the spread of searched area, as a rectangle, square or circle, should be 90 m in either direction form the turbine base;
- Search intervals will follow SNH (2021) guidance;
- Recorded fatalities will be calibrated against known predator removal rates to provide an estimate of overall fatality rates; and
- Monitoring report to be submitted annually to Kilkenny County Council and the NPWS.

6.12.9 Summary of Effects

A summary of the potential impacts, significance of the effects, proposed mitigation, residual effects and, where relevant, proposed compensation measures is provided for each IEF included in the assessment is presented in Table 6-11. Compensatory measures are provided for habitats where only significant residual impacts are identified.

Table 6-11: Summary of Important Ecological Features Subject to Detailed Assessment

Important Ecological Feature	Potential Impacts	Significant of Effects	Mitigation Measures	Residual Effects	Proposed Compensation	Means of Delivering Compensation
European Sites						
River Barrow and River Nore SAC [002162]	Habitat degradation as a result of water quality impacts, habitat degradation as a result of dust deposition and disturbance/displacement to qualifying interest species (during the construction and decommissioning phases of the proposed project).	Habitat degradation as a result of water quality: Likely, short-term, negative, significant effects at an international geographical scale. Habitat degradation as a result of dust deposition: not significant. Disturbance/displacement to qualifying interest species: not significant.	Refer to Section 6.12.2.1.2 and 6.12.8.1.2.1)	No significant residual effects.	NA	NA
Lower River Suir SAC [002137]	Degradation of water quality (during the construction and decommissioning phases of the proposed project).	Likely, short-term, negative, significant effects at an international geographical scale.	Refer to Section 6.12.2.1.2	No significant residual effects.	NA	NA
Other Sites of Conservation Interest - pNHA						
Lough Cullin pNHA [000406]	Degradation of water quality (during the construction and decommissioning	Likely, short-term, negative, significant effects at a national geographical scale.	Refer to Section 6.12.2.1.2	No significant residual effects.	NA	NA

Important Ecological Feature	Potential Impacts	Significant of Effects	Mitigation Measures	Residual Effects	Proposed Compensation	Means of Delivering Compensation
	phases of the proposed project).					
Grannyferry pNHA [000833]	Degradation of water quality (during the construction and decommissioning phases of the proposed project).	Likely, short-term, negative, significant effects at a national geographical scale.	Refer to Section 6.12.2.1.2	No significant residual effects.	NA	NA
Habitats						
BL1/WL1 - Stone walls and other stonework/Hedgerows Mosaic	Habitat loss (during the construction).	Habitat loss: likely, permanent, negative, significant effects at a local geographical scale.	Refer to Section 6.12.2.3.1.2	Permanent, significant residual effects at a local geographic scale.	The permanent loss of habitat cannot be compensated for (refer to Section 6.12.2.3.1.3 and WL1 – Hedgerows within this table).	Refer to WL1 – Hedgerows within this table.
BL1/WL2 - Stone walls and other stonework/Treelines Mosaic	Habitat loss (during the construction).	Habitat loss: likely, permanent, negative, significant effects at a local geographical scale.	Refer to Section 6.12.2.3.1.2	Permanent, significant residual effects at a local geographic scale.	The permanent loss of habitat cannot be compensated for (refer to Section 6.12.2.3.2.3).	NA

Important Ecological Feature	Potential Impacts	Significant of Effects	Mitigation Measures	Residual Effects	Proposed Compensation	Means of Delivering Compensation
BL1/WS1 - Stone walls and other stonework/Scrub Mosaic	Habitat loss (during the construction).	Habitat loss: likely, permanent, negative, significant effects at a local geographical scale.	Refer to Section 6.12.2.3.1.2	Permanent, significant residual effects at a local geographic scale.	The permanent loss of habitat cannot be compensated for (refer to Section 6.12.2.3.3.3).	NA
BL2/WL1 – Earth banks/Hedgerows Mosaic	Habitat loss (during the construction).	Habitat loss: likely, permanent, negative, significant effects at a local geographical scale.	Refer to Section 6.12.2.3.1.2	Permanent, significant residual effects at a local geographic scale.	The permanent loss of habitat cannot be compensated for (refer to Section 6.12.2.3.1.3 and WL1 – Hedgerows within this table).	Refer to WL1 – Hedgerows within this table.
FW1 – Eroding/upland rivers	Habitat degradation as a result of water quality impacts (construction and decommissioning phase of the proposed project).	Likely, short-term, negative, significant effects at a local geographical scale.	Refer to Section 6.12.2.1.2.1	No significant residual effects.	NA	NA
FW4 – Drainage ditches	Habitat loss (construction phase) and habitat degradation as a result of water	Habitat loss: likely, permanent, negative, significant effects at a local geographical scale.	Refer to Section 6.12.2.3.5.2.1 and 6.12.2.1.2.1	No significant residual effects.	NA	NA

Important Ecological Feature	Potential Impacts	Significant of Effects	Mitigation Measures	Residual Effects	Proposed Compensation	Means of Delivering Compensation
	quality impacts (construction and decommissioning phase).	Water quality: likely, short-term, negative, significant effects at a local geographical scale.				
GS4 – Wet grassland	Habitat loss (during the construction).	Habitat loss: likely, permanent, negative, significant effects at a local geographical scale	Refer to Section 6.12.2.3.6.2.1	Permanent, significant residual effects at a local geographic scale.	The permanent loss of habitat cannot be compensated for (refer to Section 6.12.2.3.6.3).	NA
HH3 – Wet Heath	Habitat loss/damage, habitat degradation as a result of dust deposition and habitat degradation as a result of changes to surface water drainage (construction and decommissioning phase).	Habitat loss/damage: likely, long-term, negative, significant, negative effects at a local geographic scale. Dust deposition: likely, short-term, negative, significant, effects at a local geographical scale. Changes to surface water drainage: likely, long-term, negative, significant effects at a local geographical scale.	Refer to Section 6.12.2.3.7.2	No significant residual effects.	NA	NA
WD1 – (Mixed) broadleaved woodland	Habitat loss (during the construction).	Habitat loss: likely, permanent, negative, significant effects at a local geographical scale.	Refer to Section 6.12.2.3.1.2.1	No significant residual effects.	Compensation at the site of the loss cannot be carried out. Planting of	Native, mature standards and saplings planted (Refer to Section 6.12.7.1).

Important Ecological Feature	Potential Impacts	Significant of Effects	Mitigation Measures	Residual Effects	Proposed Compensation	Means of Delivering Compensation
					2.39 ha of WD1 elsewhere within the proposed wind farm site (refer to Section 6.12.2.3.8.2 and 6.12.7.1).	
WL1 - Hedgerows	Habitat loss (during the construction).	Habitat loss: likely, permanent, negative, significant effects at a local geographical scale.	Refer to Section 6.12.2.3.1.2.1	Permanent, significant residual effects at a local geographic scale.	1,022.93 m of hedgerow will be planted (refer to Section 6.12.2.3.1.3). The full loss of habitat cannot be compensated for.	Native whips and advanced nursery stock planted (refer to Section 6.12.6).
WL1/WS1 – Hedgerows and Scrub mosaic	Habitat loss (during the construction).	Habitat loss: likely, permanent, negative, significant effects at a local geographical scale.	Refer to Section 6.12.2.3.1.2.1	Permanent, significant residual effects at a local geographic scale.	The permanent loss of habitat cannot be compensated for (refer to Section 6.12.2.3.1.3 and WL1 – Hedgerows within this table).	Refer to WL1 – Hedgerows within this table.

Important Ecological Feature	Potential Impacts	Significant of Effects	Mitigation Measures	Residual Effects	Proposed Compensation	Means of Delivering Compensation
WL2 - Treelines	Habitat loss (during the construction).	Habitat loss: likely, permanent, negative, significant effects at a local geographical scale.	Refer to Section 6.12.2.3.1.2.1	Permanent, significant residual effects at a local geographic scale.	The permanent loss of habitat cannot be compensated for (refer to Section 6.12.2.3.2.3).	NA
WS1 - Scrub	Habitat loss (during the construction).	Habitat loss: likely, permanent, negative, significant effects at a local geographical scale.	Refer to Section 6.12.2.3.1.2.1	Permanent, significant residual effects at a local geographic scale.	The permanent loss of habitat cannot be compensated for.	NA
Protected Species						
Common frog	Habitat loss and fragmentation, habitat degradation as a result of water quality impacts and risk of mortality (construction and decommissioning phases).	Habitat loss/fragmentation: not significant. Water quality: not significant. Risk of Mortality: likely, permanent, negative, significant effects at a local geographic scale.	Refer to Section 6.12.2.4.1.2.1 and 6.12.8.1.2.3	No significant residual effects.	NA	NA
Badger	Loss/fragmentation of resting, breeding and/or foraging sites and disturbance/displacement (construction	Loss/fragmentation of habitat: not significant. Disturbance/displacement: not significant.	Refer to Section 6.12.8 and 6.12.8.1.2.2	No significant residual effects.	NA	NA

Important Ecological Feature	Potential Impacts	Significant of Effects	Mitigation Measures	Residual Effects	Proposed Compensation	Means of Delivering Compensation
	and decommissioning phases).					
Otter	Water quality impacts on feeding resources and disturbance/displacement (construction and decommissioning phases).	Water quality: likely, short-term, negative significant effects at a local to international geographical scale. Disturbance/displacement: not significant.	Refer to Section 6.12.2.1.2.1 and 6.12.8.1.2.1	No significant residual effects.	NA	NA
Pine marten	Loss/fragmentation of resting, breeding and/or foraging sites and disturbance/displacement (construction and decommissioning phases).	Loss/fragmentation of habitat: not significant. Disturbance/displacement: not significant.	NA	NA	NA	NA
Red squirrel	Loss/fragmentation of resting, breeding and/or foraging sites and disturbance/displacement (construction and decommissioning phases).	Loss/fragmentation of habitat: not significant. Disturbance/displacement: not significant.	NA	NA	NA	NA
Fallow deer	Loss/fragmentation of resting, breeding and/or foraging sites and	Loss/fragmentation of habitat: not significant.	NA	NA	NA	NA

Important Ecological Feature	Potential Impacts	Significant of Effects	Mitigation Measures	Residual Effects	Proposed Compensation	Means of Delivering Compensation
	disturbance/displacement (construction and decommissioning phases).	Disturbance/displacement: not significant.				
Bats species						
Leisler's bat Common pipistrelle Soprano pipistrelle Nathusius' pipistrelle Brown long-eared bat *Myotis* bats	Loss or damage to commuting and foraging habitat (construction and decommissioning phases), loss of, or damage to, roosts (construction and decommissioning phases), displacement of individuals or populations (construction and operational phase) and collision mortality, barotrauma and other injuries (operational phase).	Loss or damage to commuting and foraging habitat: likely, long-term, negative, significant effects at the local geographical scale. Loss of, or damage to, roosts: not significant. Displacement of individuals or populations (construction and decommissioning): not significant. Displacement of individuals or populations (operational): likely, long-term, negative, significant effects at a local geographic scale. Collision mortality, barotrauma and other injuries: likely, permanent, negative, significant effects at a local to County geographic scale.	Refer to Section 6.12.2.4.7.2 and 6.12.3.3.1.2	Displacement of individuals or populations (operational): long-term, negative, significant residual effects at a local geographic scale. Collision mortality, barotrauma and other injuries: long-term, negative, significant residual effects at a local geographic scale.	NA	NA

Important Ecological Feature	Potential Impacts	Significant of Effects	Mitigation Measures	Residual Effects	Proposed Compensation	Means of Delivering Compensation
Other faunal species	Loss/fragmentation of resting, breeding and/or foraging sites and disturbance/displacement (construction and decommissioning phases).	Loss/fragmentation of habitat: not significant. Disturbance/displacement: not significant.	NA	NA	NA	NA
Aquatic Species						
White-clawed crayfish	Habitat degradation as a result of water quality impacts (construction and decommissioning phases).	Likely, short-term, negative, significant effects at a local to international geographical scale.	Refer to Section 6.12.2.1.2.1	No significant residual effects.	NA	NA
Salmonids and other fish species (including Atlantic salmon)	Habitat degradation as a result of water quality impacts (construction and decommissioning phases).	Likely, short-term, negative, significant effects at a local to international geographical scale.	Refer to Section 6.12.2.1.2.1 and 6.12.2.4.10.2	No significant residual effects.	NA	NA
Lamprey species	Habitat degradation as a result of water quality impacts (construction and decommissioning phases).	Likely, short-term, negative, significant effects at a local to international geographical scale.	Refer to Section 6.12.2.1.2.1 and 6.12.2.4.11.2	No significant residual effects.	NA	NA

Important Ecological Feature	Potential Impacts	Significant of Effects	Mitigation Measures	Residual Effects	Proposed Compensation	Means of Delivering Compensation
European eel	Habitat degradation as a result of water quality impacts (construction and decommissioning phases).	Likely, short-term, negative, significant effects at a local to national geographical scale.	Refer to Section 6.12.2.1.2.1 and 6.12.2.4.12.2	No significant residual effects.	NA	NA

6.13 Conclusion

A total of 34 IEFs were identified within this impact assessment. Stringent mitigation measures, pre-construction confirmatory surveys and monitoring have been proposed in addition to compensatory and biodiversity enhancement measures. However, there is the potential for residual ecological effects as a result of the permanent loss of hedgerows and treelines (including all mosaics), wet grassland and scrub habitat. Furthermore, residual effects will occur during the operational phase of the proposed project due to collision mortality, barotrauma and other injuries and the displacement of individuals or populations of the local bat population.

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